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Electric Railway Journal

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*Portrait.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, JULY 2, 1910 No. 1

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 2, 1910.

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The Increase in Commutation Fares Near New York

The increase in commutation fares, announced by practically all of the steam railroads entering New York, has aroused comparatively little opposition from patrons. Several "indignation" meetings have been held in Connecticut and a few in New Jersey, but they seem to have been engineered more for political effect than for any other purpose. The opportunity of championing the cause of the public was too good to be allowed to lapse entirely. Complaints were far more generally expressed on one of the lines whose service broke down during a severe winter several years ago than on the same road now in anticipation of the increase in rates. People generally recognize the fact that all the expenses of the railroad companies have increased. Advances in the wages paid employees have received publicity in the daily papers and the fact that materials of every kind have increased in cost is part of the personal knowledge and experience of every patron of the railroads. In an editorial commenting on the situation recently, the *New York World* referred to the steam railroads as being the only public utility in the vicinity of New York which had found it necessary to increase rates. A more correct statement would have been that it was the only public utility which had done so. But the need is equally great, if not greater, with the electric roads and we believe that if any practicable method should be devised to increase moderately the present rates of fares on city roads, the action would be accepted with much less opposition than many anticipate.

Fixed Wages for Men on the Extra List.

Two methods for paying trainmen on the extra list are in vogue. One is to pay extra conductors and motormen only for the time they are actually in service; the other is to give them a fixed minimum daily or weekly wage in accordance with the principle that "He also serves who only stands and waits." On first thought, it might appear that while the latter practice is more just to the men, the former has the merit of being less costly. This is not necessarily true in all cases. Several large city companies which have tried both methods have found that the average wages of the extras are no greater in one case than in the other. One railway company in the East pays each of its intermittent platform employees $10.50 a week, without regard to the time they work. Another has fixed a minimum rate of $1.50 a day for any period up to six hours with pay at the regular hourly rates for all work exceeding six hours. The benefit of this policy has made itself felt, not so much in a reduction of the payroll, as in the greater reliability of the extra men. The best recruits are among the first to desert if they find that they have no assurance of a living wage while waiting for a regular position. It is only natural, therefore, that they should look for steady work somewhere else. Transportation superintendents

who know how much it costs to break in platform men will appreciate that the fixed payment policy is worth trying from this standpoint alone, even if it should result in a slightly bigger payroll.

Changing the Running Speeds for Different Periods of the Day

Judging from talks with traffic managers and schedule makers, it seems that many of them do not give enough thought to the economies which are possible by changing the running speeds at certain intervals throughout the day. It goes without saying that during business hours, the car schedule speed is limited by slow-downs and blockades resulting from vehicular traffic. However, this hindrance practically is eliminated at night. For this reason, a car well-loaded with a crowd coming from the theaters can be operated and its patrons distributed over a given route in much better time than otherwise, even if the total number of passenger stops is the same as during the day. The late rider is especially appreciative of high speed during the wee, sma' hours. From the standpoint of the railway company, a raising of the schedule speed by say 10 per cent to 20 per cent means a corresponding reduction in night equipment and crews. This consideration appears too obvious for comment. Nevertheless, it is a fact that there are plenty of places where an inflexible time card needlessly is in force throughout the day and night. On such lines, one may frequently see the motormen amuse themselves by running ahead of their schedules and then crawling for a stretch merely to kill time. No particular complications are involved in the operation of a variable schedule system. On one large railway, for example, each route is divided into time-point sections and the individual motormen simply are instructed that after a given hour and minute they must raise their average speed to get over the given divisions in certain stated periods of time.

Instructing the Jury in Accident Cases

The use of models of electric railway equipment in the court room is often helpful to a company in a closely contested accident case. Out of this method of handling complex situations involving considerable sums of money has grown the plan of bringing into court the actual parts of the car equipment which are involved in the dispute between the plaintiff and the defendant. This practice has, of course, been followed for hundreds of years in criminal cases, but its adaptability to electric railway damage suits is of comparatively recent origin. In a recent case where a large number of passengers brought suit in connection with the derailment of a double-truck car on account of a broken axle the company took the truck parts most intimately concerned into the court room and thus the jury was enabled to study the situation at first hand, with the benefit of thorough non-technical discussion of the conditions by expert metallurgical engineers summoned by the company as witnesses. The company contended that the accident was unavoidable and of the kind which could not be foreseen, and while the experts for the plaintiffs had the opportunity to examine the broken parts at length, the weight of evidence supported the company's position. The trouble and expense to which the company went in carrying a set of wheels, axle, and gearing into the court room, showed the jury that it had nothing to conceal, and enabled the jurymen to grasp the conditions under discussion far more easily than would have been possible by the use of photographs and drawings alone. A similar course in connection with controller flashing suits, circuit breaker accidents, and the like, has given good results in the conduct of damage cases. The company always has to meet severe conditions of inquiry in cases where the causes of the accident are at all obscure, and when it is possible to bring the whole matter within a few feet or inches of the jury, the opportunities for proper instruction are greatly enhanced and a doubtful case often can be won.

THE UNIVERSITY AND BUSINESS

This is the month of college commencements, as well as of the annual meetings of engineering organizations, which are as truly national universities devoted to higher branches of technical education and study as the undergraduate institutions are of the lower branches. It is interesting and instructive therefore to notice that the relations between the university and the extension of university work as represented both in engineering and industrial lines are growing closer yearly. This is as it should be, because if a university is most fully to live up to its opportunities—we might almost say to its real purposes of being—it should grow with the community which it is aiming to serve. To do this, it should direct its energies so as best to fit its students after graduation to solve those problems which the outside world most needs to have answered and should be so closely in touch with these outside events as to modify its curriculum of undergraduate instruction from time to time so as to accomplish this most desirable result.

Two incidents during the latter part of the past month exemplify the closer connection between the college and business, the scholar and the man of affairs, to which we have been referring. One was the inauguration as president of the American Institute of Electrical Engineers of the professor of electrical engineering at one of our leading technical schools. The other was the award to James J. Hill by Yale University of the degree of LL.D. We do not mean that either incident was without precedent. Other professors have filled the same office as that to which Prof. Jackson was elected, but none perhaps had devoted his activities to so great an extent purely to the purposes of education. In a similar way, the degree to Mr. Hill was not the first of its kind at Yale. Indeed, in his case, the incident was noteworthy, not because it was unusual, but because it followed similar bestowals of the same degree during the last few years to Mr. Mellen and Mr. Morgan, in both cases for distinguished achievements in railroad organization. The repetition this year indicates that the policy of the university is to include among those to whom its highest honors are awarded the creators of industries as well as those who have distinguished themselves in scholarship or have achieved success in political life. We do not propose to draw comparisons between the intellectual effort required in these different kinds of human endeavor or between the benefits conferrd by them upon humanity. But if college honors are to retain the respect which is and should be held for them, they will recognize genius equally whether directed toward the design of machinery, which adds materially to a nation's comfort, to the creation of a railway system or an industry which increases its wealth, or to the production of treatises which widen its knowledge.

CONSERVATION OF WATER POWERS

It is a striking evidence of the interest now felt in the policy of conservation of water powers pursued by the Government that the subject should have been made by Mr. Stillwell the topic of his presidential address at the annual convention of the American Institute of Electrical Engineers. Foresighted engineers have long realized the important part which water powers will play in the generation of power in the future, as the supply of coal decreases and its cost increases. A very large proportion of water powers which have not yet been utilized are, however, either located upon government lands or are dependent wholly or in part upon the run-off from government lands; therefore the policy adopted by the government in permitting utilization of these powers is of practically controlling force so far as future hydroelectric development in this country is concerned.

While Mr. Stillwell believes that the presence of forest cover on a watershed regulates the rate of run-off to an extent which, in many cases materially affects the value of a water power, he dissents from the theory enunciated by the late chief forester that forests are the principal and determining factor in the value of such a plant. It was upon this latter assumption that the present rates charged for water power rights on streams dependent upon government forest reserves were established. These rates are based on the kilowatt-hour. They vary with the proportion of the water supply which comes from reserved and unreserved lands, but the maximum is 2 cents per 1000 kw-hours for the first year, increasing to 32½ cents for the fiftieth, that is, the last year of the permit issued by the government.

To this rate Mr. Stillwell files exception, not because it is excessive for a fully developed enterprise, but because it penalizes the builders of efficient plants and the owner who sells his power at a low rate, because it makes no allowance, like the corresponding Italian law, for long distance transmission losses, and because it is imposed regardless of the actual condition of the forestation upon which it is based. He also charges the form of permit with being unnecessarily rigorous, in that it prevents the owner of one water-power plant combining with others, often a step toward general economy; because it requires continuous operation up to a specified percentage of the full hydraulic capacity of the works, and because the permit is revokable at the discretion of the government. A better plan, according to Mr. Stillwell, providing a tax upon natural resources to be used in conserving and developing these resources is desirable, would be to impose a tax on all sources of power found upon public lands such as coal lands, which are now sold by the government at the equivalent of a tax of 0.5 cent per thousand kw-hours, instead of for an average rental of 20.86 cents per thousand kw-hours as in the case of water power; the income thus derived to be devoted to conservation purposes as with water power rentals. Mr. Stillwell also believes that the charge for water-power should be based upon the power appropriated and the effective head resulting from the topography of the government lands concerned or that, as commercial conditions of cost and development differ so widely, that the government lease different powers to the highest bidders.

The relation between electric railway operation and water-power service can no longer be considered remote. To cite a single instance, although the most conspicuous one, Niagara power is now operating electric lines 150 miles from the Falls, and with the development of appliances and insulators which are capable of use on voltages up to 100,000 or more, New York may be said to be almost as near Niagara electrically as was Buffalo 15 years ago. Mr. Stillwell took a most prominent part in the development of Niagara power and it is extremely appropriate that he should now utter a word of caution as to the policy to be adopted by the government as to future hydroelectric development.

REVISION OF THE INTERURBAN RULES

It is surprising probably to many interurban railway operating officers to learn that the committee on interurban rules of the Transportation and Traffic Association has decided to recommend in its report this year radical changes in the code of rules adopted at the Denver convention in order to make them conform almost exactly in numbering and wording with the American Railway Association code of steam railway rules. The 1909 code of interurban rules included the wording or intent of many of the steam railway rules, but at the time of its adoption there was a decided difference of opinion among members of the association and the vote was not unanimous. Representatives of a number of interurban electric railways which operate with the steam railway rules strongly urged the adoption of those rules as a whole instead of the modified rules recommended by the committee. Their arguments and those which have been presented at a number of recent meetings of sectional associations where the subject of interurban rules has been discussed seem to have brought the members of this year's committee around to the same point of view. The revised interurban code as approved by the committee will be as nearly like the standard steam railway code as most of the amplified codes in use by individual steam railway companies.

The committee had two questions to consider. Can the steam railway code of rules be adapted for electric railway operation with a few slight modifications? Is it the best code which can be prepared? The experience of several interurban roads which are using the steam railway code practically without alteration is a good answer in the affirmative to the first question. Argument will develop on the second question. Judging from replies received to a circular letter sent out by the committee about half of the roads heard from consider the steam railway rules preferable to last year's code of interurban rules.

The steam rules have much to commend in them. They are concise, practical and safe to use and have stood the test of time under every conceivable condition of steam railway operation. They are thoroughly familiar to a large body of experienced steam railway trainmen and officers and many of these men are being recruited into electric interurban service. The 1909 interurban code was faulty in some respects and doubtless could have been improved upon with careful study. The committee in abandoning many of the rules which it formulated last year and confining its efforts to adapting the well-tried steam rules to electric railway conditions has taken a radical step which no doubt will meet with strong opposition from many managers who are satisfied with the interurban rules as they stand. At any rate, we believe that the proposed revision has not been made merely to satisfy the wishes of a few companies which have argued strongly in favor of the steam rules. There has been no sectional or partisan influence exerted by the individual members of the com-

mittee during the discussions. In considering the comparative merits of proposed rules each member has tried not to let his decision be swayed by the operating conditions of his own road, but has drawn upon his general knowledge of operating methods throughout the country.

The revised code will be simple in wording and so should meet the criticism made of the 1909 code at the meeting of the Iowa Street and Interurban Railway Association that it was so voluminous and full of detailed explanations and instructions as almost to imply an insult to the intelligence of the average trainman. These explanations and instructions frequently are necessary, but the bulletin board affords a suitable place for posting them and if conditions arise which require changes in the rules or putting into effect special rules the standard rule book need not be revised.

On a number of important principles of practice the committee has not been able to agree as to the best method. In such cases optional rules have been framed and will be included in the code as such. Rule 207c, for example, does not permit a train to proceed when it arrives at a meeting point and finds that the opposing train has not arrived and that communication cannot be established with the dispatches. An optional rule, 207c, provides that the train may proceed if protected by flag. Here are two methods of procedure directly opposed to each other in principle. One or the other is best practice and the rules should outline only best practice. It is perfectly proper for the committee to present both rules to the association for consideration, but only that rule which in the opinion of the majority represents best practice should be allowed to appear in the code as finally adopted and issued as the standard of the association.

The interest with which the present situation concerning the interurban code is followed is indicated by the proceedings this week at the meeting of the Street Railway Association of the State of New York. Before it was known that the Transportation & Traffic Association committee would recommend important changes at the next Atlantic City meeting, notice had been served that the New York association would be asked to approve the Denver code. It appears that the adoption of the Denver code by the New York association after the discussion, of which an abstract is given in another part of this issue, is due to a desire to support the American Association in its endeavor to compile a code that shall best meet the requirements of the industry and that if that code shall be changed further so as to represent later judgment of the majority than that of 1909, the subject will be brought again before the New York organization. The New York Association has followed with approval the last recorded action of the American Association on this topic and if, at this time or later, the associations of other States or sections will adopt a similar course concerning the rules as amended in 1910, a definite step toward uniformity of practice will have been taken.

Copies of the report of the committee this year will be in the hands of all members of the association five or six weeks before the convention, and the rules should be carefully studied in advance of the meeting. Such an important question ought not to be disposed of by a vote of only those members who may be able to attend the meeting at which the report is presented. Every member company is affected and upon each company rests a moral obligation to assist in the work of standardizing the rules by putting them into use. Each company, therefore, should have the right to cast a vote or at least to express an opinion for or against their adoption as the standard of the association. A letter ballot after the convention may not be possible under the constitution of the association, but in its place it might bring out an expression of opinion if each company received with the advance copy of the committee's report an urgent request from the executive committee of the association to send in a letter of approval or criticism if no representative can attend the convention and vote in person. It would be most unfortunate if the code as revised this year should be subjected to the same amount of adverse criticism after the convention has adjourned as was the case last year.

A STANDARD SYSTEM OF ELECTRIC TRACTION

The presidential address of George Westinghouse to be read next month at the joint meeting of the American Society of Mechanical Engineers and the British Institute of Mechanical Engineers in London is an unbiased and non-partisan plea for the immediate selection of a standard system of electric traction for universal use by all steam railways which in the future may convert their lines for electric operation. Enormous sums of money have already been invested in the electric equipment of a few terminal zones and, as Mr. Westinghouse points out, the future development of heavy electric traction will be the expansion of these terminal zones until they reach out and touch each other. When that time comes, if there is such a diversity of electric equipment that it will be impossible for the motor cars or locomotives of one road to run over the tracks of a connecting road, interchange of traffic as it is carried on to-day will be difficult, if not impossible. The steam railroads would long since have been in bankruptcy or have been compelled to increase their rates enormously if interchange arrangements had not been perfected many years ago. The financial burdens under which some of the weaker steam roads are staggering at the present are due in no small measure to the expenditures required to change their track and equipment years ago to conform to the standard gage of 4 ft. 8½ in.

All of the steam railroad equipment operated in the United States is fitted with interchangeable types of car couplings and uniformly operative brake apparatus. For electrically operated railways Mr. Westinghouse mentions three additional requirements of interchange. These are a uniform supply of electricity, a uniform type and location of conductors for supplying electricity to the motors, and uniform control apparatus for multiple-unit trains. There is at the present time a wide diversity of practice on existing electrified steam roads in all three of these particulars.

It might appear that a consideration of this subject at the present time was borrowing trouble because of the comparatively few installations which already have been made. Nevertheless, within the last two years there have been two striking instances of the influence which the necessity for interchangeability has had in determining the selection of a system of electric traction. In the case of the Pennsylvania tunnels in New York City, while there were perhaps other reasons for the adoption of 600-volt direct current, the principal reason was the necessity for accommodating the suburban trains operating in the Long Island Railroad electric zone which had already

been equipped with this system. Had any other system been selected the only alternatives would have been to have segregated the trackage over which the Long Island trains could enter the terminal or to replace the entire electric equipment of the Long Island Railroad. The decision of the Illinois Central Railroad to defer electrification of its terminal zone in Chicago was based largely on the difficulties which might be encountered in future interchange of traffic if the other railroads entering Chicago should adopt some other system different from that which the Illinois Central might install.

There are at the present time four systems in use in the United States and only two are interchangeable with any of the others. The 1200-volt, direct-current system can be operated in connection with a 600-volt, direct-current system and a single-phase system can be operated in connection with a 600-volt, direct-current system, but expensive complications of apparatus are involved in either case. Mr. Westinghouse says that the great difficulty in the electrification of steam railways is no longer an engineering problem, but is a broad question of financial and general policy. It is true that the engineering details of each of the four systems referred to have been perfected to a high degree, but unfortunately it is also true that the foremost electrical engineers are not agreed among themselves as to which system possesses the greatest advantages for universal application. Until the engineers reach an understanding on this point it will not be possible to develop the broader financial and general policies involved.

HANDLING SHOPWORK ECONOMICALLY IN CROWDED QUARTERS

The difficulties of economical maintenance of rolling stock are seriously increased by very limited shop capacity. The problem of making the most of restricted quarters is one which many master mechanics have been obliged to face, for it is seldom feasible to establish a new shop until the inconvenience of the old installation has made itself felt for a considerable period. Much can be done to improve old shops, however, by re-arranging machinery so as to avoid as far as possible interference with the main aisles of travel, by installing direct-connected motors in place of belt and shaft drives on various high-powered tools which may be in use a considerable portion of the time and by re-locating in some instances the stock room and quarters of the head of the department.

In the railway repair shop the sequence of operations found in ordinary manufacturing plants is conspicuous by its absence. While certain repair and maintenance work like the lining of bearings, straightening of shafts, winding of armature and fields into stock forms, undercutting of commutators, smoothing commutator surfaces, wheel grinding and trolley wheel turning is repetitive in character there are numerous other tasks in the shop which are seldom done precisely alike twice, and cannot be foreseen by either the operating or maintenance department in relation to any specific day or hour. Such work requires for its execution space which is variable in extent, hence is apt to interfere more or less with routine work.

Usually in a crowded shop, materials and supplies tend to accumulate around the machine tools, benches and sometimes the aisles. The working force requisition more material than is immediately necessary from the stock room and store it close by their tools, to save the trouble of more frequent trips through the shop. There is a temptation to load the telpher system close to its full capacity in delivering a set of spare parts to a lathe, drill or grinder, but in crowded quarters this practice leads to obstruction of aisles and spaces between tools and benches, thus hindering the general transit of materials and men through the shop. It is a better plan in a small shop, which is congested with work, to depend more upon the stock room and to avoid the accumulation of sub-storage in the vicinity of the tools. The distances to be traversed in small shops are so short that a clear and systematic arrangement of equipment spacing is preferable to any attempt to save time by assembling too many parts outside the stock room. In this connection a centralized location of the stock room is in general excellent practice; but if it means the sacrifice of machine capacity through restricted space and poor natural lighting it may be a better plan to locate the stock room at or near the end of the main repair division. With a well equipped telpher system and a first-class interior telephone installation, the immediate location of the stock room in a small shop becomes less important.

There is considerable room for improvement in the driving of tools by motors in small, crowded shops, which have long since outgrown the limitations of group driving by a single motor of antiquated design. The saving in power through direct connection must be experienced to be fully appreciated, but more than this is the clearing of the shop from cumbersome hangers, belts and shafting, and the possibility of forcing the output of individual machines according to the character of work under the tool. A valuable feature of the individual drive which has been applied in not a few shops of the long, rambling shape, is the facility with which a large tool handling a single class of service may be isolated from the rest of the equipment and operated in a compartment sufficiently large for the specific service but too small for other machines. The individuality of the different jobs in the repair shop greatly facilitates such an arrangement. Nothing aids production efficiency in a crowded shop more than a separation of tools which tend to limit each other's capacity, combined with adequate facilities for telpher transportation. If it is important to reduce muscular labor to the lowest limit in a spacious shop having a modern arrangement of quarters, it is still more so in the congested repair plant where the limitations of area and often of height, obstruction of belts, pipes and often columns impede rapid preparation of work for machining and intensify all the adverse conditions which surround the worker. Supplies must be kept off the floor in such shops if work is to be handled quickly in the long run. The use of higher powered lighting with modern scientific reflectors pays a high return on its cost in the congested shop. It is often hard to know where to keep supplies in limited quarters, but the construction of a narrow overhead platform or mezzanine floor is far preferable to the use of the pits as a general storehouse. It should not be overlooked that hand work can be performed under less favorable location conditions than machine operations, provided the lighting is adequate. The possibilities of re-arrangement are generally much wider in scope than often appears evident to the man whose horizon is limited by constant association with quarters and facilities which have gradually fallen below the standards of efficient production which would be demanded in a new installation of the same area.

REGULATION OF TRANSPORTATION SERVICE BY THE METROPOLITAN STREET RAILWAY, NEW YORK

In the first article on the transportation department of the Metropolitan Street Railway, New York, published in last week's issue, information was given principally with reference to the organization of this department, its emergency service and to the employment, instruction and comfort of the employees. The present article concludes the entire series on this company* with a description of the transportation service.

REGULATION OF SERVICE

It is only within recent years that the extent to which the finances of a company may be affected, both negatively and positively, by the operation of the transportation department, has been fully appreciated, and that the affairs of such a department, even more than any other department of a street railway company, must be subjected to keen scrutiny in every detail of income and outgo, in order that the net income item of the annual balance sheet may be satisfactory to the owners of the property. In addition to the net income derived from the operation of the property two other factors have also to be considered in the preparation of schedules, namely: the necessity of arranging the runs so that each man will receive a reasonable amount of work, and the regulations of the Public Service Commission which are peculiar to New York State. On the Metropolitan system a great deal of attention is given to the preparation of the schedules. Observations are made and statistics compiled to indicate the volume of riding at various times of day on each section of every line. The point of heaviest riding on such sections is determined and tallies are taken to indicate the number of cars passing in each direction during each 15 minute interval, their seating capacity, the relation of such capacity to the passenger traffic, and the limits of the sections where the heaviest riding is to be found.

Considerations of economy of operation as well as adequacy of service require, in the case of the avenue lines traversing Manhattan Island in a northerly and southerly direction, that there should be a number of intermediate terminals. For instance, in the case of the Lexington Avenue line the northern terminals are at Ninety-ninth Street and Lexington Avenue, 130th Street and Lexington Avenue and 146th Street and Lenox Avenue. The southern terminals are at Twenty-third Street and Lexington Avenue, Twenty-second Street and Broadway, Houston Street and Broadway, Murray Street and Broadway, Bowling Green and South Ferry. In compiling the schedules, the volume of traffic between these different terminals at different hours of the day has to be taken into account, as well as the physical capacity of the different sections of the line as measured by intersections with other lines, joint routes with other lines and vehicular and pedestrian congestion. A certain amount of short service between intermediate terminals is both necessary and desirable, but a certain amount of surplus or tag-end service is also unavoidable as otherwise cars would be switched back every few blocks. This would cause delays to car movement along the entire line and create undesirable complications far offsetting the advantages accruing from saving in mileage.

SHORT SERVICE

The question of short service is perhaps one of the most important phases of car movement which has been thoroughly investigated since the appointment of the receivers. As a result, a material decrease in operating expenses has been effected without sacrificing the facilities afforded the travelling public, but on the contrary, improving them.

These switch-back points were determined upon after a series of most exhaustive observations, and have, in some instances, not only resulted in the improvement of the facilities on the line where this policy has been followed, but have bettered conditions on other lines. For instance, the operation of cars from Twenty-third Street north on Lexington Avenue at night has not only provided a better service on the northbound Lexington avenue line, but has reduced the congestion on the track between Lexington Avenue and Broadway on Twenty-third Street, used jointly by the Lexington Avenue line and the Twenty-third Street line, where cars are operated on a headway of about 15 seconds during the period of maximum service.

The intermediate service on Fourth and Madison Avenues between Thirty-second Street and Fourth Avenue on the south and Eighty-sixth Street and Madison Avenue, as well as 116th Street and Madison Avenue on the north, has been a distinct improvement over the old method of operation. The short service in the morning on Sixth Avenue, between Fourth Street and Twenty-third Street, a distance of about one mile, has been of great benefit in carrying passengers from the Eighth Street and Fourteenth Street crosstown lines to the stores and factories lying between Fourth Street and Twenty-third Street. There is a very heavy volume of riding in this particular locality.

A better theater service on Broadway has been rendered by operating a short service from Fifteenth Street and Broadway northbound, instead of from a point farther south as heretofore, where there was no demand for such frequency of car movement. On Eighth Avenue the intermediate service between 116th Street and Fiftieth Street has greatly improved the conditions along that section of the line over what was the case when the cars were operated from Thirteenth Street to 158th Street.

It must not be misunderstood that the long service between the terminals farthest separated is discontinued during the period of short service, for such is not the case, but rather the car movement is regulated in accordance with the relative demands of traffic along the entire line which fluctuate with the season, the opening of new transportation lines and other causes.

The failure of the Metropolitan receivers to adopt certain leases and agreements has involved some changes in operated routes, but new service has been inaugurated to afford facilities in place of those necessarily abandoned. For instance, the Broadway and Amsterdam Avenue line provides accommodations to persons who used the line of cars which formerly traversed Broadway from 130th Street to Houston Street.

The analysis of the service as shown by the street observations to which reference has been made above has been supplemented by a detailed study of the riding over entire lines during different periods of the day. This information furnishes from another viewpoint light on the question as to whether the service is being operated economically and efficiently.

The accompanying statement, Table I, illustrates the principle of such an analysis. A careful study of these analyses early in the receivership indicated that during certain periods of the day the service was unnecessarily great, as, for example, on Sunday morning prior to the church riding. Adjustments were accordingly made in the schedules with very satisfactory results.

In connection with the more economical regulation of the service, as mentioned above, there has come about an improvement in the receipts per car-mile for individual lines and for the system, and these figures in general have shown a gratifying and consistent improvement. In other words, this means the elimination of unprofitable mileage, which may be summarized as follows, as nearly as may be estimated:

Monthly saving due to the inauguration of short service, 100,000 car miles.

Monthly saving through a reduction in unprofitable car mileage, i. e., elimination of service not required, 300,000 car miles.

These figures are based on a comparison with conditions prevailing prior to the receivership.

The inauguration of the short service method of operation has rendered it possible to distribute the equipment to much better advantage than was previously practicable in that one car can make several short trips in the time which would be consumed in the making of one long trip.

*See Electric Railway Journal, March 26, April 2, April 9, April 16, April 23, May 7, May 14, May 21, May 28 and June 25, 1910.

CHECKING BY STATISTICS

The third method of checking the service consists in a comparison which is made of the car-seat miles from month to month. This is of value, particularly in cases where cars of more than one type are being operated, as, for instance, long closed, short closed, long open and short open cars. Obviously the car mileage on a given line for a certain period might be precisely the same as for any other period, but the actual service measured in seating capacity might be radically different due to the different types of cars operated.

Not only is the record of revenue car miles closely analyzed, but the idle mileage is subjected to the same scrutiny and its ratio to the active mileage closely observed, the analysis as in the active mileage being made for each operated line of the system and a comparison being made with other periods, such as the previous month and the same month for the previous year. Every effort has been made to reduce to a minimum the amount of idle mileage and cars are housed in those localities which will bring about this result, due consideration being given to all of the factors entering into this situation, such as special track work, interference with the operation of other lines, time table requirements, etc., etc. It is estimated that a close study of this situation has made possible the saving of from 65,000 to 80,000 car miles a year.

A record is also kept of the idle mileage operated in connection with the running of a disabled car off the road, and comparisons with other periods are also drawn for the purpose of closely checking up this phase of operation. For the year ended Dec. 31, 1909, this disabled car mileage was reduced by about 20 per cent from the figure of the previous year. The car mileage reports are so arranged as to show the mileage operated by each of the various types of cars used.

COMPETITION BETWEEN SURFACE, ELEVATED AND SUBWAY LINES

Notwithstanding an impression which has existed to the contrary, there is competition between the surface car lines and the elevated and subway lines, particularly with regard to travel between two given points which may be reached in relatively the same time by either means of transportation. Of course, weather conditions and personal choice enter largely into a decision on the part of the passenger, but the Metropolitan management has been making a constant effort to build up the speed of its lines so far as is consistent with the requirements of safety in order that the service may be as attractive as possible to the travelling public. Tests have been made on different sections of different lines at different times of the day and measures are being adopted to prevent unnecessary loafing or dragging of the road, with consequent impairment of the service. The close relation between the speed of the cars on a given line and the receipts is too manifest to require discussion, particularly when the element of competition enters in to so great an extent as is the case on Manhattan Island. On the other hand, stringent measures are taken to eliminate reckless or careless operation of cars.

AVERAGE SPEED OF CARS

It is of interest to state that the average speed of the electric cars on the Metropolitan System is about 7 1-3 m.p.h., and this average speed is maintained under the congested conditions which prevail practically from one end of a line to the other over the whole system. In this respect the surface lines on Manhattan Island are operated under conditions differing radically from those to be found in any other city in the country. In Chicago, in Boston and even in Brooklyn a very large portion of the routes traversed by the street cars run through territory where there is absolutely no congestion by either vehicles or pedestrians. The congested sections are proportionately small as compared with the whole territory covered by the street car systems in these cities, and in this respect conditions on Manhattan Island present a striking contrast. On such a line as the Eighth Avenue, for instance, from South Ferry to Thirteenth Street there is frequent blocking

TABLE I.—BROADWAY AND COLUMBUS AVENUE DIVISION. ANALYSIS OF MILES OPERATED AND PASSENGERS CARRIED FOR THE 24 HOURS ENDED AT 12.00 MIDNIGHT, TUESDAY, SEPT. 28, 1909; WITH CENTS PER CAR MILE AND PERCENTAGE OF TRANSFER PASSENGERS TO TOTAL PASSENGERS CARRIED. WEATHER CLEAR. TEMPERATURE 58 DEG. CARS IN SERVICE, 161.

Southbound Hour		Cash passgrs.	Transfer passgrs.	Total passgrs.	Per cent transfer to total	Total miles	Dark miles	Receipts	Cents per car mile	Passgrs. per car mile
12.00MN to	1.00AM	266	59	325	.1815	104.86	21.66	13.30	.1268	3
1.00AM	2.00	397	34	431	.0789	103.28	13.54	19.85	.1921	4
2.00	3.00	133	22	155	.1419	68.06	3.74	6.65	.0977	2
3.00	4.00	66	14	80	.1750	64.32	...	3.30	.0513	1
4.00	5.00	94	71	165	.4303	64.32	...	4.70	.0730	3
5.00	6.00	374	377	751	.5020	132.12	...	18.70	.1415	6
6.00	7.00	1087	1368	2455	.5572	376.90	...	54.35	.1442	7
7.00	8.00	2280	2157	4437	.4861	424.21	3.52	114.00	.2687	10
8.00	9.00	3283	1365	4648	.2937	455.33	7.48	164.15	.3605	10
9.00	10.00	3875	1281	5156	.2484	380.28	7.84	193.75	.5095	14
10.00	11.00	5053	1049	6102	.1719	452.61	9.96	252.65	.5582	13
11.00	12.00N	5316	1089	6405	.1700	471.14	5.29	265.80	.5642	14
12.00N	1.00PM	6109	1193	7302	.1634	488.82	6.09	305.45	.6249	15
1.00PM	2.00	5423	1215	6638	.1830	491.29	5.55	271.15	.5519	14
2.00	3.00	5050	1114	6164	.1807	559.47	.43	252.50	.4513	11
3.00	4.00	5137	623	5760	.1082	436.30	1.37	256.85	.5887	1
4.00	5.00	6182	662	6844	.0967	514.74	7.07	309.10	.6005	13
5.00	6.00	4651	619	5270	.1175	479.99	.86	232.55	.4845	11
6.00	7.00	3067	461	3528	.1307	354.71	28.05	153.35	.4323	10
7.00	8.00	5758	763	6521	.1170	523.38	13.33	287.90	.5501	12
8.00	9.00	3883	544	4427	.1229	382.68	6.88	194.15	.5073	12
9.00	10.00	3806	514	4320	.1190	448.88	8.20	190.30	.4239	10
10.00	11.00	3214	362	3576	.1012	402.10	6.96	160.70	.3997	9
11.00	12.00MN	1623	185	1808	.1023	305.83	62.28	81.15	.2653	6
Total		76.127	17.141	93,268	.1838	8485.62	220.10	3806.35	.4486	11
Northbound.										
12.00MN to	1.00AM	836	113	949	.1191	213.53	6.82	41.80	.1958	4
1.00AM	2.00	291	55	346	.1590	81.69	7.31	14.55	.1781	4
2.00	3.00	151	23	174	.1322	68.91	...	7.55	.1096	3
3.00	4.00	71	19	90	.2111	63.21	...	3.55	.0562	1
4.00	5.00	88	26	114	.2281	60.84	...	4.40	.0723	2
5.00	6.00	154	197	351	.5613	101.28	...	7.70	.0760	3
6.00	7.00	569	1243	1812	.6860	172.57	...	28.45	.1649	1
7.00	8.00	1769	4383	6152	.7125	396.78	5.65	88.45	.2229	15
8.00	9.00	2150	1947	4097	.4752	367.88	7.18	107.50	.2922	11
9.00	10.00	3783	1178	4961	.2375	462.02	2.04	189.15	.4094	11
10.00	11.00	4924	1052	5976	.1760	399.45	5.65	246.20	.6163	15
11.00	12.00N	5789	1171	6960	.1682	420.85	6.20	289.45	.6878	17
12.00N	1.00PM	8835	1673	10,508	.1592	557.01	1.28	441.75	.7931	19
1.00PM	2.00	6732	1547	8279	.1869	532.49	5.10	336.60	.6321	16
2.00	3.00	5424	955	6379	.1497	486.46	...	271.20	.5575	13
3.00	4.00	6589	983	7572	.1298	486.22	.51	329.45	.6776	16
4.00	5.00	5273	859	6132	.1401	406.44	...	263.65	.6487	15
5.00	6.00	5262	814	6076	.1340	418.06	...	263.10	.6293	14
6.00	7.00	4132	818	4950	.1652	583.00	1.53	206.60	.3544	8
7.00	8.00	4275	981	5256	.1866	456.95	14.28	213.75	.4678	12
8.00	9.00	4601	789	5390	.1464	402.48	5.61	230.05	.5716	13
9.00	10.00	4360	549	4909	.1118	475.18	.51	218.00	.4588	10
10.00	11.00	2527	394	2921	.1349	429.56	1.02	126.35	.2941	7
11.00	12.00MN	1319	256	1575	.1625	399.87	14.21	65.95	.1649	4
Total		79,904	22,025	101,929	.2161	8442.73	84.90	3995.20	.4732	12

occasioned by the large number of heavy trucks which use the thoroughfares traversed by the Eighth Avenue cars. From Thirteenth Street to Fifty-ninth Street, while the character of the vehicular traffic is different from that south of Thirteenth Street, it is neverthless a source of great congestion. From Fifty-ninth Street to 110th Street, along the western side of Central Park, are to be found pleasure vehicles of all descriptions and of great number, besides the vehicles which use this thoroughfare more than any other in the conveying of goods, merchandise, etc., between lower Manhattan and Harlem. From 110th Street to the terminus at 158th Street the route lies through one of the most congested sections of Harlem, and is furthermore located beneath the elevated railway. The Eighth Avenue line is but an illustration of conditions more or less analogous in character which might be cited with reference to the routes traversed by cars of other Metropolitan lines. In many instances where the numbers of vehicles are relatively small, the swarms of children who utilize the streets for play grounds render the conditions of operation extremely difficult, particularly in the lower section of the Island and along the East Side of the city from the Harlem River to the Battery.

TABLE II.—DELAYS TO ELECTRIC CARS OF FIVE MINUTES OR OVER DUE TO FOLLOWING CLASSIFIED CAUSES, ENTIRE SYSTEM, APRIL, 1910.

	Number of delays	Minutes delayed	Proportion of total delays	Proportion of total minutes	Average length of delays—minutes
Blocking by vehicles	329	3,109	.235	.258	9
Carelessness of transportation dept. employees	123	1,116	.088	.092	9
Miscellaneous car trouble	161	1,255	.115	.104	8
Accidents	181	1,206	.129	.100	7
Plow trouble	87	803	.062	.067	9
Electrical car trouble other than plow trouble	54	388	.039	.032	7
Electrical transmission trouble.	40	410	.029	.034	10
Mechanical defects (cars)	90	860	.064	.071	10
Faulty track	133	1,096	.095	.091	8
Fires	39	607	.028	.050	16
Delays caused by outside lines.	68	511	.049	.042	8
Miscellaneous trouble	65	470	.047	.039	7
Delays due to outside construction work	14	106	.010	.009	8
Delays due to obstruction in slot.	14	132	.010	.011	9
Totals	1,398	12,069	1.000	1.000	9
Delays of five minutes or over, July, 1909, to April, 1910, inclusive.					
Blocking by vehicles	4,045	36,672	.300	.289	9
Carelessness of transportation dept. employees	1,296	13,480	.096	.106	10
Miscellaneous car trouble	1,714	13,063	.127	.103	8
Accidents	1,372	10,759	.102	.085	8
Plow trouble	871	9,603	.065	.076	11
Electric car trouble other than plow trouble	384	2,807	.028	.022	7
Electrical transmission trouble.	499	6,395	.037	.050	13
Mechanical defect (cars	781	7,464	.058	.059	10
Faulty track	490	5,234	.036	.041	11
Fires	351	6,943	.026	.055	20
Delays caused by outside lines.	695	5,693	.052	.045	8
Miscellaneous trouble	753	6,296	.056	.049	8
Delays due to outside construction work	110	1,106	.008	.009	10
Delays due to obstruction in slot.	126	1,390	.009	.011	11
Totals	13,487	126,905	1.000	1.000	9

The two most congested lines are probably Broadway below Fourteenth Street and Canal Street. On lower Broadway the average speed is less than 6 m.p.h. On Canal Street the average speed is even lower, being about 5 m.p.h., but of course the number of cars on this line is much less than on lower Broadway.

CLASSIFICATION OF DELAYS

In this connection it is of interest to note that a classification is made every month of the delays to the operation of the cars and a cumulative statement is prepared giving the same information for a given period to date. In both cases these statements are compared with the previous year, so far as it is practicable to obtain the data for the earlier period from the records which were then taken. Table II indicates this information for the month of April, 1910, and for the 10 months ended April 30, 1910. As will be seen, this statement relates only to delays which are of five minutes' duration or greater.

The efficient work of the traffic squad of the police department is of material assistance in the maintenance of regular and continuous operation, but the physical difficulties due to the narrowness of many of the streets on the lower part of Manhattan Island, taken in connection with the extreme congestion of vehicular and pedestrian traffic, set a certain limitation beyond which no amount of skillful guidance of traffic will increase the volume of traffic movement within a given period. Even north of Fourteenth Street much congestion is encountered, and in this connection the figures in tables III and IV are of interest as showing conditions prevailing at different points.

TABLE III.—TALLY OF TRAFFIC AT THIRTY-FOURTH STREET AND BROADWAY.

Vehicles and pedestrians taken on Nov. 18, 1908, 7 A. M.—7 P. M. Cars taken on Dec. 8, 1908, and Dec. 10, 1908, 7 A. M.—7 P. M.

	Street cars	Vehicles	Pedestrians
North	1,573	3,442	58,525
South	1,611	4,064	57,716
East	708	569	10,348
West	727	693	15,608
Totals	4,619	8,768	142,197

Note: North and south bound traffic includes both Broadway and Sixth Avenue lines. East and west bound traffic, Thirty-fourth Street line only.

The figures in Table IV indicate the conditions prevailing at the above point during the maximum hour as shown by observations taken since the first of the year:

TABLE IV.—TALLY OF TRAFFIC AT THIRTY-FOURTH STREET AND BROADWAY, MAXIMUM HOUR, 6.00 P. M. TO 7.00 P. M., TAKEN ON THREE DAYS IN JANUARY, APRIL AND MAY, 1910.

	Street cars	Vehicles	Pedestrians
North	199	308	3,509
South	123	338	4,636
East	81	33	3,055
West	94	71	
Totals	497	750	11,200

Thirty-fourth Street and Broadway is the heaviest transfer point in the system as transfers are given betwen three lines. The number of passengers who transferred at this location was shown by the result of a single day's tally to be 27,833 persons. This condition, of course, adds materially to the difficulties of rapid operation of cars past this point.

As in other cities the time of the day has a very important influence on the traffic at different localities, but it is doubtful whether any other city in the United States can show any such figures of theater traffic as those given in Table VI. Tables V and VI give the conditions at Forty-second Street and Broadway during a half hour of the rush hour period as compared with the half hour after the theaters have closed at night:

TABLE V.—TALLY OF TRAFFIC AT FORTY-SECOND STREET AND BROADWAY, TAKEN FEB. 5, 1910, BETWEEN 5.15 P. M. AND 5.45 P. M.

	Street cars	Vehicles	Pedestrians
North	52	234	4,614
South	46	155	2,028
East	38	28	3,825
West	39	96	1,363
Totals	175	513	11,830

TABLE VI.—TALLY OF TRAFFIC AT FORTY-SECOND STREET AND BROADWAY, TAKEN FEB. 5, 1910, BETWEEN 11.00 P. M. AND 11.30 P. M.

	Street cars	Vehicles	Pedestrians
North	35	211	3,406
South	30	225	3,683
East	27	38	4,676
West	26	18	1,395
Totals	118	492	13,160

INFLUENCE OF WEATHER ON TRAFFIC

Weather conditions also play their part in increasing or decreasing traffic. The dense crowd of people which walks to and from work south of Forty-second Street is in marked contrast to the number which follows such a course in inclement weather. This is well illustrated by a comparison of the business of four avenue lines and two crosstown lines in Table VII, which gives the traffic on April 6, 1910, when the weather was rainy, and on March 30, 1910, when the weather was fair. They relate only to the rush hour period from 5:00 p. m. to 7:00 p. m., and show how rain increases the travel.

These tables are but instances of many analyses which the transportation department of the Metropolitan Street Railway makes to determine what results will follow the creation of certain conditions and how to cope with them.

During the period of the Hudson-Fulton Celebration last fall, approximately 11,000,000 persons were carried in eight days on the Metropolitan lines without a single fatality. This statement is significant of the efficiency of the service rendered.

ACCIDENTS

For a number of years it has been the experience of the Metropolitan management that the expense of the settlement of injury and damage claims, suits and judgments, has been between 10 per cent and 11 per cent of the annual gross receipts from operation. Throughout the period of the receivership a systematic campaign has been carried on having for its object the reduction of this excessive drain on the finances of the property. The following comparative accident statement is significant in this connection. The figures for the year 1907 are those only, which relate to the lines now under the jurisdiction of the receivers of the Metropolitan system.

	Years ended June 30, 1909	June 30, 1907
Total accidents	14,561	20,553
Car collisions	242	596

This means that during the fiscal year ended June 30, 1909, the total number of accidents was 30 per cent less than on the same lines during the fiscal year ended June 30, 1907, which was the fiscal year immediately preceding the receivership. Car collisions alone, which constitute a more serious type of accident, have been cut down approximately 60 per cent.

The accident prevention campaign has been actively conducted through the co-operation of the legal department and the transportation department. The methods so far as they relate to the education of the employees have already been referred to, but the form in which accident data is assembled is of interest.

ACCIDENT RECORDS

A monthly report is compiled indicating the number of accidents occurring on each line, under approximately 30 different classifications, showing a comparison with the figures for the corresponding period of the previous year.

Another report divides the accidents on each line into three general classifications, namely, personal accidents, collisions between cars and wagons, and collisions between cars, indicating the ratio between the number of accidents of each class, and the number of passengers carried and car miles operated during the month in question, a comparison being made between the ratios of the month under consideration and those applying to the corresponding month of the previous year.

Similar ratios are also compiled with reference to the frequency of cases in which pedestrians are struck by the cars of each line.

Boarding and alighting accidents are made the subject of a special monthly report which shows the total miles operated, and the total number of passengers carried on open cars, closed cars other than prepayment cars, and prepayment cars, on each operated line of the system, the number of accidents in which each type of car was involved and the ratios of passengers carried and miles operated, respectively, to boarding cases and to alighting cases. These figures are tabulated so as to apply to each line and to each type of car.

Data are also compiled to indicate the location and character of the serious accidents which have occurred during the month, for the purpose of determining the frequency with which serious accidents occur in congested districts as compared with sections which are less crowded, and whether there is any relation between the character of the accidents and the character of the location in which they occur.

CLASSIFICATION OF ACCIDENT DATA

For the purpose of determining the relative seriousness of the various accidents under the 30 odd different classifications, a record is kept which indicates the number of accidents under each such classification on each line in the system during each month, the number of such cases upon which payments in the nature of claims, suits or judgments, are made, and the total amounts of such payments. This record is of a cumulative character. For instance, a certain number of accidents occurring in June may not be disposed of until some time after that month, but the amount of claims, suits and judgments for each class of accident for each line is debited against the month in which the accident actually occurred without regard to the date of settlement. This information is proving of value as indicating not only the average cost of each character of accidem on the whole system, but also because it sets forth the same data with reference to each line and shows to what particular phases of the situation special care should be given.

CLASSIFICATION AS TO APPARATUS

Records are also kept with reference to the efficiency of certain devices. For instance, front fenders are not used on any of the cars of the Metropolitan system, all of which are equipped with automatic wheel guards. Some years ago it became apparent that the conditions on Manhattan Island were such as to render it impracticable to attempt to operate cars with projecting front fenders. It was next to impossible to keep these devices in serviceable condtion, and experience demonstrated that they were a more potent factor in causing accidents than they were in preventing casualties. The Metropolitan has been a pioneer among the street railways of Greater New York in the testing of wheel guards, and during the receivership particular attention has been given to this feature of car equipment.

A very careful analysis is made of the relative efficiency of the different types of wheel guard as measured by the seriousness of the accidents in which they are concerned, and the percentage of cases in which they operate satisfactorily. According to the records which have been compiled the automatic wheel guards now used by the Metropolitan are from 60 per cent to 70 per cent more efficient than was the rigid wheel guard which was formerly used, and it is quite apparent that these improved devices will in a relatively short time pay for themselves, on account of the saving which will thereby be effected in the amount which otherwise would have been paid out in injury and damage claims.

CLASSIFICATION AS TO EMPLOYEES

The personality of the employees concerned in accidents is also made the subject of investigation. The records of two years pertaining to cases as a result of which the injured party died or suffered amputation of a limb, are given in Table VIII.

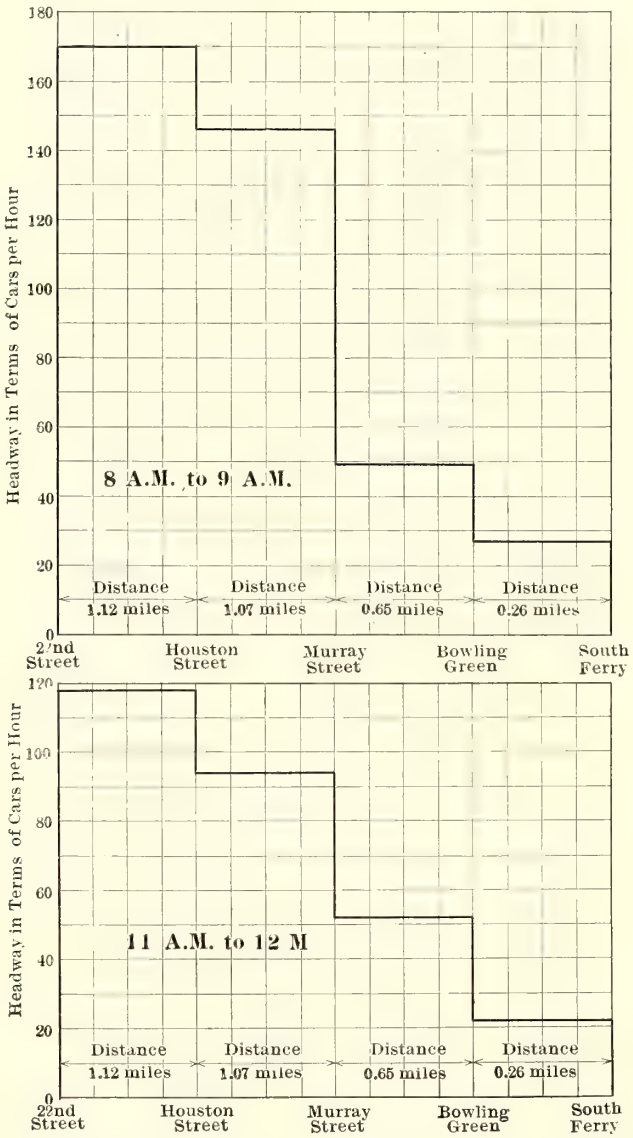
TABLE VII.—SHOWING PERCENTAGE OF INCREASE IN RIDING BETWEEN 5 P. M. AND 7 P. M., ON WEDNESDAY, APRIL 6, 1910—WEATHER RAINY, TEMPERATURE 64 DEG., COMPARED WITH SAME PERIOD ON WEDNESDAY, MARCH 30, 1910—WEATHER FAIR, TEMPERATURE 64 DEG.

Line	Per cent increase cash pass.	Per cent increase trans. pass.	Per cent increase total pass.	Per cent increase cash pass.	Per cent increase trans. pass.	Per cent increase total pass.	Per cent increase total pass. North and south bound
	South bound	South bound	South bound	North bound	North bound	North bound	
Lexington Avenue	44.57	8.35	34.43	25.88	3.58	17.18	22.97
Fourth and Madison Avenue	33.61	21.35	29.74	25.16	21.45	24.05	26.22
Sixth and Amsterdam Avenues	43.18	41.68	42.90	45.67	17.31	38.16	40.74
Eighth Avenue	33.00	32.56	32.86	11.07	8.67	10.28	18.56
Totals	38.98	24.77	35.10	25.21	11.20	20.58	26.35
Increase south bound over north bound	13.77	13.57	14.52				
	East bound	East bound	East bound	West bound	West bound	West bound	East and west bound
Thirty-Fourth Street Crosstown	28.59	40.81	33.56	58.59	36.67	45.52	38.61
Fourteenth Street Crosstown	43.92	24.69	33.23	40.07	50.99	42.27	35.26
Totals	37.02	29.68	33.36	48.23	39.22	44.25	36.77
Increase west bound over east bound				11.21	9.54	10.89	

TABLE VIII.—PERCENTAGES OF MEN INVOLVED IN SERIOUS ACCIDENTS AND LENGTH OF THEIR EMPLOYMENT.

Period of employment	Percentage of motormen and conductors to total force of motormen and conductors	Percentage of total number of accidents in which men of each class were involved
Less than 1 year	34	49
Less than 2, but more than 1 year.	15	19.2
Less than 3, but more than 2 years	11	9.3
Less than 4, but more than 3 years.	7	2.6
Less than 5, but more than 4 years.	4	.7
Five years and over	29	19.2
	100	100

Table VIII, which for the uses of the company was prepared in considerable detail but which is printed only in summary,



Metropolitan Street Railway— Headway on Various Sections of Broadway, Expressed in Terms of Cars Per Hour

indicates that the new men, who constitute about one-third of the entire force, were concerned in about one-half of the serious accidents, that the second-year men were concerned in slightly more accidents than should have been the case based on the number of men of this class to the total number of employees, and that the men of more than two years' experience, who constitute about one-half of the operating force of motormen and conductors, were concerned in slightly less than one-third of the serious accidents. These figures serve to illustrate forcibly the necessity of carefully training the new men.

As another sidelight on the situation, the serious accidents covering a period of two years, were made the basis of an inquiry regarding the general character of the records of the men therein concerned, both from the standpoint of accident records and general records of the men. This analysis resulted as shown in Table IX.

TABLE IX.—PERCENTAGES OF MEN ENGAGED IN SERIOUS ACCIDENTS AND CHARACTER OF THEIR PREVIOUS RECORD.

Character of record.	Accident records of men involved in serious cases, per cent.	General records of men involved in serious cases, per cent.
Excellent	5.96	3.3
Good	35.76	28.48
Fair	44.37	54.97
Poor	13.91	13.25
	100.00	100.00

These figures are of interest as indicating one of the many points of view from which the accident situation is considered.

TRANSFERS

The interpretation which has been given by the courts to the transfer statute of the State of New York is such as to render the unfair use of the transfer privilege by individuals comparatively easy of accomplishment, and the difficulties in the way of obtaining sufficient evidence to secure convictions are so great that it is impracticable to put a stop to all abuses. Certain dishonest practices, however, have been ferreted out and the guilty parties prosecuted. Notices have been posted in the cars calling the attention of the public to the illegality of the wrongful use of a transfer, and the backs of transfer tickets have also been used to a certain extent for this purpose. Special inspectors have been engaged in obtaining evidence against persons guilty of transfer imposition, and while, unfortunately, the courts have not seen fit to impose penalties commensurate with the gravity of the offense, there has resulted considerable publicity, and apparently there has been a certain amount of reduction in the extent of this illegal practice. All phases of this proposition

TABLE X.—SHOWING PENALTIES IMPOSED FOR TRANSFER FRAUDS ON METROPOLITAN STREET RAILWAY. BETWEEN NOV. 26, 1909, and JUNE 7, 1910.

Penalty	No. of Cases
$1.00	29
2.00	1
3.00	2
5.00	21
10.00	2
One day in prison	1
Sentence suspended	32
Paroled	4
Acquitted	3
Discharged with reprimand	19
Total	114

are being closely followed up by both the transportation department and the legal department.

A statement of the disposition made of cases in which the defendant was charged with the illegal use of transfers is given in Table X.

The statement as shown covers a period of approximately six months. A number of cases are now awaiting final action. In those instances in which the defendants were held for trial by the Court of Special Sessions, the defendant was subjected to the alternative of procuring bail or being imprisoned awaiting trial by the higher court.

PRE-PAYMENT CARS

Upon the whole, the operation of the pre-payment cars on the Metropolitan lines has been satisfactory, broadly speaking, and of such a character as to have justified their introduction in New York. They have been thoroughly successful as far as operation proper is concerned and very satisfactory to the traveling public and to the employees. The air-brake and the enclosed vestibule have greatly assisted in producing this result. From a financial standpoint the results of pre-payment car operation have fallen far short from what was prophesied at the time when these cars were introduced. All phases of pre-payment car operation, including the non-registration of fares, the additional weight of the car, the time consumed in the loading and unloading of passengers are being carefully watched and the present indications are to the effect that the benefit from a revenue and financial standpoint is slight. The situation is still being studied and some time must necessarily elapse before definite conclusions can be reached with reference to the net total result of pre-payment car operation.

Following closely the introduction of the pre-payment car in this country came the production of the fare box. Many types of these boxes have been tested and examined by the Metropolitan management, but in all of them have been found defects of such a nature as to preclude the final adoption of any box for general use. The management, however, is now testing out a fare box which registers the coins received and then allows the money to pass into the possession of the conductor, thereby doing away with the necessity of the conductor carrying a large amount of change beyond which he might be reasonably expected to furnish. This fare box has been quite successful in its operation and in the opinion of the management possesses sufficient merit to warrant its continued use for further test.

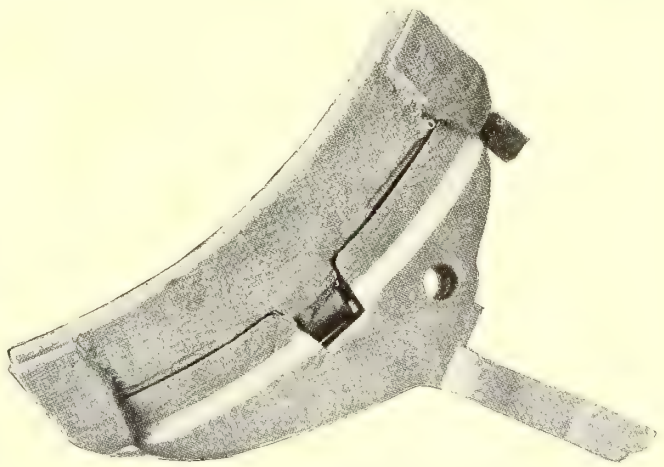
The Metropolitan company has in service approximately 550 pre-payment cars. Of these approximately one-half are cars originally constructed for pre-payment operation; the remainder are standard closed cars which have been converted to adapt them for pre-payment operation. These converted cars have been working satisfactorily up to date, but the period of their use has been too limited as yet to warrant the making of any definite statement regarding the net financial result of the change.

ELECTRIC RAILWAYS OF CANADA

An interesting report on electric railways in Canada for the year ended June 30, 1909, by J. L. Payne, Comptroller of Statistics, has been issued. It gives the total mileage of electric railways in 1909 as 988.97 miles. Confusion that has heretofore prevailed due to the different methods employed by the railways in computing mileage will be removed hereafter by the adoption of a uniform basis. The foregoing mileage is the length of first main track. The length of second main track in 1909 was 215.057 miles, and the length of sidings and turn-outs 83.624 miles. The paid-up capital on June 30, 1909, aggregated $91,604,989, an increase of $4,195,104 over 1908. The gross earnings were $14,824,936, showing a gain of $817,887 over the preceding year. Passenger earnings amounted to $14,080,755, freight earnings to $386,092, and mail and express earnings to $54,185. The net income was $4,716,308, or the equivalent of 5.13 per cent on the electric railway capitalization of $91,604,989. The operating expenses were $8,884,690, and include $246,192 of net loss to certain railways. The operating expenses were equal to about 59.93 per cent of the gross earnings, as against 62.08 per cent the previous year. The electric railways carried 314,026,671 fare passengers, and 81,670,945 transfer passengers. The number of employees in 1909 was 10,557, a gain of 603, and the salaries and wages paid aggregated $6,761,281, or 77.84 per cent of the total operating expenses. The accident statistics show that 68 persons were killed, as against 69 in 1908, and 2139 were injured, an increase of 256. Of those killed, 11 were passengers, 7 were employees and 50 were other persons. Of those injured, 1303 were passengers, 218 were employees and 618 were other persons.

BRAKE SHOE STANDARDIZATION IN ENGLAND

At a recent meeting of the British Tramways & Light Railways Association, J. A. Panton, superintendent rolling stock, Liverpool Overhead Railway, presented a paper on "Brake Shoe Standardization." The author drew attention to the outlay connected with brake shoes which was 10 per cent of the car maintenance. At the present time some 40 per cent to 60 per cent of the material received in the brake-shoes was sent to the scrap-heap only partly worn. The fault usually lay in the length and adjustment of the hangers, and design of brake-shoe used, which did not permit it to be worn out. It would probably surprise many to know that wheels wore more



English Standard Brake Shoe

quickly without brake-shoes than with them. Brake-shoes assisted in preserving the wheel camber. Although effective, cast-iron shoes unfortunately showed two very distinct objections and disadvantages for general use—namely, rapid wearing qualities and lack of strength against breakage. It was these two disadvantages, as experienced in steam railroads, which induced the brake-shoe manufacturers to attempt to produce shoes possessing the advantages of cast-iron shoes without their disadvantages, resulting in the introduction of the various types of shoes which had become so generally known during the past few years. The plan of the accompanying standard brake-head and brake-shoe which the author submitted contemplated keying the contacts at the center lug of the brake-head, while the ends of the brake-head fitted close to the full length and width of the brake-shoe back, the result being a great support to the shoe. The raised recess at each side of the iron lug, in conjunction with the end abutments, was merely to keep the shoe in vertical alignment, and should fit the holder and lug so as to prevent any upward or downward movement of the shoe, the center lug transmitting the load directly to the beam, by virtue of the usual wedge-shaped key. Quite a little unnecessary metal had been removed from the flange and back of the shoe. The proposed standard shoe could safely be worn down to the steel back while the old style shoe had to be removed when only half worn to prevent the wheel flange from wearing out the brake-head.

GEORGE WESTINGHOUSE ON RAILWAY ELECTRIFICATION

In an address which George Westinghouse, president of the American Society of Mechanical Engineers, will deliver at the joint meeting of that society with the British Institute of Mechanical Engineers in London on July 26, he presents some strong arguments for the immediate standardization of such details of electric railway apparatus as will affect future interchange of equipment. The tendency at the present time seems to be toward diversity, rather than standardization. Unless a selection of some standard system is made soon the extension of the existing diversified systems will continue so far as to forever prevent general interchange. In the opinion of Mr. Westinghouse, the great difficulty in the electrification of steam railways is no longer the engineering problem of developing a locomotive and an electrical system which will operate trains, but it is a broad question of financial and general policy of far-reaching scope. The future electrification of railways in general will require a combination of the highest engineering and commercial skill.

To insure interchange of traffic the following requirements are fundamental for both steam and electrical operation:

1. Standard gage of track.
2. Standard types of couplings between cars.
3. Uniform and interchangeable types of brake apparatus.
4. Interchangeable heating apparatus.
5. Uniform system of train signals.

For electrically operated railways the following additional requirements are fundamental:

(A.) A supply of electricity of uniform voltage and frequency.

(B.) Uniform location of conductors to convey this electricity so that without any change an electrically equipped locomotive or car of any railway can collect its supply of current and run on the lines of any other railway.

(C.) Uniform apparatus for the control of electric motors whereby trains of two or more electric locomotives or motor cars from different lines can be operated as a unit from one locomotive or car.

Mr. Westinghouse compares the single-phase alternating current system, the three-phase alternating current system and the direct-current system from the standpoint of the motors and transmission devices. The limitations of speed control of the direct-current railway motor with a fairly uniform line voltage are contrasted with the constant speed characteristics of the three-phase motors which have the advantage, however, that they become generators in running down grade and act as a perfect brake at the head of the train. The single-phase railway motor has speed characteristics very similar to those of the d.c.-motor, but the control apparatus employed permits of maintaining the desired speed under almost any conditions of load and without rheostatic losses. The limit of capacity of the motors is determined only by the safe temperature rise. With a properly designed single-phase control apparatus any desired voltage may be impressed on the motors regardless of fluctuations in the line voltage which is stepped down in a ratio approximately 30 to 1. The determination of the frequency to be used on single-phase railways is of great importance. For general use in power transmission 25 cycles is the standard and this has been adopted by nearly all of the single-phase railways now in operation. The Midi Railway of France, however, has adopted 15 cycles and this lower frequency permits of a marked reduction in the size of the motors required for a given output. Nearly all three-phase systems, which have been installed, employ 15 cycles. The choice of frequency to be used is one of the most involved and difficult problems now presented for solution.

Referring to the transmission of power from the power house to the locomotive, Mr. Westinghouse says that the controlling factor in the cost of electrification in nearly all cases is the system of transmitting power and not the cost of the locomotives themselves. Current for all existing systems is usually generated as high-tension alternating current, so that the type and capacity of the power house does not enter into the problem.

In selecting a proper electrical system for railway operation, Mr. Westinghouse presents the following outline of elements which are of prime importance:

A. The electric locomotive should be capable of performing the same kinds of service which the steam locomotives now perform. This will most readily be secured by electric locomotives which can practically duplicate the steam locomotives in speed and power characteristics. This includes a wide range of performance, embracing through passenger service at different schedule speeds; local passenger service; through freight service in heavy trains; the handling of local freight by short trains; and a variety of switching, terminal and transfer movements. This, naturally, calls for wide variation in tractive effort and in speed, both for the operation of different kinds of trains, and, also, for the operation of the same train under the varying conditions usually incident to railway service.

B. The electric locomotive should be capable of exceeding the steam locomotive in its power capacity. It should be made to handle heavier trains and loads, to operate at higher speeds, and, in general, to exceed the ordinary limits of the steam locomotive in these respects. The readiness with which several electric locomotives can be operated as a single unit enables any amount of power to be applied to a train.

TABLE 1.—RECORD OF SINGLE-PHASE SERVICE.
NEW YORK, NEW HAVEN & HARTFORD RAILROAD FOR 12 MONTHS.

	Total Miles Run.	No. Locomotive Delays.	Miles Run per Locomotive Delay.	Number of Power House Delays.	Number of Line Delays
1909					
April	146,189	9	16,243	..	3
May	155,551	25	6,222	1	3
June	166,759	14	11,911	..	4
July	183,434	13	14,110	..	2
August	177,714	14	12,694	..	5
September	189,656	14	13,547	..	1
October	174,400	11	15,854	1	4
November	173,370	10	17,337	..	1
December	167,808	23	7,296	..	3
1910					
January	163,274	28	5,831	..	2
February	138,929	12	11,577	..	1
March	156,901	12	13,075	..	1

C. The electric system should adapt itself to requirements beyond the ordinary limitations of the steam locomotive in small, as well as large, things. It should be adapted for use on branch lines, and for light passenger and freight service similar to that so profitably conducted by interurban electric roads, which in many cases run parallel to steam roads, not only taking away the traffic of the steam roads, but building up a new and highly profitable traffic, both in passenger and in express service.

D. A universal electric system requires that power should be transmitted economically over long distances and supplied to the contact conductor. The system should utilize the most highly perfected apparatus for the electric transmission of energy and its transformation into suitable pressures for use.

E. The contact conductor in an ideal system should be economical to construct, both for the heaviest locomotives, where the traffic is dense, and for light service on branch lines. It should impose minimum inconvenience to track maintenance; should give minimum probability of disarrangement in case of detailment, or in case of snow and sleet, and should in general be so placed and constructed as to give a maximum assurance of the continuity of service.

The future electrification of steam railways, in the opinion of Mr. Westinghouse, will be the extension of limited zones, until these zones after a time meet each other. If the systems employed on different zones, which ultimately may connect, are unlike, great inconvenience and expense will arise. It may be a matter of little moment at the present time whether different systems are in use, just as in the early days of railroading it was of little consequence whether the tracks were all of the same or of different gage.

The complete electrification of a railway will necessitate a

rearrangement of ideas and practices in regard to operation. Coaling and water stations will not be needed; passenger trains will be differently composed, some classes being of less weight; and they will operate more frequently, thus promoting travel; other trains will be heavier than at present, or will operate at higher speeds; and branch lines, by the use of electrically equipped motor cars, can be given a through service not now enjoyed.

The movement of freight will undergo great changes, due to the fact that electric locomotives can be constructed with engines from the progress already made in the development of gas and oil engine power, a still further reduction in cost may be expected, which will accelerate the work of electrifying existing railways.

One important aspect of this great question will engage the thoughtful consideration of every government, namely, the military necessity for uniform railway equipment in time of war.

There will be serious difficulties to surmount in the selection of a general system. There naturally will be arguments in

TABLE 2 DATA ON ELECTRIC LOCOMOTIVES OF AMERICAN DESIGN
BUILT BY THE WESTINGHOUSE ELECTRIC & MFG. CO.

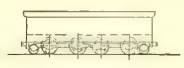
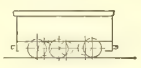
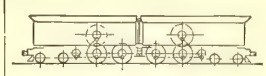
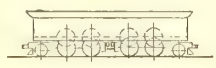
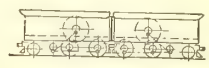
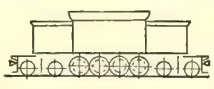
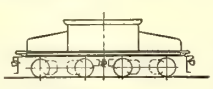
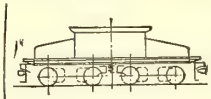
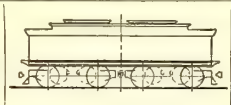
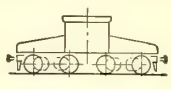
					
Built for	New Haven	Grand Trunk St. Clair Tunnel	Pennsylvania	New Haven	New Haven
Electric system	A.C., D.C.	A.C.	D.C.	A.C., D.C.	A.C., D.C.
Service	Passenger	Frt. & Pass.	Passenger	Frt. & Pass.	Frt. & Pass.
First placed in service	July 1907	February 1908	17,000-mile test	3000-mile test	building
No. in service or on order May 1910	41	6	24	1	1
No. motors per locomotive	4	3	2	4	2
Armature diameter, inches	39½	30	56	39½	76
Core length, including vent opening, inches	18	14¾	23	13	13
Weight one motor, pounds	16,420	15,660	45,000	19,770	41,600
Weight all motors on locomotive	65,680	46,980	90,000	79,080	83,200
Weight all electrical parts	110,400	58,400	127,200	130,000	135,000
Weight all mechanical parts	94,100	73,600	204,800	130,000	125,000
Weight complete locomotive	204,500	132,000	332,000	260,000	260,000
Weight on driving wheels	162,000	132,000	207,800	180,000	180,000
Weight complete locomotive for A.C. operation	196,000	132,000	D.C.	241,000	240,000
Max. guar't'd speed, miles per hr.	about 86	30	about 80	45	45
Feature limiting speed	track	armatures	connecting rod	armatures	armatures
Max. tractive effort	19,200	43,800	69,300	40,000	40,000
Loco. wt. in excess of 18% adhesion Max. T.E., A.C. operation	88,700	none	none	18,500	17,500
Designed for trailing load, tons	250	500	550	{1500 freight / 800 pass.}	{1500 freight / 800 pass.}
Balance speed on level with above load	about 75	about 25	60	{35 freight / 45 pass.}	{35 freight / 45 pass.}

TABLE 3 DATA ON ELECTRIC LOCOMOTIVES OF AMERICAN DESIGN
BUILT BY THE GENERAL ELECTRIC COMPANY

					
Built for	N. Y. C. & H. R. R.	Detroit River Tunnel	B. & O. R. R.	Great Northern	Paris-Orleans
Electric system	D.C.	D.C	D.C.	3-phase	D.C.
Service	Passenger	Frt. & Pass.	Frt. & Pass.	Frt. & Pass.	Passenger
First placed in service	July 1906	tests completed	March 1910	July 1909	1899
No. in service or on order May 1910	47	6	2	4	11
No. motors per locomotive	4	4	4	4	4
Armature diameter, inches	29	25	25	35¾	23½
Core length, including vent. opening, inches	19	11½	11½	16¼	12
Weight one motor, pounds	18,150	10,560	10,560	15,000	8,855
Weight all motors on locomotive	72,600	42,240	42,240	60,000	35,420
Weight all electrical parts	91,200	54,000	54,000	109,000	42,500
Weight all mechanical parts	138,800	146,000	130,000	12,,000	67,500
Weight complete locomotive	230,000	200,000	184,000	230,000	110,000
Weight on driving wheels	141,000	200,000	184,000	230,000	110,000
Weight complete locomotive for A.C. operation	D.C.	D.C.	D.C.	230,000	D.C.
Max. guar't'd speed, miles per hr.	75	30	55	30	45
Feature limiting speed	track	armature	armature	armature	armature
Max. tractive effort	47,000	67,000	61,000	77,000	37,000
Loco. wt. in excess of 18% adhesion Max. T.E., A.C. operation	none	none	none	none	none
Designed for trailing load, tons: Freight		900 on 600 {2% grade}	850 on 500 {1½% grade}	500 on 2.2% grade	
Passenger		{Freight 20.5 / Pass. 22}	{Freight 26 / Pass. 30}		
Balance speed on level with above load	{45 / 63}			15	{300 / 32}

great excess capacity, enabling them to move longer trains at schedule speed on rising gradients.

The large percentage of shunting operations due entirely to the use of steam locomotives will no longer be required.

The railway companies can combine upon some co-operative plan for the generation of electricity, thereby effecting large savings in capital expenditures; and can utilize their own rights of way for the transmission of the current, not only for the operation of trains, but for many other useful purposes.

Notwithstanding the fact that great strides have already been made in cheapening the cost of generating electricity by steam

favor of one or another of the systems now in use and the inclination of those who have adopted a particular system will be to advocate its general use. There will be enthusiastic inventors, and there will be many advocates of the common view, namely, that there is room for several systems, and that each system will best meet the requirements of a particular case. There will be those who give undue weight to some feature of minor importance, such as a particular type of motor or of locomotive, instead of giving a broad consideration to the whole system, and recognizing that, in the general problem of railway electrification, facility and economy in

transmitting power from the power house to the locomotive are of controlling importance.

Were there now only one system to be considered, there would be a concentration of the energy of thousands on the perfecting and simplifying of the apparatus for that system, to the advantage of railway companies and of manufacturers.

There is pressing need of determining the system which admits of the largest extension of railway electrification and of a prompt selection of those standards of electrification, which will render possible a complete interchange of traffic, in order to save expense in the future and to avoid difficulties and delays certain to arise unless some common understanding is arrived at very shortly.

In an appendix which forms part of the address, the author gives a complete record of locomotive, line and power house delays during the 12 months from April, 1909, to March, 1910, on the New York, New Haven & Hartford Railroad. This record is given in table on page 12. The commutation on the motors with which the New Haven locomotives are equipped is excellent, many of the locomotives having made over 100,000 miles without turning or sandpapering of the commutators. The brushes show an average life of 40,000 to 45,000 miles. Most of the locomotives have now run more than 100,000 miles, and the cost of maintenance per mile, and the number of miles per failure, are much more favorable than with the steam locomotives formerly used.

The operating record of the St. Clair tunnel locomotives

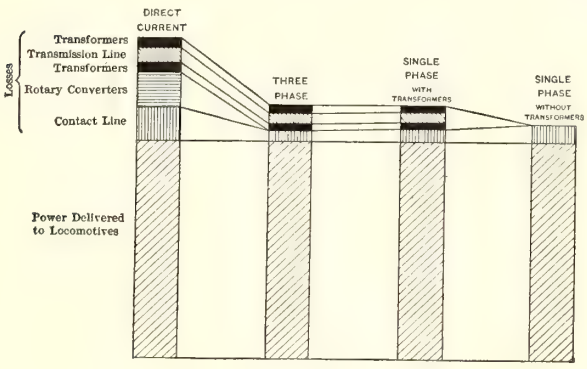


Fig. 1

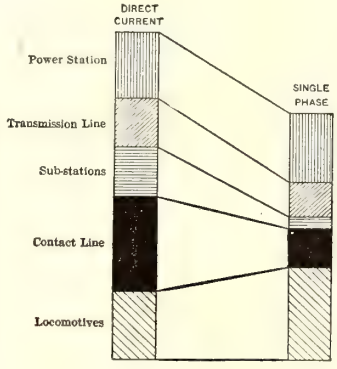


Fig. 2

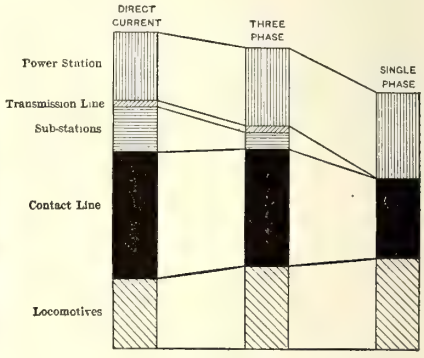


Fig. 3

is also briefly referred to in the same appendix. During the past 12 months the electric locomotives, which average 25 trips of 4 miles each per day, have been responsible for but one delay of 8 minutes.

In a second appendix to the address are given two tables of descriptive data of electric locomotives built by the Westinghouse Electric & Manufacturing Company and the General Electric Company. These two tables are reproduced herewith.

In a third appendix Mr. Westinghouse compares, by means of diagrams, the losses between the generators and the locomotives for a direct-current system, a single-phase system and a three-phase system based on a class of service where the input to the locomotive by the several systems is practically the same. This diagram is reproduced in Fig. 1. The total height of the different columns in the diagram indicates the total power delivered by the power house in the systems designated and the loss between the power station and the locomotive is represented by the upper shaded areas. The loss is smallest in the case of a single-phase system without transformers, which is the method of distribution employed on the New York, New Haven & Hartford Railroad.

The comparative first costs of a single-phase and a direct-current system for a particular case are shown diagramatically in Fig. 2. The estimates cover a single-track road 100 miles long, operating freight and passenger trains with 20 locomotives.

Fig. 3 shows the comparative first costs for the three different systems in a particular case of pusher service on mountain grades where 12 locomotives are required, the total length of the line being 32 miles. In addition to the main line a large yard was to be electrified, making a total of 90 miles of single track. The location of the power station was such that substations were required for either direct current or three-phase current, but not for single-phase current.

TRACKLESS TROLLEYS ABROAD

In a paper on "Railless Traction," presented at the Dublin meeting of the British Tramways & Light Railways Association on May 12 and 13, Harry England remarked that on the Continent there were three systems of railless cars working successfully, both in an engineering and commercial sense. In Italy the Filovia system was in operation over a total route mileage of more than 60 miles. The trolley, built on the "Cantono" patent, consisted of an ordinry trolley pole fixed to the car by a trolley base similar to the bases used on single-deck and covered cars. The trolley head consisted of a four-wheeled truck, which was affixed to the trolley pole by means of a ball and socket joint. This allowed the trolley head to move easily and to adapt itself to any irregularities in the overhead line. The overhead work was similar to that for ordinary rail traction, with the difference that there were both positive and negative wires. The trolley showed no disposition to leave the wires at high speeds, or when the vehicle had to move laterally to pass other vehicles traveling in the same direction. In the Mercédès-Stoll system, at Vienna, motors of 20 hp each were fitted in the hubs of the rear driving wheels, so that the motors formed an integral part of the driving wheels themselves, thus doing away with the necessity for any mechanical transmission. The cable was carried through the interior of the axle, and the armature of the motor was fixed by means of keys on the axle itself, and so acted as the nave of the wheel. The trolley consisted of a frame or carriage fitted with four wheels, which ran on the tops of the wires, the current-collecting device being attached to the car by flexible cables. A pendulum weight was attached to the center of the trolley carriage to keep the carriage balanced and the wheels well pressed down on the wires. The conducting cable was wound round a small drum mounted upon the chassis, and about 12 yd. of spare cable were carried which could be played out to allow the car to run on the whole width of the road. In the Max Schiemann system, installed at Mulhausen, the trolley was similar to that used on tramways, with a pole from 14½ ft. to 16 ft. in length. It was fitted with two sliding contacts, and the car could deviate for distances of 10 ft. on either side of the wires. The overhead work was similar in all respects to ordinary tramway practice, except that two wires were used. It was estimated that a trackless trolley system could be fully equipped, provided current was purchased from a supply authority, at about £3,000 per mile of route, though much would depend upon local conditions. With overhead line and cables at £1,500 per mile, five motor cars at £600 each, five trailer cars at £250 each, land and depot, £800, and spare parts, tools, etc., £950, 4 miles of railless traction would cost £12,000, as against an expenditure of £40,000 for a tramway of a similar length. The author stated that the cost of working a railless traction system in Great Britain had been estimated at 6.164d. per car-mile, as against 6.494d. in the case of a tramway.

WINNIPEG, SELKIRK & LAKE WINNIPEG INTERURBAN RAILWAY

The Winnipeg, Selkirk & Lake Winnipeg Railway, operated by the Winnipeg Electric Railway Company, is 22 miles long connecting the northern terminus of the Main Street lines of the Winnipeg Electric Railway with the town of Selkirk, on the Red River. The present line is built at one side of a highway 132 ft. wide and the franchise rights and track arrangements contemplate the addition of a second track. This 22-mile road is notable in that it has no curves or grades of sufficient degree to limit the speed of the cars at any point on the line. The route follows the course of the Red River from Winnipeg to Selkirk, but the tracks conform very closely to a



Winnipeg & Selkirk—Passenger and Freight Station at Selkirk

tangent. The track is of such character and the obstructions to fast running are so slight that the local cars on this line, some of which haul trailers, are easily able to make the 22 miles, including all stops, in 45 minutes. The roadway is constructed according to interurban standards accepted in this section. On account of the severe winter weather special care has been taken to raise the track level above the surrounding country, and as there are no cuts on the entire line, the borrowed excavation has served to make deep ditches parallel with the track, which afford excellent drainage. The route lies over a broad, level plain with the view unobstructed for miles except by infrequent sections of timber.

A franchise has been obtained and it is proposed in the near future to extend this interurban line from Selkirk to Winnipeg Beach, about 15 miles north of Selkirk. The company is also considering the construction of a line to Victoria Park. Winnipeg Beach is a well-patronized summer resort on the west side of Lake Winnipeg, which now is served only by a steam railway. Victoria Park is said to be an excellent site for the development of an attractive pleasure resort, and this also is located on Winnipeg Lake, but on the eastern shore. Winnipeg Lake is a navigable body of water nearly 500 miles long, into the southern end of which the Red River flows to offer a route for freight boats into Winnipeg.

The track of the interurban line is laid with an English rail weighing 56 lb. per yard. The rail is supported by cedar and tamarack ties, ballasted with white gravel of good quality, obtained from a large pit owned by the company. Steam railway special work, with spring switches and frogs, is used. The joints are made with six-hole angle bars. A portion of the line was first bonded with round wire and bonding caps, but these more crude bonds are being replaced with electrically welded bonds applied with a special car leased from the Electric Railway Improvement Company, Cleveland, Ohio.

The southern terminus of the interurban line is at the north Main Street car house and division headquarters of the Winnipeg Electric Railway system. At this station passengers are transferred to the city cars and the interurban cars are Y-d. Some of the more important stops along the line of the interurban are Middle Church, Parkdale, St. Andrews and Lower Fort Gary. The northern terminus, Selkirk, is a town of about 3500 inhabitants, which also is served by the Canadian Pacific Railway.

The interurban company has built an attractive passenger and freight station in the center of Selkirk. An illustration of this building is presented. At the northern end of the track in Selkirk a car house and headquarters for the interurban division has beeen erected. Provision is made here for doing light car-repair work, but the heavy repairs are made in the shops of the Winnipeg Electric Railway.

POWER SUPPLY AND STEP-UP STATION

Current for the operation of the Selkirk interurban line is received from the hydroelectric generating station of the Winnipeg Electric Railway Company. This plant delivers power to a receiving station in Winnipeg over a 65-mile transmission line. From the receiving station current is transmitted at 2200 volts to a step-up station located on the interurban line at the north city limits of Winnipeg. Here transformers raise the potential to 13,000 volts for transmission along the right-of-way to converting substations located at Middle Church, 5 miles north of Winnipeg, and at Lockport, 10 miles farther north.

The step-up station near the Winnipeg end is a fireproof building of brick and concrete located about 1600 ft. north of the south end of the interurban line at which point direct current is fed to the interurban trolley wire from a substation of the city railway. The transformer station has ground dimensions of 44 ft. x 21 ft. 6 in. The equipment of the step-up station includes four air-blast transformers of 300-kw capacity each. One transformer is for emergency use. The transformers are furnished with cooling air by two induction motor-driven Buffalo Forge Company fans, which receive air from outside the building and discharge it into an air-tight concrete basement compartment over which the transformers stand.

The power supply is received as 2200-volt, three-phase, 60-cycle current delivered by weatherproof cables to a hand-throw oil switch installed in a brick compartment on the station floor near the wire entrance. The switchboard carries a voltmeter



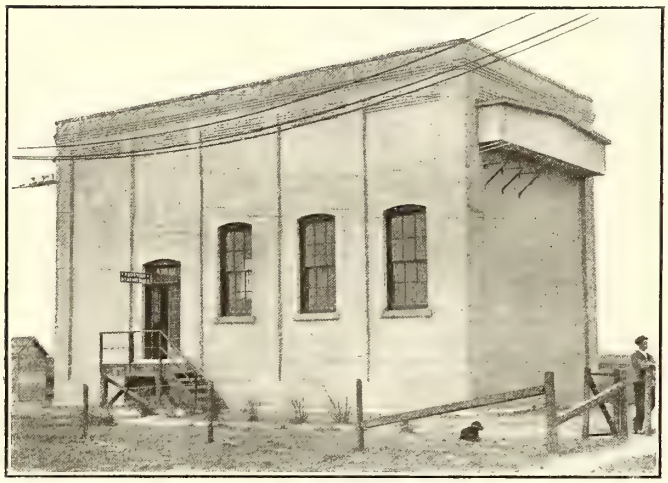
Winnipeg & Selkirk—Substation at Middle Church

and three ammeters on the incoming line. From the terminals of the power switch a set of bus wires connects with the low-tension side of the step-up transformer. The secondary (13,000 volts) side of the transformers is connected with the transmission-line outlets at the track end of the building. The 13,000-volt, three-phase transmission circuit is carried on a single arm at the top of the trolley pole and a lightning rod is installed on every other pole.

SUBSTATIONS

The two substations which supply 650-volt current to the

middle and northern sections of the Selkirk interurban line are similar in design. Each is a fireproof structure of steel, concrete and brick. The building and equipment at Middle Church is typical. This building is located on an acre of ground adjacent to the track roadway. Apartments for the station operator and his family are provided by a two-story extension of the substation building. The parcel of land about the station is used by the operator as a kitchen garden. Current at transmission voltage is led into the substation through a wire tower at the rear of the building. The transmission wires extend across the upper part of the tower and out of the opposite side and on to the Lockport substation. Provision for disconnecting the line on either side of the substation taps is afforded by hand-throw switches. Lightning arresters are installed on both incoming and outgoing transmission terminals. The high-tension connections lead to a set of bus wires to which, in turn, two duplicate sets of converting apparatus are connected. Each set includes line and machine oil switches, a starting compensator and a 300-kw General Electric motor-generator set. The motors of these sets operate with current at transmission voltage and are rated at 436 hp. Each has its own exciter with the armature carried on an extension of the motor-generator shaft. Two starting compensators are provided in this substation, al-



Winnipeg & Selkirk—Step-Up Transformer Station at North Winnipeg

though the connections are such that either compensator may be used in starting either motor-generator set.

ROLLING STOCK

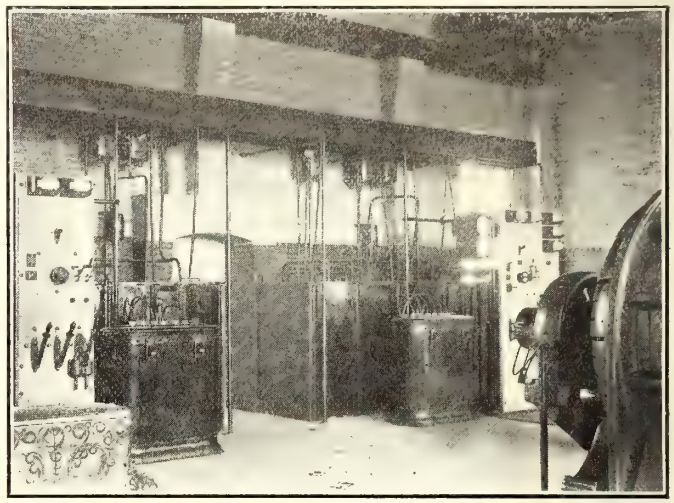
The rolling stock equipment for the Selkirk interurban line now comprises six large double-truck cars, designed and built in the shops of the Winnipeg Electric Railway. These cars are arranged for operation in trains, having end doors, multiple-unit control and M. C. B. couplers. All the equipment is built for single-end operation. All the interurban passenger cars are of similar type except that two of the six car bodies are provided with baggage compartments. Each car body is 55 ft. long over vestibules and provides seats for 64 passengers. The front vestibule is reserved for the motorman and the control and hot-water heater. Hale & Kilburn "walkover" seats with mahogany arm rests and red plush upholstering are used. The interiors are illuminated with a row of 20 16-cp lamps placed directly above the bell rope along the center of the upper deck. The windows are fitted with pantasote curtains carried on Curtain Supply Company fixtures.

Two methods are provided for heating these cars. During the severe winter weather they are heated with Peter Smith hot-water heaters and in the milder weather heat is furnished by an equipment of Consolidated electric heaters. It is stated that both methods of heating are never required at one time, but the electric heaters are installed for use in mild weather because current is available at practically no additional cost from the large water-power generating station.

Each interurban car is mounted on two trucks of Curtis design. Thirty-three-inch wheels, of Midvale and Carnegie manufacture, are used. The axles are 5½ in. in diameter, and each car is equipped with four GE-73 motors and type M control. Other parts of the equipment are as follows: Washburn M. C. B. couplers; Crouse-Hinds arc headlights; Knutson trolley retrievers; Kalamazoo trolley wheels; General Electric automatic air brakes; Peacock hand brakes; Ohio Brass sanders; Ottawa Car Company parcel racks and trimmings.

SERVICE

The Winnipeg, Selkirk & Lake Winnipeg Railway operates



Winnipeg & Selkirk—A. C. Boards and Line Switches in Sub-Station

six trains in each direction daily between Winnipeg and Selkirk, one of which is a mixed passenger and freight train. One train a day is operated in each direction between Middle Church and Winnipeg. All of the through trains make the run of 22 miles in 45 minutes, except the freight train, which requires an hour on its southbound trip and 1 hour and 20 minutes on its northbound trip. During the summer the afternoon runs require two-car trains, which are made up of one motor and one trail car, and which cover the route in the same time as single-car trains. The movement of all trains is controlled by a dispatcher at Selkirk, who transmits his orders over a telephone line.

The financial report of the Winnipeg, Selkirk & Lake Winnipeg Railway for the year 1909 showed receipts of $67,420 and expenses of $31,148, and net earnings for the year of $36,272, against which were charges of $20,000 for interest on bonds and $2,698 for taxes, etc., leaving a surplus of $13,574. This new interurban road was built by company forces under the supervision of Wilford Phillips, general manager, and Wilson Phillips, superintendent of construction of the Winnipeg Electric Railway, to whom acknowledgment is made for the foregoing information.



Winnipeg & Selkirk—Standard Car

CLEVELAND MEETING OF COMMITTEE ON INTERURBAN RULES

The committee on interurban rules of the Transportation and Traffic Association, as reported in last week's issue of the ELECTRIC RAILWAY JOURNAL, page 1105, held a second meeting at Cleveland, Ohio, on June 22. An account of the first meeting of the rules committee held at Fort Wayne, Ind., June 7, 1910, appeared in the ELECTRIC RAILWAY JOURNAL for June 11. At the Cleveland meeting the committee continued the consideration of adapting to interurban service the American Railway Association standard code of train rules and rule numbers, beginning with the section on "Movement of Trains."

Mr. Emmons, the chairman, first announced that additional data sheets had been received and that the total mileage of the 65 roads which had replied to the data sheets sent out by this committee was 6396. The vote on the question of whether the Transportation and Traffic Association should adopt the steam railway code insofar as it was applicable to electric interurban service stood 19 for adoption and 23 against adoption. Mr. Emmons then read correspondence that he had carried on with F. C. Rice, chairman of the committee on transportation of the American Railway Association. Following the instructions of the Denver meeting of the Transportation and Traffic Associaiton, Mr. Emmons, as chairman of the committee on interurban rules, had asked Mr. Rice for a joint meeting with the rules committee of the steam railway association for the purpose of suggesting any modifications in the steam railroad code which would make it more adaptable for both steam and electric operation. Mr. Rice thought it was not possible to arrange for a joint meeting of the full committees at which sufficient time could be given to consideration of all proposed revisions. He, therefore, suggested that one representative from the steam and electric railway associations meet with some railway commissioner to discuss the need for changes. The interurban rules committee instructed Mr. Emmons to represent it at such a meeting.

RECONSIDERATION OF RULES

Before passing to the rules for movement of trains the committee reconsidered Rule 128 of the interurban code which had been discussed but not adopted at the Fort Wayne meeting. This rule was approved with the substitution of the words "proper stop signal" and "proper proceed signal" for "one bell and "two bells" to make it conform to Rule 16 defining "Communication Signals." The rule was numbered 37 and now reads as follows:

"37. Motormen approaching any siding used for meeting-point purposes will blow one long blast of whistle when approaching same, in all respects, as required when approaching a regular station stop. The conductor shall answer such blast with the proper stop signal if a train is to be met at such siding, or if any order is to be taken at such siding, and with the proper proceed signal if the train is to proceed."

At the Fort Wayne meeting Rules 81 to 86, covering the movement of trains were formulated. At the Cleveland meeting, however, this portion of the work was reviewed and some slight changes were made as follows:

Rule 81 was approved to read as follows:

"81. (Double, Three or more tracks.) Trains must run with the current of traffic, unless otherwise directed by proper authority."

Rule 82 of the steam code was approved. It follows:

"82. Time-table schedules, unless fulfilled, are in effect for 12 hours after their time at each station.

"Regular trains 12 hours behind either their schedule arriving or leaving time at any station lose both right and schedule, and can thereafter proceed only as authorized by train order."

Rule 203 of the interurban code was approved and renumbered 83.

In a discussion of interurban Rule 203, which permits the movement of a train, protected by flag, when the dispatcher cannot be reached, Mr. Griffin and Mr. Handshy expressed disapproval of this procedure, because they did not believe it wise to use any rule whereby trains might approach each other between telephone stations. Because of this difference of opinion steam code rule 83 was inserted as optional and renumbered 83a. This reads:

"83a. A train must not leave its initial station on any division (or subdivision), or a junction, or pass from double to single track, until it has been ascertained whether all trains due, which are superior, or of the same class, have arrived or left."

Interurban Rule 203a, explaining "Protected by Flag," as used in interurban Rule 203, was numbered 83b.

Steam code Rule 87 was approved with the use of a five-minute clearance. It reads:

"87. An inferior train must keep out of the way of opposing superior trains and failing to clear the main track by the time required by rule must be protected as prescribed by Rule 99.

"Extra trains must clear the time of regular trains five minutes unless otherwise provided, and will be governed by train orders with respect to opposing extra trains."

Steam code Rule 88 was approved with the same number and with the addition of the following foot note: "Your committee does not recommend the use of superiority by direction in interurban train service." Rule 88 reads:

"88. At meeting points between trains of the same class, the inferior train must clear the main track before the leaving time of the superior train.

"At meeting points between extra trains, the train in the inferior time-table direction must take the siding unless otherwise provided."

"Trains must pull into the siding when practicable; if necessary to back in, the train must first be protected as prescribed by Rule 99, unless otherwise provided."

Interurban Rule 206 was approved and numbered 88 (optional) for use when superiority by direction is not used.

The following rule was approved for No. 88a:

"88a. (Single track.) At meeting points between trains, either by schedule or train order, should the train that is to to occupy the main track arrive first, it will be the duty of the conductor of such train to promptly set switch for the siding, so that the train to be met can take the siding with the least possible delay."

Steam code Rule 89 was adopted with the following note which will apply both to Rules 88 and 89. "Your committee recommends that where greater clearance is necessary Rule 88 shall require a clearance of five minutes and Rule 89 of 10 minutes." Rule 89 reads:

"89. At meeting points between trains of different classes the inferior train must take the siding and clear the superior train at least five minutes, and must pull into the siding when practicable. If necessary to back in, the train must first be protected as prescribed by Rule 99, unless otherwise provided."

Steam code Rule 90 was approved with the same number, with a foot note stating that the committee does not recommend superiority by direction. Rule 90 reads:

"90. Trains must stop at schedule meeting stations, if the train to be met is of the same class, unless the switch is right and the track clear.

"When the expected train of the same class is not found at the schedule meeting station, the superior train must approach all sidings prepared to stop, unless the expected train is met.

"Trains must stop clear of the switch used by the train to be met in going on the siding."

The committee approved the following steam code rules retaining the steam code numbers: 91, 92, 93, 94, 95 (same as interurban Rule 201), 96 (same as interurban Rule 214), 97, 98 and 99. The steam code rules which are not duplicates of the interurban code rules read as follows:

"91. Unless some form of block signals is used, trains in the same direction must keep at least five minutes apart, except in closing up at stations."

"92. A train must not arrive at a station in advance of its schedule arriving time.

"A train must not leave a station in advance of its schedule leaving time."

"93. Within yard limits the main track may be used protecting against ——— class trains.

"——— class and extra trains must move within yard limits prepared to stop unless the main track is seen or known to be clear."

"94. A train which overtakes another train so disabled that it cannot proceed will pass it, if practicable, and if necessary will assume the schedule and take the train orders of the disabled train, proceed to the next open telegraph office, and there report to the ———. The disabled train will assume the right or schedule and take the train orders of the last train with which it has exchanged, and will, when able, proceed to and report from the next open telegraph office.

"When a train, unable to proceed against the right or schedule of an opposing train, is overtaken between telegraph stations by an inferior train or a train of the same class having right or schedule which permits it to proceed, the delayed train may, after proper consultation with the following train, precede it to the next telegraph station, where it must report to ———. When opposing trains are met under these circumstances, it must be fully explained to them by the leading train that the expected train is following."

"97. Extra trains must not be run without orders from the ———."

"98. Trains must approach the end of double track, junctions, railroad crossings at grade, and drawbridges, prepared to stop, unless the switches and signals are right and the track is clear. Where required by law, trains must stop."

"99. When a train stops or is delayed, under circumstances in which it may be overtaken by another train, the flagman must go back immediately with stop signals, a sufficient distance to insure full protection. When recalled he may return to his train, first placing two torpedoes on the rail when the conditions require it.

"The front of the train must be protected in the same way, when necessary, by the ———."

Interurban Rule 218 will be inserted as Rule 99a because no similar precautionary rule appears in the steam railway code.

The committee also approved steam code Rules 100 to 104, retaining the same numbers. These read:

"100. When the flagman goes back to protect the rear of the train, the ——— must, in the case of passenger trains, and the next brakeman, in the case of other trains, take his place on the train.

"101. If a train should part while in motion, trainmen must, if possible, prevent damage to the detached portions. The signals prescribed by Rules 12 (d) and 14 (f) must be given.

"The detached portions must not be moved or passed until the front portion comes back."

"102. When cars are pushed by an engine (except when shifting and making up trains in yards) a flagman must take a conspicuous position on the front of the leading car."

"103. Messages or orders respecting the movement of trains or the condition of track or bridges must be in writing."

"104. Switches must be left in proper position after having been used. Conductors are responsible for the position of the switches used by them and their trainmen, except where switch tenders are stationed.

"A switch must not be left open for a following train unless in charge of a trainman of such train."

Interurban code Rule 255, defining the responsibility for the safety of trains, will be renumbered and used as Rule 105.

Rule 106 of the steam code was approved with its present number. It reads:

"106. In all cases of doubt or uncertainty the safe course must be taken and no risks run."

Additional rules were formulated to follow Rule 106, because they are necessary for interurban operating conditions with telephone train dispatching. In all cases where the steam code uses the word "engine" the revised interurban code will use "engine or motor."

Rules 107 to 114, inclusive, were approved to read as follows:

"107. When unable to reach the dispatcher on account of defective telephone, all extra trains will lose their rights as extra trains and such extra trains whose movement is essential to the maintenance of the passenger service will become sections of regular scheduled trains as provided in Rule 108, all other extras at once clearing main track and remaining clear until telephone service is restored."

"108. When telephone line is out of order, any scheduled train, when requested by conductor of any train, may carry signals for such, as a section following, without first obtaining orders from the ———. The conductor of train desiring signals displayed shall issue second section order in duplicate, as per No. 3, form F, Rule —, to be duly signed by the respective conductors. Both copies of order to be turned in by the conductors of the respective trains. Scheduled train, under such arrangement, will immediately display signals, though second section must not proceed until it is certain that signals are so displayed by the first section."

"109. Where extra trains are assigned working limits, such trains must move within these limits with the current of traffic unless train orders otherwise direct."

"110. Every train must be brought to a full stop before crossing the tracks of any railroad at grade, at a distance of not less than fifty (50) ft. from the railroad track, except when such crossing is provided with interlocking apparatus or other system of signals, and must not proceed until proper signal is received from the conductor, and crossing is seen to be clear, and no train approaching and about to pass over crossing. The conductor shall be responsible for the motorman having in front vestibule, for immediate use in case of necessity, a red flag by day and a red light by night. This order strictly prohibits the motorman from taking a signal or order from any one else but his own conductor, and conductors must not permit any one else to perform their duties at these crossings unless authority has been conferred upon another employee by the ———."

"111. A train about to enter or leave a siding must approach the switch under full control."

"112. A train meeting another train at a siding open at both ends must enter at the nearest end, and under no circumstances run by and back in without special orders from the ———."

"113. Tongue switches, wherever located, must be approached with train under full control, and must not be run over unless the tongue is known to be properly set. Motormen and conductors will be held equally responsible for the proper setting of switches used by them, and they must take every precaution for the protection of their trains, even if not provided by the rules."

"114. All regular trains, or sections of a regular train, when becoming —— minutes late, must report to the dispatcher, and will also report for each successive —— minutes lost. If unable to get the dispatcher by company or long-distance telephone, the train may proceed on its time-card rights until it is ——minutes late, after which it must not proceed except by flagging, according to rule 83a.

Rule 115 will be the same as steam code double-track Rule D-153. It reads:

"115. Trains must use caution in passing a train receiving or discharging passengers at a station, and must not pass between it and the platform at which the passengers are being received or discharged."

Rule 116 regarding approaching at meeting points was approved to read as follows:

"116. All trains must approach meeting or passing points under full control, and must not attempt to pass until switches and signals are seen to be right and the train to be met or passed is clear of the main track.

RULES FOR MOVEMENT BY TRAIN ORDERS

Steam code Rules 201, 202 and 203 were approved with their numbers. They read:

"201. For movements not provided for by timetable, train orders will be issued by authority and over the signature of the ———. They must contain neither information nor instructions not essential to such movements."

"They must be brief and clear; in the prescribed forms when applicable; and without erasure, alteration or interlineation."

"202. Each train order must be given in the same words to all persons on trains addressed."

"203. Train orders will be numbered consecutively each day, beginning with No. — at midnight."

Interurban code Rules 252 and 253 were approved and renumbered 204 and 205.

Steam code Rule 206 was approved with its number. It reads:

"206. Regular trains will be designated in train orders by their numbers, as 'No. 10' or '2d No. 10,' adding engine or motor numbers if desired. Extra trains will be designated by engine or motor numbers, and the direction as 'Extra 798 "East" or "West."' Other numbers and time will be stated in figures only."

Interurban code Rule 255 was approved and renumbered 206a.

The committee spent considerable time in formulating rules covering instructions for obtaining train orders over telephone lines from stations with or without operators. Some members favored having the conductor read the order to the dispatcher for completion after the order had been taken by the motorman and read back for O. K. Other members held that the introduction of a third party in the handling of the order was too great a refinement. Because of the continued difference of opinion between the members of the committee the rules which will be submitted will include optional rules, so that a choice can be made of either method.

Interurban code Rule 256 with the elimination of the last paragraph which reads: "If for any reason the line shall fail before the dispatcher completes an order, it is of no effect, and must then be treated as though it had not been given," and interurban Rule 257 were combined and renumbered 207a.

Interurban code Rules 256 (Optional), including the last paragraph, and Rule 257, were combined and renumbered 207a (Optional).

The first paragraph of interurban code Rule 258 was approved with the following supplement and was numbered 207b. The supplement reads:

"207b. To obtain orders at stations where there are operators the operator will call up the dispatcher upon approach of train, who will give such orders as are necessary, whereupon the operator will write same plainly and without abbreviations on a blank provided for that purpose with two carbon copies and as many additional carbon copies as may be ordered by the dispatcher and when the operator has finished writing the order he shall repeat it to the train dispatcher, who will O. K. same, if correct. The operator shall sign same and repeat his signature with the number of the order to the dispatcher, who will then give the time at which the order is O. K.'d, which shall be entered upon the order by the operator. The operator will hand the order to the conductor of the train for whom it is intended, who shall sign same with name and train number, and read the order in full without abbreviation back to the dispatcher. The dispatcher will, if the order is correct, complete the order by giving his initials and the time of completion to the conductor, who will immediately write same on the order, which will then be in full force and effect. If, for any reason, the line should fail before the dispatcher completes the order, it is of no effect and must then be treated as if it had not been sent."

The first sentence of interurban Rule 261, with the proper references, will be renumbered as Rule 207c.

The entire interurban Rule 261, inserting the proper reference numbers, was approved as 207c (Optional).

Rule 208b of the steam code was approved and renumbered 208. It reads:

"208. A train order to be sent to two or more offices must be transmitted simultaneously to as many of them as practicable.

"The several addresses must be in the order of superiority of trains and when practicable must include the operator at the meeting or waiting point, each office taking its proper address.

"When not sent simultaneously to all, the order must be sent first to the superior train.

"Copies of the order addressed to the operator at the meeting or waiting point must be delivered to all trains affected until all have arrived from one direction."

Rule 262 of the interurban code was approved as Rule 209.

The committee agreed to leave blank the numbers from 210 to 213 inclusive, to permit individual properties to insert any special rules required.

Steam code Rules 214, 215 and 216 were approved and the numbers retained. They read:

"214. When a train order has been repeated or 'X' response sent, and before 'complete' has been given, the order must be treated as a holding order for the train addressed, but must not be otherwise acted on until 'complete' has been given.

"If the line fail before an office has repeated an order or has sent the 'X' response, the order at that office is of no effect and must be there treated as if it had not been sent."

"215. The operator who receives and delivers a train order must preserve the lowest copy."

"216. For train orders delivered by the train dispatcher the requirements as to the record and delivery are the same as at other offices."

Steam code Rule 217, which is not contained in the interurban code, was approved with its number. It reads:

"217. A train order to be delivered to a train at a point not a telegraph station, or at one at which the telegraph office is closed, must be addressed to

'C. & M——— (at ———), care of ———,'

and forwarded and delivered by the conductor or other person in whose care it is addressed. When form 31 is used 'complete' will be given upon the signature of the person by whom the order is to be delivered, who must be supplied with copies for the conductor and motorman addressed, and a copy upon which he shall take their signatures. This copy he must deliver to the first operator accessible, who must preserve it, and at once transmit the signatures of the conductor and engineman to the train dispatcher.

"Orders so delivered must be acted on as if 'complete' had been given in the usual way.

"For orders which are sent, in the manner herein provided, to a train, the superiority of which is thereby restricted, 'complete' must not be given to an inferior train until the signatures of the conductor and engineman of the superior train have been sent to the ———."

Interurban code Rule 265 was approved and renumbered 218.

Rule 219 was accepted as follows:

"219. Unless otherwise directed, an operator must not repeat a train order for a train, the motor of which has passed his train order signal or station, until he has ascertained that the conductor and motorman have been notified that he has orders for them."

Steam code Rules 220, 221a, 221b and 222 were approved with their numbers. They read:

"220. Train orders once in effect continue so until fulfilled, superseded or annulled. Any part of an order specifying a particular movement may be either superseded or annulled.

"Orders held by or issued for, or any part of an order relating to a regular train become void when such train loses both right and schedule as prescribed by rules 4 and 82, or is annulled."

"221a. A fixed signal must be used at each train-order office, which shall indicate 'stop' when there is an operator on duty, except when changed to 'proceed' to allow a train to pass after getting train orders, or for which there are no orders. A train must not pass the signal while 'stop' is indicated. The signal must be returned to 'stop' as soon as a train has passed. It must be fastened at 'proceed' only when no operator is on duty.

"Operators must have the proper appliances for hand signaling ready for immediate use if the fixed signal should fail to work properly. If a signal is not displayed at a night office trains which have not been notified must stop and ascertain the cause and report the facts to the ——— from the next open telegraph office.

"Where the semaphore is used the arm indicates 'stop' when horizontal and 'proceed' when in an inclined position."

Note to rule 221a.—The conditions which affect trains at stations vary so much that it is recommended each road adopt such regulations supplementary to this rule as may best suit its own requirements.

"221b. A fixed signal must be used at each train-order office, which shall indicate 'stop' when trains are to be stopped for train orders. When there are no orders the signal must indicate 'proceed.'

"When an operator receives the signal '31,' or '19,' followed by the direction, he must immediately display the 'stop' signal for the direction indicated and then reply 'stop displayed,' adding the direction; and until the orders have been delivered or annulled the signal must not be restored to 'proceed.' While 'stop' is indicated trains must not proceed without a clearance card (from ——— (A)).

"Operators must have the proper appliances for hand signaling ready for immediate use if the fixed signal should fail to work properly. If a signal is not displayed at a night office trains which have not been notified must stop and ascertain the cause and report the facts to the ——— from the next open telegraph office.

"Where the semaphore is used the arm indicates 'stop' when horizontal and 'proceed' when in an inclined position."

"Notes to rules 221a and 221b.—The committee has recommended two forms of Rule 221, leaving it discretionary to adopt one or both of these forms according to the circumstances of the traffic."

"222. Operators will promptly record and report to the ——— the time of departure of all trains and the direction of extra trains. They will record the time of arrival of trains and report it when so directed."

Interurban code Rule 276, indicating signs and abbreviations, was approved as No. 223 with the exception of the use of "Jct." for junction.

Interurban code Rule 263 was approved and renumbered 224.

Interurban code Rule 271 was approved and renumbered 225.

Interurban code Rule 270 was approved and renumbered 226.

Interurban code Rule 266 was approved and renumbered 227.

FORMS OF TRAIN ORDERS

The committee next discussed the advantages of "run late" orders. It was voted to approve the American Railway Association standard forms of train orders for single and double-track operation, with the exception that the words "motor number" be indicated in addition to "train number" in the form for each order.

The committee recommended the use of the standard "31" and "19" order forms of the American Railway Association and a modified form with certain printing on the body of the blank, similar to that used by the Indiana Union Traction Company. It also recommended that the train-order numbers of the American Railway Association be adopted and that the examples of orders quoted be printed in italics, as in the American Railway Association standard code of rules.

The chairman announced that he would have copies of the minutes of the Ft. Wayne and Cleveland meetings of the committee forwarded as soon as possible to each member so that they could carefully reconsider the rules as a whole and designate whether another meeting of the committee was needed.

DATA SHEET OF ENGINEERING ASSOCIATION COMMITTEE ON WAY MATTERS.

The committee on way matters of the American Street & Interurban Railway Engineering Association is sending out to all member-companies a data sheet containing 10 questions relating to economical maintenance of track and roadway, car clearance and specifications for steel rails. Replies should be addressed to E. O. Ackerman, engineer of maintenance of way, Columbus Railway & Light Company, Columbus, Ohio, who is chairman of the committee.

MEETING OF CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The meeting of the Central Electric Accounting Conference, held on board the White Star Line steamer *Greyhound,* en route between Toledo and Detroit, on Saturday, June 25, 1910, was attended by over two-thirds of the membership of the conference, and was one of the most successful meetings that the conference has held. O. Burgett, Western Ohio Railway, suggested holding the meeting on the steamer. It was an unique idea, and resulted not only in a large attendance, but a most interesting and profitable meeting. Irwin Fullerton, auditor, Detroit United Railway, entertained the members of the conference during the afternoon and evening. Mrs. Fullerton was present to entertain the ladies.

The report of the executive committee indicated that the finances of the conference were in excellent condition, and recommended for the consideration of the conference the acceptance of the invitation extended by C. E. Thompson, auditor, Chicago & Milwaukee Railway, to hold the September meeting in Chicago. A letter from the Illinois Traction System was read in which an invitation was extended to the conference to hold a meeting in St. Louis, upon the completion of the company's terminal building. It is possible that the spring meeting will be held in St. Louis. It was also recommended that the proceedings of the meeting be published in pamphlet form for distribution among the members, and that in the interest of the membership, a competent man be employed to prepare a classified list of items chargeable to the several operating expense accounts provided in the Interstate Commerce Commission classification.

The recommendations of the executive committee were approved and the question of holding the next meeting in Chicago is to be submitted to a vote by mail. S. C. Rogers extended an invitation to the conference to hold the December meeting in Youngstown, Ohio.

H. S. Swift, president of the American Street and Interurban Railway Accountants' Association, was introduced by A. F. Elkins, auditor of the Columbus, Marion & Delaware Railway. Mr. Swift said in part that the length of life of way, structures and equipment and the determination of the proper amount to be added above ordinary maintenance to cover depreciation were great questions to those companies whose franchises were nearing maturity, to others who have been over sanguine in the inauguration of charges too low to cover cost and to give a reasonable return on their investment, and to those who are subject to rate regulation. In the past, changes due to obsolescence have been so frequent that the owners had not had the chance to wear out their property but he hoped that this condition would not continue in the future. Consequently, there ought to be available better length of service data to give a correct basis for figuring depreciation. He said that the American Street & Interurban Railway Association recognized the good work the Central Electric Accounting Conference was doing, and believed that other localities should organize similar associations. There were many problems which could best be discussed in such meetings, particularly those arising from interchange of traffic. However, all should be members and attend the meetings of the national association which needed their help and influence to bring about more uniform practice and a more general recognition of the value of the services given to the public, and a better knowledge of the fact that after proper allowance for depreciation and similar charges is made, the profits on the investment are seldom greater than the usual returns in other lines of business. However he had great confidence in the justice of the public when it is correctly informed, but the concentrated effort of all companies would be required to remove the false impression formed from past reports on profits.

The auditors might sometimes be consulted in reference to the financial policy of their companies, with good results. As a class they were conservative. Certainly the errors of the

past had not, as a rule, been that of conservatism, the auditors had long advocated those principles of accounting which were now recognized by bankers and investors. He thought that the auditors often were too modest when they spoke about their duties and responsibilities. Perhaps their great failing was to assume that their reports and statements showed as much to their executive officers as they did to themselves. This was not true in some cases and he wished to emphasize the importance of discussing such reports with the manager, and bringing to his attention the value of details which could be easily overlooked. Concluding, President Swift said the auditors should avoid the false idea that they could best serve their companies by endeavoring to do a large amount of clerical work. In smaller companies the auditor must necessarily give much of his time to the detail work of the office, but it is false economy to try to save a clerk's salary if this prevents the auditor having sufficient time to familiarize himself with the property and to analyze his own figures intelligently.

At the close of his address a resolution of thanks was given to Mr. Swift.

A paper on "Park Accounting," by E. L. Schmock, assistant secretary and treasurer, Cleveland, Painesville & Eastern Railroad, was productive of an animated discussion that brought out the fact that very few companies interested in parks owned and operated the parks themselves. This paper will be found on page 20. Some parks were operated by a separate company, others were operated under lease. In but few instances were parks operated at a profit except such profit as might be derived from the increased travel attracted by the park. Mr. Rogers was asked to outline the organization and plan of park accounting in his company, and stated that the Mahoning & Shenango Railway & Light Company owns and operates Cascade Park in New Castle and one of its underlying companies, the Youngstown Park & Falls Street Railway, owns and operates Idora Park in Youngstown. The company actually operates all the refreshment stands and amusement features of the parks, except the roller coaster, circle swing and old mill. Each park has its own superintendent, who has jurisdiction over everything but the receipts, a representative of the treasury department collecting all money daily, giving written receipts to the persons from whom he receives the money. He also attends to the daily collection of cancelled tickets and their subsequent destruction. A detailed daily report is prepared, duplicate copies of all receipts issued being attached. One copy of this report goes to the operating officer and the other to the accounting department. There is attached to this report also a duplicate deposit slip issued by the bank for the total amount of money called for by the report. The representative of the treasury department who attends to the daily collection of the receipts is the only person who handles the money from the time it leaves the park until it is actually deposited in the bank. The park revenue and expense accounts, some 30 in number, are kept in a loose leaf abstract form with a separate sheet for each account. In the general ledger one general account with the park is provided to which is credited all revenue and charged all operating expenses. Included in the operating expenses is every item of expense incident to the park management, including a proportion of the salary of the treasury and auditing department clerks engaged in the keeping of park accounts. At the close of the year the net revenue derived from the operation of parks is credited under the head of miscellaneous income, or if there should be a deficit, this under the Interstate Commerce Commission classification is charged to account No. 46, advertising. While the direct operation of the parks involves many difficulties it has been found that the company has been able to give the public better value for the money expended than through the medium of lessees or concessionaires, and has been able, in addition to the large increase in travel, to make a net profit on the operation of the parks themselves. To do this it requires people adapted to this class of work, but Mr. Rogers' company had been fortunate in that respect. It takes care of the park superintendents during the winter season by employing them in other work.

The paper, "Comparative Statements," by W. B. Wright, auditor, Indianapolis & Cincinnati Traction Company, which is printed in abstract below, treated of a subject of great importance and value at this time. At the close of the discussion on this paper a motion was made that the chairman appoint a committee of three, of which W. B. Wright should be chairman, to look into this matter further, and submit forms of comparative statements at the next meeting of the conference with the intention of adopting standard forms in this connection. The president appointed E. L. Kassemeir and S. C. Rogers to serve with Mr. Wright.

Walter Shroyer, auditor, Indiana Union Traction Company, led a discussion on accounting of interline baggage. Two points were brought out in the discussion:

1st. Advisability of adopting an interline baggage check, since both local and interline baggage are now handled on the same form, providing additional coupons for each road over which such baggage is handled, thus conforming with the present method of handling interline tickets and way bills.

2d. Proper method of accounting in connection with the checking of interline baggage on Central Electric Traffic Association mileage. It is not permissible to check baggage interline on C. E. T. A. mileage at the present time, but it is understood that the Traffic Association expects to arrange for such checking in the near future.

A. F. Elkins paid a tribute of respect to the memory of W. I. McLure, who at the time of his death was auditor of the Toledo Urban & Interurban Railway and a member of the conference. On motion Mr. Elkins was appointed a committee of one to prepare resolutions expressing the sympathy of the conference, to be forwarded to the family.

UNIFORM COMPARATIVE MONTHLY STATEMENTS*

BY W. B. WRIGHT, AUDITOR, INDIANAPOLIS & CINCINNATI TRACTION COMPANY

It may be trite to say that standardization, concentration or centralization if you will, is the order of the day; that the production of the greatest amount of "useful work," with the least expenditure of energy must be the end and aim of those directing the expenditures of such energy, whether that energy be the electrical output of the power station or the mental product of the office. With the coming of fixed system and accurate records in the production department, and further with the strong tendency now manifested by the executive himself to come closely in touch with actual operating conditions, instead of reaching his conclusions through reports from his operating officers, we find a continued call for better and cleaner cut work from the accounting department. The latter in turn is asking and getting better office room, better furniture, better mechanical equipment and better men. I believe that these conditions will continue until accounting shall have broadened and developed into one of the recognized professions, calling into its field of effort men of high mental attainment and force of character. There are large problems ahead of us that must be solved through scientific accountancy. The men who solve them must have a training which will make them the equal of the engineer in technique and give them the acumen of the financier and the finesse of the statesman.

The original idea of a comparative monthly statement for a manufacturing concern seemed to include a comparison of the *cash receipts, cash disbursements, total shipments, total pay-roll* and a showing of cash balances on hand; this with a trial balance (no balance sheet was ordinarily made) completed the list as required by many concerns with high commercial rating. From what I have seen of the earlier accounting of our traction companies, I should say that a goodly number of them are possessed of records of scarcely greater value. For instance, I remember one item on the books of a company not now in existence, where an accommodation loan was made at the local

*Abstract of a paper presented at the Central Electric Accounting Conference, Toledo, Ohio, June 25, 1910

bank, the bank properly charged and *earnings* account for the day *credited;* the entry had never been corrected and apparently never discovered. A comparative analysis of the earnings account, in the hands of a competent executive, would undoubtedly have brought to light what in charity we will call an error.

Granting the necessity for a uniform system and admitting that we now have a standardized classification, imposed by government, on which to build our system work, there still remains one step to be taken—the adoption of a standardized statement which shall at fixed times and for definite periods compare in an orderly and concise manner the data accumulated through the working of the standardized methods now in use, and which shall in addition show such data deduced therefrom as may be deemed necessary or desirable. With a view to furnishing ground for discussion I will suggest that this statement should show first the income account in the most condensed form possible, using *grand totals only.* For instance, give gross earnings from operation, total operating expenses, net earnings from operations, miscellaneous income, gross income less operating expenses, deductions from income (showing taxes separately if desired), net income, etc. In addition, as the data mentioned will occupy but small space, there might be made an analysis of the earnings from operation showing *by divisions,* the value of various classes of tickets sold and items of revenue other than passenger. Following the condensed income statement, should appear the usual income statement, showing the footings of the various revenue accounts, the footings of the five divisions of the operating accounts as shown by the standard classification, and such detail as to taxes, bond interest and other fixed charges, and deductions from net income as the conditions peculiar to each company may indicate.

Next to and supporting the income account should be the statement of operating expenses, this showing footings for each of the five groups, with footings of subdivisions in group 4, and a grand total of all these footings showing total operating expenses. In addition it might be convenient to show on this page immediately below the footing of each group its "Per Car Mile Cost" and also the percentage of the *group total* to the *total operating expenses.* This latter percentage is, I think, usually computed on gross earnings as a base, but I can see no logical connection between gross earnings and these operating group totals, while there is an approximately fixed ratio between the group totals and the grand total of the operating expenses. In comparison with gross earnings, where the latter show a sudden increase caused by interesting events inducing the people to ride freely with little increased cost to the operation account, the group per cent will fall. If the latter condition is continued for any length of time it would be possible for expenditures in one or more of the groups to be in reality extravagant while the percentages would appear to show by their lessening, that economies were being practiced. With the total operating expense as the base, this would not be the case, but the nominal ratio once established, any serious variation from month to month would be justified to the inspecting officer by known traffic conditions. Lacking this, the responsible official would be called upon for an explanation.

Following this should, I think, come the data sheet bearing the revenue and traffic statistics. Standardized data should be carefully worked out and in the planning should be reduced to the fewest possible number of items that will reasonably and safely give the necessary information. In cases where additional information is necessary on account of local conditions, this may be added by the individual company without prejudice to the standard. After the data sheets would logically come the statement of expenditures for road and equipment which should also conform to the requirements of the Interstate Commerce Commission's classification.

Last should be shown the balance sheet carrying assets and liabilities. If desired the general ledger may be so sectionalized and the items on the balance sheet so grouped that the latter will each month show the conditions of capital stock account, bonded debt, sinking funds, etc. This would make unnecessary, with the monthly showing, any separate statement or schedule carrying this information. In addition to the double columns usually carried on the comparative statement, showing the amounts for each month and for each yearly period. I should suggest that the standard form might show two additional columns, one to contain the increases and decreases, the other the percentages of same based on the previous year; these latter, however, would probably be worked out only for the more important items and for the group and total footings. With the appliances now available for "mechanical arithmetic" the additional time required would be small, even with the larger companies.

As to the method to be followed in getting any proposed form of report in concrete shape for consideration, I believe that this is a most important subject and feel that it should be thoroughly discussed at this or a subsequent meeting—that each member should inform himself fully as to the ideas of his executive officers and that this conference possibly through its officers, should by correspondence or otherwise place itself in touch with other like associations and learn their practices and wishes. I take this position as it seems to me there is too much tendency to standardize *locally* and *sectionally,* without due reference to conditions beyond the limits of our immediate interest, forgetting that our business is a progressive one, that our borders are rapidly enlarging, that the stranger of to-day may be our neighbor to-morrow, and that shortly his lines may become a portion of our own systems. Under such conditions standardization in all departments, not sectional, but national, is the end for which we should strive.

PARK ACCOUNTING*

BY E. L. SCHMOCK, ASSISTANT SECRETARY, CLEVEVLAND, PAINESVILLE & EASTERN RAILROAD

The park accounting methods of the Cleveland, Painesville & Eastern Railroad probably are different from those of other roads, because a small company has been incorporated to operate Willoughbeach Park. A separate set of books is used by the park company, although they are not as elaborate as the railroad company's books. On the ledger is kept a separate account for the receipts of each of the different amusements and concessions. In the operating and maintenance accounts is kept a separate account from each of the amusements and concessions showing labor separate from material and supplies. The man in charge of each amusement and concession makes out a report each evening covering his receipts for the day. This report, together with the cash and tickets collected, is turned in to the superintendent of the park.

There is only one ticket booth in the park; it is in the main pavilion. On holidays another ticket booth is opened on the grounds. The ticket seller at the main pavilion also acts as cashier and makes out a report each evening, showing the number of tickets sold, turning in this report with the cash to the superintendent. The superintendent then takes each of the individual reports and the cashier's report and makes one final report for the day's business covering all of the amusements and concessions. Each morning the individual reports, superintendent's report, tickets and cash collected are sent to the general office, where they are checked up by the cashier of the railroad company and the money deposited in the bank.

Owing to the fact that some of the concessions and amusements are scattered around the grounds, and the park not being large enough to have several ticket sellers stationed around the grounds, both tickets and cash are accepted at some of the concessions and amusements.

In the large parks where the business justifies employing several ticket sellers, no cash should be taken at the concessions and amusements. Each amusement and concession should be provided with a ticket box (one which cancels the tickets being preferred) in which the people can deposit their tickets

*Abstract of a paper read at a meeting of the Central Electric Accounting Conference, June 25, 1910.

without having the attendant handle them. Some persons in authority should at the close of each day's business go around and collect these tickets, and in order to get at the receipts of each amusement the tickets can be weighed, and the receipts approximated in this way.

The dining-room and confectionery privileges, also the cane-rack, doll-rack, etc., in Willoughbeach Park are leased on a percentage basis. The superintendent of the park makes a settlement with the manager of each of these concessions every evening, redeeming the tickets which are taken in, less the percentage which belongs to the park.

The railroad company's linemen take care of the wires, lamps, etc., at the park, and occasionally some of the trackmen are sent to the park to help fix up the grounds, when it is necessary. The railroad company bills the park company each month for this labor, and any material used.

In the matter of advertising attractions at the park or any special event, the railroad company does this advertising and charges one-half of the cost to the park company. This is billed to them at the end of the month. At the end of each month a statement is made comparing the receipts of each amusement and concession with those of the preceding year, and a trial balance is also taken showing the condition of the company at that time. In order not to make the bookkeeping of the park company a burden no attempt is made to get out a detail statement of operation each month.

FARE CASE AFFECTING EAST ST. LOUIS & SUBURBAN RAILWAY

A case involving the rate of fare charged in Belleville, Ill., by the East St. Louis & Suburban Railway, is now pending in the United States Courts. The company seeks to enjoin the city of Belleville against the enforcement of an ordinance reducing the rates of fare previously collected by the railway in certain territory.

The company formerly made four fare collections between the city of St. Louis (Eads Bridge) and the city of Belleville. Two of these collections were within the limits of the two cities as they existed at that time and the other two collections were in the intervening territory and were equally divided geographically. Largely for the purpose of effecting a reduction in the rate of fare on the lines of the railway, the city of Belleville annexed a strip of territory about 6 miles long by 2000 ft. wide, extending from its former city limits to the dividing point of the inter-city fare collections and passed an ordinance prohibiting a charge of more than a 5-cent fare within the city limits as extended. By agreement, the railway operated under this plan for over a year in order to determine the actual results. It was found that the net receipts from operation were from $40,000 to $50,000 per annum less than the amount required to pay 6 per cent on the actual cash cost of the property regardless of the issue of securities and 6 per cent for depreciation and amortization.

The company then entered suit in the United States Court for an injunction against the enforcement of the ordinance. It was alleged that the ordinance would take the property of the company without compensation and also that the ordinance violated the contract agreement originally existing between the city and the company. The court denied a temporary injunction pending the hearing of the case and since Jan. 1, 1907, the company has been operating the 17 miles of single track within the extended city limits of Belleville at substantially the rate of loss mentioned.

Efforts to secure a compromise of the matter failed and testimony was taken recently by a special master. Testimony was presented by disinterested accounting and engineering experts. The company presented evidence and facts to show that insufficient revenue was derived form the 5-cent fare basis to meet operating expenses, interest and depreciation on either the original cash cost of the construction, etc., or the present estimated replacement value of the property.

THE PROBLEM OF THE FIVE-CENT FARE *

BY HENRY W. BLAKE, EDITOR, ELECTRIC RAILWAY JOURNAL

During the past two months announcements have been made by all of the steam railroad companies entering New York from the north and west that they would advance their suburban passenger rates. Some of these rates have already gone into effect; others were to begin, according to announcement, on July 1 or earlier, although the request made by the Interstate Commerce Commission of the presidents of the railroads in New Jersey to delay the establishment of their advances in rates until August 1 may postpone action by those roads.

It is probable that no such general increase of suburban railroad rates or one affecting so many individuals has ever been proposed before in this country. Those most severely affected by the policy outlined will be the commuters, as the charges for commutation tickets have been increased from a few per cent to, in at least one case, that of New Haven, practically 80 per cent. It is difficult, without official data of the number of commuters from each station, to determine the total percentage of the increases on the different roads, but in the case of one company doing a very large suburban business, the increased income from the higher fares, based upon the present number of commuting passengers, is estimated at about 10 per cent, and it is probable that the average of all of the roads would not be far from this figure. The effect, if the proposed changes are carried out, will undoubtedly be to compel the suburban steam railroad passenger near New York to pay more for his transportation than he has had to do for a long time.

A significant fact in connection with the increases proposed has been that all of the roads have given the same reasons for their contemplated advances, namely, that for a long time the former rates were inadequate and owing to the advance in unit costs which go to make up operating expenses it has become no longer possible to carry passengers at the low rates except at a large loss. This explanation has been given irrespective of the financial condition of the company advancing the rates. It applies to the Erie Railroad, which has paid no dividend on its common stock and a total of only 8 per cent on its second preferred stock since the company was reorganized in 1895, and none on either its first preferred or second preferred since April, 1907; to the Delaware, Lackawanna & Western Railroad, whose stock is quoted at about 550 and which pays regular dividends at 20 per cent and declared an extra dividend of 50 per cent in July, 1909, and to the Central Railroad of New Jersey which has paid 8 per cent annually since 1902 and at the two last quarterly meetings declared extra dividends of 2 per cent. It applies also to the New York Central and Pennsylvania railroads, which are installing magnificent city terminals at tremendous expense, and to the West Shore Railroad, whose passengers can reach New York only by ferry across the river.

Changes in policy of this extensive kind possess more than ordinary significance and it is interesting to consider more in detail some of the reasons which have been advanced for making the changes described. The general passenger agent of the Erie Railroad in discussing the matter said: "When the old rates were made, the tracks were laid with 67-lb. rails at $15 a ton, now 85-lb. to 100-lb. rails are laid, costing $28 a ton, with 30 more tons to the mile. Ties were 30 cents, now they are 75 cents. Labor was a dollar a day, now it is $1.75 to $2. Passenger cars formerly cost $4,700 each; the 60 coaches bought a year or two ago cost $8,800 apiece. Locomotives were $8,000, to-day the average price is $15,000. The cost of labor of all descriptions has doubled, yet up to a certain point the full effect was not had, due to the gradual increase of travel. It may be interesting to know that, despite the Erie's relatively heavy local passenger business, last year the average number of passengers per coach was 16 and a fraction, while the seating capacity was 52. If all the seats were filled fares could come down. * * * Going still further into the question of increasing costs, the

*Abstract of paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 28, 1910.

Erie's taxes, a charge against income, have gone up $500,000 in New Jersey in four years, whether justly or not need not be discussed. They have to be paid from the traffic receipts and the proper proportion charged to the suburban traffic."

Gerrit Fort, general passenger agent of the New York Central & Hudson River Railroad says: "The advance in our commutation fares was made because of a sharp increase in the cost of everything that enters into the conduct of our business, not only wages, but all kinds of supplies. For example, fuel has increased 38 per cent; ties, 76.4 per cent; steel rails, 47.4 per cent; angle bars, 52 per cent; gray-iron castings, 46.9 per cent; bar iron, 49.9 per cent; cast-iron pipe, 62.8 per cent; track spikes, 37.3 per cent; cast-iron wheels, 39.2 per cent; barbed wire, 47.1 per cent; bridge timber, 77.3 per cent; car axles, 41.4 per cent; locomotive steel forgings, 45.4 per cent; stationery, paper, etc., 20 per cent; locomotives, 50 per cent; cars, 72 per cent.

"The general effect of the new tariff is to place our fares on a harmonious and consistent basis. This is due to the fact that we have adopted a uniform scale in figuring the fares on all divisions, the maximum rate per mile being 1 cent, and the minimum rate 3.85 mills. To nearby points the maximum rate per mile obtains, and the rate per mile is gradually diminished until the minimum rate is reached at the most remote station in the commutation district. The percentage of increase varies from nothing to as high as 15 per cent."

Several of the steam railroad companies have issued leaflets giving statistics justifying the proposed increase.

Coincidently with this increase in passenger rates, which has been most marked on the roads centering in New York, there has been a general movement on the part of the steam railroads, both in the East and the West, toward an increase of their freight rates. The action of the Government in connection with this increase is well known. The reasons given by the railroads in their official explanation of these proposed increases are the same offered by railroads around New York to justify the increase in passenger rates; namely, the inadequacy of the old rates and increased "living expenses," the complaint which is made by a very large body of individuals to-day.

THE SITUATION OF THE ELECTRIC ROADS

In some respects the electric railways are in a worse condition than steam railroads. They are not only confronted by the same economic situation with regard to the higher cost of labor and of nearly all of the materials which are used in construction, operation and maintenance, but for a number of years past the city roads have witnessed a steadily decreasing income per passenger for the service which they render. Whether they can counteract this condition by an increase of unit charges as easily as the steam railroads have done or hope to do is another question.

INADEQUACY OF THE 5-CENT FARE

The present standard unit fare for city electric railway transportation has grown to be inadequate principally for the following reasons:

1. The increased length of ride which is obtained by the passenger for a single fare.

2. The decreased receipts per passenger owing principally to the issue of transfers.

3. The increased cost of operation per passenger.

4. The increased cost of raising capital for extensions and improvements and for retiring maturing issues of bonds.

INCREASE OF TRANSPORTATION FURNISHED

This is shown most clearly by the greatly increased size of the systems over which it is possible to ride for a single fare. As late as in 1890 there were as many as five separate and independent street railway companies in the Albany and Troy district, 12 in the territory comprised in the present borough of Brooklyn, 18 in Manhattan and Bronx, 10 in Syracuse and three in Utica. The tendency toward the consolidation of all of the electric railway companies in one city which was initiated on a large scale first in Boston soon extended during the early nineties to many other large cities until, in 1900, there were few cities in the country in which more than one company was giving purely city service. Before these consolidations, passengers, in most cases, had to pay a separate fare every time they changed from one road to another. After the consolidations, either by agreement with the municipality, by charter or by State statute, a single fare was sufficient to purchase a ride from any given point within the city limits to any other point on the same system, and as extensions were built still longer rides became available. Tables I and II show in concrete form both the rapid increase in number of the large roads brought about by these consolidations and the disproportion between the increase in mileage and number of companies. The same conditions have prevailed throughout the country, as shown by Table III. These consolidations have been accompanied by a large increase in the length of the average road, which has grown from 7.4 miles in 1890 to 20.4 miles in 1902 and 27 miles in 1907. Coincidently with these consolidations there has been a large increase in the number of transfer points. Those in the United States increased between 1902 and 1907 from 4455 to 7376, or 65.6 per cent, and those in New York State increased during the same period from 1157 to 1942, or 67.8 per cent.

TABLE I—NUMBER OF COMPANIES IN NEW YORK STATE WITH DIFFERENT LENGTHS OF TRACK.

(ELEVATED AND SUBWAY INCLUDED.)

Miles of Track.	1908.	1902.	1896.	1890.	1884.
0 to 10	39	41	51	53	66
10 to 20	17	24	17	19	12
20 to 30	13	7	12	7	3
30 to 40	3	6	7	6	..
40 to 50	5	2	4	3	1
50 to 60	2	1	..	..	..
60 to 70	2	2	..	2	..
70 to 80	1	3	1	2	..
80 to 90	3	..	..	..	..
90 to 100	3	1	2	..	..
100 and over	10	6	4	3	..
Totals	98	93	98	95	82

Note: Statistics from New York State reports, years ended June 30.

TABLE II—NUMBER OF COMPANIES IN NEW YORK STATE, WITH AVERAGE LENGTH OF TRACK.

(EXCLUSIVE OF ELEVATED RAILWAYS AND SUBWAYS.)

	Number of companies.	Average length of track, miles.
1894	83	16
1898	99	20
1900	102	22
1902	92	29
1904	99	31
1906	105	33
1908	97	40

Note: Statistics from New York State reports, years ended June 30.

TABLE III—NUMBER OF COMPANIES IN UNITED STATES, WITH DIFFERENT LENGTHS OF TRACK.

Miles of track.	1907. Number of companies.	1902. Number of companies.	1890. Number of companies.
Total	945	817	691
0 to 10	399	394	557
10 to 20	229	219	99
20 to 30	101	76	16
30 to 40	61	34	7
40 to 50	33	25	4
50 to 60	27	16	2
60 to 70	16	12	2
70 to 80	17	7	1
80 to 90	7	6	1
90 to 100	8	3	..
100 and over	47	25	2

Note: Statistics from United States Census reports, years ended June 30.

DECREASED EARNINGS PER PASSENGER

With the enlargement of the 5-cent zones which have followed the extensions of roads into the suburbs the available transportation for a single fare has been increased independent of the issue of transfers. We can, therefore, properly say that in addition to the longer ride which is obtained by the passenger of to-day, the gross receipts per passenger have been steadily decreasing as the ratio of transfers issued to passengers carried has increased. In New York City there has been a slight decrease in the ratio between transfer passengers and fare passengers due to the segregation of several of the roads, but as late as 1908 the ratio of transfer passengers to fare passengers on the electric railways of New York State (exclusive of the subway and Manhattan elevated) was 38.8 per cent, compared with 33.2 per cent in 1906 and 30.4 per cent in 1904. It is interesting to note in this connection that in

1908 if each transfer passenger in New York State had paid 1 cent for his transfer instead of receiving it without charge, the amount paid to the companies for the transfer privilege would have been $4,596,800.

INCREASED OPERATING EXPENSES

While developments in the art have had a tendency to decrease the operating expenses of those railway companies which have been in a position to take advantage of the improvements thereby effected the benefits which have resulted from them have been more than counterbalanced by the causes which have acted to increase expenses. Thus in the five years from 1902 to 1907 while the earnings from operation of the operating companies in the United States increased 68.9 per cent, and the passengers carried increased 63.3 per cent, the operating expenses increased 76.6 per cent. During the same period the ratio of operating expenses to earnings from operation increased from 57.5 per cent to 60.1 per cent, and the ratio of net income to earnings from operation dropped from 12.2 per cent to 9.4 per cent.

Four of the principal causes for increased operating expenses have been the following:

1. Increased cost of materials.
2. Increased cost of labor.
3. Higher standards of service and of equipment required by the public and by the commissions, and
4. An inclusion in operating expenses of charges for various items formerly capitalized.

Ever since 1897 there has been a continuous general increase in the selling prices of both raw and manufactured commodities, interrupted only, as all such general advances are, by occasional reactions which have but emphasized the general upward trend of prices. Many explanations have been advanced to account for this general advance and the subject has been carefully studied by the committee of the United States Senate appointed to investigate wages and the prices of commodities. The majority of this committee has just rendered a report in which a number of reasons for the present high prices of labor and materials are given, among them: the increased cost of production of farm products, by reason of higher land values and higher wages; the shifting of population from food-producing to food consuming occupations and localities; reduced fertility of land, resulting in lower average production or in increased expenditures for fertilization; increased banking facilities in agricultural localities, which have enabled farmers to hold their crops and market them at higher average prices; increased cost of distribution; industrial combinations; increased money supply, and higher standard of living. Whatever the cause, the results have affected electric railway companies in common with other consumers. Many statistics have been published of the increased cost of raw and manufactured materials used in different industries. But the electric railway art has changed and is changing so continuously that tabular statistics of material used now and 10 or 20 years ago, such as cars, motors and rails, while interesting and instructive, would be between apparatus of entirely different characters and capacities. We could say with perfect propriety, for instance, that 20 years ago a box horse car with running gear such as was then standard for city service in New York could be purchased for $1,000 and an open car for operation by horses could be purchased for $550 or $600, whereas the price of a two-motor car with electrical equipment, like that used in city service in New York to-day, would be about $5,000, while a four-motor car, such as is employed in many cities, would cost considerably more. Comparisons between other classes of material used in electric railway work would also show great differences in cost, but great differences as well in the character of equipment and service rendered.

With certain possible exceptions relating particularly to portions of the steam and electrical machinery, it is reasonable to assume the cost of the materials used by electric railway companies has been governed by practically the same law as that which has occasioned the general advances in prices of materials in other industries. Statistics relating to the cost of materials are available through several publications of the Bureau of Labor, especially Bulletins 75, 77, 81 and 87. The relative prices of commodities as given in Bulletins 75, 77 and 81 have been widely published, but the latest figures, as given in Bulletin 87, have just appeared and are of especial interest as they show that the tendency to high prices recorded in these earlier tabulations still continues. Advance figures from Bulletin 87 show, for instance, that the average wholesale price during 1909 of all of the materials considered by the bureau was 26.5 per cent higher than the average price of the same materials during the decade from 1890 to 1899 and was 41 per cent higher than in 1897 which was the year of lowest prices between 1890 and 1900.

The prices in these tables are those of a selected series of articles, including farm products, food, cloths and clothing, fuel and lighting, metals and implements, lumber and building materials, drugs and chemicals, house furnishing goods and miscellaneous. Of the articles enumerated, those most closely related to electric railway industry are metals and implements and lumber and building material. Metals and implements increased in price in 1909 24.8 per cent over the average between 1890 and 1899, and lumber and building material increased 38.4 per cent during the same period.

There were, of course, fluctuations in the index price of all the materials quoted during the decade 1900-1909, and the maximum for any one year up to 1907 was reached in that year when the increase over the 1890-1899 period was 29.5 per cent. This average fell to 22.8 per cent in 1908 and again rose to 26.5 per cent for the year 1909. But the 1908 reduction was only temporary and as Table IV shows, the prices during the first quarter of this year were considerably higher even than in 1907. In other words prices are higher now than for any year during the 20 years for which the government has published comparative figures.

Bradstreet's "index number of staple articles" shows this same general tendency in the increase in the prices of materials. This index number is made up by taking the average cost during each month of 96 staple articles whose fluctuations in price have been found to follow fairly closely commercial conditions. These articles represent the following main groups: Breadstuffs, live stock, provisions, fruits, hides and leather, textiles, metals, coal and coke, oils, naval stores, building materials, chemicals and drugs, and miscellaneous. Bradstreet's index number follows: On Jan. 1, 1908, it was 8.2949; on July 1, 1908, it was 7.8224; on Jan. 1, 1909, it was 8.2631; on July 1, 1909, it was 8.4573; on Jan. 1, 1910, it was 9.2310.

TABLE IV—RELATIVE WHOLESALE PRICES OF MATERIALS CONSIDERED.

(Average price for 1890-1899 = 100.0%.)

Period.	All commodities.	Lumber and building materials.	Metals and implements.
Average, 1907*	129.5	146.9	143.4
Average, 1909	126.5	138.4	124.8
January, 1909	124.0	137.4	126.1
February, 1909	124.0	137.8	124.4
March, 1909	124.5	136.1	122.6
April, 1909	124.6	135.8	121.8
May, 1909	125.4	135.7	121.3
June, 1909	125.5	135.5	121.6
July, 1909	126.2	135.3	122.3
August, 1909	126.4	136.8	123.5
September, 1909	128.1	141.3	125.8
October, 1909	129.0	140.6	128.1
November, 1909	130.9	143.5	129.3
December, 1909	132.2	145.0	130.6
January, 1910	132.8	149.3	132.8
February, 1910	133.0	151.5	133.0
March, 1910	133.8	151.3	133.8

* Highest average yearly prices for all three groups for period 1890-1907.
Note: Statistics from Reports 81 and 87, Bureau of Labor.

Undoubtedly, as explained, improvements have been made in railway equipment during the past 10 years, and these improvements have had a tendency to overcome in some departments the increased cost of materials used in that department. For instance, it is probably true that the increased cost of fuel has been largely overcome by improvements in the efficiency of power-station equipment for those companies which have been in a position to install generating equipment of high efficiency. Invention and a better knowledge of the requirements have improved railway conditions in other branches, but the fact

must not be forgotten that this same march of improvement has brought with it an equally rapid rate of depreciation due to the obsolescence of the apparatus in use, a fact which has to be taken into consideration in determining the value of the benefits received.

INCREASED COST OF LABOR

In 1907 the wages paid employees constituted over three-fifths of the entire operating expenses of the electric railways of the country, so that any increase in this charge is a more serious matter in economical railway operation than probably in any other public utility. In this connection some figures on the hours and wages of employees in New York State during 1885, as shown by the report of the Board of Railroad Commissioners of New York State, may be of interest:

Albany Railway: Conductors, average number of hours on duty per day, 8 to 16 hours; wages per day, $0.78 to $1.82; per hour, 9.8 cents to 11.4 cents. Drivers, average number of hours on duty per day, 8 to 16; wages per day, $0.72 to $1.95; per hour, 9 cents to 12.2 cents.

Albany, Watervliet Turnpike and Railroad: Conductors, average number of hours on duty per day, 15; wages per day, $1.70; per hour, 11.3 cents. Drivers, average number of hours on duty per day, 15; wages per day, $1.45; per hour, 9.7 cents.

Brooklyn City Railway: Conductors and drivers, average number of hours on duty per day, 13¼; wages per day, $2; per hour, 15.1 cents.

Buffalo Street Railway: Conductors, average number of hours on duty per day, 12; wages per day, $1.80; per hour, 15 cents. Drivers, average number of hours per day, 12; wages per day, $1.60; per hour, 13.4 cents.

Coney Island and Brooklyn: Conductors and drivers, average number of hours on duty per day, 14; wages per day, $2; per hour, 14.3 cents.

Forty-second Street & Grand Street Ferry, New York: Conductors and drivers, average hours on duty per day, 13½; wages per day, $2; per hour, 14.8 cents.

Rochester City and Brighton: Conductors and drivers, average hours per day on duty, 13; wages per day, $1.87½; per hour, 14.4 cents.

Syracuse and Geddes: Conductors, average hours per day, 16; wages per day, $1.54; per hour, 9.6 cents. Drivers, average hours per day, 16; wages per day, $1.31; per hour, 8.2 cents.

The difference between these rates and those paid in the same cities now to street railway employees will be recognized.

The cost of labor, however, has increased steadily, not only in electric railway service, but in all industries in the United States, with the cost of food, and it is not surprising to find the striking correspondence between the two given in the accompanying chart, which is from Bulletin No. 77 of the Bureau of Labor. This shows an increase in 1907 of 28.8 per cent in wages per hour over the average rate between 1890 and 1899, inclusive. During this period, however, there was a reduction of 5 per cent in the average working hours per week, so that the average full-time wages per week showed an increase in 1907, as compared with the period 1890-1899, of 22.4 per cent. The corresponding increase in the cost of food was 20.6 per cent. This cost, also plotted on the chart, is based on retail prices and on weights of different articles proportioned according to their consumption in a workingman's family.

The figures on wages and employees for all the street railway companies in New York State for alternate years from 1898 to 1906, inclusive, are given in Table V. Table VI, which is from the United States census report, shows the number of different classes of employees in New York in 1907 and 1902. Complete statistics on wages since 1907, either for the entire country or New York State, are not available, but

TABLE V—SHOWING NUMBER OF EMPLOYEES AND WAGES PAID BY THE NEW YORK STATE STREET RAILWAYS. (INCLUDING BROOKLYN ELEVATED.)

	Number of employees (including officials).	Wages paid.	Average per employee.
1898	25,052	$13,080,651	$522
1900	28,075	16,968,907	604
1902	30,529	17,857,825	585
1904	32,646	19,812,227	607
1906	*43,285	*28,882,153	*667

*Including Manhattan Elevated Railway and Subway.
Note: Statistics from New York State reports, years ended June 30.

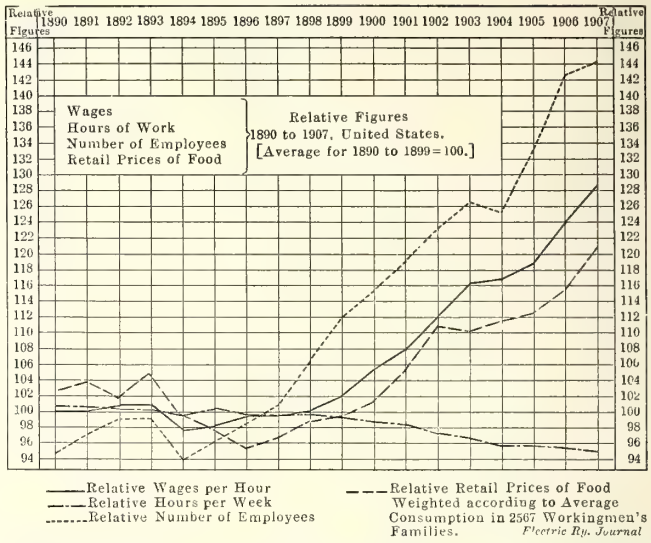


DIAGRAM SHOWING RELATION BETWEEN WAGES, HOURS OF LABOR, NUMBER OF EMPLOYEES AND RETAIL PRICES OF FOOD IN THE UNITED STATES, FROM 1890 TO 1907.

as with the price of materials, there has undoubtedly been a constant increase in the rate of wages paid in all industries. Certainly there has been a marked increase in the wages which have been paid in the electric railway industry.

TABLE VI—SHOWING CLASSES OF STREET RAILWAY EMPLOYEES IN NEW YORK STATE IN 1907 AND 1902 AND PERCENTAGE OF TOTAL.

	Number.		Percent in number of total.	
	1907.	1902.	1907.	1902.
Number of companies	101	96	....	....
Salaried employees—				
Total	1,877	1,221	3.9	3.5
Officers of corporation	170	188	.4	.5
Other officers, managers, superintendents, etc	231	136	.5	.4
Clerks and bookkeepers	1,476	897	3.0	2.6
Wage earners—				
Total	46,001	33,192	96.1	96.5
Foremen	447	205	.9	.6
Inspectors	517	316	1.0	.9
Conductors	12,946	9,661	26.9	28.1
Motormen	9,748	9,204	20.2	26.7
Starters	317	262	.7	.8
Switchmen	767	591	1.6	1.7
Road and trackmen	4,921	2,778	10.2	8.1
Linemen	595	430	1.2	1.3
Electricians	481	320	1.0	.9
*Car and motor repairers	3,127	....	6.5	....
Engineers	225	209	.5	.6
Dynamo and switchmen	414	302	.9	.9
Firemen	503	578	1.0	1.7
Other mechanics	3,720	1,660	7.8	4.8
Hostlers and stablemen	518	546	1.1	1.6
Watchmen	409	173	.9	.5
All other employees	6,346	5,957	13.3	17.3

*Not separately reported in 1902.
Note: Statistics from United States Census reports, years ended June 30.

The claim may be made by some persons that most if not all of the wage increases of the past year were voluntary acts of the different companies and that consequently they constituted a burden which might have been avoided. But this is an erroneous conception of the situation. While the advances might not have been occasioned by strikes or even caused by fear of strikes, wages have increased so generally that those companies which were not paying the market price for competent labor had to increase their rates to retain their old men and attract new men and keep their cars in operation. The compulsion from an operating standpoint was as great as if the advance was forced by a strike while the result was better for the men, the company and the public.

HIGHER STANDARDS OF EQUIPMENT AND QUALITY OF SERVICE REQUIRED BY COMMISSIONS AND BY THE PUBLIC

It is impossible to estimate the exact effect of this factor in increasing expenses, but there is no doubt that the more expensive standards required by public service commissions, by

legislatures and by public opinion, in the way of increased safety and comfort of transportation and in the maintenance of unremunerative service on poorly patronized lines have increased materially the expenses of operation. For instance, between 1902 and 1907 there was an increase in number of cars in the United States of 25.2 per cent, whereas the number of cars equipped with fenders increased 36.2 per cent and the number equipped with air brakes increased 300.8 per cent. During the same time the number of cars other than open cars in the United States increased 43.7 per cent, the number of these cars which were heated increased 45.6 per cent and the number heated by electricity increased 65 per cent.

Under this heading also can be included the additional clerical and experienced accounting labor needed to compile the more elaborate financial and other statistics required now by the public and stockholders. Thus in the United States there was an increase between 1902 and 1907 of 4572 salaried employees, or 64.1 per cent. Of this number there was an increase of 38 officers, or 2.6 per cent; 767 managers, superintendents, etc., or 57.8 per cent, and 3767 clerks and bookkeepers, or 108.3 per cent. Table VI gives the classification of the employees in New York State, with the percentage of the total in each of the years mentioned.

OTHER FACTORS WHICH HAVE INCREASED OPERATING EXPENSES

Other charges against operating expenses which have increased rapidly during the past few years are:

(a) Requirements by commissions as to representation of companies at hearings, requiring attendance of principal officials, engagement of legal counsel, and often the engagement of outside engineering and accounting experts.

(b) Requirements of public service commissions, the State or public opinion in regard to hours and terms of labor, employers' liability, safety and sanitary precautions for employees and the public.

(c) Increase in charges for damages. This charge for all the electric railways in the country increased for 1902 to 1907 from 6.6 per cent to 7.2 per cent of the operating expenses in spite of the fact that in 1902 94.2 per cent of the gross income of the operating companies reported came from railway service and 5.8 per cent came from other activities while in 1907 only 90.9 per cent of the gross came from railway operation.

(d) Frequent legal obligation on the part of railway companies to defray the expenses of municipal or State regulation.

INCREASE IN TAXES

The direct taxes and license fees paid by operating electric railway companies in the United States decreased slightly in the period 1902-1907 when calculated as a percentage of the gross income, or from 5.2 per cent to 4.6 per cent, but if indirect taxation is included, such as paving, lighting, sprinkling, snow removal and similar requirements, it is probable that there has been an increase. Table VII shows the taxes paid by street railway companies in New York State in alternate years from 1894 to 1908, inclusive, per mile of track and percentage of earnings for operation, as given in the report of the Railroad and Public Service Commissions. The figures given do not include franchise taxes assessed but not paid. If added they would considerably increase the amounts of taxes during the past 10 years.

TABLE VII—SHOWING TAXES PAID BY STREET RAILWAY COMPANIES IN NEW YORK STATE (NOT INCLUDING MANHATTAN ELEVATED AND SUBWAY).

	Total.	Per mile of track.	Per cent. of earnings from operation.
1894	$959,542	$706	4.01
1896	1,164,820	671	4.04
1898	1,439.250	717	4.51
1900	2,311,303	1,009	5.66
1902	*2,456,881	*925	*5.24
1904	*2,656,233	*868	*5.24
1906	*2,895,408	*897	*4.89
1908	*3,784,299	*965	*5.79

*Including elevated in Brooklyn.
NOTE: Statistics from New York State reports, years ended June 30.

INCREASED COST OF CAPITAL

The deductions from income on account of interest and rentals of the electric railways in the United States increased between 1902 and 1907 from 25.8 per cent to 27.5 per cent of the gross income. It is well known that the rate of interest demanded by investors in all forms of investment securities is considerably larger than 5 or 10 years ago, and this has undoubtedly had an influence in reducing the net income of those electric railway companies which have had to borrow money during this period to make improvements or to meet maturing issues of bonds. It would be interesting in this connection to learn the proportional increase in funded and unfunded debt of the electric railway companies in the United States, but this condition is complicated by advances made by holding companies to leased companies. On the face of the returns while the interest paid on the funded debt of operating electric railway companies in the United States decreased between 1902 and 1907 from 14.1 per cent to 12.5 per cent of the gross income, the aggregate of the interest on other debt, rent of leased lines and terminals, and miscellaneous deductions increased from 11.7 per cent to 15. per cent of the gross income, so that, as quoted above, the deductions from income on account of interest and rentals increased from 25.8 per cent to 27.5 per cent.

REDUCED MILEAGE

The condition is admittedly a serious one, not only to the electric railway companies, but to the country which is dependent upon extensions of the transportation facilities to keep pace with the development in the industries, populations and transportation requirements of the community. But the ability to construct extensions involves the ability to sell securities and in the present state of the investment market it is extremely difficult to finance any new electric railway undertaking. As an example, the returns from New York State, as contained in the 1909 and 1910 editions of *American Street Railway Investments,* show during the year only 138.1 miles of new electric track were built, or less than 3 per cent of the total mileage of the State. Of these, 80 miles represented the interurban railway construction of one set of owners whose work was commenced several years ago, 15½ miles represented an interurban line built across Long Island and 6 miles were horse track, leaving less than 37 additional miles for the 160 or more other operating companies of the State. It is doubtful whether any one would have the temerity to claim that the needs for additional means of transportation in the territory served are limited to the pitiful amount of new mileage shown above.

CONCLUSION

A study of the situation of the average city electric railway company indicates, therefore, that, although it is enjoying an increase in gross receipts, this gain is being accompanied by such a large increase in expenses that the net receipts are becoming less. Unfortunately there are no radical improvements of either apparatus or practice in sight to promise material betterment of present conditions. The limit of size of cars which can be commercially operated has been reached, if indeed it has not been exceeded in many instances. The outlook for reducing expenses by increased car speeds is equally discouraging because as the business of our cities grows, street congestion will become worse rather than better. The prices for labor and materials, as a whole, are higher than at any other period in the history of electric traction. Such a condition means a general cessation of extensions and improvements—possibly of operation in some cases—unless some plan can be evolved by which the receipts per passenger can be increased. To secure this advance, special authority would probably be necessary, but if the advance is justified in public opinion the authority should not be difficult to secure. The form and extent of the increase would, of course, have to be determined, and might vary in individual cases. But the main facts of the higher costs of material and labor are matters of general knowledge and the movement to increase the rates on the steam railroads forms a precedent to similar action on the part of the electric roads. The final solution of the problem merits the most serious study on the part of legislatures, public service commissions and railway officials.

THE LATEST DEVELOPMENT IN CAR WHEELS FOR ELECTRIC RAILWAYS *

By V. S. Yarnell, Expert, Carnegie Steel Company.

The methods of manufacture, as will be explained in the paper, are those employed by the Carnegie Steel Company in the manufacture of Schoen solid forged and rolled steel wheels.

DEVELOPMENT

The solid steel wheel represents the result of evolution. The first wheels made were of wood sawed from the trunk of trees or fashioned from timber. These were later bound with iron to insure longer life and better service. The wooden wheel of a century or more ago was superseded in turn by the cast iron wheel as that material came into use as the result of improved methods in founding and casting, and continued to be the standard wheel for all classes of service so long as that service did not exceed the limit of its strength.

Wheels were then made from paper, compressed into solid form, with iron or steel rims. They in turn were superseded by wheels of cast iron or cast steel centers with rolled steel tires, the process of rolling not having been sufficiently far advanced to insure the immediate and satisfactory substitution of a solid steel wheel for cast iron, although more than 20 years ago a company was organized to forge and roll steel wheels from solid ingots. The solid steel wheel, whether forged or rolled, stands at the head of this chain of development. It may not be the ideal wheel of the future, but it is to-day the best wheel for all classes of service because it combines within itself those elements of strength, safety and homogeneity which characterize rolled steel over any other material of construction.

HISTORY

The first practical solid forged and rolled steel wheel manufactured in the United States was made in 1903, by Charles T. Schoen, the pioneer builder of steel cars, after a long series of experiments covering a period of five years. The Schoen Steel Wheel Company was organized in May, 1903, and was purchased by the Carnegie Steel Company in July, 1908. The Schoen plant is located at McKees Rocks, Pa., and is now a part of the Homestead Steel Works organization, which is one of the plants of the Carnegie Steel Company.

SELECTION OF MATERIAL

The chemistry of the steel used in the manufacture of Schoen steel wheels has been arrived at after careful consideration. The prescribed limits of the carbon, maganese, silicon, phosphorus and sulphur, as shown in the 1910 wheel catalogue, issued by the Carnegie Steel Company, we believe to be ideal for wheels manufactured by this process, to insure the proper degree of hardness and toughness, which means wearing quality combined with safety.

ROLLING THE SLAB

Ingots of the proper chemistry being selected, they are heated and rolled in the slab form, about 26 in. wide by 4¾ in. thick. The process of rolling the ingots into slabs is the first refining process in the manufacture of the wheel—the reduction being about 6 to 1.

SELECTING THE SLAB

This is one of the most important features in the manufacture of wheels. It is a well known fact that in all steel ingots there exists a certain amount of segregation and small gas pockets, usually in the center, extending from the top downward. To insure the elimination of the segregated portion, a liberal discard is invariably made. No slab is ever used in the manufacture of wheels that in any way shows surface or internal defects. The slabs that pass this rigid inspection are then stamped with the heat number from which they were rolled, also numbered serially, and marked with a letter indicating the position in the ingot from which the slab was cut.

PROCESS OF FORGING AND ROLLING THE WHEEL

The first operation in the wheel plant is heating the slab for forging, extreme care being exercised to bring the slab to the proper temperature by gradually heating, to insure that the structure of the metal when finished will be in the best possible condition. The slab after heating is forged in a 7000-ton hydraulic press.

This forging machine carries in addition to the top forging die, a heavy circular knife or shear, and after the first forging operation, the blank is sheared by the same machine to circular form. Fig. 1 is a sectional view of the wheel blank after the first forging operation. In this view can be seen the result of distributing the metal which is pressed into the hub from the portion that will eventually be the web, and this gives the blank its first form of a wheel.

REHEATING

After the blank has been reheated it is subjected to the second forging operation in a 5000-ton capacity hydraulic press. A ring is slipped over the hot blank and through this ring the rim alone is given an extra forging. The result of these two successive forgings is that the metal has been pressed from the center of the slab and condensed in the rim where density and homogeneity of material make possible uniformity of service wear. Fig. 2 is a sectional view of the blank after the second forging. From the second forging press the blank passes through the punch, where the metal left in the hub by the acorn-shaped dies of the forge is removed by a specially constructed punch. This punch exerts a pressure of 750 tons. Fig. 3 is a sectional view of the blank after coming from the punching machine. The blank comes from the punching machine at about a cherry red, and again passes to another heating furnace, where it is heated uniformly, after which it is rolled in a specially constructed rolling mill, where the rim of the wheel receives a thorough working or rolling.

Fig. 1



Fig. 2



Fig. 3

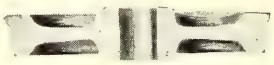


Fig. 4

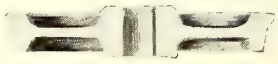
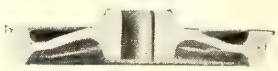


Fig. 5



Fig. 6



In the rolling operation a mandrel is placed through the hub and the wheel is supported in this manner during the rolling operation. There are five rolls, all bearing on the wheel at the same time. The two web rolls, which are power driven, have a bearing surface from directly under the rim extending to within 6 in. of the hub. The back roll formed to fit the trend and flange is on the same horizontal plane as the web rolls and directly in line with the center of the wheel. The two side rolls bearing on the edge of the rim work by friction. All the rolls are adjustable and during the rolling operation the back roll is forced towards the web rolls, compressing the metal in the rim to the required density, and can be varied according to the amount of rolling and the temperature at which the metal is finished. The web of the wheel, as it comes from the rolls, is flat and at right angles to the tread.

Fig. 4 is a sectional view of the wheel as it comes from the rolling mill, and shows the amount of work that has been done on the portion of the web nearest the rim of the wheel. It also shows the decreased area of the rim, indicating the amount of pressure brought to bear at this point in the rolling operation. The rolling of the rims is done principally to make the metal of the proper density to resist wear in service. The wheel is taken from the rolling mill at about a cherry red and

*Paper presented at annual meeting of Street Railway Association of State of New York, Cooperstown, June 28-29.

is given the proper amount of coning or dishing. Under the same press the wheel is made truly round by compressing its circumference in a die composed of segments of a circle. Fig. 5 is a sectional view of the wheel after coming from the coning and truing press. Fig. 6 is a sectional view of the wheel machined to a finish.

INSPECTION

The wheel after passing through the various operations, as described, is now ready for inspection. All wheels are carefully inspected, either by a representative of the purchaser, or by the inspectors of the manufacturer. All wheels are rejected that in any way show they have developed defects in the course of manufacture, also those that are not within the tolerances set forth in the specification.

RESULTS OF THE METHODS OF MANUFACTURE

The care exercised in selecting steel of a suitable grade, discarding a liberal amount from the top of each ingot used, the thorough, uniform working of the steel in the rolling mill, in the forging presses, and finally in rolling the wheels at proper temperature, results in the finished wheel being homogeneous and as free from inherent defects as it is possible to manufacture.

The proper chemical composition of the steel used, combined with the mechanical operation in the process of manufacture, insures durability.

Strength and hardness, combined with toughness, guard against failure from breakage in service, which means that the solid steel wheels, as being made to-day, under the supervision of experts, are safe, strong, durable and homogeneous and meet the hard service conditions of high speed and heavy wheel loads, as shown by the service records of the railways.

NUMBER OF WHEELS IN SERVICE

There are nearly 400,000 Schoen steel wheels in service, of which approximately 100,000 have been applied on electric railway cars, in addition to a large number of solid steel wheels of other makes. We are all striving after the same result—a perfect wheel.

To have wheels prove efficient in service, it is necessary that they be made well and treated well. The responsibility for the performance of wheels in service rests as much with the user as with the manufacturer.

SHOP PRACTICE AND MAINTENANCE OF WHEELS

In the maintenance of wheels, both for efficiency and economy, there are several points which might be considered which would increase the mileage of the life of the wheel. In selecting a pair of wheels to be mounted on an axle, the first thing to be taken into consideration is the diameter, in order that there may be as little variation in the wheels as possible.

In boring the wheel, it should be bored absolutely true and it should be known that the axle is perfectly straight. The wheels after being pressed on should be gaged properly at several different points on their circumference so as to be absolutely sure that the flanges run true to the rail at all points. A gage should also be furnished the wheel inspectors, whereby they could determine the exact wear of the tread and flange before the wheels are removed for re-turning.

It is very common practice for the interurban companies to allow the flanges to run until they are dangerously sharp. This is false economy, as in this way so much metal has to be removed in turning so as to again bring the tread and flange to its proper shape that the loss of metal is much greater than would be necessary were the wheels turned at the proper time.

Trucks should also be considered an important feature in the saving of wheel flanges. While from ordinary inspection it might appear that the truck was in fair condition, the placing of a tram diagonally across the truck from center to center of journal box will show a great many of these to be untrue, or in other words, the truck will be out of square. This also has a great deal to do with sharp flanges or the crowding of wheels. All of the above defects, to say nothing of bad track conditions, are important factors in the life or mileage of wheels.

STANDARDIZATION

A word as to standard designs for solid steel wheels. It is the desire of the Carnegie Steel Company to lend every assistance to its railway friends in their efforts to arrive at a limited number of standard designs for electric railway wheels. To this end the Carnegie Steel Company has recently issued a wheel and axle catalog, in which are shown wheels suitable for all classes of service. These are, with few exceptions, in accordance with the recommended practice of the Committee on Equipment of the American Street & Interurban Railway Association.

In this connection the speaker wishes to quote from the 1909 report of the Committee on Equipment, as follows:

PROPOSED STANDARDS FOR ROLLED STEEL WHEELS

"The demand for standardization of rolled steel wheels has been manifest for some time and now that their use is becoming so general, the necessity of some sort of standards becomes more and more urgent.

"Manufacturers of rolled steel wheels state that a large number of designs come in, which require large expenditure for dies and rolls. If the number of designs and sizes could be reduced, it would enable the manufacturers to avoid equipping with a multiplicity of dies, and what perhaps is even a more important feature, the use of a limited number of standards would obviate the necessity of frequent change of dies in running out small orders. It can readily be seen that a continuous day's run on one size and style of wheel means the maximum output and minimum cost of production, but if, after running out a few wheels, it is necessary to change dies, run out a few more and repeat this operation a few times, the day's output will be greatly curtailed and the cost of production rise to an unduly high figure.

"It is the belief of the wheel manufacturers, and of your committee, that certain representative dimensions of wheels can be adopted which will meet practically all railway requirements.

"The great advantage of standards to the railway company arises from the fact that fewer designs mean lower production cost to the manufacturer and correspondingly lower prices to the consumer."

ACTUAL SERVICE RECORD

Another quotation from the report of the committee on equipment of the American Street & Interurban Railway Engineering Association, which report was compiled from data received from 35 different street and interurban railway companies, is as follows: "That many of the larger companies are coming to the use of rolled steel wheels, deeming it safer and more economical."

The mileage obtained from rolled steel wheels is shown in committee's report by questions and answers, as follows:

Q. "How many turnings are given them?"

A. "The average is 3, with the exception of one large company, which gives 10."

Q. "What is the approximate mileage between each turning?"

A. "The large company above mentioned gets 10,500 miles between each turning. The rest of the companies give the wheels between three and four turnings and obtain an average of between 30,000 to 35,000 miles between each turning." The rim of the wheels ranges from 2 in. to 3¾ in. in thickness when new and were worn down to between ½ in. and 1¼ in. in thickness when scrapped. This record shows the life of the wheels to be 150,000 to 175,000 miles.

Although many of the roads using solid steel wheels are obtaining much greater mileage, one company has had several hundred Schoen rolled steel wheels in service for more than three years with a record of over 100,000 miles, without turning.

The large number of rolled steel wheels that are being used, and the growing demand for wheels of this type indicate that the railways are adopting them principally for reasons of safety and economy.

RAILWAY MOTOR GEARS AND PINIONS*

BY T. W. WILLIAMS, GENERAL ELECTRIC COMPANY

The involute or single curve tooth is used for railway motor gears and pinions in preference to the epicycloidal or two curve tooth for two reasons: Firstly, on account of the greater thickness of the dedendum, and, secondly, because the epicycloidal tooth cannot be operated unless the distance between the centers of the gear and pinion remain constant, which is impossible under present operating conditions. While the epicycloidal tooth affords as nearly a perfect roll and frictionless operation as can be obtained, this unfortunately is not true with respect to the involute tooth. In order to obtain a perfect roll it is obvious that the meshing teeth of the gear and pinion must have the same contour of face. This condition cannot obtain for the involute tooth unless both gear and pinion are made with 30 teeth or more, and practically all railway motor pinions are designed to have less. Pinions with less than 30 teeth have the dedendum undercut, which undercutting becomes greater as the number of teeth diminish. This is done to give a proper clearance for the gear teeth. It is, of course, quite clear that the smaller the diameter of a gear the greater is the space between the tops of the teeth.

A radial line passing through the pitch circle on the face of a tooth and another line at a tangent to the same point forms in the case of a standard involute tooth an angle of 14½ deg. It is obvious that the greater the angle the thicker does the tooth become at the base and any increase in this direction is a distinct gain in tooth strength. It is now fairly standard practice to make gear and pinion teeth with an angle of 20 deg. for all motors of over 150 hp capacity. They are generally known as stub teeth. No matter what angle of tooth, it is, of course, essential that the dimension at the pitch line shall remain constant. It is also the practice to have the dedendum or distance from the pitch line to the tooth base remain the same as the standard, while the addendum or part above the pitch line is reduced. It is claimed that on account of the increased angle of pressure the bearing linings will be the more readily affected, but from observations in actual practice this trouble does not seem to exist. Mention has already been made of change in tooth profile for pinions which have less than 30 teeth. Theoretically this change takes place as each tooth is eliminated, but the difference for each change is only a few thousandths of an inch. There is also a growing demand for considerable accuracy with respect to tooth dimensions. Such requirements are commendable and are being given careful and proper attention, and doubtless they would increase the efficiency of the gearing if all other vital requirements could be maintained, but when one considers the unsatisfactory conditions under which railway motor gearing is operated it is obvious that the change of a few thousandths of an inch in some part of the tooth dimensions is insignificant. Take as an instance the fact that the present design of trucks precludes the use of a bearing on both sides of the gear and pinion so that when power is transmitted from the pinion to the gear both the armature and axle shafts tend to spring away from one another. The armature shaft bearing adjacent to the pinion becomes worn on the side which is farthest from the axle shaft, while the bearing at the other end wears on the side near the axle shaft. This allows the pinion teeth to set at an angle to the gear teeth, which means that the ends of the teeth nearer the motor do the greater proportion of the work while the pitch lines at the other end of the gear and pinion teeth are so far apart that they do not transmit their share of the pressure. Furthermore, it must not be forgotten that the axle bearings on which the motor is mounted have also worn on the side away from the motor tending to carry the pitch lines of the gear and pinion teeth still further apart. Again an examination of teeth broken in service almost invariably shows the fracture to have started at the motor end and that only about one-third of the tooth is broken off. If the axle linings were more frequently replaced or an outboard bearing could be provided for both the armature and axle shafts, it would then be advisable to pay more detailed attention to the profile of the tooth face, but under existing conditions the tooth is unquestionably the most accurate part of the whole mechanism. A means for a partial elimination of bearing wear is the mounting of a pinion on each end of the armature shaft with two gears on the axle shaft. This throws equal stress on both trains and always keeps the pitch circles of the meshing gears and pinions parallel to one another. The writer recently had the opportunity to inspect an electric locomotive operating under such conditions and found that the wear across the whole of the face of the teeth was identical and for this reason alone they should give a much greater life than if only one gear and pinion were used of twice the tooth thickness or length of face.

A second fruitful cause of rapid wear of teeth is the amount of sand that drifts into the gear case. It is generally conceded that gears and pinions operated on elevated structures show a longer life than those run over paved streets, and a still far greater life than those run over unpaved streets especially in a sandy country. An analysis of grease taken from motor gear cases used on elevated structures shows about 1 per cent of gritty matter, while on paved streets the percentage of grit increases to 5 or 6 per cent and in sandy country it will run as high as 18 or 20 per cent. Rapid wear of gears and pinions can almost always be attributed to wear of bearing linings or an excessive amount of grit in the gear case. The question of a suitable gear lubricant has received careful attention from a number of prominent manufacturers. Unquestionably a lubricant of a heavy clinging character gives the best results, but it is quite possible to err too far in this direction and use one that is so heavy, that considerable energy has to be expended even to make the gearing turn round. To insure a maximum of clinging quality of lubricant at a minimum expenditure of power some companies manufacture two grades, a heavy one for summer use and a lighter one for winter.

Cedar chips and cork dust can also be added with quite beneficial results. What seems to be most needed is some agent which will form a cushion between the meshing teeth and prevent them from cutting one another, and for this reason oils and thin grease are not recommended.

The question often comes up as to the limit of wear of gear and pinion teeth. So far as efficiency is concerned, tests have indicated that there seems to be little difference between new and considerably worn teeth running together, so that the question seems to hang on two pegs. First and perhaps most important, the susceptibility of the nerves of the population living on the route over which the gears are operated and in the second place, upon the strength of the metal in the teeth.

It is the standard practice to manufacture gears from cast steel. Such steel contains about 30 points of carbon and has about the following physical characteristics:

Tensile strength	60,000 lb.
Elastic limit	25,000 lb.
Elongation in 2 in.	18 per cent
Reduction in area	20 per cent

This metal is of ample strength for gears to be used with motors up to a capacity of 75 hp, but for motors with a higher capacity greater strength is required. This can be attained by increasing the carbon content so as to obtain the following physical characteristics:

Tensile strength	70,000 lb.
Elastic limit	30,000 lb.
Elongation in 2 in.	20 per cent
Reduction in area	30 per cent

It will be noted that the reduction in area has been increased notwithstanding the increased content of carbon. This has been effected by annealing the metal after it has been cast, because

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 28, 1910.

the extra carbon would make it too brittle if annealing were not resorted to.

Cast steel gears are made either split or solid and the split type are furnished with either four or eight bolts. In the case of the eight bolt gears, four are placed on each side of the hub, two alongside one another near the hub, the other two as near the rim as possible. A bad feature about the eight bolt gear is that the bolts cannot be made of sufficient diameter to prevent the metal being stretched beyond its elastic limit, when the gear is bolted on the shaft. This complaint cannot be raised with reference to four bolt gears because the diameter of the bolt can be sufficiently increased to prevent trouble. The bolts in four bolt gears can be located one on each side of the hub, and the other two out by the rim. In this case the hub bolts are about 8 in. long, while the rim bolts are less than half that length. Naturally there is more stretch to the longer bolt and a consequent difficulty to equalize the strains between them. Another method is to place the bolts side by side midway between the hub and rim. In this case all four bolts are of the same length.

It may be argued that on account of such a location the gear when under stress would tend to open either at the hub or at the rim. This trouble can be anticipated in the design and it does not occur in actual practice. In fact both are amply strong for the requirements.

Solid gears on account of their general design can be made both stronger and lighter than split gears and one excellent feature is the fact that if sufficient allowance is made for a pressing fit there is no necessity for weakening the wheel axle by key seating for the gear key. An allowance of 0.001 in. for every inch of axle diameter should require from 40 to 60 tons to force the gear in place, and such a fit is ample to prevent the gear from slipping. In order to obtain maximum strength of steel in a casting it is essential that all sections shall be as nearly the same thickness as possible. Therefore, when the outside finished hub diameter (or that portion around which the gear case fits) is large in comparison with the hub bore, it is advisable to core or groove the exterior of the hub. This will tend to leave all sections about the same thickness, reduce the weight, and allow all portions of the metal to cool equally. If the hub were left full size then it would cool more slowly than the spokes, excessive shrinkage strains would be set up at the junction and any excessive stress in operation would be liable to cause a fracture at that point. Similar care should be taken in the design of the juncture of the spokes and rim because when a gear rim breaks the fracture almost invariably occurs at this point.

During the early days of electric railroading when the capacity of motors did not exceed 40 or 50 hp. cast steel gears and soft machine steel pinions were ample for the work required of them, but with the advent of heavy interurban and suburban cars requiring greater capacity motors and running at much higher speeds, such metal was unable to cope with the demands, until at the present time every artifice known to the steel manufacturer is being used to produce a metal of sufficient hardness, strength and toughness to successfully take care of the service.

The first step in the direction of strengthening pinion steel was to increase the contents of carbon and manganese, the former to raise the elastic limit and the latter to increase the toughness and liability to wear. Also the pinion billets were forged in both directions to obtain equal physical characteristics in both longitudinal and transverse axes. This increased the elastic limit from 25,000 lb. per sq. inch, as is obtained in ordinary machine steel, up to about 40,000 lb. per sq. inch, but even this increase was insufficient to cope with the demands of some roads. It then became a choice of heat treating carbon steel or going over to alloy steels such as chrome nickel or chrome vanadium.

The highest requirement in tooth stresses is about 75,000 lb. per sq. inch. The elastic limit of heat treated carbon steel or chrome vanadium steel will exceed the value, but as the first cost of the carbon steel, also the cost of making it into a pinion, is much less, it has been generally adopted. Properly selected and carefully heat treated carbon steel has about the following physical characteristics:

Tensile strength	115 to 120,000 lb. per sq. in.
Elastic limit	80 to 85,000 lb. per sq. in.
Elongation	30 to 35 per cent
Reduction in Area	13 to 15 per cent

While before heat treatment the same metal would give only the following characteristics:

Tensile strength	85,000 lb. per sq. in.
Elastic limit	40,000 lb. per sq. in.
Elongation	18 per cent
Reduction in Area	40 per cent

To cope with similar high tooth stresses in gears, a steel rim of quite similar physical characteristics is shrunk on a cast steel center; a maximum allowance is made on the rim for a shrinkage fit of 0.001 in. for every inch of diameter of the cast steel center. The rim can be readily expanded in boiling water and this fit is sufficient to hold the rim in place without the aid of a key.

The method of heat treating steel is to raise it to a predetermined temperature depending on the carbon content. Care must be exercised to see that every portion of the metal is the same temperature, otherwise shrinkage strains will be set up when it is quenched. Experience shows that oil is the best quenching medium for gears and pinions since it cools the metal more slowly than water and allows the interior to receive the treatment before the outer skin has become hard and set. Water on the other hand cools the skin so quickly that it becomes rigid while the interior is still in a soft and ductile state; when the time comes for the interior portion to cool and harden it naturally contracts and pulls away from the already hardened skin. This sets up shrinkage strains and lowers the physical characteristics of the metal. The high physical properties of heat treated steel will recur to the original value if the temperature of the metal is raised to about 600 deg. F. or over and allowed to gradually cool. Therefore, it is most essential that no heat treated gears or pinions should be subjected to a greater heat when they are mounted on rims or shafts respectively. To obviate over heating when shrinking on gear rims and pinions, it is advisable to boil them in water or oil as such temperatures will expand sufficiently to meet all requirements.

Case hardening has also been successfully exploited. Steel of a very low carbon content is necessary for this process. After the pinion or gear has been cut it is placed in a metal box, bone dust is packed around the teeth and the bore is plugged or covered over in such a way as to prevent the process from affecting it. The metal box with the pinion and bone dust inside is placed in a furnace and kept at a bright heat for several hours, the time depending on the depth the hardness is required to penetrate the metal. During the heat the bone dust turns into almost pure carbon and by the action of heat this carbon becomes impregnated in the pinion teeth, so that about 1 per cent of carbon is found in the steel on the face of the pinion, and this gradually tapers off until the original 20 points are found at a depth of about 0.1 in. from the surface. It is only natural that the physical properties of this steel cannot be as high as are those of oil-quenched steel, but it is much harder and shows a long life for gears and pinions which are not subjected to excessive strains.

The destructive action of gritty matter which becomes mixed with the gear lubricant is very conspicuous when hardened pinions are operated with relatively softer cast steel gears, and strange though it may seem the hard pinion gets most of the wear. Hard gritty substances seem to embed themselves in the faces of the gear teeth and lap the harder pinion teeth. This action becomes so pronounced on some roads operating over sandy country that a longer life can be obtained by the use of a soft machine steel pinion.

The question of the rate of wear per thousand miles run is

one which does not seem to have been very fully investigated. The writer has several gears and pinions under observation to obtain such data, but this is a test which requires two or three years to complete. To show the relative wear of hardened gears and pinions operated in various combinations, the following approximated life has been obtained from gears and pinions on 100-hp motors under two cars running over the same route and identical as to weight, motor capacity and running schedule. The life has been estimated by subtracting the amount of wear on the pitch circle of the teeth after running 50,000 miles from the original thickness and then estimating how many more car miles the teeth could run before 0.1 in. had been worn from each face of the teeth, on the basis that the wear would be constant throughout their life. All teeth on these gears are cut to 2½ pitch.

Untreated high carbon pinion running with cast steel gear: Pinion life 70,000 miles; gear life 220,000 miles.

Heat-treated high carbon pinion running with cast steel gear: Pinion life 100,000 miles; gear life, 240,000 miles.

Heat treated high carbon pinion running with heat treated high carbon gear: Pinion life, 250,000 miles; gear life 750,000 miles.

Case-hardened pinion running with case-hardened gear: Pinion life 200,000 miles; gear life 650,000 miles.

With a view to discovering the relative merits of alloy steels both heat treated and untreated, also heat treated carbon steel a number of pinions were tried out on a road whose service conditions are about as severe as are known. After the pinions had been in service for over two years they unfortunately had to be removed on account of a change in the gearing, but as every one of them was given an opportunity to run over 100,000 miles the results obtained are quite interesting. All the pinions were made with 2½ pitch teeth, 14½ deg. angle. Chrome nickel steel was furnished by two companies, and for a matter of comparison they are given as No. 1 and No. 2.

UNTREATED CHROME NICKEL STEEL NO. 1, 4 PINIONS

One pinion broken after 33,300 miles.
One pinion worn out after 84,800 miles.
One pinion broken from outside causes after 85,600 miles.
One pinion, record lost.

CHROME NICKEL HEAT TREATED STEEL NO. 1, 4 PINIONS

Two pinions broken, one after 26,000 miles and the other after 82,000 miles.
Two pinions, record lost.

CHROME NICKEL NO. 2, UNTREATED, 4 PINIONS

None broken.
Two pinions worn out after an average of 98,500 miles.
Two pinions broken from outside causes after an average of 49,000 miles.

CHROME NICKEL HEAT TREATED STEEL NO. 2, 4 PINIONS

One broken after 48,500 miles.
One worn out after 33,000 miles.
One removed due to change in gearing after 117,000 miles.
One pinion, record lost.

CHROME TUNGSTEN NICKEL STEEL, UNTREATED, 4 PINIONS

None broken.
Two pinions broken from outside causes after an average of 82,000 miles.
One pinion removed due to change in gearing after 119,000 miles.
One pinion, record lost.

CARBON HEAT TREATED STEEL, 10 PINIONS

None broken, none worn out.
Three broken from outside causes after an average of 73,800 miles.
Five removed due to change in gearing after an average of approximately 115,000 miles.
Two pinions, record lost.

All tests and experiments clearly indicate the advisability of using high grade heat treated steel, or case hardened steel for gears and pinions used with railway motors which are of 75 hp. capacity or under, while heat treated carbon steel alone is best suited for gears and pinions which are subjected to higher tooth stresses by motors of larger capacity; for not only will the breakage of the teeth be reduced to a minimum, but the cost of the gearing per car mile run will be considerably lowered notwithstanding the relatively high price paid for it.

STANDARDIZATION OF TRACK CONSTRUCTION IN PAVED STREETS*

BY BENJAMIN E. TILTON, ENGINEER MAINTENANCE OF WAY, NEW YORK STATE RAILWAYS

The question of standardizing track construction in paved streets is both a general and a local one. As a general question it consists of standardizing the constituent parts of a track—the foundation, the substructure and the superstructure. As a local question it consists of standardizing the local conditions in each city; that is, in having a standard type of construction to fit any conditions under which the city desires to carry on a street improvement. I think it can safely be said that the measure of efficiency of any organization is the extent to which it is standardized. A poor standard is better than none at all, as it results in economy in expenditures.

A large majority of roads of the size of those in this State find themselves afflicted with the maintenance of from 25 to 75 different types of construction on their city lines. At certain times in their history they come face to face with a condition where it is necessary for them to make heavy track renewals. Then it becomes necessary to choose a type of construction which is the most efficient and at the same time the most economical to build and maintain.

On account of the great changes in street railroading in the past 20 years it is very difficult to decide between the various types of construction which have been put down in that time. Each type shows some point of superiority over the other types. The natural result, therefore, is to build an experimental piece of track embodying as many of the good points of the old types as possible and from the results shown by this construction derive what conclusions we can for our standard type. Such a section of track was built in Rochester in 1909. A good system of drainage was put in, 7½-in. concrete ballast, steel ties, T-rail and stone block pavement. The rail was laid of three kinds—Bessemer, open-hearth and nickel steel—held with continuous plates. The pavement was Medina block set on a mortar cushion instead of sand. The stones were 5 in. deep and the groove cut in them by hand. This structure is being used as the basis of an analysis of a track structure in Rochester.

The constituent parts of the track structure are its foundation, substructure and superstructure.

THE FOUNDATION

Let us first consider the foundation. The foundation of our track is ordinarily clay or sandy soil. It is the bottom of a trench from 15 in. to 21 in. below the surface of the street. It is, therefore, a natural sump for the collection of surface water. Obviously the first standard to perfect is the drainage system because an accumulation of confined water in this trench will destroy the best substructure and superstructure which can be built. One standard of construction for the drainage system which can be used with success consists in giving the bottom of the track trench a 6-in. crown at the center so as to form a natural path for the water to flow to the outside of each track. Outside of each outside rail and 12 in. below subgrade place a 4-in. sewer pipe drain carefully lined and joints wrapped with burlap. In this way the water is drained away from the center between tracks instead of toward it. Various schemes have been used by engineers for compacting the foundation. In some cases it is rolled; in other cases crushed stone is tamped into the ground to produce an arching effect in the

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 28, 1910.

soil. This is a condition which cannot be standardized, as it depends on the nature of the soil.

THE SUBSTRUCTURE

The second part of the track structure is the substructure consisting of the ballast and ties. We have at our command three kinds of ballast which may be used; namely, sand, crushed stone or gravel and concrete, any of which will make a good substructure, the sand least of all on account of its tendency to wash under the action of water.

After drainage the life of a track probably depends more on the substructure than any other item. The question of reasonable life of track is a dangerous one to touch upon. I doubt if any engineer would give a greater life than 20 years to track as constructed at present. We hear a great deal about so-called permanent types of construction. Perhaps certain parts of a track structure can have a degree of permanency, but as a whole I think our standard should be one which can be maintained rather than a track which is permanent. There can be no greater reason why a track structure should be expected to be permanent than that other parts of the physical property should be permanent.

With the idea that whatever permanency we get in a standard track structure other than the drainage is to be had in the substructure we are left to choose that material which has the greatest rigidity, namely, concrete. With concrete as our standard ballast construction we are at once confronted with the fact that it will not stand up unless allowed time to take its final set before traffic is allowed to pass over it. This time should not be less than 10 days.

There are certain conditions of city operation which will not permit an uninterrupted time of 10 days for concrete substructure to set. This gives rise to the use of a material such as crushed stone for ballast, and, hence, a second standard of construction as far as the substructure is concerned. When conditions are such that we can absolutely close the street to all traffic for a period of 10 days after placing the ballast, I believe the rigid concrete ballast should be standard construction. If conditions will not permit this, rock ballast tamped without interrupting traffic may become our standard. The depth of the ballast depends on the amount of traffic and the character of the foundation. A depth of 6 in. below the bottom of the tie for concrete and 8 in. for stone ballast substructure is reasonable for standard substructure construction.

We have open to us two kinds of ties for our standard construction; namely, wood and steel, but the tendency of railroads is to eliminate the wood tie, due to the increasing cost and scarcity of timber. In line with a concrete substructure, the ties which form the other element of the substructure must be as long-lived as possible. The steel tie, therefore, goes hand in hand with concrete ballast. The weight of the tie depends on the engineer's judgment. Its requirements are bearing area, stiffness and accurate rolling.

While, to my mind, the concrete foundation and steel tie construction gives the highest type of standard substructure construction, one weakness arises from the difficulty of renewal. The present form of steel tie cannot be taken out without heavy labor cost and the possibility of destroying the concrete substructure. New rail cannot be laid on the old ties and put in surface except by shimming. If our concrete substructure is going to outlive the rail, joints and pavement we must find a way to renew the steel tie without heavy labor cost and the possibility of destroying the substructure. This will mean either the use in the first installation of a wood tie or of a steel tie of different shape than those now on the market. If, for instance, we used a wood tie in the concrete in the original construction these could be removed and a small steel tie inserted in the cavity when the rail renewal took place, thus giving twice the life to the substructure as to the superstructure. The same thing would be true of a differently shaped steel tie. I think this condition must be met before we can call our concrete steel tie type of construction really standard.

For our second or stone ballast type of standard substructure construction only one tie, the wood tie, can be used, as a steel tie in stone ballast requires constant maintenance for a year after installation. In paved streets we are compelled to close up the pavement as soon as possible and consequently could not undertake frequently to re-tamp for a year the steel ties in stone ballast.

THE SUPERSTRUCTURE

The third part of the track structure is the superstructure consisting of the rail, joints and pavement. In a way this is the least important part, as its life depends to a large extent on the foundation and substructure. Stability in our substructure produces stability in the rail and consequently a longer life to our pavement.

The choice of a rail for standard superstructure construction is a discouraging undertaking. The trade catalogues contain prints of a large number of sections, principally the side-bearing rail. Our requirements for rail are not hard to meet, as we have no great trouble in keeping our rail in surface. We do, however, have one controlling condition to meet in picking a standard rail, in that it is difficult to keep our rail in line. This is due to the fact that we operate single cars and do not have the steadying effect of a long train as on steam roads. The fact that our rails are difficult to keep in line at once fixes our standard rail as one whose physical properties tend to make it easy to keep its alignment. The first requirement in a rail to meet this condition is that it be center-bearing and under present designs this limits us to a T-rail. As far as I know, no center-bearing groove rail has yet been rolled.

Assuming then that our first rail standard is to be a T-rail we must decide on what weight to use. Theoretically, I think it can be shown that an 80-lb. rail will meet any service, including interurban service, which is met in city work. However, we must consider that the first cost of the rail represents only about 10 per cent of the net cost of a track. There is, therefore, no great object in picking light rails within reasonable limits. The character of pavement must decide our type of T-rail, whether standard or special. For cities whose specifications call for a 7-in. stone for stone block pavement, the special T-rail, as recommended by the American Street & Interurban Railway Association, meets the requirements. With brick pavement the standard A. S. C. E. T-rail can be successfully installed.

Another type of pavement, the wood block, is coming into general use and will always force us to have a standard superstructure to meet this condition. As it is not practical to cut a groove in the wood block and maintain it, our third standard for superstructure should call for a groove rail.

The second part of a superstructure is the joint. Types of joints and fastenings are nearly as numerous as types of rail. Two ideas present themselves in the joint problem. Are we going to construct a joint designed to be permanent and, therefore, not admit of maintenance, or are we going to construct a joint which permits maintenance? As the standards outlined above are designed to permit maintenance, our joint standard to be in conformity must be a joint which can be maintained. The riveted joint as recently developed fulfills the mechanical requirements of a joint and also permits maintenance. The only objection to this joint is the high cost of the riveting outfit, which makes it prohibitive to some roads. As a mechanical joint its results are more than was expected, and I should feel safe in accepting it as a standard.

To those of us who cannot afford this riveted joint, any of the base-supported joints give a joint susceptible of maintenance and form a fair standard for our construction. The bolts are hard to tighten, but if necessary this can be done. The surface of the rail can be kept true at the joints by the use of a special cutting flat file. The idea proposed by the Boston Elevated Railway in 1890 of installing a joint box adjacent to the joint to allow the tightening of the bolts was a good one. This idea has been experimented with recently, but no practical results have been developed.

The choice of rail as between Bessemer, open-hearth and

alloy cannot as yet be based on experience. No great superiority has been shown for open-hearth steel over Bessemer. The alloy rails, such as nickel, have shown about 20 per cent greater resistance to abrasion than the Bessemer, but are prohibitive on account of the high cost. Titanium rail has shown remarkable results on the New York Central & Hudson River Railroad. The application of the titanium does not greatly increase the cost of the rail and, therefore, an ordinary street railway can afford to experiment with it. Extensive experiments are being carried on in the comparison of the wearing qualities of Bessemer, open-hearth and alloy rail, but the method of rolling seems to have the greatest effect on the wearing quality of the rail.

For the portion of our rail superstructure consisting of frogs, switches and mates we have four types of construction to choose from, as follows: Solid manganese work; cast-steel construction with hard center plates; iron-bound construction with hard center plates, and ordinarily built-up work. These types of construction are standard, and it remains for the railway companies to standardize them as to location and as to radii of switch pieces to permit renewals without the expense of new patterns.

Drainage of the special work foundation is even of more importance than in standard track construction. Since steel ties are not practicable in connection with special work installations, we must use the wood tie. Here is a chance to standardize by making up special sets of ties to fit each turnout. In this way we have a direct result of standardization by saving a very considerable amount of board measure in the ties by not using the ordinary tie and overlapping the ends. The question of ballast for special work is a matter of choice with each engineer, but stone ballast probably meets the greatest number of requirements in connection with the special work substructures. It allows water to pass through it and does away with the allowance of 10 days for setting, as would be the case with a concrete substructure for special work. Crushed stone also permits surfacing when renewals are made.

The choice of the third part of our superstructure, the pavement, is not entirely in the hands of the railroad companies. Pavement is essentially a problem for the city engineer, and in the last analysis his judgment must stand. Our superstructure standards must be such as meet his requirements as to pavement. My experience has been that city engineers will not permit the use of brick on any except light-traffic streets, and the tendency is more and more toward the use of the stone block pavement. This is to our advantage as the block stone has a high salvage value, while other classes of pavement have little or none. After the choice of pavement has been made, the railroad company can have something to say as to the method of laying the pavement. Ordinary city specifications cover the requirements for pavement, except as to the character of cushion between the concrete foundations and the block. As the railway has to maintain the pavement these details are of interest to it.

One of the direct results of the experimental piece of track built in Rochester was a change in the pavement specifications abolishing the use of a sand cushion and substituting for it a dry-mortar cushion. The cushion consists of one-to-one dry mortar. When the grouting takes place the water from the grout sets the dry-mortar cushion so that the blocks are on a solid bed, instead of a sand bed easily washed by water. This is one requirement which I think should be added to ordinary paving specifications and made a standard form of paving construction.

General Standards.

Considering the track as consisting of foundation, substructure and superstructure, we have then the following general standards which may be applicable to cities of ordinary size:

Foundation.—The foundation should be well drained in any type of construction.

Substructure.—First: 6-in. concrete substructure laid where it is possible to keep all traffic off the street for a period of 10 days after the concrete is placed.

Second: 8-in. stone ballast to be used in all cases where it is not possible to keep all traffic off the street for a period of 10 days.

Superstructure.—First: special T-rail as recommended by the American Street & Interurban Railway Association where the pavement is to be stone block.

Second: standard A. S. C. E. T-rail where the pavement is to be brick.

Third: grooved rail where the pavement is to be wood block.

The choice of the three rail standards as above has left out one consideration important in some cities, which is width of street. In choosing standards one must use as a basis his own experiences. To those of us who have not had experience in cities having narrow streets, it can readily be seen that where all traffic is compelled to take the car tracks this fact might so far outweigh the advantages of T-rail as to make inadvisable its use as against a groove rail.

In addition to the possible standards of foundation, substructures and superstructures as outlined above, there are many details, such as tie treatment, fastenings, tie rods, tie plates, bolts, etc., which can be standardized. These, while important, are not the controlling factors in a track structure. The important requirement for these details is that we stick to one standard so as to make renewals easy and inexpensive. Local conditions have a very great effect on our type of standard construction and on our interpretation of what result standard construction should give, particularly as to its life. Chief among these conditions is the question of sewer systems. An ordinary sewer system in a city is designed to serve a certain number of people per acre. In the business section the number of people is much higher than it would be in a residential district. In American cities it often happens in the course of rapid growth that residential districts become business districts, so that the sewers originally built are inadequate and it is necessary to renew them. Whenever this is done the tracks must come out and be rebuilt. People will not consent to be taxed for sewers for the good of future generations, so that this condition of sewer construction in cities is bound to continue as long as cities grow. Another point tending to reduce the life of a track is the continual construction of laterals of all sorts beneath the track. Sewer laterals, fire-alarm conduits, electric light conduits, water mains, gas mains and various other forms of municipal utilities find occasion frequently to cross the street and consequently have to undermine the track. In each case where this is done the so-called permanent track is reduced to limited life track.

The standards outlined above are not given with the idea that they will produce permanent construction, although in the case of the concrete construction we should be able to produce a substructure which will outlive two superstructures placed upon it.

DATA SHEET ON TRAINING OF TRANSPORTATION EMPLOYEES

The American Street & Interurban Railway Transportation & Traffic Association sent out under date of June 24, through Secretary Donecker's office, data sheet No. 60 prepared by the training of transportation employees committee, the chairman of which is G. O. Nagle, general manager of the Wheeling (W. Va.) Traction Company. Among the questions which the members are asked to answer are those relating to the number of conductors and motormen employed and new ones engaged during the past 12 months; the average number of men who remain in the service one year or longer; the methods of instruction covering the practice relative to the use of instructor motormen and conductors, extra compensation for such instructors, average time required to qualify a new man for work, the payment of men during the breaking-in period and practice with regard to paying men on extra list; use of skeleton cars and model apparatus, and determination of the candidate's fitness for a position.

RECENT DEVELOPMENTS IN MULTIPLE-UNIT CONTROL AND OTHER ELECTRIC RAILWAY APPARATUS *

BY CLARENCE RENSHAW, WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY

The use of power-operated control apparatus affords many advantages. One of the most important of these is the ability to operate multiple-unit trains of two or more motor cars. This is of the greatest assistance in handling heavy traffic under any circumstances, particularly on high-speed roads.

Increased seating capacity during rush hours or on special occasions obtained on such roads by operating additional cars as "second sections," or by reducing the usual headway, is always attended by increased danger of collision or other accident. Similar capacity obtained by the use of multiple-unit trains, however, does not affect the usual train dispatching, and is, therefore, absolutely safe in this respect. In addition to this important advantage, multiple-unit trains can be operated more cheaply than the same number of motor cars can be operated singly, and more satisfactorily than the same number of cars can be operated by a combination of motor cars and trailers.

The ability to operate multiple-unit trains during rush hours or on special occasions also will frequently permit the size of cars and equipments to be based upon the average rather than the maximum load conditions, and thus allow smaller cars and lighter motors to be used. For instance, cars small enough to be operated by means of quadruple 50-hp. motors may be sufficient where equipments of 75-hp. motors would otherwise have been required, or quadruple 75-hp. motors may do where quadruple 100-hp. motors would otherwise have been necessary. If this can be done, large economies, both in investment and in operation, may be effected.

Even where train operation is not contemplated, the use of power-operated control apparatus is well worth while to secure the location of the main power circuits and circuit-breaking devices away from the platforms and below the car floor. When thus located they are out of sight of timid passengers, and a source of numerous damage claims is eliminated. Incidentally, with large equipments, a considerable saving in platform space is effected. The location of the controlling apparatus beneath the car, also, by reducing the amount of wiring, more readily permits the thorough protection of it, and this, together with the more powerful and substantial character of the apparatus, enables a car so equipped to render a maximum service with a minimum of delays and expense.

During the past year the Westinghouse Electric & Manufacturing Company has placed on the market a new line of power-operated multiple-unit control equipments, which have been remarkably successful. These equipments are much simpler than any previous types of multiple-unit control equipments and have been designed with especial reference to the needs of city and interurban roads. They are designated as Type HL unit-switch control equipments, and have been referred to as the hand-operated type to distinguish them from equipments arranged for automatic acceleration, which was formerly the only type made. The Type HL equipments are based upon the same fundamental principles as the well-known automatic types of unit switch control equipments and retain all of their essential features. Many important improvements have been made in constructional details, however, and the circuits have been so simplified that they are easier to follow and to comprehend than those of the usual platform types of controllers.

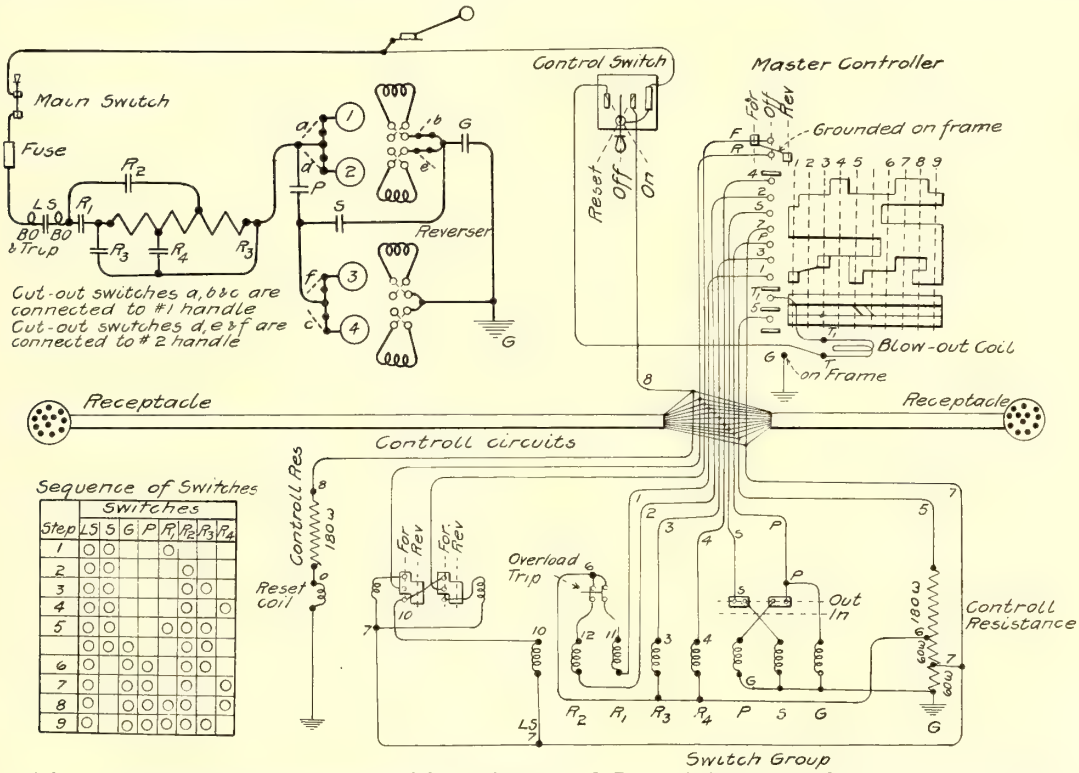


Fig. 1—Multiple-Unit Control—Wiring Diagram of Control Apparatus for Four 75-hp Motors

In the Type HL unit switch control equipments the various main circuit connections between trolley, resistance, and motors, which, in the usual car equipment, are ordinarily made by the overhead circuit-breaker and by the power drum and contact fingers of the controller, are made by six or eight (depending upon the size and number of the motors) unit switches, each provided with a strong magnetic blow-out and normally held open by a powerful spring. These switches are assembled in a common frame and designated as a "switch group." In the larger sizes of equipments the group is supplemented by two additional switches mounted in a second frame, and called a "line switch." Each switch is closed when desired by compressed air acting on a piston, which opposes the spring and forces the lower or movable switch jaw against the upper or stationary one.

The connections ordinarily made by the reverse drum of the platform controller are made up in these equipments by a re-

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 29, 1910.

verse drum similar in general to that in the controller, but of more substantial construction, pneumatically operated and mounted in a separate case. The complete reverse drum with its operating mechanism is termed a "reverser."

The admission or release of compressed air to the cylinders, and hence the operation of the switches and reverser, is regulated by means of electrically operated magnet valves attached to the cylinders and governed by means of a master controller. The small amount of power which is required for operating the magnet valves is taken from the trolley through a resistance. The circuits from the master controller are carried to a 12-conductor control "train line," from which branch circuits are run to each piece of apparatus. This train line extends the entire length of each car, and terminates in one or more 12-conductor "train line receptacles" at each end.

By means of a 12-conductor "train line jumper" placed so as to connect adjoining receptacles on adjacent cars, the train line of any car may be connected to that of a second car at either end, and the control train line thus made continuous throughout a train of any number of cars. Operating the master controller on any car under these conditions will operate the respective pieces of apparatus on all cars simultaneously.

Air for operating the pneumatic parts is obtained from the air-brake system through strainers for removing the moisture and through a reducing valve set for 70-lb pressure.

The general arrangement of main and control circuit connections for quadruple equipments of 75-hp motors or less is shown by the diagram on page 35, from which the operation of the control may be readily understood.

It will be noted that the arrangement of the main circuit connections to the motors is the same as that used in the well-known "K" type of controller. With this arrangement is combined a particularly ingenious connection of the resistance, which gives a maximum number of resistance steps with a minimum number of switches. The entire combination of main circuit connections is such that an extremely simple arrangement is obtained, and an unusually small number of switches serves to effect the necessary combinations.

From the standpoint of safety, it is usually not desirable to attempt to operate large cars unless the air brakes are in good working order. If, for any reason, it should be desired to do this, however, an emergency reservoir may be added. This provides a reserve supply of air for operating the control apparatus in case of accident to the main source.

A particular feature of the control for quadruple equipments

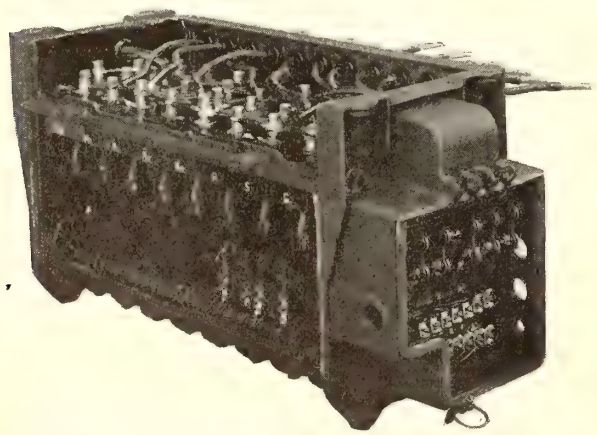


Fig. 2—Multiple-Unit Control—Unit Switch Group

is the arrangement of the cut-out switches for cutting out a damaged motor when necessary. These are so arranged that in case of motor trouble one motor of each pair is cut out, thus leaving the remaining two motors operated in series-parallel just the same as if they were the two motors of a double-motor equipment. With this arrangement a car with two motors temporarily cut out will operate just as smoothly as one with all four motors in service.

The magnet valves which control the switches and reverser are operated by means of current from the trolley through a resistance. A very small amount of current is required for operating these valves, and this has made it possible to arrange the valves so that they will operate with a wide variation of trolley voltage.

A main switch is provided in the circuit between the trolley and the motors, so that by opening this switch the control apparatus may be operated for test purposes without putting power on the motors.

Overload protection is provided by means of an overload trip mounted on one end of the switch group. In case of over-

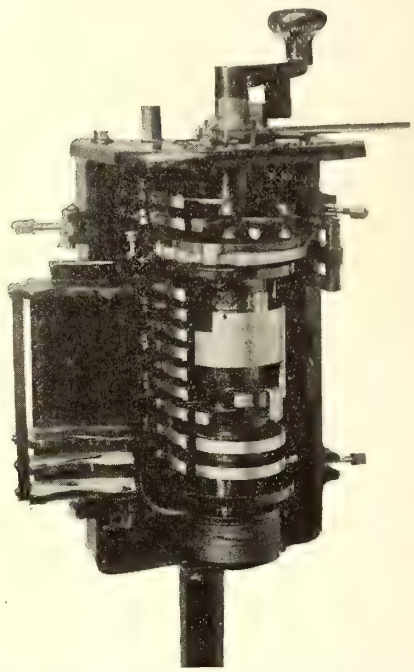


Fig. 3—Multiple-Unit Control—Master Controller

load or short-circuit, this will open the control circuit to certain of the switches in the group and thus cut off power. A copper ribbon magnetic blow-out type fuse is also provided, but there should be little or no occasion for this to blow.

In general, the switch group consists of a cast and malleable-iron skeleton frame, to which the various working parts are attached, which is completely enclosed by easily removable sheet-iron covers.

A blow-out coil is located at the side of each switch in such a way as to give a particularly short magnetic path, and thus to allow a very strong magnetic flux to be obtained with blow-out coils of reasonable size, and a moderate expenditure of energy. An exceptionally strong blow-out effect is thus obtained which enables the switches to open under heavy overloads without damage and secures long life for the contact tips.

Each switch and each blow-out coil is enclosed in an insulating box of vulcabeston, and the switch jaws are surrounded by an easily replaceable box of soapstone and asbestos lumber. All live parts are carefully insulated from each other and from the frame. Wherever possible, the connections between the various switches and blow-out coils are made of copper strap rigidly supported and giving the same substantial effect as the busbar connections on a power-house switchboard.

A particular feature of this group, and, in fact, an essential advantage of the unit-switch system of control, is the heavy pressure obtained at the switch jaws for opening and closing them. With the type of switch described a pressure due to the spring of nearly 100 lb. is obtained at the switch jaws for opening them, and a similar force due to the air pressure in the cylinder for closing them. This force is not applied merely as a steady pull or dead weight, but the means which are employed to obtain a wiping contact when closing the switch gives also a toggle-joint effect when the switch is opened. The heavy pressure for closing the switches insures good contact and excellent carrying capacity, while that for opening them is so great that failure to open is almost impossible.

The term "unit switch" which is applied to this system of control apparatus is derived from the fact that the design of the fundamental pieces of apparatus is laid out on the "unit" plan, so that any worn, broken or damaged part may be easily replaced.

The reverser consists of a number of copper fingers mounted on a stationary base and pressing on one or the other of two sets of movable contacts carried on a wooden drum. The drum is revolved to the forward or the reverse position by one or the other of two pneumatic cylinders, each controlled by a magnet valve similar to those in the switch group.

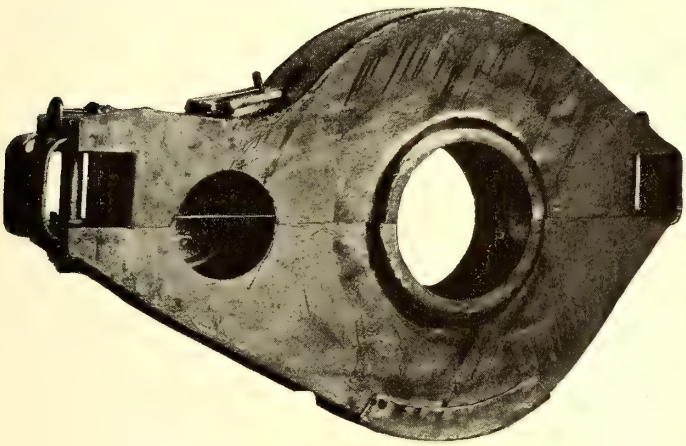


Fig. 4—Welded Sheet-Steel Gear Case

Powerful forces approximating those for operating the switches are used also for moving the reverser, so that heavy pressure may be used on the fingers and firm contact thus secured. This construction gives the reverser large overload capacity for taking care of heavy current rushes, and makes it almost impossible for the fingers to become stuck or welded, due to motor flashes, short-circuits or other similar troubles.

No springs are used in the reverser cylinders, and the drum when moved to one position by closing the circuit of one of the magnets remains in that position until the circuit of the other magnet is closed. Suitable small fingers mounted upon the reverser frame and pressing upon corresponding movable contact pieces on the reverser shaft establish the necessary interlocking connections.

The reverser parts are built upon a cast-iron frame, suitably protected by easily removable sheet-iron covers.

The master controller which is used with Type HL unit switch control equipments contains the usual power and reverse handles and these are mutually interlocked. It is arranged with five notches in series and four in parallel. The position of the notches is indicated on the cap plate of the master controller and also by a suitable star-wheel inside of the case. The main resistance, control resistance, train line receptacles, train line jumpers, and other equipment details have been carefully designed to perform their specific functions.

The Type HL unit switch control equipments offer a number of important advantages over drum-type controllers as well as over any other forms of multiple-unit control. The more important may be summarized as follows:

The apparatus is extremely simple in all of its parts.

Powerful forces are employed for opening and closing the switches and throwing the reverser. The control apparatus is capable of opening the circuit under all conditions and reliability of operation is thus insured.

The main power circuits are removed from the car platform and accidents from "controller blow-ups" are avoided.

Economy of platform space is secured.

Multiple-unit train operation is available and greatly increased passenger capacity can be had at any time without operating additional trains or overloading the motors. The dangers due to "second sections" are thus avoided.

Heavy pressures are used on the contacts and great momentary overload capacity thus secured.

An exceptionally effective magnetic blow-out is employed, and the circuit thus opened with little or no burning of the contacts.

The wiring and connections between the various switches and blow-out coils are arranged in a particularly substantial and workmanlike manner.

Automatic overload protection is secured in addition to the protection afforded by a fuse, by means of a device of such a nature that its calibration can be relied upon.

The apparatus is capable of operating satisfactorily with trolley voltages varying from a maximum of 600 volts or more to a minimum of approximately 200 volts, thus covering any range likely to be met with in service.

When operating with minimum trolley voltages the switches open and close with the same force as when operating with maximum trolley voltage.

The powerful forces used in operating the switches and their great momentary overload capacity, together with the strong magnetic blow-out which is obtained, and the substantial arrangement of connections, give an exceptional reliability of operation of the switches, and insure long life of the contact tips and other wearing parts. The use of reliable control apparatus means a minimum amount of motor trouble, since faulty operation of the control apparatus frequently causes damage to the motors. Economical maintenance should thus be effected by the use of unit switch control apparatus and at the same time reliable service secured.

WELDED STEEL GEAR CASES

The use of the acetylene welding process has recently enabled a very substantial sheet-steel gear case to be developed, and although not yet thoroughly tried out, this gear case gives good promise of success in eliminating some of the weight of car equipments. Such a gear case for a Westinghouse No. 303 motor, which has a rating of 100 hp at 550 volts, is made of ⅛-in. sheet steel and weighs 124 lb., as compared with a weight of 193 lb. for the malleable-iron gear case previously used on this motor. A saving of 59 lb. is thus effected. This is not a large saving, but it is sufficient to be well worth while where it can be conveniently secured.

The welded gear case has a reinforcing strip at the bottom, which is the part most likely to be damaged. The arrangement used on the Westinghouse motors of suspending

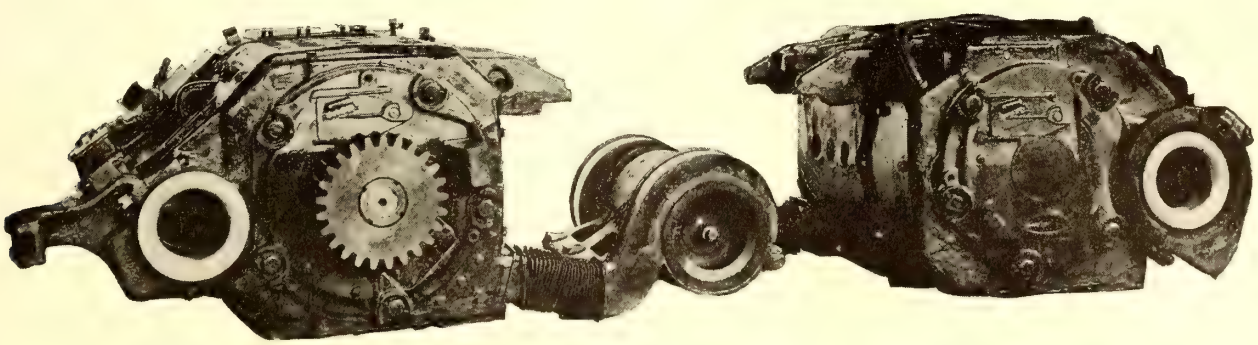


Fig. 5—Blower for Forced Ventilation of Motors on Long Island Railroad Motor Cars

the gear case from the two ends simplifies the problem of supporting such gear cases very greatly.

FORCED VENTILATION FOR RAILWAY MOTORS

An interesting development of the past year is the method used for securing increased motor capacity on the new electric motor cars purchased by the Pennsylvania Railroad interests for use on Long Island and in the new tunnels through Manhattan Island. Each car is equipped with two interpole motors, which are normally rated at 215 hp., but which by means of forced ventilation are enabled to do work which would otherwise require motors rated at about 250 hp. each.

The blower outfit consists of a 1½-hp., 2250-r.p.m. motor, to the shaft of which is attached, at each end, a blower fan, 9 in. in diameter and 3 in. wide. Each of these fans is capable of forcing between 400 cu. ft. and 500 cu. ft. of air per minute through the motor to which it is connected.

The truck on which these motors are mounted is so arranged that the blower outfit can be mounted below the bolster so that the general arrangement of motors and blowing outfit is shown.

This arrangement has been remarkably satisfactory, and 180 cars are being equipped in this way. The installation is of particular interest as being the first instance where forced ventilation has been used for car motors on such a large scale.

REVISION OF COMMUTATION RATES ON THE PENNSYLVANIA RAILROAD COMPANY

D. N. Bell, assistant general passenger agent of the Pennsylvania Railroad, recently made the following statement to a representative of this paper regarding the reasons which led that company to announce increases of its commutation rates to New York City.

"A thorough analysis was made of our commutation business, and we found that on the 50-trip tickets the average amount paid per passenger was 11.1 cents, the average distance traveled was 9.22 miles, and the average rate per mile was 1.202 cents. On the 60-trip ticket the average amount paid was 11.1 cents, the average distance traveled was 16.83 miles, and the average rate per mile was 0.666 cent. On the 180-trip and annual tickets the average amount paid was 12.3 cents, the average distance traveled was 26.45 miles, and the average rate per mile was 0.466 cent. The cost of terminal service at Jersey City and New York, including ferriage between the two points, is 10.5 cents, so that after deducting terminal and ferriage expenses we are carrying 50-trip passengers 8.22 miles for 6 mills; 60-trip passengers 14.83 miles for 6 mills, and 180-trip and annual passengers 24.45 miles for 1.8 cents.

"During the past 10 years there has been a marked increase in the cost of handling passenger traffic, due to a steady demand on the part of the traveling public for stations equipped with modern conveniences, trains composed of the best equipment and the taking of every possible precaution to insure against accident. To accomplish these results, we have invested millions of dollars in improving the roadbed, replacing block-signal system and the laying of heavier rails, thus permitting greater speed with absolute safety.

"In addition to the above, like all other roads, our cost of operation has been increased on account of greater expenditures in taxes, labor, etc. The increase in the cost of labor since 1899 has ranged from 32 per cent to 100 per cent. The increase in taxes in the State of New Jersey has amounted to 286 per cent during the same period.

"We have also, within the past year, entered into an arrangement with the Hudson & Manhattan Railroad Company by which our passengers are transported between Jersey City and Church and Cortlandt streets, New York, without additional charge, the expense of transportation being borne by this company.

"In view of the above we feel that the increased charges to commuters are not unfair, and can be justified before the public."

MEETING OF THE NEW YORK STATE ASSOCIATION

The twenty-eighth annual convention of the Street Railway Association of the State of New York was called to order by President E. F. Peck at the Hotel O-te-sa-ga, Cooperstown, N. Y., at 10:50 a. m. on June 28.

President Peck introduced Lynn J. Arnold, of Cooperstown, who made an address of welcome to the association.

John H. Pardee, the secretary, read a letter from the Hotel Clifton, Niagara Falls, Ont., inviting the association to hold its next annual meeting there.

Mr. Peck then read the president's annual address. An abstract follows:

ADDRESS OF PRESIDENT PECK.

"The evolution of transportation has been so rapid that it has been a severe task for the companies engaged in this business to keep pace with the times. A rival of the electric railways, and one which bids fair to grow rapidly in popularity, has arisen in the skies. I refer to the flying machine, recent experiments with which have set the whole nation in a quiver of excitement, and have upset many of our old-fashioned theories in regard to rapid transit. Whether this development will be of any serious import, or whether it will have any commercial value, is a problem which none of us, at the present time, is able to solve. Not many years ago we laughed at the adventures of Darius Green with his wonderful flying machine; but to-day who would dare ridicule the achievements of such venturesome men as the Wright brothers, Curtis and Hamilton? Who here is competent to predict as to the future in any matters pertaining to the development of transportation? As it is, we are not here to-day to prophesy as to the future, but rather to discuss the serious problems which daily confront us.

"The past year has been an eventful one to the electric railway interests, and the financial reports of our member companies for the fiscal year ending June 30 will, in most cases, show marked improvement over the previous year. The dark clouds of financial unrest that nearly overwhelmed us in 1908 seem to be gradually drifting away, and to-day I fully believe we have entered upon another period of prosperity.

"The paramount problem before us is that of the 5-cent fare. As this subject will be discussed later by one who has given it careful study, and is better able to present the facts than I, it is unnecessary to consider this most important matter at this time.

"Another question which has been the subject of considerable discussion during the past year has been that of the encouragement of friendly relations between the electric railway companies and the public. During the past six months this association has fathered a systematic publication of a series of educational articles on the following topics:

"'Cost of snow removal and maintenance of track pavement, showing the hazardous and expensive character of this burden which must be borne by the street railways, and which has been appreciated but slightly, if at all, by the general public.

"'Plans and methods of street railway companies, by perfecting safety devices, to prevent accidents to human beings; and the education of the public to greater care and prudence.

"'Division of the nickel as applied to the various operating and maintenance accounts, bringing out conspicuously the enormous percentage paid for labor, and the comparatively insignificant percentage which the street railway companies are able to retain as a profit from the business.

"'The remarkable and unappreciated expense, and the executive management, required to move people to and from their work in rush hours, showing the cost to the companies of meeting such extreme peak-load conditions.

"'The remarkable increase in population and prosperity in the rural districts, and the inadequately appreciated benefits resulting therefrom to farmers, small villages, and hamlets throughout the State from the extension of suburban and interurban railway systems.'

"The general object to be obtained by the publication of these

articles was to bring the public of New York State generally to a realization of the peculiar problems and expense incident to street railroading, to the end that a better and fairer treatment of these public-service corporations might result eventually.

"Indicative of the importance placed on this subject by the executive committee of the American Street & Interurban Railway Association, a joint meeting of representatives of the various State and sectional associations was held in New York City in January of the present year to discuss means to bring about a closer affiliation of State and sectional associations with the American Association, to the end that with their united action results more beneficial to our business might be obtained. After considering the various phases of the situation, it was generally concluded that the most effective method of procedure would be the appointment of the presidents of the State and sectional associations as members of the committee on public relations of the American Street & Interurban Railway Association. The suggestion of the joint committee was later adopted by the executive committee of the American Association.

"With the work performed by the association during the past year you are all more or less familiar. An innovation in our quarterly meetings was decided upon by your executive committee, a 'get-together' dinner on the evening previous to the business session. I feel that the good derived from our meetings has been greatly enhanced by these social gatherings.

"The work of an association of this character depends largely upon the personnel of the executive committee, and I wish to express my sincere thanks to the members of the executive committee for the hearty support given me in conducting the affairs of the association."

Mr. Pardee then presented his report as secretary, showing 20 member companies, 6 associate members and 75 allied members.

H. M. Beardsley, Elmira, the treasurer, made a report showing a balance at the close of the previous year of $6,101. Receipts during the year were $6,070 and disbursements $4,911, leaving a balance on hand of $7,260.

Edgar S. Fassett, Albany, chairman of the committee on city rules, reported that no questions requiring the attention of the committee had arisen during the year.

PROBLEM OF THE 5-CENT FARE

Henry W. Blake, editor of the ELECTRIC RAILWAY JOURNAL, then read a paper on "The Problem of the 5-Cent Fare." The paper is published in abstract elsewhere in this issue.

Mr. Fassett said that as a member of the committee on topics he had suggested that Mr. Blake be asked to prepare the paper and said that the title really should be, "What Shall We Do to Be Saved?" That was really the subject of the paper.

Something had to be done, Mr. Fassett said. A slight advance in commutation rates had put one company doing both an urban and an interurban business on its feet financially, but the average city road was not able to adjust its fares. With the 5-cent fare as the fixed unit of compensation the only solution was the receipt of some money for transfers. Mr. Fassett's initiation into the business took place in 1885 and at that time the street railways secured two or three 5-cent pieces for a length of ride for which but one fare was received now. A change in the law providing for a 5-cent fare should be made so as to enable companies to charge for transfers. Otherwise expansion was at an end. No increases in mileage were being constructed or would be until conditions were changed. The United Traction Company had franchises for $500,000 of new road, but could not construct the lines under existing conditions.

Mr. Fassett believed that with the publicity which the companies were receiving the people were beginning to see that the fault did not lie with the railways. However, some steps must be taken to enable the railways not only to exist but to expand so as to meet the increasing requirements of the communities.

On motion of W. H. Collins, Fonda, Johnstown & Gloversville Railroad, a vote of thanks was given to Mr. Blake for his paper.

At the suggestion of C. Loomis Allen, Utica & Mohawk Valley Railway, discussion was then postponed until a later session in order to give the delegates an opportunity to study Mr. Blake's paper.

INTERURBAN RULES

The discussion on the advisability of adopting the interurban rules approved by the American Street & Interurban Railway Association at the Denver convention in October, 1909, was opened by C. Loomis Allen.

Mr. Allen thought that a study of the interurban rules as adopted at Denver would be sufficient argument in favor of their acceptance, but he realized that an added moral support would be given to the American Association by a ratification of the rules by the New York Association. These rules represented the best thought and best practice up to the time of their adoption by the best men in the business. Where differences of opinion existed on any points they were talked over and reconciled and all points at issue were settled by deciding votes. In reading the resolutions adopted at the Denver Convention and moving their adoption Mr. Allen said that different methods of operation and the regulations of various States would cause modifications of the rules to accord with local conditions. He asked how many roads had adopted the rules approved at Denver.

Matthew C. Brush, general manager, Buffalo & Lake Erie Traction Company, said that he had the Denver code, except for very slight changes due to local conditions, in proof form and that the rules would be in force in 30 days.

W. B. Rockwell, general manager, Syracuse & Suburban Railroad, had adopted the Denver code with slight changes arising from local conditions.

T. C. Cherry, Utica & Mohawk Valley Railway, had adopted both the urban and the interurban rules with very slight exceptions. For interurban trainmen books containing both codes were provided.

Joseph K. Choate, general manager, Otsego & Herkimer Railroad, had adopted the rules effective as of July 1.

John E. Duffy, superintendent, Syracuse Rapid Transit Railway Company, was not able to attend the Denver convention, but was a member of the committee of the American Street & Interurban Railway Transportation & Traffic Association that compiled the rules. He was chairman of the committee that compiled the New York State code adopted at Kingston in 1907, which was entirely different from the Denver code. The New York code, as adopted then, was similar to that of the American Railway Association. The present committee on interurban rules of the Transportation & Traffic Association had held three meetings so far this year and it appeared to be the unanimous opinion of the members of the committee that the American Railway Association code should be adopted. The argument advanced in favor of this code was that it represented the best thought and effort of steam railroad managers.

Mr. Duffy did not see any reason why interurban electric and steam roads could not be operated under like rules. The rules should be numbered alike in both codes. The committee on interurban rules of the Transportation & Traffic Association had seen fit to change front. The sentiment in New York State was in favor of the American Railway Association code in 1907. Now the committee had practically finished its work and at the meeting to be held in Atlantic City in October of this year would present a code that would be a duplicate of that of the American Railway Association so far as it was applicable to interurban electric roads. Some of the high-speed, single-track interurban roads of the West had operated under this code with success. It would not be possible to operate under American Railway Association rules absolutely, but amendments could be made that would make them applicable to all local conditions arising in interurban electric operation.

Mr. Duffy admitted that the Denver code was good, but said that the American Railway Association code represented the thought and experience of officials of steam railroads through a period of many years.

Mr. Rockwell had been waiting for several years for some

action to be taken on the subject of interurban rules and conditions had so developed that some definite course was essential at Denver. He had never heard a more thorough discussion than that which took place over the Denver rules. Rules could be changed by amendment from year to year.

Mr. Duffy referred to the information on the data sheets sent out by the committee and said that the report to be made at the Atlantic City Convention would recommend what the committee thought was best for the roads. Continuing, Mr. Duffy said that C. D. Emmons, chairman of the committee, had taken up questions of difference with the transportation committee of the American Railway Association and would meet a member of the steam road committee and a representative of the Interstate Commerce Commission to discuss the subject. He asked that the committee be supported in the course which it had concluded to follow. Its work should not be nullified before its recommendations were presented to the Atlantic City convention. The report of the committee as presented at the Denver convention was a good work, but it was now proposed to try to reconcile the differences which developed at that time.

Mr. Allen said that the interurban code was taken up rule by rule at Denver. The final report as adopted was not coincident with that recommended by the committee. The majority determined each point. The changes that it was now proposed to recommend at Atlantic City were not so much changes of theory and practice as of other matters. The retention or rejection of rules was governed by the doctrine of survival of the fittest. The question was simply that of the adoption of the American Street & Interurban Railway Association code. Strong arguments would be presented on both sides at Atlantic City. If the code was changed then the New York association could change too. The industry was not standing still. He wanted the safest and best rules that could be secured for the industry.

Mr. Allen added that after the 1897 classification of accounts was adopted the association stood still and it was a shock when the Interstate Commerce Commission requested the adoption of a new system. The companies then were behind the times. It was better now to go on record for the rules adopted by the Transportation & Traffic Association and ratified by the parent association.

Mr. Duffy was right in his position, Mr. Allen said. He was working as a member of the committee of six. But that committee would have to convince the Transportation & Traffic Association of the correctness of its position.

John H. Cain, superintendent, Buffalo, Lockport & Rochester Railway, attended the meeting at Kingston at which the rules were adopted and put them into effect on the road with which he is connected. During the two years there had not been a failure of the rules. The New York State Association had adopted a code taken practically from that of the American Railway Association and he thought that at the Atlantic City convention substantially the same code would be adopted so far as it is applicable to electric interurban roads.

R. E. Danforth, general manager, Public Service Railway, Newark, N. J., doubted whether more than one-third of the men present knew the numbers of the rules. If a steam railroad man was hired by an electric railway he had to learn a good deal anyway about methods that were different from those to which he had been accustomed. So far as principles were concerned, the Denver code was taken almost bodily from that of the American Railway Association and it was a good safe system for operation. Perhaps each individual road would prefer some slight changes in details. He thought that Mr. Allen's resolution should be passed, although realizing that minor changes may be necessary to adapt the code for local practice.

W. H. Collins, Fonda, Johnstown & Gloversville Railroad, had a book of rules based on the Denver code about ready for adoption on that road. He believed it was the best code ever provided to meet the different conditions existing. His early experience had been with steam railroads but he realized that the American Railway Association code as used by steam railroads was not applicable to all electric interurban roads. As a matter of fact the adoption of the resolution would be in support of the work of the committee and would strengthen its position. If the committee did something better at Atlantic City the New York association should adopt that.

Mr. Duffy said that all he wanted to do was to retain the American Railway Association numbers of rules and companies could put in force the rules they desired. Some of the officials were bound to follow steam railroad practice and the committee was trying to adopt something which those officials and others also could adopt.

E. F. Campbell, Buffalo, Lockport & Rochester Railway, thought the rules all over the country should be the same. It was wrong to have different codes in different States. Some of the best men he had were trained on steam railroads. The same numbers should be applied to rules on both electric and steam properties. A few months would make very little difference. When the association acted it should take the right course.

Mr. Rockwell said that if the association waited year after year no rules would be adopted.

Mr. Cain said that the New York association had adopted practically the American Railway Association code. Each year the American Street & Interurban Railway Association had drawn nearer to the same code.

Mr. Allen said that if the report of the committee was accepted at Atlantic City he would be the first one to ask that the New York State Association rules be amended. He believed in investigating every practice and in striving to do everything that would advance the industry. He was proud of the fact that electric railways had taught steam railroads something concerning transportation. Was it a good position not to ratify the Denver code but to wait and see what else was done? If the Denver code was adopted it put the association on record as adopting rules that represented the best thought and practice up to that time.

The resolution offered by Mr. Allen was then adopted, as follows:

"Whereas, the committee appointed at the last meeting of this association has prepared and reported a certain code or set of rules governing the operation of electric interurban cars, which code is intended to include such general rules as represent the best and most modern practice in electric railway operation, and

"Whereas, this association has duly and carefully considered and amended the same in some particulars, and

"Whereas, it is for the interests of the members of this association that the association adopt, approve, promulgate and recommend a code of rules which shall be considered the standard code, except in so far as it may, in specific instances, be necessary to omit, add to or change rules in order to conform to State or municipal laws and regulation or to local conditions.

"Now therefore be it resolved, that the rules reported by the committee and as changed, omitted or amended at this meeting be the standard code of rules of this association for the operation of interurban cars, until such rules may be duly amended or changed at a meeting of this association, and

"That this association requests its members to adopt this standard code of rules for the operation of interurban cars on their respective railways except in so far as such rules may conflict with State or municipal laws or regulations or be unwise or inapplicable on account of local conditions, and

"That the committee on interurban rules be continued to report at the next meeting of the association such proposed changes or amendments as may seem wise or necessary."

Adjournment until the afternoon session followed.

TUESDAY AFTERNOON SESSION

The session of Tuesday afternoon opened with the presentation of the paper on the "Latest Development of Car-wheels For Electric Railways," by V. S. Yarnell, expert, Carnegie Steel Company. This paper is published elsewhere in this issue. Mr.

Yarnell illustrated his paper with about 20 stereopticon slides which were thrown on a screen, the room being darkened for the purpose. There was no discussion. President Peck then asked Martin Schreiber, engineer maintenance of way, Public Service Railway, New Jersey, to read the paper on "Standardization of Track Construction in Paved Streets" prepared by B. E. Tilton, engineer maintenance of way, New York State Railways. This paper is found elsewhere in this issue.

Mr. Schreiber at the conclusion of the paper discussed the subject of track construction on the Public Service Railway. He said that steel ties should be used only with a concrete substructure because with stone ballast the spacing of the ties would have to be so short that the cost of steel ties would be prohibitive. With a concrete substructure, the cost of construction with steel ties was about equal the cost of construction with wood ties. It was generally conceded that all wood ties should be treated. Practically the only wood that did not require treatment was oak, whose use for ties was prohibitive on account of cost. Mr. Schreiber then described the open tank and the closed tank methods of treatment and exhibited half sections of ties treated by each of these methods. His company has treated between 50,000 and 60,000 long leaf yellow pine ties by the open tank treatment, using the same method employed by roads in Denver, Salt Lake City, and Berlin, Germany. With the pressure system a cheaper preservative material could be used, that is, natural creosote could be employed, but the cost of treatment of the tie was higher than with the open treatment. Mr. Schreiber also showed a sample section of one of 25,000 short leaf yellow pine ties, which his company had had creosoted in Jacksonville. Complete penetration was shown. The specifications employed were the same as those of the American Engineering & Maintenance of Way Association. When both were creosoted he did not think that there was much difference in the wearing qualities of short leaf and long leaf pine. He referred to a common method of distinguishing between these two kinds of timber by the number of rings; less than from five to eight rings per inch indicated short leaf pine. In Europe good results had been obtained for ties of cheaper woods such as birch, when thoroughly impregnated. Most engineers consider the pressure system more reliable than the superficial system, but the latter seemed to be giving good results. Still another material used for tie preservation is zinc chloride or a combination of zinc chloride and creosote. This method has been used extensively in the West and is now being employed on the Chicago properties. Mr. Schreiber thought that roughly the cost of superficial treatment was from 25 to 26 cents a tie and the full treatment was approximately 40 cents per tie. The use of softer woods was less objectionable in electric railway service than in steam railway service, because there was less rail wear as the rail was supported between ties.

The Chicago roads, according to Mr. Schreiber, were using tie-plates on every tie. They were also using screw spikes, hoping that the ties would outlast two rails. With the screw spike the hole can be filled up and a new rail installed or the old rail realigned. In tests conducted by the Board of Supervising Engineers of Chicago screw spikes have shown practically double the holding power of ordinary spikes. Roughly, it required 5400 lb. to draw one out instead of 2700 lb. with the ordinary spike. He considered tie plates much more desirable than tie rods, especially with a low rail. He agreed with Mr. Tilton on the advisability of using a dry mortar cushion under the paving. His company had done this for some time, but he did not see why a T-rail could not be laid with wooden block paving. The situation in regard to rail sections was now fairly satisfactory. In streets where groove rail was used, the standard of the American Association in which the head was set slightly off from the gage line was desirable and made a good wearing rail. Many companies have adopted this section with slight modifications in the shape of the groove. He considered granite made the best paving, especially when used as in Chicago and by the Public Service Railway Company with very narrow joints. It made as smooth a paving as brick and had a much longer life.

C. Gordon Reel, consulting engineer, Kingston, spoke in favor of T-rail construction and said that it was not used in New York State as much as it otherwise would because of Sec. 109 of the Railroad Law which prohibited the use of "center-bearing" rails. This law was passed 20 years ago and had no reference to T-rails but was intended to apply to a rail with a special head, having a narrow tram on each side, at that time used in New York. This old type of rail was not desirable but the former Railroad Commission had ruled that the T-rail was also a "center-bearing" rail. He did not think that the Public Service Commission had ruled on the same subject but objection was sometimes raised to T-rail by local authorities based on this erroneous construction of Sec. 109. He made a motion that the President should appoint a committee of three to take the matter up with the Public Service Commission and obtain a ruling on the meaning of the word "center-bearing." The motion was carried.

M. V. French, engineer maintenance of way, Utica & Mohawk Valley Railway, disagreed with the other speakers as to the advisability of using dry mortar under paving. He said that if the stone paving or brick was properly grouted a sand cushion was all that was necessary. If good mortar was used, the paving blocks could not be used over again. The mortar cushion has never been used in Utica, but no trouble had ever been experienced there with the pavement heaving except in one place where it was not properly laid. He recommended a depth of ½ in. to ¾ in. as a sand cushion for brick and 1½ in. to 2 in. for block paving. He strongly recommended that on a track laid on stone ballast cars should be run over the track before the paving was laid. In Utica he had found a settlement of from ½ in. to ¾ in. in track on 8-in. ballast, thought to have a very solid foundation. He had heard of the rule in regard to eight rings to the inch to distinguish short leaf and long leaf pine, but tie contractors had declined to bid on specifications containing this provision. He also laid great stress upon the use solely of ties cut from living timber. Other ties were apt to have a fungus growth, acquired while the timber was stacked.

W. Boardman Reed, president Otsego & Herkimer Railway, described the real center-bearing rail which was condemned by the law. He did not think it was so bad a rail for railway purposes. It had been used on the 125th Street crosstown line when that line was built for cable traction, and also had been used on various horse car lines in New York City.

In answer to a question F. A. Bagg, Fonda, Johnstown & Gloversville Railway, said that he had laid strips of cement pavement 12 in. to 16 in. wide next to the rail at a point on his road where the brick next to the rail had been removed. This paving had been in some years and had given good results.

On account of the absence of a number of accounting officers, President Peck announced that the discussion on the subject of the system of accounts prescribed for street railroad corporations by the Public Service Commission, Second District, would be postponed.

A letter was read from the Public Service Commission, Second District, on the subject of passenger traffic, suggesting that the commission would be glad to confer with representatives of the electric railways on this topic. A motion was made that a standing committee be appointed to consider questions relating to tariffs and traffic to meet the representatives of the Public Service Commission.

Supplementing the letter from the commission, Walter E. Griggs, chief of the division of tariffs of the commission, said that he would be glad to have the committee appointed. He spoke of the importance of tariff construction and the advantage of committee work on this subject.

J. M. Campbell, Buffalo, Lockport & Rochester Railway, urged the appointment of a committee as suggested and said that it would perform an important work in effecting uniformity of tariffs. Mr. Campbell spoke of the discrepancies in existing tariffs on various roads and described his experience with the conditions governing the sale of tickets for children or their transportation free.

The motion for the adoption of the standing committee was then carried. President Peck appointed as members of this committee E. E. Campbell, Buffalo, Lockport & Rochester Railway; R. W. Colt, general passenger agent, Fonda, Johnstown & Gloversville Railroad; C. R. Gowan, general passenger agent, Utica & Mohawk Valley Railway; Charles H. Armatage, general traffic manager, United Traction Company of Albany, and H. C. Allen, Buffalo & Lake Erie Traction Company; B. E. Wilson, general passenger and express agent, New York State Railways; I. W. Nugent, general freight and passenger agent, Otsego & Herkimer Railroad.

The nominating committee was then appointed by Mr. Peck. This committee was as follows: C. Loomis Allen, Edgar S. Fassett, R. E. Danforth and J. N. Shannahan.

Adjournment was then taken until Wednesday, June 29.

WEDNESDAY MORNING SESSION

The Wednesday morning session was opened at 10:30 a. m. with President Peck in the chair. After Secretary Pardee announced the accession of several manufacturing and supply companies to the membership list, the chair appointed the following gentlemen to act as a committee of three to place the subject of center-bearing rails before the Public Service Commission, Second District: W. H. Collins, general manager, Fonda, Johnstown & Gloversville Railroad; M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway Company, and B. E. Tilton, chief engineer of tracks, New York State Railways.

The next order of business was the reading of a paper entitled "Railway Motor Gears and Pinions," by T. W. Williams, of the General Electric Company. An abstract of this paper is published elsewhere in this issue.

In response to a query from C. Loomis Allen, general manager of the Utica & Mohawk Valley Railway, as to what lubricants he would advise for gearing, Mr. Williams said that unquestionably the heavy, clinging grease lubricants were much better than thin ones. One of the ingredients of the heavy lubricants seemed to be pitch. The value of the material was not so much its lubricating quality, but its ability to form a cushion which prevents direct metal-to-metal contact.

Clark H. Prather, superintendent of motive power, Rochester, Buffalo & Lockport Railway, asked why there should be such variations in the life of chrome-nickel, heat-treated pinions from the same maker as given in the paper. Mr. Williams replied that it was impossible to account for a great many breakages. One pinion may have received a better heat treatment than the others. The slightest carelessness in quenching was likely to leave one portion much harder and less ductile than the rest of the piece, thus causing dangerous shrinkage strains.

The next paper was on "Recent Developments in Multiple-Unit Control," prepared by Clarence Renshaw, of the Westinghouse Electric & Manufacturing Company. An abstract of this paper is published elsewhere in this number. In response to a question, Mr. Renshaw said that no additional compressor capacity was required if care was taken to avoid leakage losses.

The next order of business was to have been a discussion on H. W. Blake's paper on "The Problem of the 5-Cent Fare," read at the Tuesday session. Upon motion by J. C. Calisch, vice-president, Buffalo & Lake Erie Traction Company, it was decided to postpone this discussion until the next quarterly meeting, when it will be made the first order of business. By that time the members of the association will have had ample opportunity to analyze the paper.

C. Loomis Allen, as chairman of the nominating committee, presented the following ticket, which was unanimously elected: President, James H. Pardee, operating manager J. G. White & Company, New York; first vice-president, E. J. Cook, general manager, New York State Railways, Rochester; second vice-president, J. W. Hinkley, Jr., president, Poughkeepsie City & Wappingers Falls Electric Railway; secretary, C. Gordon Reel, Kingston; treasurer, H. M. Beardsley, assistant general manager, Elmira Water, Light & Railroad Company; executive committee, J. K. Choate, W. H. Collins, J. C. Calisch and J. E. Duffy.

Upon motion by W. H. Collins, resolutions of thanks were tendered to J. K. Choate and to the hotel management for the splendid convention arrangements. The convention adjourned after R. E. Danforth, a former president of the association and now general manager of the Public Service Railway, Newark, N. J., had been elected an honorary member of the association upon motion of C. Loomis Allen. A farewell luncheon was held at Five-Mile Point, on Lake Otsego.

THE BANQUET

The annual banquet was held on Tuesday evening and was a most successful affair. The only disappointment was the absence of Vice-President Sherman, who was unable to appear as one of the speakers, owing to the serious illness of Mrs. Sherman in Baltimore. The toastmaster of the evening was Hon. John D. Kernan, Utica, who had a felicitous introduction for every one of the orators of the evening. The latter were James F. Hooker, Schenectady, who spoke on the "Benefits of Electric Railways"; Rev. Ralph Birdsall, Cooperstown, who gave sketches of the historical features of the convention meeting-place under the title of "The Glimmerglass"; Walter B. Reed, Schenectady, who presented a sheaf of wittily told stories under the caption of "The Flying Machine," and Hon. John N. Carlisle, Watertown, member of the Public Service Commission, Second District, who spoke on the need for and the functions of the Public Service Commissions in New York. Mr. Carlisle pointed out that such commissions offered the only method of stopping socialism through the power conferred on them to check corporation abuses. His idea of the functions of a public service commission was to help the corporations in the solution of their problems as well as to help the public.

He said that the commission of which he was a member was being used too much for complaints against corporations and too little for their assistance. The latter condition was the fault of the companies themselves. In several instances the commission had gladly helped the railway companies to secure reasonable franchises from the local municipalities, and in one case it had refused its sanction to a franchise because it felt that the railway could not do business under the rigorous local restrictions placed in its franchise. The Street Railway Association ought to ask the State Legislature to pass a uniform franchise law just as there is now a uniform fire insurance policy throughout New York. There was no reason why the electric interurban railway in particular should not be able to go through a district as easily as a steam railroad. The latter gets its privileges from the State Supreme Court without haggling with a score of petty municipalities, each of which has some special and frequently impracticable condition to impose relative to construction, speed, fares, etc. The present system led to perfectly absurd conditions. Congestion in cities presented another serious problem, and he hoped that the association members would also take up with the important manufacturers in their towns the question of having different opening and closing hours for their different departments so as to avoid peak loading.

Further, Mr. Carlisle said the corporations had a wrong idea as to the commission's attitude toward capitalization. The commission realized that the present managers were not responsible for the over-capitalization of the past. If money was needed for a new project, the commission was perfectly willing to make a reasonable allowance for the inevitable promotion and organization expenses over the actual construction cost. The financial condition of the public service corporations of the State was a most serious one. Thus, of the 310 gas, electric and street railway companies in the commission's jurisdiction, 237, or 80 per cent, were not paying dividends on any kind of common or preferred stock. The capitalization of the non-dividend companies totaled $142,330,000, or 66 per cent of all the common and capital stock issued by these corporations. Either there was too much stock or an insufficient return was being secured on it. The commission was anxious to see that the corporations got enough money to run their busi-

ness properly. It had no intention whatever of keeping them down to a 6 per cent basis or any other definite profit. It wished that they could make 25 per cent on their common stock so that the companies could do more for the public. He realized that every railway man in the State would be glad to improve his line and service, but to attain this end there must be a stop to loading up the corporations with stock.

SOCIAL SIDE OF THE CONVENTION

The social side of the convention was very enjoyable, including as it did automobile and boat trips for the ladies and the annual baseball game between the railroad men and the supply men. The line up on each side consisted of:

Railroad men: Joel, pitcher; Brown, catcher; Barnes, first base; Gower, second base; Wilson, shortstop; Weidman, third base; Hamilton, left field; French, center field; Kadl, right field.

Supply men: Ransom, pitcher; Hegerman, catcher; Smiley, first base; Ellicott, second base; Campbell, shortstop; Farmer, third base; Berry, left field; Slimp, center field; Chapin, right field.

A novel feature of the convention was the fact that many of the delegates from the western part of the State went to the convention in two special cars. These cars came from the Buffalo, Lockport & Rochester Railway, via Syracuse and Utica, then to Cooperstown over the tracks of the Otsego & Herkimer Railways.

REINFORCED CONCRETE FOUNDATIONS FOR TRACK

The Grosse Berliner Strassenbahn, Berlin, Germany, now has about 240 km (192 miles) of track on plain concrete foundations in asphalted streets, as illustrated in the section Fig. 1. It also has six different types of construction in stone-paved streets, comprising a total of 460 km (285 miles) and 8 km (5 miles) of track with wooden blocks. The standard weight of rail is 51 kg per meter (about 102 lb. per yard). In addition to the foregoing types, the company has installed during the past four years 7 km (4.3 miles) of track on foundations of reinforced concrete plates in asphalted streets. This last construction is shown in plan and section in Fig. 2 and by half-tone in Fig. 3. The reinforced concrete has been found considerably stronger than the ordinary concrete design shown in Fig. 1, and, besides, costs about $5,000 less per km (0.62 miles), as less concrete is used.

It was the belief of the Berlin company that ordinary track concrete does not contain enough cement to give it the strength necessary to carry heavy traffic. Further than this, the concrete is rarely given the opportunity to set properly, and once

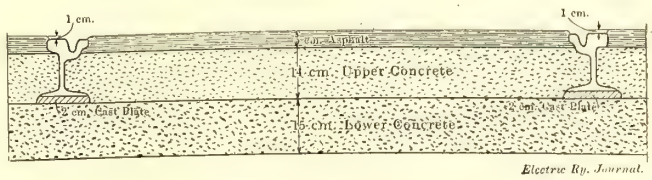


Fig. 1—Berlin Concrete Track—Ordinary Concrete Construction in Asphalt-Paved Streets

in service it is subjected to the deleterious influence of water and the continuous pounding of vehicle traffic. Consequently, it was determined to try a reinforced concrete construction in which the concrete itself would be relieved from severe strain.

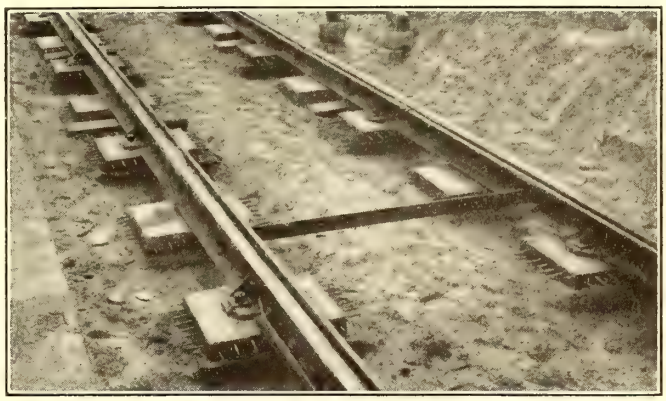


Fig. 3—Berlin Concrete Track—Blocks in Place

As shown in the illustrations the construction adopted consists principally in the use of a ready-made reinforced concrete tie or plate which is 10 cm (4 in.) thick, 40 cm (15.6 in.) wide and 50 cm (19½ in.) long. These plates are set at 1.44 m (4.4 ft.) from center to center, except at joints, where one plate is laid under the end of each abutting rail. Tie rods are installed every 2.16 m (6.6 ft.). The construction described was designed by Arthur Busse, chief engineer of way and structure of the Grosse Berliner Strassenbahn.

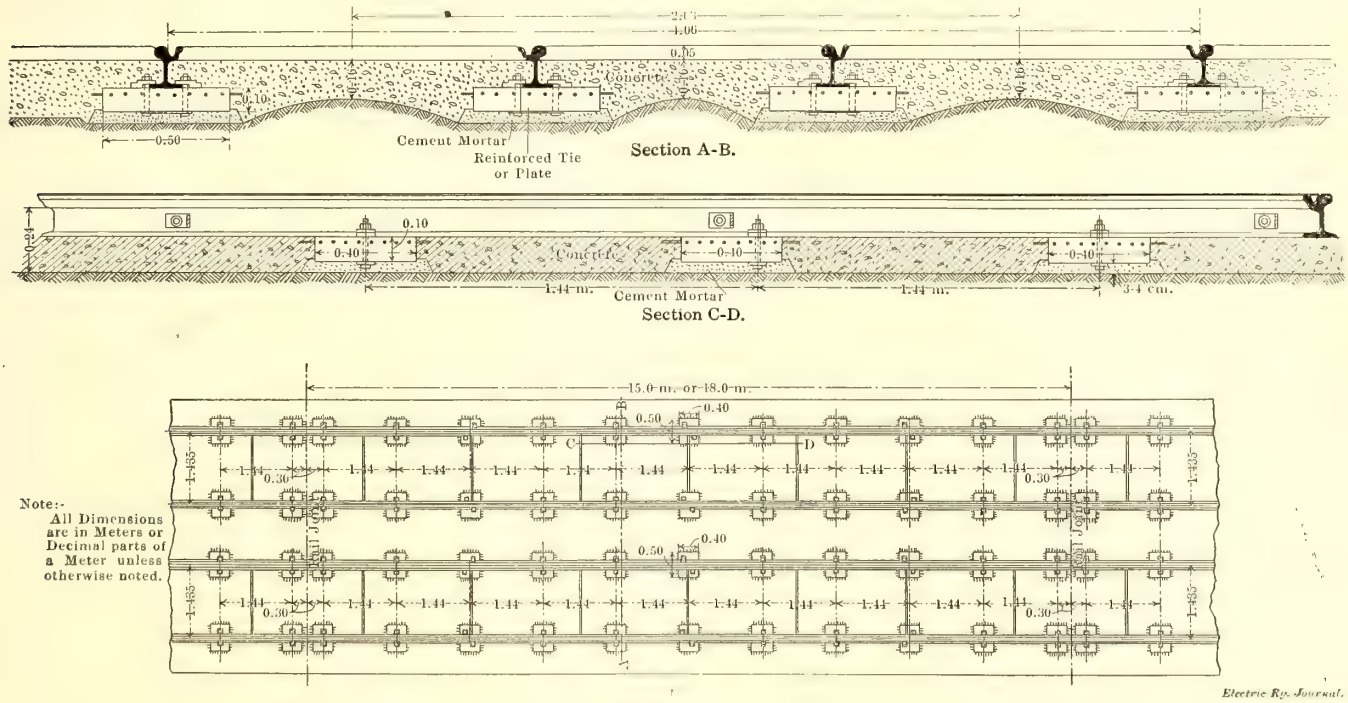


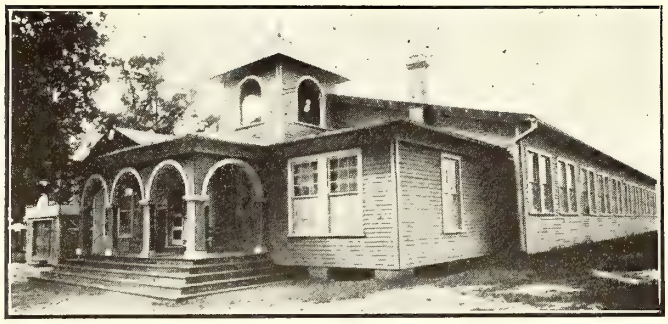
Fig. 2—Berlin Concrete Track—Construction on Reinforced Concrete Ties

NOTES ON DURHAM, N. C.

The Durham Traction Company, Durham, N. C., is an interesting example of an efficient public utilities corporation in a small town. The population of Durham does not exceed 10,000 and it has therefore proved most satisfactory to have the power, railway, lighting and even the ice manufacturing business in the hands of a single company. The following paragraphs will describe the various features of the company's work except the lighting.

TRACK AND LINE

The trackage of the Durham company is 7 miles, composed of standard gage 60-lb. T-rail on the highways and 70-lb.



Durham Traction Company—The Casino

girder rail in the paved streets, all laid on white oak or chestnut ties spaced 2 ft. The routes are single track except for a 600-ft. siding on the main street of Durham. The lines run from the center of the town about 2 miles in each direction, east and west, and the longest possible ride for one fare is about 4½ miles. The overhead construction is of the span type within the city limits but brackets are used elsewhere. The trolley wire is No. 00 throughout and the feeders are of No. 0000 cable. The feeders run from the power station in the city for about 1 mile in each direction and the longest transmission with the trolley alone is 1½ miles, which is the distance from the end of the eastern feeder to the new baseball grounds. Cars are operated on a 12 minute headway. The company sells no tickets at reduced rates except that $5 lots may be purchased at the main office for $4.50. Free transportation is given only to the city police, the chief of the fire department, the street commissioner, the county sheriff and the sheriff's deputies. The company does not give transportation to newspapers, but has an annual contract with the latter whereby car tickets are exchanged for advertising bills.

ROLLING STOCK

The company now operates 10 closed single truck cars, eight of which were built by the American Car & Foundry Company and have Lord Baltimore trucks carrying two GE-54 motors; the other two were built by the Southern Car Company and are mounted on Dupont single trucks carrying two GE-67 motors. The remaining rolling stock comprises four 10-bench Brill single truck cars with 7 ft. wheel base and four 12-bench St. Louis cars, two of which have Dupont single trucks and two were equipped last season with Brill maximum traction trucks. The company expects to equip the other cars with the maximum traction trucks some time this summer.

At present the company is doing very little repairing at its own car house, most of the work being done at a nearby machine shop which, however, is not supplied with a wheel press. The company is planning to purchase a lathe, wheel press and boring mill and other tools necessary for car repairs and power house maintenance. Woodworking tools will not be installed as there are plenty of facilities in Durham for the small amount of work of this kind which the company has. The necessity for a wheel press may be appreciated from the fact that it now costs $2.50 per wheel set each way merely for the freight.

POWER HOUSE

The power station of the company is used both for d. c. railway work and a. c. lighting. The original d. c. installation consisted of a 200-kw General Electric railway generator connected to a Ball simple engine. This machine is now used principally on Sundays when the other apparatus is shut down. Another reserve unit is the 200-kw General Electric 2300-volt alternator which is run by a high-speed Ball engine operated either condensing or non-condensing. The principal unit for carrying the load, however, is a 500-kw, 2300-volt, three-phase, 60-cycle Parsons turbine which is run at 3600 r.p.m. This machine was installed in the fall of 1906 and has been giving very satisfactory service. The voltage delivered by the turbo-generator is divided between the lighting transformers and three 75-kw oil-cooled transformers which feed a 200-kw General Electric rotary. This rotary is sometimes run inverted to take direct-current from the railway generator and to deliver alternating current to the lighting system. The boiler equipment which is operated at 160 lb. pressure now comprises three 125-hp. Aultman & Taylor and two 250-hp Stirling boilers. The power house is to be lengthened, however, about 36 ft. for its entire width of 100 ft. to take new equipment as follows: Two 250-hp boilers, one Hamilton-Corliss cross-compound condensing engine to be direct-connected to a General Electric 2300-volt, 600-kva generator. The new condensing equipment to be installed will consist of 2000 sq. ft. capacity apparatus from the C. H. Wheeler Engineering Company of Philadelphia, Pa. This will embrace a pair of natural draft cooling towers with combined capacity of 2600 gal. of which 1000 gal. will be used for the present turbine because the old cooling tower will be displaced. In connection with this apparatus, there are also to be furnished by the same contractor a Mullins wet vacuum pump and a volute pump driven by a 40-hp induction motor which will have a capacity of 1600 gal. of water per minute. The old steam auxiliaries now in this plant comprise a 1000-hp Cochrane feed water heater and a Worthington 1800 sq. ft. surface condenser. This power station also contains the refrigerating machines which are operated by steam from the boilers previously mentioned.



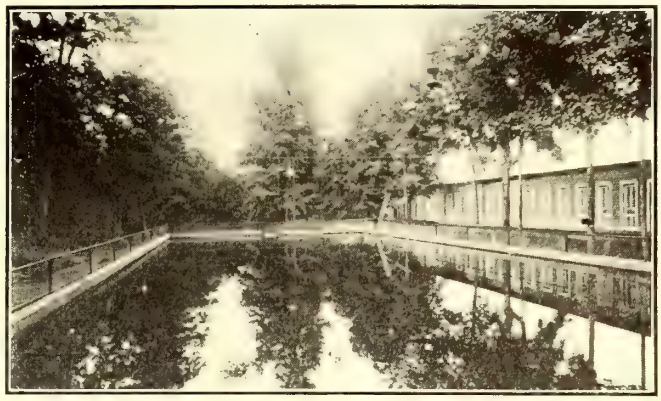
Durham Traction Company—Entrance to Lakewood Park

LAKEWOOD PARK

An excellent traffic producer for the company is a 30-acre grove located about 1½ miles from the center of Durham and known as Lakewood Park. The grounds are in the midst of fine rolling country but at present do not contain a lake suitable for boating. It is planned, however, to dam the brook which runs through the park and thereby enlarge the present pond in one of the hollows to such an extent that it will be possible to build a rustic path 900 ft. along the shores. If this work is undertaken, the company will embellish the vicinity of the lake with bridges, benches, etc. As Durham is an inland city far from large bodies of water, an improvement of this kind should greatly increase the revenues of the park.

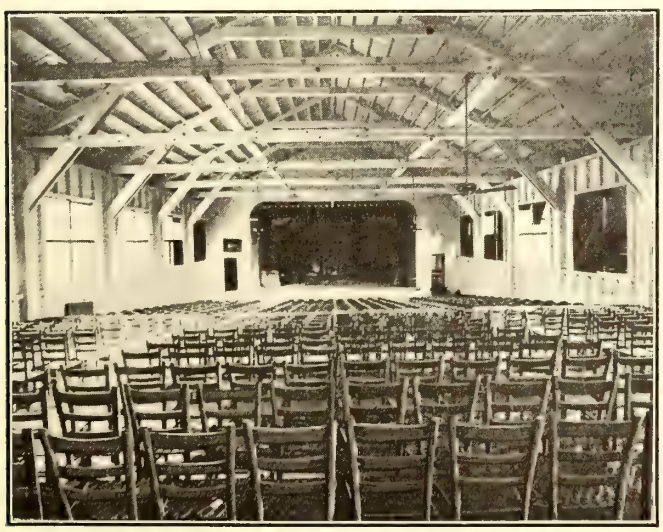


Durham Traction Company—A Scene in Lakewood Park Near the Dance Pavilion



Durham Traction Company—The Swimming Pool in Lakewood Park

The accompanying views will give a fairly good idea of the arrangement and attractions in Lakewood Park. Cars are run in on a stub track through the park gates to a covered platform, the passengers being unloaded next to the Casino, which is the principal building in the park. The Casino is provided with a ticket office in the front and eight dressing rooms in the rear. Its stage is 32 ft. wide and has five sets of scenery. The seating capacity is 1000. Admission to the entertainments last season was free to all seats except 400 orchestra chairs for which 10 cents each was charged. More money was taken in by this plan last summer than when the admission charges were 10, 15 and 25 cents. The change of policy, however, was induced primarily by a rapid development of moving picture shows in Durham which threatened to cut seriously into the park business. In 1908, vaudeville and moving pictures were given for a general admission of 10 cents and a free house for ladies and children every Wednesday afternoon. Last season the railway secured a repertoire stock company with moving pictures and vaudeville between the acts. There were two changes of bill weekly and the 10-cent charge was made only for the 400 orchestra seats. As a result, the traffic to the park was largely increased and at the same time the theatrical people received as good returns as under the old conditions. The Casino is leased for a nominal figure. The company has nothing further to do with it except to furnish the lighting and whatever policing is required. The stage people even paid for their own transportation. In order to limit the patrons of the theater to passengers, the company printed a triplicate ticket of the type reproduced on page 46. This was sold for 10 cens in the city. The first coupon was given for the ride to the park, the second was for admission to the Casino and the third for the ride to Durham.



Durham Traction Company—Interior of Theater at Lakewood Park



Durham Traction Company—In the Dance Pavilion at Lakewood Park

All the park concessions except the merry-go-round and the swimming pool are rented. These concessions include a roller skating rink, bowling and box-ball alleys, pool room, shooting gallery, ball rack, photograph studio, lunch privileges, and refreshment stands. The concrete swimming pool operated by the company is very popular especially with onlookers for whom benches are provided on the hillside. The pool is large enough for 100 people and is graded in depth to suit all ages. Forty dressing rooms are provided. A charge of 25 cents is made for the use of room and suit.

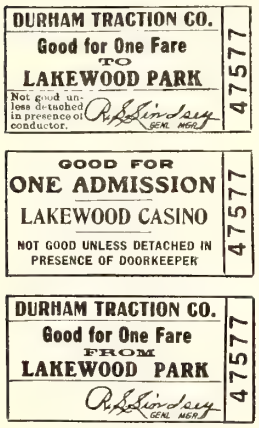
Free orchestral music and dancing are provided at the pavilion every night except Wednesday and Sundays. Four to six firework displays are also given throughout the season. A rather novel feature of the park management is that iced city water is furnished free from two artistic fountains, a 300-lb.

block being placed over each fountain coil every day of the park season.

ICE BUSINESS

For the last four years the Durham Traction Company has been making ice from distilled water from the condensation of its Westinghouse power station turbine. The daily capacity of the ice plant, which is located in the power station, is 50 tons, but this is a great deal more than the amount sold as there is only local trade to cater to, such as stores, residences, the hospital, etc. Durham is not on the main line of any railroad and has no important garden truck shipments so that there is no ice market for refrigerator cars. The ice-making equipment includes two refrigerating machines and tanks, with a special forced-draft cooling tower. The latter is kept separate from the cooling tower of the power station proper and is more liberally designed so that the water in summer never reaches as high a temperature as that in the other cooling tower. An extra multi-stage pump is installed for handling the cooling water to the refrigerating machines.

Practically no money is spent for soliciting ice business. The ice machine loads help to keep the boilers busy in the summer time when the lighting business is low. The ice compressors use steam from the regular boilers of 100-lb. pressure, this being cut down from the regular pressure of 160 lb. by a reducing valve. In the power station accounting, an arbitrary portion of the cost for steam generation is charged off against the ice department, as is also the cost of water and engineering service. The chief engineer of the power station also takes care of the refrigerating machinery.



Park Ticket

The prices of ice are as follows: 10 lb. tickets, 45 cents per 100 lb.; 25 lb. tickets and upward, 40 cents per 100 lb.; cash ice for the wagon, 50 cents per 100 lb.; block ice, 35 cents per 100 lb. when delivered and 33½ cents per 100 lb. when taken by the user at the company's platform. The summer trade is handled by 11 regular wagons and one occasional dray. Most of the horses are sold at the end of the season, as not more than two wagons are required for the winter service. Very little feed has to be bought because most of it is raised by the company on its park grounds and elsewhere.

GENERAL CONCLUSIONS.

The gross earnings of the Durham Traction Company are divided into different departments approximately as follows: Railway, 41.4 per cent; power and lighting, 39.6 per cent; ice, 19 per cent. Since 1905, the company has doubled its business and decreased its operating expenses by 15 per cent. In connection with the lighting business, it might be interesting to note that this company was one of the first to exploit tungsten lamps in the south, both for house and street sign lighting. The power business amounts to 600 hp in induction motors, all scattered among very small units because the large factories in Durham have their own power plants.

The Durham property is largely owned by R. H. Wright and J. S. Carr, local capitalists. The manager is R. L. Lindsey, who has been with this company since its organization in 1901 when he became auditor. Previous to this, he was secretary and treasurer of the parent corporation, the Durham Electric Light Company, whose service he entered in 1898. He was appointed general manager of the present company in 1905 in addition to his previous work as auditor.

The traffic on the electric street railways of Bohemia in 1909 was as follows: Passengers, 55,679,248; receipts, $1,565,078, of which the Prague lines alone had 42,634,681 passengers and $1,181,312 receipts, leaving for all others, 13,044,567 passengers, and $383,766 receipts.

AIR PURIFYING SYSTEM FOR COMPRESSORS AND OTHER MOTORS

The Spencer Air Purifying Company, New York, has placed on the market two interesting devices especially designed for securing clean air and consequent economy in air brake power consumption and maintenance. The company's air purifier is applicable to all modern compressors, while the equalizer and purifier system combined is intended for compressors where both the pump and motor are mounted in one case.

The object of the air purifier is to insure the passage of clean air to the compressor without the use of screens which soon

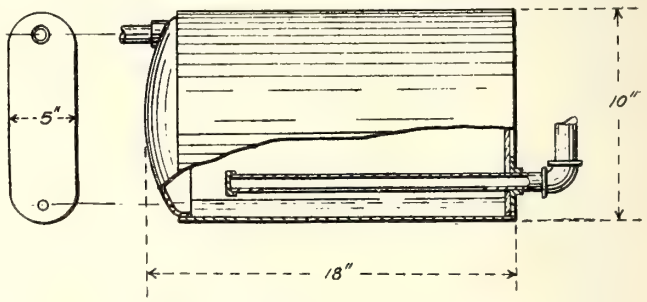


Fig. 1—Simple Air Purifier

clog up if not given constant attention. As shown in the accompanying drawing, Fig. 1, this contrivance comprises a small, light, sheet metal tank which may be placed anywhere in the line of the air-piping system as, for instance, under the seats. The air inlet is through the pipe shown at the right hand end of the drawing. The underside of this pipe is slotted so that when air comes in it is deflected toward the bottom of the tank against a layer of oil which extends almost to the height of the slot and which traps every particle of dirt before the purified air reaches the pump intake at the upper left-hand end of the tank. The bottom of the tank contains a plug to permit the removal of the dirt-filled oil from time to time. From experience with the installations already made on electric railways it has been found that the tank requires cleaning not oftener than once a year. The same principle of air purification can be applied to the natural air cooling of railway or other motors. Some figures of the power economy possible with the Spencer method were published on page 624 of the

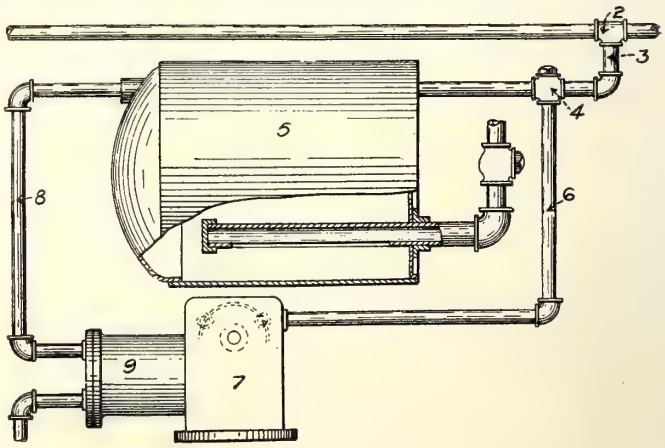


Fig. 2—Equalizer and Purifier Combined

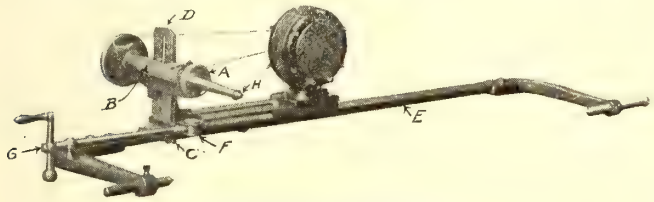
Electric Railway Journal, Oct. 2, 1909, in a description of its use on the New York & Queens County Railway. The fact that clean air is always obtainable makes possible the use of a smaller compressor and eliminates the danger of compressor burn-outs due to no-load operation.

The equalizing and air-purifying system combined is especially adapted for old style compressors. It traps the exhausts from the brake cylinders at the release of the brake and utilizes it to air cool both the pump and the motor. The principle of operation will be understood from the following paragraph and by reference to Fig. 2.

When the brakes are released the exhaust is conducted through the top pipe 1, branch pipe 3 and automatic valve 4 into the tank 5. When the exhaust and tank are equalized the automatic valve 4 closes against the volume in the tank, thus trapping it. At the same time the automatic valve opens the bypass 6, leading into the motor case 7 and the brake cylinder air is blown against the motor, thus keeping the latter clean and cool. The volume of air in tank 5 is under some pressure and due to its expansion is very cold. This air is blown on the pump 9 through the pipe 8 and cools the pump and motor and also supplies the pump with a large volume of clean air, in this way increasing the power efficiency. After the volume of air in tank 5 is pumped out, atmospheric pressure is admitted through the valve and tube shown at the lower right end of the tank and, as in the case of the simple purifier, the air is deflected and cleaned before it reaches the pump intake.

A COMPACT COMMUTATOR SLOTTER

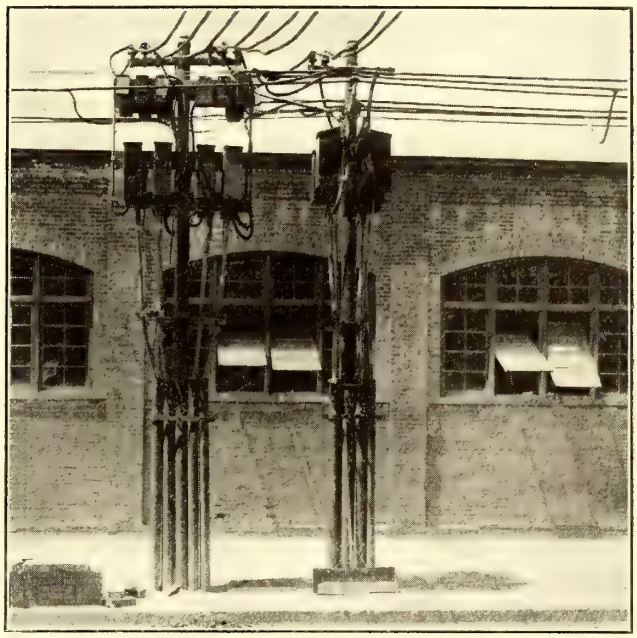
J. A. Place, Geneva, N. Y., has placed upon the market a light and compact commutator slotting machine which was first designed and installed by him for the Asheville (N. C.) Electric Company when he was in its employ. The machine is



Commutator Slotter

designed for independent drive and is adapted to any size of commutator. It is capable of slotting GE-80 and GE-67 commutators in about 1½ hours each. The machine illustrated is operated by a 1/15-hp, 60-cycle, 110-volt motor run at 1800 r.p.m.

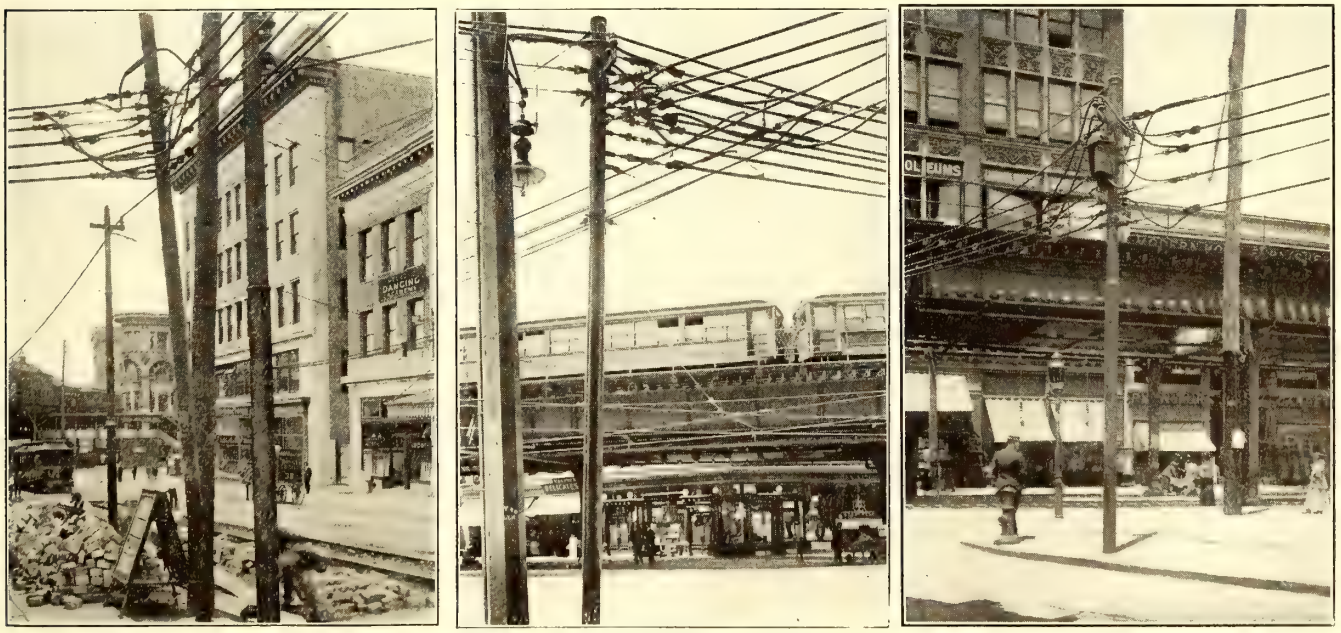
It is so constructed that the saw arbor is run in eccentric bearings. When the cut is completed the saw is raised from the slot by turning the hand wheel "A" and is ready to be carried back to starting position. The eccentric bearings are set in a solid length of brass tubing "B" which constitutes an oil receptacle sufficient to lubricate the saw arbor for months. The nut "C" is for the side adjustment of the carriage, to make possible the slotting of an armature which might be out of line with the armature shaft. The slotted vertical piece "D" is 8 in. high, thereby giving an adjustment for commutators up to 16-in. in diameter. The clamp "E" is 51 in. long and will take on any armature shaft. "F" is a movable nut, which allows free motion to the feed screw when the carriage is moved sideways for segments out of true. Three turns of the handle "G" will move the carriage 1 in.



Cable Clamps in Front of West Farms Car House

INSTALLATION ON IMPROVED CABLE CLAMPS IN NEW YORK

The accompanying views show four installations made by the Union Railway Company, New York, with Matthews cable clamps. One illustration shows them applied to a strain pole at 150th Street and Third Avenue; another to a corner pole at 150th Street and Melrose Avenue where the giving away of the first pole made it necessary to transfer the cables to a second pole without interfering with the service; a third illustration



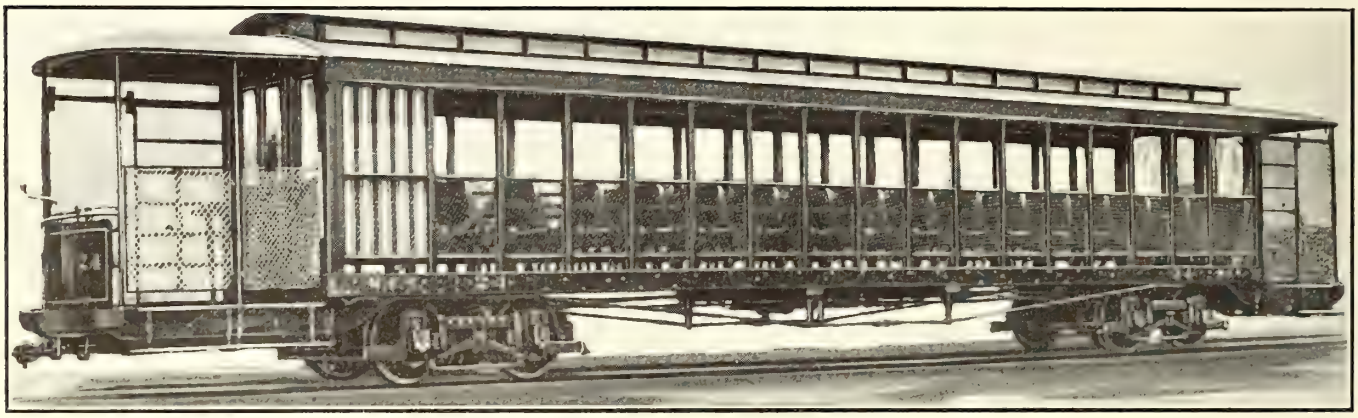
Cable Clamps at 150th Street and Melrose Avenue; Southern Boulevard and Westchester Avenue, and 150th Street and Third Avenue, New York

shows the application of the clamps at a corner pole at Southern Boulevard and Westchester Avenue; and a fourth illustration shows them in use between two poles in front of the West Farms car-house where the cables are brought from below to the aerial lines past lightning arresters, switch-boxes, etc. These clamps have given such satisfactory service that the Union Railway Company has made them its standard for all corner work, dead-ending, etc. The first clamps were installed about three years ago and the same type was adopted for all later installations.

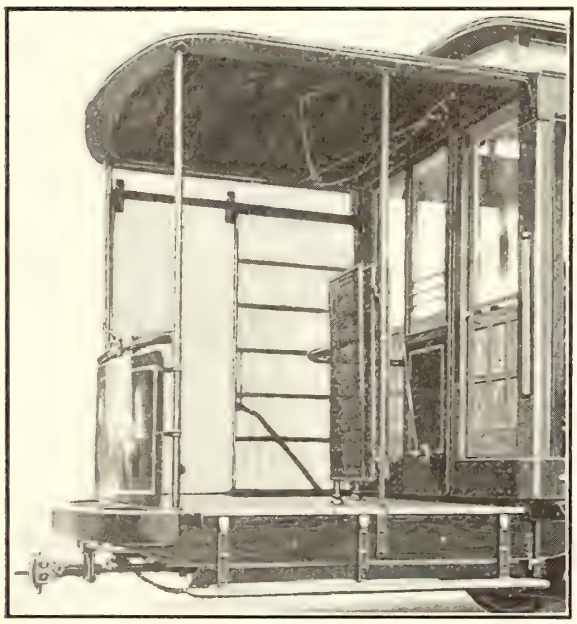
The old method was to make a wrap splice, cut the wire, dead-end on a pole and put a jumper across. In the hurry to cut in a cable, it often happened that the soldering was forgotten. The clamps have eliminated all difficulties of this kind and furthermore they avoid all waste of material and loss of current on account of bad connections. It takes less time to make a splice than before and the job looks better when it is finished. The clamps are applied after the cable insulation has been cut away for the necessary distance. No trouble has been experienced from sliding. In the case of the installation at 150th Street and Melrose Avenue already mentioned, it has been a simple matter to change from pole to pole without interference of any kind as the clamp made it possible to take the cables and loop them over one at a time on the pole arms without breaking the connections. All the clamps were installed under the supervision of J. D. Kent, chief and electrical engineer of the Union Railway Company. This company operates the greater part of the overhead trolley electric railway mileage in the Borough of the Bronx, New York.

PAY-AS-YOU-ENTER TRAILERS FOR WICHITA FALLS

The Wichita Falls (Tex.) Traction Company lately has received from the Danville Car Company four 16-bench pay-as-you-enter trailer cars of the novel design shown in the accompanying illustrations. It will be observed that the cars are of open construction with side screens. The body ends are furnished with bulkheads arranged for a sliding entrance door controlled by the conductor and a sliding exit door. These doors are used in connection with a two-leaf swinging entrance gate and a single swinging exit gate, both under the control of the conductor. On the opposite side of each platform there is a single sliding gate which is locked when on the inner side of the track; otherwise it serves as a sliding front exit controlled by the motorman. At the entrance-exit side of each platform there is a folding step which is latched when not in use. The step on the other side is of the folding type and is operated in conjunction with the sliding exit gate.



Pay-As-You-Enter Trailers for the Wichita Falls Traction Company





Platform and Interior View of the Wichita Falls Pay-As-You-Enter Cars

The general construction of this rolling stock is such that it can be converted into motor cars later on. The car body dimensions are: Length over the crown pieces, 59 ft 9⅜ in.; width over the sills, 8 ft.; length of platform center, from center of end posts, 7 ft. The side sills of the car are plated with ⅝-in. by 8-in. steel. The roof is one of the monitor deck type the full length of the car body and is provided with ventilator sash glazed with white Florentine glass. The inside finish of the car is of ash and the ceiling finish of bird's-eye maple. The cars have Westinghouse trailer car brake equipment, type S.T., and are mounted on Brill No. 27 G-2 trucks.

LONDON LETTER

(From Our Regular Correspondent)

The fifteenth annual convention of the Incorporated Municipal Electrical Association was opened on June 14, 1910, at the Institute of Engineers and Shipbuilders, Glasgow, by A. McInnes Shaw, Lord Provost of Glasgow, after which W. W. Lackie, chief electrical engineer of the Glasgow Corporation Electricity Department and president of the association, read his presidential address. Thereafter a paper on "Commercial Progress," by A. C. Cramb, Croydon, and H. Collings Bishop, Newport, was presented for discussion. Luncheon at the City Chambers was then tendered to the members and delegates by the tramways and electricity committees of the Glasgow Corporation. In the afternoon the various power houses and substations of the electricity and tramways departments were visited, and in the evening there was a reception and conversazione at the City Chambers. At the meeting of the association held on June 15 at Edinburgh the Lord Provost of Edinburgh welcomed the delegates. The papers presented at this session were "Exhaust Steam Turbines and Condensing Plant," by F. A. Newington, Edinburgh, and "Mixed Pressure Turbines," by Ashton Bremner, Burslem. Luncheon was tendered to the members and delegates by the Corporation of Edinburgh. In the afternoon the works of the Electricity Department were visited. The association met again in Glasgow on June 16, when the following subjects were discussed: "Advantages of Continuous Records of Costs and of Steam Consumption," by George Wilkinson, Harrogate, and C. E. C. Shawfield, Wolverhampton, and "Cheapening of the Cost of Mains and Services," by S. E. Fedden, Sheffield, and S. J. Watson, Bury. Various other electric stations were visited in the afternoon, and the ladies were carried in a special car to Rouken Glen. The fourth day of the convention was devoted to the business meeting and the election of officers and council for the ensuing year.

The Tramways & Light Railways Association held its annual congress this year at the Imperial Hotel, Dublin. William Murphy, chairman of the Dublin United Tramways, opened the congress. R. S. Tresilian, of the Dublin United Tramways, then read a paper descriptive of the system of that company; J. R. Salter read a paper, "Tramway Economics." Harry England submitted a paper, "Railless Traction," and Fred. Coutts a paper, "Should the 1870 Act Be Revised?". In the evening a banquet was tendered to the delegates by the Dublin United Tramways. The second day was devoted to a visit to the power station and to various excursions. The Dublin United Tramways entertained those in attendance at the conference at luncheon at the Marine Hotel, Kingstown, and at tea at the Claremont Hotel, Howth.

The first electric tramway in Edinburgh was inaugurated in June, 1910, when a car conveying a number of officials was run from Ardmillan Terrace to the new Cattle Markets at Gorgie. As is well known, Edinburgh is equipped with a most successful system of cable tramways, so that this new extension will be carefully watched.

The London County Council has a bill before a select committee of the House of Commons for extensions to its system. Mr. Macassey, who appeared for the London County Council, explained that the bill was an omnibus one, and sought to obtain powers for a variety of things. The bill contemplates a total expenditure of £931,335 for the construction of new tramways, the reconstruction of horse tramways and the widening and making of new streets. In the County of London there are 144 miles of tramways, of which 136 are owned by the London County Council, 113 miles being worked by electricity, and most of the remainder being still worked by horses. Mr. Macassey pointed out that in 1904-05 the total number of passengers carried was 164,000,000, while last year the number of passengers carried increased to 451,000,000. It has also been reported by the highways committee of the London County Council that the Council has had under consideration the question of making arrangements whereby passengers on the tramways could book direct to any station on the several underground electric railways in London, and vice versa. It has therefore been suggested that authority for this purpose should be sought at the next session of Parliament. The London County Council is also considering the subject of issuing return tickets at reduced rates between the hours of 10 a. m. and 5 p. m. with a view to increasing traffic on its system during the hours when ordinarily the traffic is light.

In the London Letter in the ELECTRIC RAILWAY JOURNAL of June 4, 1910, page 1001, it was stated that Sir George Gibb, who has resigned as managing director of the Metropolitan District Railway, had been appointed chairman of the board. It should have been stated that Sir George Gibb had been appointed chairman of the Road Board, a new body constituted under the provisions of the Development and Roads Improvement Funds Act of 1909, and formed to give proper arteries through London and provide proper egress and ingress to and from the metropolis and the outlying districts.

An interesting job in electric rail welding is being carried out on the Birmingham Corporation Tramways system by the Tudor Accumulator Company, the British representative of a German invention. If the work now being done is satisfactory after it has been in service some time it is more than likely that an agreement will be entered into between the company and the Council whereby all lines on which the return circuit is not particularly good will be welded by the Tudor process.

The Board of Trade of Torquay has intimated that it will not renew the certificate for the use of the Dolter system on the tramway after Oct. 30, 1910, unless service improves. The Torquay tramways are equipped with the Dolter surface contact system, and while on the whole the system has worked satisfactorily, there has been considerable trouble from live studs. The Board of Trade has never issued a license to the company which operates the system for a longer period than six months, and has on several occasions called attention to the number of live studs reported to it each month by the company. Doubtless the surface contact system will be abandoned and the tramways equipped with the overhead system, which, it is estimated, can be done for about £8,000.

The Maidstone Corporation has before it a proposal to extend the electric tramways of the borough to the neighboring town of Chatham, a distance of nearly 7 miles. It is estimated that the scheme would involve an expenditure of £60,000.

A receiver has been appointed for the Sunderland District Electric Tramways, Ltd. The company was formed to construct a tramway from Houghtonle-Spring to Sunderland. There are £160,000 of first mortgage debentures outstanding and £20,000 of second mortgage debentures. The company has been carrying on business for eight years at a loss. No interest has been paid on the preferred shares, of which there are £90,000, or on the £74,000 ordinary shares. Though no interest on the debentures is in arrears, it is admitted that there would not be sufficient funds to pay the interest which becomes due on July 1, 1910.

The Paisley District Tramway is building a new line 4 miles long, to connect Barrhead and Rouken Glen, and cost about £40,000. The extension will mean that passengers from Paisley to Rouken Glen will have a choice of returning by the Corporation cars or via Barrhead to Paisley, and thence by the Paisley Road to the city, or travel to Renfrew and return to the city from Renfrew or Yoker. The company has agreed to build a double-track line and Spiers Bridge has been extended at a cost of nearly £3,000, and rails laid across it. The Clyde Valley Company will supply the electric power. The terminus of the Paisley District Tramway at Rouken Glen is close to the terminus of the Glasgow lines.

The annual meeting of the Anglo-Argentine Tramways, Ltd., was held recently in London. During 1909 223,823,792 passengers were carried. The total receipts were £1,938,887, and the expenditures, including £50,000 carried to the depreciation renewals funds, totalled £1,207,222, leaving a net profit of £731,665. After providing for all fixed charges, dividends on both classes of preference shares, nine months' rent of the Metropolitan Tramways and the share capital sinking fund, the surplus is £140,972, from which has to be deducted the interim dividend paid on the ordinary shares and the extra dividend which has been recommended upon them, together £130,625, leaving a balance of £10,347 to be carried forward. A. C. S.

News of Electric Railways

Transit Affairs in New York

The Public Service Commission has rejected the terms offered by the Brooklyn Rapid Transit Company for the use of the Center Street subway loop in Manhattan. The letter from the commission to the company was signed by Commissioner McCarroll, who is acting chairman. Mr. McCarroll points out that traffic can be increased over the Williamsburgh Bridge 15 per cent or 20 per cent and that the connecting loop is a trunk line of vast importance. He also says that it is unfair for the company to desire to withhold 40 per cent of the rental until the Williamsburgh Bridge can carry 10-car trains as the stations on the Broadway elevated are not equipped to receive 10-car trains. During the rush hours 62 trains are run across the Brooklyn Bridge while only 20 trains are operated across the Williamsburgh Bridge. Mr. McCarroll suggested that President Winter, of the company, and Vice-President Calderwood should confer with the members of the commission in regard to the matter. This they have done, but no agreement has been reached. The Board of Estimate and Apportionment has also rejected the offer of the company to operate across the Manhattan Bridge.

On June 24, 1910, E. W. Winter, president of the Brooklyn Rapid Transit Company, sent a letter to the Public Service Commission containing a further statement of the position of the company in regard to the operation of the bridge loop subway. The letter in substance reaffirms the offer, with additional details and a concession in one particular, giving the city the option of changing at its will from a flat rental to payment from the company on a car mileage basis. The company offered originally to pay, in case a flat rental basis was determined upon, $40,000 the first year, $60,000 the second year, $80,000 the third year, $100,000 the fourth year, and $120,000 the fifth year. Thereafter the rate was to be $200,000 a year, with a reduction proportional to the capacity of the bridge loop subway under a limit of a 10-car train. The commission was of the opinion that these sums were much too small, and that payment for the first year should be at least $75,000 and increase annually in the proportion named in the company's proposal, making the payment for the fifth year $225,000 and thereafter, if 10-car trains were permitted to operate, $375,000 a year. Mr. Winter, in his letter, said, in part:

"In addition to payments to the city, I ask you to consider the fact that approximately $2,000,000, rather more than under, will have to be expended for a substation in Manhattan, additional electrical and other equipment made necessary by this extension of service, and a conservative estimate of increase in operating expenses of $100,000 per year will have to be borne by the operating company, constituting in all a fixed charge on the basis of our proposal ranging approximately from $240,000 for the first year to $320,000 for the fifth year, and, if the city makes it possible for the operation of 10-car trains, $400,000 per year thereafter.

"In short, the company proposes to incur an expense ranging from $240,000 to $400,000 per annum for the privilege of performing an important service for the public without additional charge, its only possible pecuniary return being such enhancement of its general business as may in time be expected because of increased accommodation to its passengers.

"I call your attention to Clause B in the proposal of May 27, in which an alternative offer is made on a car mileage basis, the rate suggested being practically the same as that applying to the Interborough Rapid Transit Company's rental reduced to car mile basis. The immediate returns to the city under this arrangement can be estimated by applying the rate of 4½ cents per mile to the closely approximated car mileage named in that communication. Under this plan the city would share in whatever increase of business might come from time to time in the line in question."

The Public Service Commission has sent a letter to the Board of Estimate and Apportionment asking the board to appropriate $490,000 to provide for additional entrances and exits for the subway. The work of lengthening the platforms in the subway is now well under way and it is estimated that this improvement will increase the capacity of the subway 25 per cent. In order to avoid extensive congestion around the entrances, however, and to make full use of the lengthened platforms it is believed by the commission's engineers that it will be necessary to have more entrances and exits. The more important stations will then be arranged more or less like the present station at Fulton Street, which has entrances and ticket booth at John Street and Dey Street, on Broadway, as well as at Fulton Street.

Cleveland Traction Situation.

The Cleveland Railway has refused to accept the Hitchens amendment to the Tayler franchise, which provided that a greater portion of the cost of renewal work shall be charged to capital account. The officers of the company concluded that the capital valuation would probably be increased too rapidly through the working of the amendment, and that trouble might possibly result in the future from it.

J. J. Stanley, president of the company, has asked the City Council to confer with him on the question of an additional allowance for renewal charges. If the company is granted an addition above that provided in the Tayler franchise, the improvements may proceed, but if this is not done the account will have to be overdrawn for a time, at least, as some of the track is still badly in need of repair. Under the present grant all the renewal cost that may be charged to capital account is the difference between the cost of the new property and the original cost of the property which is replaced.

An allowance will have to be made for operation, it is believed, if the increase in the wages of motormen and conductors is to stand. This will also be referred to the City Council for consideration. Mr. Stanley believes that the board of arbitration took an extreme view of the conditions affecting the men who have been in the employ of the company more than one year, and that an increase of 2 cents an hour would have covered the case satisfactorily.

During May, 1910, 3,403,578 more passengers were carried than in May, 1907. The increase in car mileage for May, 1910, over May, 1907, was 23,330 miles. During March and April, 1910, there was a decrease in car mileage, but an increase of about 2,000,000 in the number of passengers carried. During the rush hours all available cars are in service, and about 50 per cent. of the business is done during those periods. Mr. Stanley states that no additional cars can be operated during the rush hours, but that the service can be bettered by not taking so many cars out of service during the non-rush hours. Street Railway Commissioner Dahl has objected to this because it would increase the operating expenses.

Yonkers Strikers Return to Work Pending Settlement

On June 23, 1910, the motormen and conductors of the Yonkers (N. Y.) Railroad who were on strike returned to work, temporarily, pending the decision of Supreme Court Justice Keogh, in the matter of an increase of wages.

On the same day there was a hearing before Justice Keogh, at which Thomas F. Curran represented the city of Yonkers, John J. Crennan appeared for the strikers, and Leverett S. Crumb represented Leslie Sutherland, the receiver of the company. Mr. Curran told the court about the inconvenience to which persons were being put by the strike, and the suffering that it entailed, and urged the court to come to a decision that would speedily end the existing situation. Mr. Crumb said that the men on strike wanted an increase in wages to 30 cents an hour. Prior to the strike they had been paid on a sliding scale, the aver-

age pay being about 23 cents an hour. By the sliding scale system, which had been fixed by Justice Morschauser about a year ago, and to which the men had agreed, the men longest in the service of the company received the highest pay. According to Mr. Crumb the company's bonds are held by the Central Trust Company, New York, N. Y., as a depository. He said that Frederick W. Whitridge, receiver for the Third Avenue Railroad, represented the bondholders of the Yonkers Railroad, and was also receiver of the Union Railway. The Yonkers Railroad, the Westchester Electric Railroad and the Tarrytown, White Plains & Mamaroneck Railroad were all in the hands of receivers and all were controlled by Mr. Whitridge, as representative of the bondholders. Mr. Crumb argued that if the increase demanded by the strikers of the Yonkers Railroad were granted it would mean an increase in the wages of the men of the Westchester Electric Railroad and the Tarrytown, White Plains & Mamaroneck Railroad, which would amount to about $295,000 a year.

Justice Keogh, after being assured that the receiver of the Yonkers Railroad would submit to him a full statement as to the financial status of that road, said he would take the matter of the strike under consideration, and, in the meantime, desired that the strikers return to work pending his decision.

The strike was declared on June 15, 1910. Leslie Sutherland, who is operating the property as receiver, requested the men to return to work pending an adjustment of the wage question. This the men declined to do, and Mr. Sutherland stated that the cars would be permitted to remain in the car house until the men did return to work. Finally, the case came before the court for review as a result of an action by the City of Yonkers to compel the company to operate cars.

Plans for Opening Franchise Negotiations at Toledo

Brand Whitlock, Mayor of Toledo; B. Merrell, chairman of the railways and telegraph committee of the City Council of Toledo, and Carl Nau, of Nau, Tanner & Rusk, who are examining the books of the Toledo Railways & Light Company, Toledo, Ohio, for the city, have been named as a sub-committee of the general committee of the whole of the City Council to frame a reply to the suggestion of the company that the franchise matter should be referred to a commission of engineers. Mayor Whitlock has prepared two letters on the matter and whichever is adopted by the sub-committee will be referred to the Council before it is transmitted to the company.

Mayor Whitlock has formally accepted the invitation to make an inventory of the physical property of the company, but has declined to entertain the suggestion of President Lang, of the company, that the matter be referred to a board of engineers for settlement. The Mayor says that, in referring the matter to a board of engineers, the city officials and Council would be delegating to others duties with which they were charged when elected. He says that engineers will be employed to secure and furnish information, but that he does not believe such a board could properly arrange a settlement of the question. Mayor Whitlock states that Nau, Tanner & Rusk will proceed to make up the inventory, and suggests that they be allowed to inspect a copy of the inventory which was prepared for the committee representing the bondholders of the company some months ago.

Ohio State Board of Arbitration Acts in Threatened Strike at Columbus

On June 23, 1910, the State Board of Arbitration of Ohio ordered the officers of the Columbus Railway & Light Company, and the representatives of the organized employees of the company, to appear before the board on June 24, 1910, and present evidence under oath regarding the differences between them. The board can not enforce compliance with its decision, but it can make its findings public.

Previous to this call the employees of the company who are organized had authorized the executive committee of the body of which they are a part to call a strike. The representatives of the employees claimed that several men were discharged without cause, in violation of the agreement of May 5, 1910, between the company and the men.

On June 23, 1910, the officers of the company issued a written explanation. They claimed that there had been no discharges except for cause. In taking action in a case they had not inquired whether the employee was a member of the organization or not. Mr. Stewart, general manager of the company, subsequently asserted that he would protect all his men, whether they belonged to an outside organization or not, and that men who were uncivil to other employees could not remain in the service of the company.

At the hearing before the State Board of Arbitration, each side was represented by attorneys. Chairman Theodore I. Reese turned the chair over to Judge Noah Swayne. On motion of the attorney for the men the hearing was continued until July 1, 1910, in order that another attorney might have an opportunity to be present as a co-representative of the men. The attorneys were instructed to formulate a code of procedure and to specify to the board by June 28, 1910, the charges against the company, so as to give an idea of the extent of the hearing. The question of wages does not enter into the controversy at this time.

Association Meetings

Central Electric Traffic Association.—September.

Central Electric Accounting Conference.—Chicago, Ill., September.

Colorado Electric Light, Power & Railway Association.—Glenwood Springs, Col., Sept. 21, 22 and 23.

Oklahoma Public Utilities Association.—Oklahoma City, Okla., Sept. 30 and Oct. 1.

American Street & Interurban Railway Association.—Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

New Jersey Line Opened.—The North Jersey Rapid Transit Company, Paterson, N. J., which is building an electric railway to connect Paterson, Glen Rock, Ridgewood, Hohokus, Allendale and Suffern, placed the line in operation between Paterson and Hohokus on June 22, 1910.

Sentence Passed on Men Who Held Up Seattle Car.—The four young men who held up a car of the Seattle (Wash.) Electric Company, at First Avenue South and Spokane Avenue, Seattle, at 1 a. m., on April 8, 1910, and robbed the passengers of $1500 in money and jewels, entered pleas of guilty when arraigned recently in the criminal court, and were sentenced to serve from five to 20 years each in the State penitentiary. The robbers were apprehended in Portland, and were promptly identified in Seattle.

Equipment Trust Certificates Subject to Approval of Commission.—The Court of Appeals has affirmed a decision of the Appellate Division of the Third Department in the controversy submitted without action upon an agreed statement of facts between the Public Service Commission of the Second District of New York and the New York Central & Hudson River Railroad. The companies, known collectively as the New York Central Lines, issued $30,000,000 of equipment trust certificates for the purchase of engines, cars and equipment in November and December, 1907, without application to the commission. The commission held that under section 55 of the Public Service Commissions Law the consent of the commission was necessary, and the court upholds the contention of the company.

Meeting of the Stone & Webster Club.—About 50 representatives of Stone & Webster, Boston, Mass., in the Pacific Northwest, who are members of the Stone & Webster Club of Washington, met at the Tacoma Hotel, Tacoma, Wash., on June 15. A. L. Kempster, superintendent of transportation of the Seattle Electric Company, who is president of the club, presided as toastmaster at a dinner which preceded the business session of the club. J. W. Wilmot, of the Seattle Electric Company, read a paper entitled "Prevention of Accident Claims"; A. H. McKay, traffic manager of the Puget Sound Electric Company, presented a paper entitled "Freight Transportation," and W. Osborn, of the Washington Water Power Company, Spokane, Wash., who was in attendance at the meeting of the National Electric Light Association, held recently in St.

Louis, read excerpts from a number of papers presented before that association, devoting particular attention to the paper by Arthur S. Huey, of H. M. Byllesby & Company, Chicago, Ill., which dealt largely with the relations between public service corporations and the public.

Plans for Boston Elevated Station Approved.—The Massachusetts Railroad Commission has approved the plans of the Boston Elevated Railway to establish an elevated station in Causeway Street, Boston, in connection with the East Cambridge elevated extension over the Charles River Dam. The station will be connected by passageways with the North Union Station of the Boston & Maine Railroad and the North Station of the Boston elevated system. A platform about 410 ft. long will be provided for East Cambridge cars, and a spur track will be installed for the use of elevated trains running between the North and South Stations. The entrances and exits will be located on the property of the Boston & Maine Railroad, with a covered connection with the North Station. Provision will be made in Commercial Street for double-track service in connection with the inter-terminal train operation. The East Cambridge elevated service will be handled by surface cars, which will be diverted into the Tremont Street subway at the head of the Canal Street incline. The new station will materially reduce the volume of traffic, which at present has to be handled in a somewhat limited platform area at the North elevated station.

Grand Central Terminal Improvements.—The work of demolishing the Grand Central Station of the New York Central & Hudson River Railroad, in New York, has been begun preparatory to erecting the new terminal on the site now partially occupied by the company. There will be two great waiting rooms in the new station, one for the suburban traffic, and the other for the through passengers. Each will be on the level of the tracks that it serves, and will be quite distinct from the other. The ticket offices, the entrances and exits, and everything else are distinct and separate. There will be two concourses, also, for suburban and through passengers. Each will have its own ticket offices, information bureaus, baggage checking places, parcel rooms, and all the facilities for travel. The concourse for the inbound trains will accommodate 8,000 people, and the outbound 15,000. The waiting rooms will be large enough to accommodate about 5,000 more. Seventy thousand outbound passengers an hour will be the capacity of the new terminal. Among the features which have been decided on is one by which trains when coming in will discharge passengers and continue on around a loop instead of backing out, as they do at present. The total area of the old terminal was 23 acres; that of the new will be 76 acres. The old terminal had a capacity of 366 cars; the capacity of the new will be 1,149 cars. The station building proper will be 600 ft. on the street level, 300 ft. wide, and 105 ft. high. Below the street level it will be 745 ft. long, 480 ft. wide, and 45 ft. deep.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—The Legislature adjourned on June 15. Near the close of the session the bills were passed to authorize the purchase of the Berkshire Street Railway by the New York, New Haven & Hartford Railroad, and to permit the Boston & Eastern Electric Railroad to build a tunnel under Boston Harbor. The proposed acquisition of the securities of other street railways by the Boston Elevated Railway was embodied in a resolution which provides for an investigation and report upon the subject by the Boston Transit Commission and the Massachusetts Railroad Commission as a joint board. Other constructive legislation included the passage of a resolve to require the Boston Transit Commission to investigate the engineering details of a subway from Park Street to the South Station, Boston; the extension of liability to cover passengers riding on car platforms and the granting of half-fare privileges to pupils of industrial schools. A resolution was also passed to require the standard-gage steam railroads at Boston to report upon electrification within the Boston metropolitan district, the report to be passed upon in a supplementary report to the Legislature of 1911 by the joint commission on metropolitan improvements created by the acts of 1909.

Financial and Corporate

New York Stock and Money Market

June 28, 1910.

With no outside buying and with professional traders timid, there is little chance to hold a market the tone of which is radically weak. Beginning yesterday morning, after a week of exceptional dullness, a selling movement was started, and before it was checked near the close to-day prices had declined from 2 to 5 points. There was no assignable cause for the break. Tractions suffered along with the other issues.

The money market, on the other hand, continues to be entirely in favor of the buyer. Rates to-day were: Call, 2½ to 3 per cent; 90 days, 3¾ per cent.

Other Markets

The Philadelphia market has been weak, in sympathy with Wall Street, and trading has been light. Prices have receded, but to no considerable extent. Rapid Transit sold down to 18¾ and Union Traction to 46, but very little stock changed hands.

The main interest in tractions in Chicago has been in Elevated railway shares. Metropolitan has been more active than the others, and both the preferred and common now approximate the figures of the merger agreement.

Tractions in Boston have been less active during the past week. While there has still been some trading in Massachusetts Electric and Boston Elevated, there have been no material changes in prices.

There has been practically no trading in tractions in Baltimore during the week except in the bonds of the United Railways Company. Prices for these are unchanged.

Quotations of various traction securities as compared with last week follow:

	June 21.	June 28.
American Railway Company	a44¾	a44
Aurora, Elgin & Chicago Railroad (common)	*60	a60
Aurora, Elgin & Chicago Railroad (preferred)	*93	a91
Boston Elevated Railway	a126	a126
Boston & Suburban Electric Companies	a14	a14
Boston & Suburban Electric Companies (preferred)	a74	a74
Boston & Worcester Electric Companies (common)	a10½	a10½
Boston & Worcester Electric Companies (preferred)	a41	a40
Brooklyn Rapid Transit Company	79	76¾
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	83⅞	83¼
Capital Traction Company, Washington	a129½	a129½
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7½	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a19	a17
Chicago Railways, ptcptg., ctf., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4s	a6½	a6½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J. 5 per cent bonds	a103	a103
Detroit United Railway	*50½	*50½
General Electric Company	147	143
Georgia Railway & Electric Company (common)	a108½	a108
Georgia Railway & Electric Company (preferred)	a87	a87
Interborough-Metropolitan Company (common)	19¼	18
Interborough-Metropolitan Company (preferred)	51⅞	49½
Interborough-Metropolitan Company (4½s)	79¾	80
Kansas City Railway & Light Company (common)	a25	a25
Kansas City Railway & Light Company (preferred)	a72	a73
Manhattan Railway	130⅛	130
Massachusetts Electric Companies (common)	a16	a15⅞
Massachusetts Electric Companies (preferred)	a81	a80
Metropolitan West Side, Chicago (common)	*24½	a23¾
Metropolitan West Side, Chicago (preferred)	a71	a70
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	69	68
Northwestern Elevated Railroad (common)	a22	a22
Northwestern Elevated Railroad (preferred)	66	a65
Philadelphia Company, Pittsburg (common)	a48½	a48
Philadelphia Company, Pittsburg (preferred)	a43½	a43¾
Philadelphia Rapid Transit Company	a20	a19⅞
Philadelphia Traction Company	a84½	a84½
Public Service Corporation, 5 per cent col. notes	*96	a96
Public Service Corporation, ctfs	a101	a101
Seattle Electric Company (common)	*110½	a110
Seattle Electric Company (preferred)	*101	a100
South Side Elevated Railroad (Chicago)	a72	a72¾
Third Avenue Railroad, New York	7⅛	a7⅜
Toledo Railways & Light Company	9¼	8
Twin City Rapid Transit, Minneapolis (common)	110½	109½
Union Traction Company, Philadelphia	a46⅞	a46
United Rys. & Electric Company, Baltimore	a13¾	a14¼
United Rys. Inv. Co. (common)	32	30
United Rys. Inv. Co. (preferred)	*65	55
Washington Ry. & Electric Company (common)	a35	a33½
Washington Ry. & Electric Company (preferred)	a89	a88
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	a101	a100
Westinghouse Elec. & Mfg. Company	65¼	62
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Reorganization of International Traction Company

The committee consisting of Robert L. Fryer, Thomas De Witt Cuyler, Lewis Cass Ledyard, Thomas E. Mitten and Charles Steele, which has been appointed to protect holders of the $30,000,000 of 50-year 4 per cent collateral trust bonds of the International Traction Company, has issued a statement in part as follows:

"The International Traction Company owns all of the stock of the International Railway, which is deposited under the collateral trust indenture and constitutes the main security for the 50-year 4 per cent collateral trust gold bonds. The International Railway owns and operates the properties known as the International Traction System, all of which are located in Buffalo and vicinity.

"The International Traction Company has issued all of the bonds under the collateral trust indenture reserved for extensions and betterments of the property. There remain unissued $11,665,000 of bonds reserved exclusively for the acquisition or retirement of underlying bonds secured by liens on the property of the International Railway.

"For the payment of such underlying International Railway bonds, the collateral trust indenture contemplated the issue and sale of an equal amount of the 50-year 4 per cent collateral trust gold bonds of the International Traction Company reserved for such purpose. As the collateral trust bonds have a limited market and are selling much below par, they cannot provide sufficient funds to meet such underlying obligations, of which many will mature in the near future.

"In view of this situation and of the fact that under the collateral trust indenture no more bonds can be issued for extensions or betterments, there is urgent need for a reorganization of the finances and the legal status of the International Traction System. The urgency of this need is indicated by the foreshadowed inability of the International Railway to pay the dividend on its stock necessary to enable the International Traction Company to make its interest payments due next July on the 50-year 4 per cent collateral trust gold bonds.

"This condition has resulted, not from lack of earning power, but from the rapid growth of its business, and the consequent necessity of devoting to improvements and extensions publicly demanded a large part of its earnings which have been the only resource of the International Traction Company for such capital requirements since the exhaustion of collateral trust bonds reserved for such purposes.

"The agreement recognizes that foreclosure proceedings may ensue, and that the interests of the bondholders will require protection through the committee, empowered to acquire the pledged stocks of the International Railway at the foreclosure sale, and to cause to be organized under the laws of New York a new railroad which, by merger, shall acquire first the stock and then the physical properties of the International Railway (subject to its prior mortgages). Under this agreement such new company is to execute a refunding mortgage to secure 5 per cent bonds to mature not earlier than July 1, 1949, which shall constitute a first lien upon portions of the property of the International Railway, and a lien upon the other properties owned or controlled by the International Railway, as embraced in the reorganization, subject to bonds secured by direct liens.

"In exchange for their deposited bonds, the depositing collateral trust bondholders, at their option, shall receive either (a) 5 per cent refunding bonds of the new company to the amount of 80 per cent of the par value of such deposited bonds, and accrued interest in full in cash on the deposited bonds from the date of the last interest payment thereon to the date from which the new bonds shall draw interest, or (b) cash to the amount of 70 per cent of the par value of such deposited bonds, and also accrued interest in full on the deposited bonds from the date of the last interest payment thereon to the date fixed by the committee for such cash payment. Should the holders of the bonds prefer not to accept the new bonds, they can sell them at 70 cents on the dollar, a sum in excess of the present market price.

"It will be observed that the agreement authorizes the committee in its discretion to make provision for the stockholders of the International Traction Company in the stock of the new railroad.

"Arrangements have been effected whereby J. P. Morgan & Company, New York, N. Y., will act as depositary for the committee, and on behalf of the committee will issue transferable receipts for all deposited bonds.

"In view of past experience and the present condition of the property, the normal capital requirements of this growing system must now be estimated to be $1,000,000 per annum. The larger amount, $2,750,000, as indicated by the proposed capital expenditures for 1910 and 1911, is due to the fact that, because of the exhaustion of the 4 per cent collateral trust bonds provided for such purposes, the capital expenditures for the two preceding years, 1908 and 1909, were abnormally and harmfully low.

"On the basis of the reorganization of the property, as now proposed, net earnings as at present would indicate a satisfactory margin over the amount necessary to pay the fixed charges of the reorganized company. The normal increase in net earnings should be more than sufficient to meet the additional fixed charges for future capital requirements."

Consolidation of Chicago Elevated Railways.

The proposed consolidation of the elevated railways in Chicago seems likely to be effected. A few weeks ago an option was secured on the stock of the South Side Elevated Railroad by Henry A. Blair, on behalf of a syndicate headed by the First National Bank, New York, N. Y. Subsequently the trustees of the Northwestern Elevated Railroad stock accepted terms proposed by Mr. Blair. The Chicago & Oak Park Elevated Railroad has for some time been controlled by the Blair interests, and will, of course, enter the merger. On June 22, 1910, the directors of the Metropolitan West Side Elevated Railway voted to accept the offer of Mr. Blair for the purchase of the stock of that company, subject to the ratification of the stockholders. It is stated that the consolidated company will probably be known as the Union Consolidated Elevated Railways.

Chicago Railways Readjustment

Andrew Cooke, Charles G. Dawes and John Barton Payne, acting as a committee of the security holders of the Chicago Railways and the Chicago Consolidated Traction Company, submitted to Judge Peter S. Grosscup on June 22, 1910, a plan of readjustment which they have worked out for these companies. In effect the Chicago Railways will purchase the property of the Chicago Consolidated Traction Company and execute a rehabilitating mortgage to provide the necessary funds, including the cost of retiring the receivers' certificates outstanding. The Chicago Railways will use its existing rehabilitation mortgage for the purpose of acquiring the property of the Chicago Consolidated Traction Company if the City of Chicago approves the plan. A mortgage to secure what shall be known as purchase money bonds, bearing interest at the rate of 4 per cent for five years, and 5 per cent thereafter, will also be approved, as will a mortgage to secure what shall be known as funding mortgage bonds, to bear interest at a rate of 4 per cent a year, if earned, and such interest to be non-cumulative. It is agreed that the mortgage shall cover all the properties of the Chicago Consolidated Traction Company acquired by the purchase within city limits. The allotment of the proposed new bonds to the holders of the present securities was shown in a table. No agreement has yet been reached as to how the $2,000,000 of bonds of the Cicero & Proviso Street Railway will be taken care of. The Chicago Railways and the reorganization committee are willing to submit this question for decision to some arbitrator to be agreed upon by the parties at interest, or a referee to be appointed by the court. As to the securities held by the Yerkes estate, the plan is subject to the approval of the probate court.

On June 23, 1910, Louis S. Owsley, executor for the Charles T. Yerkes estate, asked the Probate Court to approve his acceptance of the reorganization plan of the Chicago Railways.

An ordinance authorizing the merger of the Chicago Consolidated Traction Company with the Chicago Railways is being prepared by the transportation committee of Chicago City Council, acting under instructions from the whole body issued in response to letters from Judge Grosscup, John M. Roach, president of the Chicago Railways, and Andrew Cooke, chairman of the reorganization committee. The letters were transmitted to the Council by Mayor Busse. It was agreed in the Council that in case the ordinances cannot be prepared in time for presentation before the summer recess, which will probably begin on July 11, 1910, a special meeting will be called by Mayor Busse.

Report of Westinghouse Electric & Manufacturing Company

The annual report of the Westinghouse Electric & Manufacturing Company for the year ended March 31, 1910, has been issued in printed form, for presentation at the annual meeting of the stockholders on July 27, 1910.

The gross earnings for the year ended March 31, 1910, were $29,248,682; the net manufacturing profits were $3,552,978; other income aggregated $1,616,561, making a total income of $5,169,539, or an increase of $3,203,280 over the preceding year. After making deductions the net income for the year was $3,060,664, an increase of $3,979,346 over the preceding year. The value of unfilled orders on March 31, 1910, was, in round numbers, $11,256,000, which is the largest in the history of the company with the exception of the year ended March 31, 1907. During April and May of the present year additional orders were taken aggregating in value $7,083,000, and unfilled orders on May 31 aggregated over $13,000,000.

Robert Mather, chairman of the board of directors, states that the satisfactory results reflected in the report are largely due to the policy adopted by the board of liberal expenditures for increasing the effectiveness of the selling organization and for development and improvement in design and in manufacturing methods. While this plan has added considerably to the expenses for the year, the increase is stated to have been amply justified both in the increased volume of business and in the decreased cost of production.

The consolidated balance sheet shows total assets of $83,588,000. Of this sum $14,974,000 is represented by property and factory plant; $13,893,000 in working and trading assets, including raw material and supplies, finished parts and machines, work in progress, goods on consignment and apparatus with customers; $27,206,000 by investments in stocks, bonds, debentures and collateral trust notes, including those of affiliated European and Canadian Westinghouse companies; $20,479,000 by current assets, including $7,040,000 in cash, $3,766,000 in notes receivable and $9,169,000 in accounts receivable. Charters, franchises, patents, insurance, taxes paid in advance, etc., enter in the assets for the sum of $6,083,000.

The main charges under liabilities are capital stock, $40,719,000; funded debt, $22,326,000; collateral notes, $8,720,000; readjustment notes, $1,387,000; current liabilities, $3,302,000; reserve, $1,280,000; surplus, $5,668,000.

Boston & Worcester Electric Companies, Boston, Mass.—The trustees of the Boston & Worcester Electric Companies have voted to defer the July, or semi-annual, dividend on the preferred stock of the company. The last dividend paid was $1, on Jan. 1, 1910. In 1909 $2 was paid, and in 1908 $4. W. M. Butler, president of the Boston & Worcester Electric Companies, has issued a statement in regard to the passing of the dividend, in which he says, in part: "By a recent act of the Legislature the fiscal year of all street railways in Massachusetts has been changed from Sept. 30 in each year to June 30, the change to take effect June 30, 1910. This change in the fiscal year means that the report of the company to the Railroad Commission will have to be made up for the nine months beginning Sept. 30, 1909, and ended June 30, 1910. By this change in the fiscal year, July, August and September, the three best months, during which practically the whole year's dividend is earned, are eliminated from the report. If the regular July dividend were declared at this time, it would mean the declaration of a dividend on the first day of the new fiscal year and before sufficient earnings had been made from which to pay the same, and the company has not at the present time a surplus adequate for this purpose. The trustees, therefore, have decided to defer the payment of a dividend on July 1."

Carbon Transit Company, Mauch Chunk, Pa.—The Carbon Transit Company has filed a mortgage to the Mauch Chunk Trust Company, Mauch Chunk, Pa., as trustee, to secure an issue of $100,000 of second mortgage 30-year 5 per cent gold bonds, of which only a part, it is stated, will be sold at present to provide for floating debt and necessary working capital.

Chicago City & Connecting Railways, Chicago, Ill.—The governing committee of the Chicago City & Connecting Railways has declared a dividend of $2.25 a share on the preferred participation shares of the company and $1 a share on the common participation shares, payable to shareholders of record on June 21, 1910.

Denver & Inter-Mountain Railroad, Denver, Col.—Interests identified with the Denver City Tramway have secured control of the Denver & Inter-Mountain Railroad, and new officers have been elected as follows: W. G. Smith, as president to succeed Charles F. Propst; J. H. Brown as secretary, to succeed J. F. Gaule; Fred Moffatt as treasurer, to succeed Wm. F. McDermott. Frank L. Butler was re-elected vice-president and general manager.

Elizabeth & Trenton Railroad, Trenton, N. J.—The Elizabeth & Trenton Railroad has been incorporated to take over the Trenton & New Brunswick Railroad and the New Jersey Short Line Railway. It is said that the Elizabeth & Trenton Railroad will later be leased to the Public Service Corporation of New Jersey, and that the New Jersey Short Line Railroad will then be pushed to completion.

El Paso (Tex.) Electric Railway.—The El Paso Electric Railway has applied to the State for permission to increase its capital stock from $1,500,000 to $2,500,000.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—Final order for the sale under foreclosure of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway has been entered by Judge Lacombe, of the United States Circuit Court, in the suit of the Union Trust Company. In accordance with a decree of the court Edward H. Childs, special master, is to sell all the property, franchises and securities on Sept. 1, 1910. The company is directed by the court to pay within 20 days $1,679,933, which is the amount due for principal and interest on a mortgage held by the Union Trust Company. The special master is also directed that 75 pay-as-you-enter cars, purchased since the mortgage was given to the Union Trust Company, must be sold with the rest of the property, but that the purchaser must pay in cash $350,365 to reimburse the receiver in the amount expended for these cars. All bidders for the property as a whole shall be required to deposit $100,000 with the special master prior to the acceptance of any bid. The decree does not fix any upset price, but the court reserves the right to reject or accept any bid.

Gary & Interurban Railway, Gary, Ind.—The Gary & Interurban Railway has authorized an issue of $10,000,000 of refunding and first mortgage 5 per cent gold bonds to provide for extensions, etc. Of the total issue, $470,000 will be reserved to retire a like amount of first mortgage 5 per cent bonds dated 1909. It is stated that $1,500,000 of the new bonds have been sold. The company has declared an initial dividend of 1 per cent, payable July 10, 1910, to holders of record on June 30, 1910.

Illinois Valley Gas & Electric Company, Streator, Ill.—Russell, Brewster & Comapny, Chicago, Ill., and New York, N. Y., offer for subscription at $85 a share, with a bonus of 25 per cent of common stock, the 6 per cent cumulative preferred stock of the Illinois Valley Gas & Electric Company, which controls the Illinois Light & Traction Company, Streator, Ill., and other companies.

Lehigh Valley Transit Company, Allentown, Pa.—The Lehigh Valley Transit Company's mortgage for $15,000,000 to the Lehigh Valley Trust & Safe Deposit Company, Allentown, Pa., as trustee, has been filed for record.

Nashville Railway & Light Company, Nashville, Tenn.—The Nashville Railway & Light Company has declared a

quarterly dividend of ¾ of 1 per cent on the $4,000,000 of common stock of the company, payable on June 22, 1910, which compares with ½ of 1 per cent in April and semi-annual distributions of 1 per cent in January, 1910, and July, 1909. This increases the annual rate from 2 per cent to 3 per cent.

Ocean Shore Railway, San Francisco, Cal.—F. S. Stratton, receiver of Ocean Shore Railway, has filed a petition in the United States Circuit Court asking that the master in chancery examine the claims of the various creditors of the company to determine the priority of the claims as between the bondholders and the other creditors. An itemized list of the debts of the company, exclusive of the bond issue, was filed with the petition, showing the amount to be $2,321,743.50. In the list the receiver segregated the debts contracted six months or more prior to his appointment and those contracted afterwards up to May 5.

Owosso & Corunna Electric Company, Owosso, Mich.—The property of the Owosso & Corunna Electric Company has been sold under foreclosure for $80,000 to W. M. Eaton, who is said to represent the Commonwealth Power Company, Jackson, Mich.

Philadelphia Company, Pittsburgh, Pa.—An extra dividend of 1 per cent has been declared on the common stock of the Philadelphia Company, payable one-half of 1 per cent on Aug. 2, 1910, to stock of record on July 1, 1910, and one-half of 1 per cent on Nov. 1, 1910, to stock of record on Oct. 1, 1910.

Southwestern Street Railway, Philadelphia, Pa.—The sale of the property of the Southwestern Street Railway, which was to have been held on June 23, 1910, has been postponed indefinitely.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has been organized under the laws of Maine in the interest of Child, Hulswit & Company, Grand Rapids, Mich., to take over the Fort Dodge (Ia.) Light Company, Muscatine Light & Traction Company, Muscatine, Ia.; Cadillac (Mich.) Gas Light Company, La Porte (Ind.) Gas Light Company, Mattoon (Ill.) Gas Light Company, Chattanooga (Tenn.) Gas Company, Cedar Rapids (Ia.) Gas Light Company, and the La Porte (Ind.) Electric Company. The United Light & Railways Company has an authorized capital stock of $30,000,000, of which $12,500,000 is first preferred 6 per cent cumulative stock, $5,000,000 second preferred 3 per cent cumulative stock, and $12,500,000 common stock.

On June 23, 1910, Chairman Knapp, of the Interstate Commerce Commission, sent the following telegram to the presidents of the Delaware, Lackawanna & Western Railroad, the Erie Railroad, the Pennsylvania Railroad, the Central of New Jersey Railroad, the Lehigh Valley Railroad, the New York Central & Hudson River Railroad and the Philadelphia & Reading Railway:

"Several complaints have been filed against advances in commutation rates between New Jersey points and New York City, and the commission is urged to suspend the same. The new law has not been carefully examined and some of my associates are absent. Under the circumstances, and to afford opportunity for proper consideration both as regards our power and the propriety of its exercise, the commission requests your company to postpone until August 1 the effective date of tariffs announcing these advances. Your compliance with this request will be highly gratifying and permission to postpone will be granted on application."

The complaints filed included that of the New Jersey Railroad Commission and several other complaints received from various municipalities of New Jersey, all directed against proposed advances of rates by the same railroads. At the informal hearing on the subject the New Jersey complainants' delegation, headed by Attorney General Wilson, was informed that it was questionable whether the commission would accept the complaints, as the commission was doubtful of its jurisdiction over the matter of commutation rates. Mr. Wilson urged upon Chairman Knapp and Commissioners Cockrell and Harlan action by the commission to suspend the advanced rates, under the new law, as nearly all of the traffic involved was interstate commerce.

Traffic and Transportation

Fare Complaint Dismissed in Pennsylvania.

On June 24, 1910, the Railroad Commission of Pennsylvania dismissed the complaint of the West Chester Improvement Association against the Philadelphia & West Chester Traction Company, Philadelphia, Pa., which, in October, 1909, established six 5-cent fare zones between Sixty-third Street and Market Street, Philadelphia, and West Chester, instead of five. The circular of the company to the public announcing the increase was published in the ELECTRIC RAILWAY JOURNAL of Oct. 16, 1909, page 888, and a summary of the testimony presented in behalf of the company at the hearing before the commission in Harrisburg, on April 14, 1910, was published in the ELECTRIC RAILWAY JOURNAL, of April 30, 1910, page 787. The decision of the commission is substantially as follows:

"The operation of the respondent's road began in January, 1899, and from that date until September, 1909, the through fare from Sixty-third Street, Philadelphia, to West Chester, a distance of approximately 20 miles, was 25 cents, the fare zones in that distance being five, and the second one of that number—counting from Philadelphia—ended at Newtown Square, where nearly all the complainants in this case reside.

"In September, 1909, the company felt compelled to increase those fare zones to six, making the through fare from Philadelphia to West Chester 30 cents; and in this readjustment of those zones, Newtown Square fell practically in the centre of the third zone, instead of being the terminus of the second, as theretofore. This change is the occasion of this complaint.

"We have not been given the distances of the original zones, but the distances of the present zones on the main line, counting from Philadelphia, are as follows: First zone, 20,900 feet; second zone, 16,130 feet; third zone, 16,320 feet; fourth zone, 17,475 feet; fifth zone, 16,355 feet; sixth zone, 17,060 feet.

"All of these zones, it will be noted, except the first, cover practically the same distances. On the first zone, however, are two branch connections, one running off therefrom at Upper Darby Junction, 5,070 feet from Sixty-third Street, to Collingsdale, 25,761 feet from said Junction, making a total distance from Sixty-third Street to Collingdale of 29,831 feet; and another running off at Llanerch, 14,259 feet from Sixty-third Street, thence to Ardmore, a distance of 17,270 feet, making the total distance from Sixty-third Street to Ardmore, 31,529 feet.

"The fare from Sixty-third Street to both Collingdale and Ardmore is 5 cents, and it is in comparison with the fare on these branch lines that the complainants find their principal ground of objection to the present arrangement of the zones throughout the main line.

"On all such interurban lines the most equitable arrangement of the fare zones is that which makes them practically equal in distance, for it is for his transportation for such distances that the patron pays; but in practice it is almost impossible to make these fare zone distances absolutely equal, and in this case, with the exception of the first zone and the branch lines leading therefrom as aforesaid, the distances are as nearly equal as it is ordinarily possible to make them.

"To account for the greater length of the first fare zone and for the length of the lines to Collingdale and Ardmore, it must be remembered that this zone and these branch lines are those located at the Philadelphia end of respondent's road, in the most thickly populated section of its territory, and reach points which are competitive by reason of their close proximity to the city. Because of these facts, roads of this character have found it necessary to make such fare zones, as a rule, longer than those which extend a greater distance beyond the limits of the centers of population. Moreover, in the statements which have been furnished us by the respondent it appears that these operations of its road are those which bring it the greatest proportionate return for the services rendered. Trolley rates are largely determined by the density of travel in each particular section, so that the probability is that, if the travel beyond the first zone were at all commensurate

with that within that zone, the other zones would be so arranged as to make each include substantially the same distance as the first.

"The complainants find no fault with the through rate from Philadelphia to West Chester, but because of what they conceive to be due to them from the company—largely, perhaps, in consequence of the location of the original fare zone termini—they would have the second zone extended, as it originally was, to Newtown Square, making it cover a distance of 23,600 feet, and then propose, in order to maintain for the respondent the same through fare to West Chester, to make the zones between Newtown Square and West Chester considerably shorter than they now are, or have ever been; that is, they would make the third zone but 15,000 feet, the fourth zone 14,280 feet, the fifth zone 13,420 feet, and the sixth—the last—17,060 feet, as it is at present.

"It is natural to suppose that if any such rearrangement of the zones were made to suit the convenience and desires of complainants, it would occasion more or less dissatisfaction and complaint on the part of residents all along the line between that place and West Chester, the result of which would be that the dissatisfaction would probably be greater than it is at present.

"When the whole situation is thus considered, it does not appear that the commission would be justified in recommending the readjustment of these fare zones which the complainants desire."

Recommendations Regarding Service in Pittsburgh

The Railroad Commission of Pennsylvania on June 23, 1910, issued the following recommendations regarding street railway service in Pittsburgh, based on the report on traction matters in that city made for the commission by Emil Swensson, the letters to the commission by both Mayor Magee and President Callery of the Pittsburgh Railways and the report made about a year ago on the local street railway situation in Pittsburgh by Stone & Webster, Boston, Mass.:

"1. That 50 additional closed motor cars of 56-seat capacity be ordered at once for delivery as speedily as possible.

"2. That all cars be distributed over practicable routes according to the amount of travel, and during rush hours be scheduled to meet, so far as possible, the demands thereof; and that, outside of the morning and evening rush hours, a sufficient number of cars be run on all routes to accommodate the travel comfortably.

"3. That hereafter there be annual additions to the rolling stock amply sufficient to provide for any increase in travel and to supply the loss from wear and tear.

"4. That so far as the character of the various routes permits and the travel thereon requires, and as the wear and tear of the rolling stock demand its renewal, the old 28-seat cars should be replaced by the 56-seat or other equally good, large type of cars.

"5. That routing and re-routing and the operation of short runs should be carefully studied, and, from time to time, experimented with, as the city, the other municipalities concerned, and the company may find advisable and practicable, until the best arrangement thereof is determined, and that thereupon publication be made of the several routes and the service thereon for the convenient information and guidance of the patrons, and that wherever now practicable, or hereafter rendered so, the terminal loops be shortened, the number of stops thereon decreased and the crossings of loops by each other avoided.

"6. That all cars be regularly and thoroughly cleaned, both inside and outside, each day, with such additional cleaning during the day as the circumstances demand and permit, and that ample provision be made for prompt and full repairs as they may be required.

"7. That the roadbed be maintained in first-class condition, and that the power plants be made sufficient for every demand.

"8. That persistent endeavor be made to keep the cars on schedule time. This is regarded as very important.

"9. That the company promptly determine the additional franchise privileges it regards as necessary for the most satisfactory and efficient service, and then make application to the respective municipal authorities for the grant thereof, and persist in efforts to obtain the same until a definite conclusion is reached.

"10. That the endeavor to eliminate grade crossings of steam railroads be prosecuted vigorously.

"11. That proper and adequate provision be made for the storage of cars near the terminal district, so that the cars can be readily run in for short trips and for the rush hour service."

Freight Petition Granted in Massachusetts.—The Railroad Commission of Connecticut has granted the petition of the Connecticut Valley Street Railway, Greenfield, Mass., to act as a common carrier in Hadley.

Car License Suit in Milwaukee.—Emil Seidel, Mayor of Milwaukee, has begun action against the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to recover $77,000 in car license fees which he claims is due the city.

Special Seeing Buffalo Service.—The International Traction Company, Buffalo, N. Y., operated a special seeing Buffalo service during the recent conclave of the Knights Templars in that city, arranged especially to suit the convenience of those in attendance at the conclave.

Freight Over the Rochester, Syracuse & Eastern Railroad.—The Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has filed tariffs with the Public Service Commission of the Second District of New York to provide for the transportation of freight locally over its lines hereafter.

Interurban Poultry Car.—The Evansville & Southern Indiana Traction Company, Evansville, Ind., proposes to run a poultry car over its Rockport line every Saturday, leaving Rockport at 7 a. m., and arriving in Evansville at 11 a. m., stopping at all the intermediate points to receive consignments of eggs, chickens, etc.

Report on Elevated Loop Congestion in Chicago.—It is expected that Bion J. Arnold and the commission appointed to consider the reduction of congestion on the Union Elevated Railroad, operating the loop in Chicago, will report very soon. It is predicted that through routes and liberal transfers will be recommended.

Proposed Abandonment of Part of New York State Line.—In connection with the petition of the Waverly, Sayre & Athens Traction Company, Waverly, N. Y., under section 103 of the Railroad Law for an approval of a declaration of abandonment of a portion of its constructed route, the Public Service Commission of the Second District of New York has directed the company to present to the commission a record of its passenger business arising exclusively from that part of its system which is involved in the matter.

Pittsburgh Fare Ordinance Signed.—The Mayor of Pittsburgh has signed the city ordinance which provides for transfers on all lines operating within the city which cross, intersect or run within a radius of 250 feet. Transfers are to be issued upon transfers, the intention of the law being that, for a single fare, any passenger shall be entitled to a single continuous ride over the lines of the railway system within the limits of the city. J. D. Callery, president of the Pittsburgh Railways, says that the legality of the ordinance will be tested on the ground that it is illegal and unjust, and that Councils have no right to order or regulate the issuing of transfers.

Arbitration in Albany.—Two of the three arbitrators have been chosen who will consider the question of the wages of the employees of the United Traction Company and the length of the new agreement between the company and its employees in regard to terms of service. C. Gordon Reel, formerly second vice-president and general manager of the Kingston (N. Y.) Consolidated Railroad, has been selected to represent the company, and Joseph McLoughlin, president of the Troy division of the organization representing the employees of the company, has been selected to represent the men.

Increase in Wages on Toledo & Chicago Interurban Railway.—On June 1, 1910, the following wage scale for motormen and conductors became effective on the Toledo & Chicago Interurban Railway, Kendallville, Ind.: First six months, 18 cents per hour; second six months, 19 cents per hour; third six months, 20 cents per hour; fourth six months,

21 cents per hour. Motormen and conductors on freight runs receive 2 cents per hour, in addition to the above. The old wage scale was: First six months, 17 cents per hour; second six months, 18 cents per hour; third six months, 19 cents per hour; fourth six months, 20 cents per hour. No extra amount was received by motormen and conductors on freight cars under the old scale.

Wage Agreement in Brooklyn.—The agreement between the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., and its employees regarding wages and terms of service expires on July 1, 1910. The man have been receiving 23 cents per hour for swing runs, no swing run to pay less than $1.75, and a flat rate of $2.30 per day for straight runs of 10 hours completed inside of 11 hours. Some of the straight runs fell short of 10 hours and others extended over 10 hours. The men asked for an increase in pay to 25 cents an hour, no swing run to pay less than $2, and straight runs to be paid for all time in excess of 10 hours. The company declined to increase the rate of wages or to guarantee $2 per day for swing runs so long as two-thirds of the runs on the table were straight runs, but agreed to pay 23 cents an hour for all time made by straight runs in excess of 10 hours. On this basis an agreement has been signed for another year.

Decision in Oregon Fare Case.—The Supreme Court of Oregon in an opinion written by Justice Slater on June 1, 1910, denied the application of the Portland Railway, Light & Power Company, Portland, Ore., for a rehearing of the case of the company against the State Railroad Commission of Oregon in the matter of the fare over the Milwaukee line of the company. The company contended that the act of the Railroad Commission and the decision of the court are confiscatory. The court states that it finds itself unable to assent to the conclusions of the company's attorneys, and concludes with an answer to the contention that the State has no power to regulate fares in Portland. The opinion concludes: "Assuming that these claims are well founded, still we do not see that the order of the commission attempts to regulate fares within Portland, for the decision operates only upon traffic reaching or extending beyond the boundaries of the corporate limits."

New Transfers in Portland, Ore.—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has announced that the company will adopt a new style of transfer. In connection with the proposed change, Mr. Josselyn issued a statement in which he said: "The new transfers will have the date printed in red across the face and in large, bold type, so that there can be no mistake about it. At present the conductor punches the date, and no doubt mistakes sometimes creep in. On the other hand, there are passengers who will present transfers that they know have outlived their usefulness, but it is difficult for the conductor to refuse to accept them because the conductor who issued them might have made a mistake. The new transfers will also be better equipped for giving the time of transfer. Along one side of the slip will be printed the even hours, while on another will be the figures 15, 30, 45. This will make it easy for the conductor to punch the exact time. The transfers cannot be used for any other date but that indicated in red."

More Brooklyn Rapid Transit Advertisements.—The Brooklyn (N. Y.) Rapid Transit Company has recently published in the Brooklyn newspapers a number of advertisements setting forth features of the company's work. As typical of these advertisements there were two, one on the power system of the company, and one on the employees' training school, which indicate their scope and purpose. Each contained less than 100 words, and both were illustrated, the one about the power station with an exterior view of the company's Kent Avenue plant, and the one about the employees' school with a view of the motormen's instruction room. The advertisement about the company's training school for employees follows: "Brooklyn Rapid Transit was one of the first systems in the country to develop the training of its motormen. In its fully equipped schoolroom, at Second Avenue and Fifty-eighth Street, and in the actual operation of school cars all prospective motormen are first trained, and then required to pass strict efficiency tests before being permitted to break in on cars in regular service."

Personal Mention

Mr. William G. Smith has been elected president of the Denver & Inter-Mountain Railroad, Denver, Col., to succeed Mr. C. F. Propst.

Mr. Fred Moffat has been elected treasurer of the Denver & Inter-Mountain Railroad, Denver, Col., to succeed Mr. William F. McDermott.

Mr. James H. Brown has been elected secretary of the Denver & Inter-Mountain Railroad, Denver, Col., to succeed Mr. James F. Gaule.

Mr. A. Katterheinrich has been appointed assistant auditor of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. Mr. Katterheinrich was formerly general passenger and freight agent and auditor of the Fort Wayne & Springfield Railway, Decatur, Ind. Mr. Katterheinrich entered electric railway service in 1906 as a stenographer with the Fort Wayne & Springfield Railway, and was appointed chief clerk of the company on Sept. 1, 1908, and on Jan. 1, 1909, was appointed general passenger and freight agent and auditor of the company. He subsequently relinquished the duties of general passenger and freight agent of the company to Mr. J. R. Fink, but upon the retirement of Mr. Fink from the company he resumed the duties of this position. In the meantime he acted as auditor.

Mr. E. P. Clark, until recently president of the Los Angeles-Pacific Railrway, Los Angeles, Cal., has acquired traction interests in and near Portland, Ore., and has identified himself with the Mt. Hood Railway & Power Company, in the management of which he proposes to take an active part, although he does not intend to give up his residence in Los Angeles. Mr. Clark and his associates, some of whom are Southern California capitalists, have invested several million dollars in the vicinity of Portland. An electric railway is now in process of construction to Mt. Hood. Gen. M. H. Sherman, who is a brother-in-law of Mr. Clark, although still vice-president of the Los Angeles-Pacific Company, is also interested in the Mt. Hood Railway & Power Company. Mr. Clark still retains a financial interest in the Los Angeles-Pacific Company.

Mr. William Walker has been appointed assistant superintendent of the Milford, Attleboro & Woonsocket Railway, Milford, Mass., and the Interstate Consolidated Street Railway, North Attleboro, Mass., which are controlled by the New England Investment & Security Company. Mr. Walker's first electric railway experience was with the Schenectady (N. Y.) Railway as conductor and then as motorman. He was later made an inspector of the company, which he served in all about 10 years. Mr. Walker next became connected with the Berkshire Street Railway, Pittsfield, Mass., as motorman, but soon after entering the employ of the company he was made train dispatcher. Subsequently he was transferred to Westfield as inspector of transportation, and later was transferred from Westfield to Springfield, where he was located about two years. Finally he was again transferred to Westfield.

Mr. K. K. Garrick has been appointed general traffic agent of the Seattle-Everett Traction Company, Everett, Wash. In September, 1902, Mr. Garrick entered the service of the Everett Improvement Company as assistant bookkeeper. At that time the Everett Improvement Company controlled and operated the Everett Railway & Electric Company, the Everett Water Company, the Everett Theatre Company, the Everett Dock & Warehouse Company and was interested in the townsite of Everett. About June, 1903, Mr. Garrick was made assistant cashier of the company and in January, 1904, he was appointed bookkeeper. In July, 1904, Mr. Garrick was made chief clerk of the company, and about January, 1906, the duties of purchasing agent were added to the office of chief clerk. In August, 1907, the Puget Sound International Railway & Power Company, managed by Stone & Webster, Boston, Mass., leased the properties of the Everett Railway, Light & Water Company, and Mr. Garrick continued with the lessee company as chief clerk and purchasing agent until recently, when he was placed in charge of the freight and passenger traffic of the Seattle-Everett Traction Company, which is being managed at the same offices in Everett as the Puget Sound International Railway & Power Company.

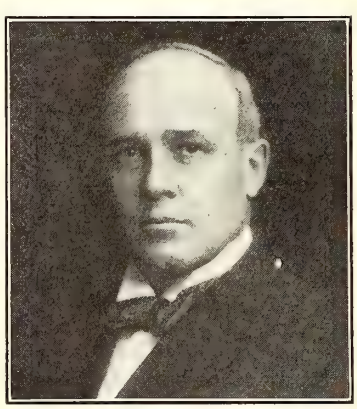
Mr. C. Gordon Reel, who retired early in the year as first vice-president and general manager of the Kingston (N. Y.) Consolidated Railroad, after holding that position since 1902, when the Colonial City Traction Company and the Kingston City Railroad were consolidated, was elected secretary of the Street Railway Association of the State of New York at the meeting which was held at Cooperstown on June 28 and 29, to succeed Mr. J. H. Pardee, who has been elected president of the association. Mr. Reel has been appointed as arbitrator to represent the United Traction Company, Albany, N. Y., in settlement of a schedule of wages for three years, to be determined by a representative of the company, of the men and by a third person to be chosen by the two other arbitrators. Mr. Reel is also one of the commissioners of appraisal in the land condemnation proceedings in connection with the Ashokan dam, which is being built to hold the water supply of New York City. He is making his headquarters in Kingston as a consulting engineer. Mr. Reel was formerly first vice-president of the Street Railway Association of the State of New York.



C. G. Reel

Mr. J. E. Gibson has been appointed assistant to Mr. J. M. Egan, president of the Metropolitan Street Railway, Kansas City, Mo. Mr. Gibson was born in Kansas City, Mo., on Aug. 20, 1881, and was educated in the public schools of Kansas City and at the Missouri State University at Columbia, Mo., from which he was graduated in 1902. From 1902 to 1904 Mr. Gibson served as private secretary to Mr. W. S. Cowherd, Congressman from the Fifth Missouri District, in Washington. In 1904 he entered the service of the Metropolitan Street Railway as a clerk in the office of the auditor. On Jan. 1, 1905, Mr. Gibson was appointed secretary to Mr. Bernard Corrigan, who was then president of the company, and he continued in this capacity until March 1, 1909, when he entered the service of the operating department of the company as a division superintendent.

Mr. J. H. Pardee, who has been secretary of the Street Railway Association of the State of New York since November, 1906, was elected president of the association to succeed Mr. E. F. Peck, at the meeting of the association which was held at Cooperstown on June 28 and 29, 1910. Mr. Pardee has been connected with J. G. White & Company, Inc., New York, N. Y., since January, 1907, as operating manager of the public utility companies which are controlled by that company. Mr. Pardee was born at Lysander, N. Y., in 1867, and in 1889 was graduated from Hamilton College. In 1891 he was admitted to the bar of New York and began to practice as a member of Petrie, Zimerman & Pardee, with whom he continued until 1898. Meanwhile Mr. Pardee perfected the reorganization of the railway, lighting and gas company at Canandaigua, N. Y., and was appointed general manager of the Ontario Light & Traction Company and the Canandaigua Gas Light Company. In 1898 he was appointed general manager of the Rochester & Eastern Rapid Railway, and continued in this position until he became connected with J. G. White & Company, Inc. Mr. Pardee has been connected with the Street Railway Association of the State of New York as an officer since 1903.



J. H. Pardee

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Butte & Plumas Railway, Oroville, Cal.**—Application for a charter has been made in California by this company to build a 30-mile railway to connect Oroville and Stanwood. Surveys are now being made. Capital stock, $500,000. Incorporators: O. C. Hasslett, E. S. Dunbar and J. L. Smith.

***Forest City & Mason City Railway, Forest City, Ia.**—Incorporated in South Dakota to build a 30-mile railway, to be operated either by steam or electricity, from Forest City, via Fertile to Mason City. Capital stock, $400,000. Headquarters, Watertown, S. D., and at Forest City. Incorporators: P. O. Koto, C. N. Christopherson, C. S. Isaacs, Forest City; A. M. Sheimo, Baldwin, Wis.; A. L. Sherin and M. J. Hawley, Watertown, S. D.

***Niobrara Investment Company, Omaha, Neb.**—Application for a charter has been made in Nebraska by this company for the purpose of constructing an interurban railway between the Niobrara River and Sioux City. A power plant will be built on the Niobrara River. Capital stock, $1,200,000. F. Jaeggi is interested.

***Riverside Traction Company, Trenton, N. J.**—Incorporated in New Jersey to succeed the Camden & Trenton Railway. Capital stock, $1,500,000. Common, $20,000; preferred, $8,000. Officers: Thomas Haydock, Philadelphia, president; Dietrich Debuys, Camden, secretary, and Robert Long, Philadelphia, treasurer.

***Washington-Virginia Railway, Vienna, Va.**—Incorporated in Virginia to build a 50-mile electric railway from Vienna, Fairfax County, to Bluemont, Loudoun County. Maximum capital stock, $1,000,000. Officers: M. E. Church, president; G. B. Fadsley, vice-president; F. B. Parker, secretary; L. L. Northrop, treasurer, all of Falls Church, Va.

Ontario & Northern Railway, Ontario, Wis.—Chartered in Wisconsin to build an 8-mile electric railway from Ontario to Wilton. Capital stock, $75,000. Directors: V. A. Stoddard, C. W. Lord, A. T. Saunders, L. R. Abbott, F. G. Bredlow and Levi Wallace, all of Ontario. [E. R. J., June 4, '10]

FRANCHISES

Point Grey, B. C.—The British Columbia Electric Railway, Ltd., Vancouver, has applied for a 40-year franchise to build a street railway in Point Grey..

Berkeley, Cal.—The Oakland Traction Company has been granted a franchise by the Council for the extension of its Euclid Avenue line.

Martinez, Cal.—A. W. Maltby, representing the Antioch & Oakland Electric Railway, has asked the Board of Supervisors for a franchise to build a railway over the county roads between Martinez and Pachoco.

Carbondale, Ill.—The Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, has applied to the Council for a franchise to build a street railway over certain streets in Carbondale.

Hammond, Ind.—The Indiana Northwestern Traction Company, Monticello, has been granted a 50-year franchise by the City Council to build a railway in Hammond. This proposed line will connect Cedar Lake, Hammond, Crown Point and Chicago. Eugene Purtelle, 222 La Salle Street, Chicago, president. [E. R. J., Dec. 25, '09.]

Grand Ledge, Mich.—J. W. Ewing, J. S. Mudge and associates have been granted a franchise by the Council to build an electric railway between Lansing and Grand Ledge. R. E. Olds is said to be financing the proposition. [E. R. J., June 18, '10.]

Billings, Mont.—At a special election held in Billings on June 30, the Eastern Montana Electric Railway was voted a 50-year franchise to build a railway over certain streets in Billings. This is part of a plan to build an electric railway to connect Laurel, Bearcreek, Billings, Red Lodge, Rockvale, Belfry and Fromberg. F. A. Kesselhuth, chief engineer. [E. R. J., June 4, '10.]

Lincoln, Neb.—The Lincoln (Neb.) Traction Company has asked the Council for a franchise to extend several of its lines in Lincoln.

Cairo, N. Y.—The Catskill (N. Y.) Electric Railway has been granted a franchise by the Town Board to extend its railway from Leeds to Cairo.

Columbus, Ohio.—The Fifth Avenue Railway & Light Company has asked the Council for a franchise to build a street railway on Fifth Avenue, Columbus. A. C. Wolfe is interested. [E. R. J., June 25, '10.]

Morristown, Pa.—The Philadelphia & Western Railway, Philadelphia, has been granted a franchise by the City Councils to build a railway in Morristown. This completes the preliminary work for connection with the Lehigh Valley Transit Company.

Cleburne, Tex.—Daniel Hewett and associates have been granted a franchise to build a street railway in Cleburne. [E. R. J., June 18, '10.]

Barnstown, W. Va.—The Fairmont & Northern Traction Company, Fairmont, has been granted a franchise by the Council to build a railway over certain streets in Barnstown.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has recently completed and placed in operation the extension of its railway to Corey.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company has awarded the contract to Christian & Hartney, Vancouver, for building the Richards Street extension in Vancouver.

Los Angeles-Pacific Company, Los Angeles, Cal.—This company will proceed at once with the proposed four-tracking of its line between Venice and Retondo. The borings for the company's new subway have also been begun. By next winter the latter improvement will be under full headway, and will likely be completed by the end of 1912.

***Modesto, Cal.**—J. C. Mehling, G. S. Schuler, J. H. Wallace and L. Eddinger, are said to be interested in promoting an interurban railway project to connect Modesto and Stockton, via Escalon.

***Monterey, Cal.**—A. G. Metz and H. M. Bergine, Monterey, are said to be interested in a plan to build an electric railway to connect Fresno and Monterey, via Coalinga.

St. John's Light & Power Company, St. Augustine, Fla.—This company has prepared plans for the construction of several extensions to its street railway in St. Augustine.

Burley, Idaho.—Isaac N. Powell, Chicago, advises that he is not interested in the proposed electric railway to connect Albion and Burley. [E. R. J., June 11, '10.]

Kankakee & Urbana Traction Company, Kankakee, Ill.—This company is securing right of way in Urbana for its proposed 125-mile railway to connect Kankakee, Urbana, Villa George, Camargo and Charleston. It is expected that construction will be started at an early date. W. J. Brock, Kankakee, president. [E. R. J., Nov. 27, '08.]

Peoria Railway Terminal Company, Peoria, Ill.—This company states that it is now building 2.3 miles of double track within the city limits, making a total of 4.6 miles, which will be complete and in operation in about 90 days.

Evansville, Mount Carmel & Olney Electric Railway, Evansville, Ind.—This company is said to have nearly completed the preliminary arrangements and construction will soon be started by the Burns Construction Company, Chicago, on its proposed 65-mile interurban railway to connect Mount Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. J. J. Burns and M. A. Peoples are interested. [E. R. J., June 4, '10.]

Evansville (Ind.) Railway.—In connection with the absorption of the Owensboro (Ky.) City Railroad and the Henderson (Ky.) Traction Company by interests identified with the Evansville Railway, it is planned to build a bridge across the Ohio River between Evansville, Ind., and Henderson, Ky., and to connect Evansville, Henderson and Owensboro. Other lines are planned from Henderson to Uniontown and Morganfield, Ky., and from Owensboro to Calhoun into the Green River territory. This company has recently awarded a contract to the Tennis Company for the construction of 6½ miles of track between Rockport and Grandview.

***South Bend, Ind.**—M. H. Lane, president of the Chicago & Kalamazoo Terminal Railroad; H. Bennett, president of the Chicago, Kalamazoo & Eastern Railroad; Edward G. Folsom, M. P. Reed and R. W. Reynolds are said to be interested in the construction of a proposed line from South Bend, Ind., to Kalamazoo, Mich.

Central Kentucky Traction Company, Frankfort, Ky.—This company is said to be considering plans for building an extension from Frankfort to Owenton.

***Henderson, Ky.**—J. P. Porter is said to be promoting a plan to build an electric railway to connect Uniontown, Smith Mills, Dixon, Corydon, Morganfield and Henderson, Ky.

Grosse Isle Railway, Detroit, Mich.—This company has completed surveys of Grosse Isle, and is now securing right of way around it. It is expected that construction will be started within a few weeks. Frank Whitehall and P. N. Jacobsen are interested. [E. R. J., May 28, '10.]

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company has completed preliminary arrangements and construction will soon be begun on its 1½-miles extension to Henes Park.

***Winona, Minn.**—John E. Hanson, St. Paul, is said to be promoting an electric railway to connect Rushford, Chatfield and Spring Valley.

Kansas City, Lawrence & Topeka Electric Railway, Kansas City, Mo.—This company is building a 5-mile extension to its railway.

United Railways, St. Louis, Mo.—This company plans to rebuild 4 miles of its McPherson line, using white oak ties and new 120-lb. rails. This line will be extended to the western city limits. It will also build an extension of its De Givernville Avenue line to the city limits.

Jersey Central Traction Company, Keyport, N. J.—This company has placed a contract with the Standard Bitulithic Paving Company, New York, for paving Perth Amboy.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company has secured rights of way through Chemung County, and as soon as the Steuben County negotiations have been closed it will begin construction of the extension between Elmira and Corning. The line will connect Waverly, Elmira and Corning.

Hudson Valley Railway, Glens Falls, N. Y.—This company has applied to the Public Service Commission of the Second District for permission to construct an extension of its lines in Saratoga Springs, through East Avenue and crossing Union Avenue. Saratoga Springs has granted a franchise for the proposed extension.

Union Railway, New York, N. Y.—This company has applied to the Public Service Commission of the First District for permission to extend its lines from Fordham Road and Sedgwick Avenue, across the University Heights Bridge at 207th Street, to Amsterdam Avenue, and through Emerson Street to Broadway. This extension will connect the Union Railway and the Third Avenue Railroad.

Alliance-Akron Railroad, Alliance, Ohio.—It is reported that this company has awarded a contract to the B. & M. Engineering & Construction Company, Cleveland, to build the proposed 26-mile railway between Alliance and Akron. L. C. Marble, Schofield Building, Cleveland, engineer in charge. [E. R. J., June 11, '10.]

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—This company is reported to have succeeded in financing the first section of its projected railway from Cadiz to New Athens, a distance of 8 miles. This proposed 60-mile railway will connect Wheeling, Cadiz, Uhrichsville and Cleveland. A. E. Townsend, Cadiz, president. [E. R. J., June 18, '10.]

Fifth Avenue Railway & Light Company, Columbus, Ohio.—This company announces that construction will start on its proposed 7-mile railway from East Columbus to Marble Cliff, Columbus, as soon as the company can obtain a franchise. A. C. Wolfe is interested. [E. R. J., June 22, '10.]

*Enid, Okla.—J. M. Spaulding is said to be interested in a plan to build a four-mile electric railway between Enid and North Enid. Press reports state that work has been begun on the line.

Monaca & Ambridge Street Railway, Monaca, Pa.—This company has nearly completed the surveys for its proposed railway to extend through Monaca, Moon and Hopewell Townships. [E. R. J., Dec. 11, '19.]

Pittsburgh (Pa.) Railways.—This company has awarded the contract to Wm. Pickett & Company for building an extension of its railway from East Maiden Street to Washington Park.

Galveston-Houston Railway, Houston, Tex.—The Stone-Webster Engineering Corporation, Boston, Mass., which is building this 50-mile railway between Galveston and Houston, has ordered 5700 tons of 80-lb steel rails from the Pennsylvania Steel Company.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company reports it expects to commence building from Milwaukee to Beaver Dam this year, a distance of 70 miles.

SHOPS AND BUILDINGS

Athens (Ga.) Electric Railway.—This company reports it has started construction of its new reinforced concrete car house and repair shop, to cost approximately $20,000. Work is being done by the Foy-Proctor Company, Nashville. [E. R. J., June 4, '10.]

Aurora, Elgin & Chicago Railway, Chicago, Ill.—This company will build a 3-story brick railway station and offices, 40 ft x 120 ft.

Grafton (W. Va.) Traction Company.—This company reports that during the summer it will build a new brick car house in Grafton. [E. R. J., Apr. 30, '10.]

POWER HOUSES AND SUBSTATIONS

St. John's Light & Power Company, St. Augustine, Fla.—It is stated that this company will install a new engine at its power plant in St. Augustine, which will increase the capacity of the station by 1,200 hp. Additional generators, motors and other machinery will also be installed.

Chicago, Aurora & De Kalb Railroad, Aurora, Ill.—This company is building a new substation at Cortland.

Peoria (Ill.) Railway Terminal Company.—This company has under construction a new power house, 72 ft. x 200 ft. The building will also contain a machine and blacksmith shop. The company is preparing plans for increasing its power generating capacity, which will cost nearly $60,000.

Evansville (Ind.) Railway.—This company has awarded a contract to the General Electric Company for apparatus for two 300-kw substations and 21 miles of high-tension lines. [E. R. J., June 18, '10.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has awarded the contract to the Bedford Stone & Construction Company to build its new power house in West Tenth Street, west of White River, in Indianapolis. The Brown-Ketcham Iron Works have the contract for steel construction. Work has been started. The stack at the new power plant will be 995 ft. high and will be 45 ft. square at the base.

Kansas City, Laurence & Topeka Electric Railway, Kansas City, Mo.—This company is now installing a 150-kw generator and a 250-hp gas engine in its power house at Endora.

Metropolitan Street Railway, Kansas City, Mo.—This company is constructing a five-story steel and brick addition to its present building on Fifteenth Street and Grand Avenue in Kansas City. The structure will be 115 ft. x 90 ft. The addition will cost, it is estimated, $75,000.

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—It is reported that this company will soon build a power house at Cadiz. A. Evans Townsend, president.

Corpus Christi & Interurban Railway, Corpus Christi, Tex.—This company, which at present rents power from the local electric light plant, expects to soon erect its own power plant.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company will build a power house at Hustisford having a capacity of nearly 20,000 hp. J. W. Barber, secretary.

Manufactures & Supplies

ROLLING STOCK

Selma Street & Interurban Railway, Selma, Ala., is in the market for three new cars.

Milwaukee Western Electric Railway, Milwaukee, Wis., expects to purchase several new cars and trucks.

Mason City & Clear Lake Railway, Mason City, Ia., expects to purchase two 60 or 70-ton electric freight locomotives.

Worcester (Mass.) Consolidated Street Railway expects to purchase 12 28-ft. closed cars complete with motors, trucks, etc.

Interurban Construction Company, Wichita, Kan., is in the market for several standard interurban passenger cars for August delivery.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., expects to purchase one double-truck closed car, either new or second-hand.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., is said to be considering the purchase of eight semi-convertible cars for 1911 delivery.

J. H. Clark, Boise, Idaho, is asking prices on combination passenger and baggage cars and passenger cars for a 25-mile line in Idaho. The cars are to be equipped with four motors each.

New York & Queens County Railway, Long Island City, N. Y., which was noted in the ELECTRIC RAILWAY JOURNAL of June 11, 1910, as contemplating the purchase of 25 60-hp, double-motor equipments, including air brakes, has placed the order for this equipment with the General Electric Company.

Springfield (Ill.) Consolidated Railway has placed an order with the G. C. Kuhlman Car Company for five 22-ft. closed car bodies with 5-ft. 9-in. platforms at each end so arranged as to be easily converted for prepayment operation. These car bodies will be mounted on Brill No. 21-E single trucks and equipped with two GE-54 motors.

Metropolitan Street Railway, Kansas City, Mo., which was noted in the ELECTRIC RAILWAY JOURNAL of May 14, 1910, as having issued specifications for 25 cars, has placed an order with the Cincinnati Car Company for 25 cars of the prepayment type, with an option of increasing the order to 50 cars. The company is rebuilding at its shops in Kansas City 25 trail cars. These cars are now being fitted with motors and will also be of the prepayment type.

Portland Railway, Light & Power Company, Portland, Ore., mentioned in the ELECTRIC RAILWAY JOURNAL of March 26, 1910, as having purchased 40 pay-as-you-enter cars from the American Car Company, has specified the following details for 10 of these cars, which are to be narrow-gage and of the closed type:

Length of body....28 ft. 8 in.	Destination signs....Hunter
Over bumpers.....45 ft.	Gongs.....Brill Dedenda
Width over sills.....7 ft. 4 in.	Hand brakes.....Brill
Over posts at belt.....8 ft.	Headlights ....Crouse-Hinds
Sill to trolley base .....12 ft. 2⅝ in.	Journal boxes.....Brill
	Motors, type.....GE
Height from top of rail to sills.. 2 ft. 7½ in.	Push button.....Brill
	Roofs .....monitor
Body .....wood	Sanders.....De Witt
Interior trim.....bronze	Seats .....Brill
Axles .....Brill	Seating material.....rattan
Brakeshoes .....Brill	Side bearings.....Brill
Bumpers .....Brill	Springs .....Brill
Car trimmings.....Brill	Step treads.....Universal
Couplers, Brill, with Van Dorn head	Trucks, type.....Brill 22
	Varnish .....Murphy
Curtain fixt...Curt. Sup. Co.	Ventilators .....Brill
Curtain material...Pantasote	Wheels .....Griffin

TRADE NOTES

Rail Joint Company, New York, N. Y., has moved its office in London, England, to the Egypt House, 36-38 New Broad Street.

Pennsylvania Steel Company, Philadelphia, Pa., has moved its offices to the Morris Building, 1421 Chestnut Street, Philadelphia.

Northern Engineering Works, Detroit, Mich., have recently installed two 25-ton, 40-ft. span cranes and one 10-ton Northern traveling crane in the power stations of the Pennsylvania Tunnel & Terminal Railroad, New York, N. Y.

Crocker-Wheeler Company, Ampere, N. J., announces the election of the following officers, who will serve during the ensuing year: Schuyler Staats Wheeler, president; Gano Dunn, first vice-president and chief engineer; Arthur L. Doremus, third vice-president; Rodman Gilder, secretary, and W. L. Brownell, treasurer.

J. B. McClary, formerly general manager of the Sheffield Company, Sheffield, Ala., has been elected vice-president and general manager of the Yolande Coal & Coke Company and the New Connellsville Coal & Coke Company, and president of the Abernant Coal Company, with headquarters in the Brown-Marx Building, Birmingham, Ala.

C. W. Hunt Company, New York, N. Y., builder of coal handling, conveying and hoisting machinery, has opened offices at the State Bank Building, Richmond, Va., and at 607 Rhodes Building, Atlanta, Ga., with W. F. Lee, for several years preliminary engineer to the company, in charge. The C. W. Hunt Company also announces the appointment of C. T. Anderson as manager of its Chicago office, at 1616 Fisher Building.

Kean, Taylor & Company, New York, N. Y., has been formed by Hamilton F. Kean and Moses Taylor to continue from July 1, 1910, the business of Kean, Van Cortlandt & Company, which expired by limitation on that date. Joseph R. Swan, formerly treasurer of the Union Trust Company, Albany, N. Y., has been admitted to partnership in the new firm. The business of Kean, Taylor & Company will be carried on at the same address, 30 Pine Street, New York.

Parmenter Fender & Wheel Guard Company, Boston, Mass., has received a second order from the Metropolitan Street Railway, New York, N. Y., for 550 wheel guards; also from the Rhode Island Company, Providence, R. I., for 160 wheel guards, and the Washington Railway & Electric Company, Washington, D. C., for 100 wheel guards and 50 fenders. In addition the company has an order from the Brooklyn Rapid Transit Company for 500 wheel guards.

Penberthy Injector Company, Detroit, Mich., on March 29, 1910, numbered its 600,000th Penberthy automatic injector. The combined capacity of these injectors is so great that the Penberthy Injector Company has compared this capacity to the water going over Niagara Falls, as estimated in the "Encyclopedia Americana," and finds that 600,000 of its size GG injectors would handle about one-third of the supply of water, or approximately 2,520,000,000 gals. per hour.

Peter Smith Heater Company, Detroit, Mich., on July 1 will move its Eastern sales office in New York from 30 Church Street to Room 2065, 50 Church Street. The company announces the appointment of Walter E. Hinmon, who will have charge of the central and Western territory. Mr. Hinmon was formerly connected with the Cooper Heater Company. The Peter Smith Heater Company reports that the contract which it secured from the Cleveland (Ohio) Railway was for 250 Peter Smith forced circulation hot air equipments instead of hot water equipments, as noted in a recent issue.

Columbia Machine Works and Malleable Iron Company, Brooklyn, N. Y., entertained about 120 electric railway officers and supply men on Saturday afternoon, June 25, 1910, on the occasion of the completion of an extensive addition to its works in East New York. The guests were transported in automobiles from the Flatbush Avenue terminal of the subway in Brooklyn to the works, and at 2 o'clock a beefsteak luncheon was served in the new building, which was elaborately decorated. Among the railway officers who occupied seats at the head of the long tables with J. C. Buehler, president of the company, were W. O. Wood, president and general manager, New York & Queens County Railway; Edward A. Maher, manager, Third Avenue Railroad; J. S. Doyle, superintendent car equipment, Interborough Rapid Transit Company; H. H. Adams, superintendent of rolling stock and shops, Metropolitan Street Railway; W. T. Dougan, engineer maintenance of way, Metropolitan Street Railway; J. S. McWhirter, superintendent car equipment, Third Avenue Railroad; F. T. Wood, assistant to general manager, Metropolitan Street Railway, and L. H. Palmer, superintendent of transportation, Metropolitan Street Railway. After luncheon the guests were conducted through the shops and shown the variety and quantity of the work which the company is doing. The new building will be used largely for the manufacture of sheet steel gear cases, and by moving this department from its present location the foundry can be greatly enlarged. Later in the afternoon a hard-fought baseball game was played by teams made up of supply men and railway men. The score was tied when the game was called to permit a number of the players to take part in a golf tournament over the Forest Park links. Eight handsome silver cups were competed for. At the conclusion of the golf tournament Mr. Buehler was presented a large loving cup, the gift of his many friends, who joined in wishing him continued success in conducting the business which he has built up in the electric railway field.

ADVERTISING LITERATURE

Dorner Railway Equipment Company, Chicago, Ill., has published list C for 1910, of cars, power plant equipment, etc., which it has on hand for immediate shipment.

Weir Frog Company, Cincinnati, Ohio, has issued a 208-page catalog, No. 8, in which are listed and illustrated the different types of frogs, switches, crossings, etc., which it manufactures.

Allis-Chalmers Company, Milwaukee, Wis., has issued bulletin No. 1071, describing and illustrating type C jet condensers; also the second edition of bulletin No. 1070, which is descriptive of type B barometric condensers.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued a complete catalog on Westinghouse direct suspension line material. The catalog contains 200 pages, and cancels special publication No. 7060.

Ohio Brass Company, Mansfield, Ohio, has issued its annual catalog, No. 8, on electric railway and mine haulage material. The book is copiously illustrated, and lists a variety of overhead line material and many other specialties made by this company, such as the car signal system, arc headlights, radial couplers, sander equipment, hose bridge, etc. The publication also contains a large number of wire and other tables of value to line and power engineers. Owing to the extensive development of its catenary line material, the company has published catalog No. 20 to cover that subject exclusively. In addition the Ohio Brass Company has issued catalog H, which is descriptive of the complete line of Ohio valves and steam specialties.

The J. G. Brill Company, Philadelphia, Pa., prints in the *Brill Magazine* for June a biographical sketch of Thomas E. Mitten, president of the Chicago (Ill.) City Railway. The sketch is accompanied with an excellent portrait of Mr. Mitten as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service—Glasgow, Scotland"; "Pay-As-You-Enter Type Cars for Roanoke and Lynchburg," "Cars for Akron Lines of Northern Ohio Traction & Light Company," "More Pay-As-You-Enter Cars for Chicago" and "Cars for the Toledo Railways & Light Company." The J. G. Brill Company has also issued a new catalog, entitled "City and Interurban Car and Trucks," in which are listed and illustrated the various patented types of cars, trucks and car parts which it manufactures. The publication contains 58 pages, and is printed in English, Spanish and French.

NEW PUBLICATIONS

Railway Special Work. By Walter E. Silsbee and Percy E. Blood. New York: McGraw-Hill Book Company; 107 pages; flexible leather. Price, $2 net.

Track engineers will find this book a useful pocket guide for the calculation of frog work and special curves. The authors have used approximate methods for clearance curve problems, as absolute exactness would not lead to better practical results. A valuable feature of the book is the insertion of such adjuncts to calculation as tables on the reduction of inches to decimals of a foot, and on common logarithms, so that the engineer can get all needful data from one handy volume. A simple explanation of the use and value of the Mannheim slide rule also is included.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. ‡Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., May '10	207,323	111,250	96,074	43,375	52,699
	1 " " '09	188,749	103,833	84,917	43,809	41,107
	5 " " '10	865,662	501,105	364,557	216,541	148,015
	5 " " '09	775,739	445,389	330,349	219,075	111,275
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., May '10	42,875	21,134	21,741	13,102	8,639
	1 " " '09	39,936	22,203	17,733	13,011	4,722
	11 " " '10	510,230	221,978	288,252	144,208	144,044
	11 " " '09	478,464	227,143	251,321	136,751	114,570
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., Apr. '10	8,303	5,162	3,140	1,959	1,182
	1 " " '09	7,344	6,053	1,291	1,921	†630
	12 " " '10	104,433	69,832	34,601	22,883	11,718
	12 " " '09	93,971	65,709	28,262	.....	.....
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Apr. '10	32,661	19,091	13,571	8,370	5,201
	1 " " '09	31,552	18,002	13,550	8,138	5,412
	12 " " '10	413,567	236,546	177,021	100,882	76,139
	12 " " '09	371,906	217,545	154,361	101,733	52,628
CHAMPAIGN, ILL. Illinois Traction System.	1m., Apr. '10	466,497	288,990	177,507	.....	.....
	1 " " '09	415,058	237,232	177,826	.....	.....
	4 " " '10	1,893,509	1,120,662	772,847	.....	.....
	4 " " '09	1,677,715	959,523	718,192	.....	.....
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., Apr. '10	120,384	71,150	49,234	33,310	15,924
	1 " " '09	106,412	64,182	42,230	28,552	13,677
	10 " " '10	1,302,282	726,760	575,523	307,264	263,257
	10 " " '09	1,183,401	653,439	529,962	280,245	249,717
CLEVELAND, O. Cleveland Southwestern & Columbus Ry.	1m., Apr. '10	76,020	43,791	32,229	27,875	4,354
	1 " " '09	67,609	41,625	25,984	25,181	803
	4 " " '10	281,012	176,213	104,799	111,422	†6,623
	4 " " '09	242,677	155,849	86,828	91,610	†4,782
DALLAS, TEX. Dallas Electric Corporation.	1m., Apr. '10	113,405	74,510	38,896	26,599	12,296
	1 " " '09	100,964	61,678	39,286	28,832	10,454
	12 " " '10	1,371,826	877,527	494,299	328,226	166,074
	12 " " '09	1,217,574	787,967	429,607	344,517	85,090
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., May '10	90,289	49,825	40,464	‡19,417	21,048
	1 " " '09	81,533	47,331	34,202	‡18,417	15,785
	5 " " '10	416,311	253,051	163,260	‡97,083	66,177
	5 " " '09	369,455	233,888	135,567	‡92,083	43,484
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., May '10	183,478	102,738	80,740	50,351	30,389
	1 " " '09	171,072	95,538	75,534	49,429	26,105
	5 " " '10	918,799	493,189	425,610	250,396	175,214
	5 " " '09	792,328	453,750	338,578	247,850	90,728
EL PASO, TEX. El Paso Elec. Co.	1m., Apr. '10	49,490	28,874	20,616	8,306	12,310
	1 " " '09	46,493	29,304	17,189	7,900	9,289
	12 " " '10	624,844	359,327	265,516	100,599	164,917
	12 " " '09	547,361	374,527	172,834	90,087	82,747
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., May '10	51,827	17,012	33,275	12,609	20,666
	1 " " '09	42,122	13,362	28,760	12,309	16,451
	5 " " '10	216,455	82,766	133,689	62,684	71,005
	5 " " '09	170,171	63,940	106,231	61,564	44,667
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Apr. '10	111,280	61,001	50,278	19,083	31,198
	1 " " '09	97,837	56,532	41,305	17,190	24,115
	12 " " '10	1,319,993	714,953	605,040	209,712	395,329
	12 " " '09	1,142,510	668,124	474,387	200,449	273,937
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Apr. '10	104,550	66,059	38,491	23,540	14,951
	1 " " '09	93,721	55,245	38,475	21,259	17,216
	12 " " '10	1,239,449	745,649	493,800	270,407	223,393
	12 " " '09	1,129,450	655,736	473,715	249,743	223,972
GRAND RAPIDS, MICH. Grand Rapids Ry. Co.	1m., May '10	93,207	45,732	47,475	19,574	27,901
	1 " " '09	85,243	40,706	44,537	18,893	25,644
	5 " " '10	430,871	216,861	214,010	99,309	114,701
	5 " " '09	388,045	190,921	197,124	94,574	102,550
HARRISBURG, PA. Central Penn. Trac. Co.	1m., May '10	69,934	48,960	20,974	.....	.....
	1 " " '09	66,350	46,720	19,630	.....	.....
	5 " " '10	319,795	237,021	82,774	.....	.....
	5 " " '09	290,850	220,778	70,072	.....	.....
HOUGHTON, MICH. Houghton County Trac. Co.	1m., Apr. '10	24,248	13,479	10,769	6,317	4,453
	1 " " '09	25,727	14,257	11,470	6,242	5,228
	12 " " '10	322,125	167,617	154,508	76,008	78,500
	12 " " '09	285,724	158,704	127,020	63,124	63,896
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Apr. '10	47,213	24,443	22,770	9,290	13,480
	1 " " '09	40,307	23,931	16,376	9,345	7,031
	12 " " '10	521,035	275,572	245,463	112,295	133,168
	12 " " '09	449,838	261,617	188,220	86,434	76,787
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Apr. '10	601,477	407,208	194,268	158,790	35,478
	1 " " '09	552,628	308,610	244,018	156,271	87,747
	11 " " '10	6,563,191	3,761,675	2,801,515	1,734,970	1,066,546
	11 " " '09	6,052,696	3,438,830	2,613,866	1,728,348	885,519
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., May '10	384,866	279,919	104,948	47,659	57,289
	1 " " '09	346,908	219,964	126,944	47,512	79,431
	5 " " '10	1,879,343	1,351,753	527,590	233,336	294,254
	5 " " '09	1,688,095	1,133,942	554,153	233,749	320,404
Milwaukee Lt., Ht. & Traction Co.	1m., May '10	130,404	54,677	75,727	55,378	20,349
	1 " " '09	115,924	41,583	74,341	51,278	23,063
	5 " " '10	586,270	238,948	347,322	276,712	70,610
	5 " " '09	528,522	198,350	330,172	252,885	77,287
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., May '10	627,946	289,382	338,564	140,112	198,451
	1 " " '09	569,217	260,970	308,247	140,251	167,996
	5 " " '10	2,931,643	1,446,451	1,485,192	701,029	784,163
	5 " " '09	2,656,964	1,361,601	1,295,364	687,507	607,857
MONTREAL, CAN. Montreal St. Ry.	1m., May '10	370,234	199,617	170,617	54,435	116,182
	1 " " '09	329,339	181,148	148,192	45,891	102,301
	8 " " '10	2,707,235	1,607,443	1,099,792	318,550	781,242
	8 " " '09	2,437,055	1,501,283	935,773	284,557	651,216
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Apr. '10	147,519	*87,993	59,526	33,690	25,836
	1 " " '09	139,939	*85,196	54,743	32,607	22,136
	4 " " '10	581,833	*336,291	245,542	134,760	110,782
	4 " " '09	544,354	*327,583	216,771	130,120	86,651
NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1m., Apr. '10	537,475	276,131	261,344	176,380	84,964
	1 " " '09	494,827	262,981	231,846	173,790	58,056
	4 " " '10	2,140,821	1,108,104	1,032,717	701,947	330,770
	4 " " '09	2,048,057	1,074,427	973,630	691,180	282,450
OKLAHOMA, OKLA. Oklahoma City Ry.	1m., May '10	53,861	31,825	22,036	.....	.....
	1 " " '09	37,533	21,694	15,839	.....	.....
	5 " " '10	227,916	131,198	96,718	.....	.....
	5 " " '09	149,144	96,795	52,349	.....	.....
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Apr. '10	20,389	12,342	8,047	7,047	1,000
	1 " " '09	18,352	11,137	7,215	7,033	182
	12 " " '10	234,796	140,899	93,897	81,694	12,203
	12 " " '09	223,638	133,554	90,084	82,624	7,460
PENSACOLA, FLA. Pensacola Electric Co.	1m., Apr. '10	22,263	12,754	9,508	4,937	4,571
	1 " " '09	18,559	11,468	7,091	4,322	2,769
	12 " " '10	254,445	145,892	108,553	54,657	53,896
	12 " " '09	222,958	140,371	82,587	51,998	30,589
PHILADELPHIA, PA. American Railways.	1m., May '10	335,599	.....	.....	.....	.....
	1 " " '09	310,683	.....	.....	.....	.....
	11 " " '10	3,067,977	.....	.....	.....	.....
	11 " " '09	2,847,522	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., Apr. '10	8,744	6,581	2,163	1,807	355
	1 " " '09	9,096	7,025	2,071	1,758	313
	12 " " '10	129,792	93,677	36,115	20,871	15,243
	12 " " '09	124,421	85,978	38,443	25,332	13,111
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., May '10	466,436	197,109	269,327	132,969	136,358
	1 " " '09	399,590	177,921	221,669	125,027	96,642
	5 " " '10	2,166,734	929,777	1,236,957	659,561	577,396
	5 " " '09	1,842,036	877,733	964,303	609,161	355,142
ST. JOSEPH, MO. St. Joseph Ry., Lt., Ht. & Power Co.	1m., May '10	79,587	45,276	34,311	22,683	11,628
	1 " " '09	77,187	42,622	34,565	21,536	13,029
	5 " " '10	408,614	227,264	181,350	111,359	69,991
	5 " " '09	377,924	205,271	182,553	104,868	67,685
SAN FRANCISCO, CAL. United Railroads of San Francisco.	1m., Apr. '10	648,015	366,427	281,588	.....	.....
	1 " " '09	620,626	345,527	275,099	.....	.....
	4 " " '10	2,494,867	1,455,829	1,039,038	.....	.....
	4 " " '09	2,337,252	1,391,270	945,982	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., Apr. '10	50,651	32,740	17,910	17,901	9
	1 " " '09	47,488	30,802	16,686	17,442	†756
	12 " " '10	608,256	395,066	213,190	211,134	2,056
	12 " " '09	601,671	370,767	230,904	208,986	21,919
SEATTLE, WASH. Seattle Electric Co.	1m., Apr. '10	460,490	273,266	187,224	108,708	78,516
	1 " " '09	422,129	261,843	160,286	104,140	56,145
	12 " " '10	6,049,682	3,515,783	2,533,899	1,278,810	1,255,089
	12 " " '09	4,721,194	2,787,651	1,933,542	1,152,322	781,221
TACOMA, WASH. Puget Sound Electric Ry.	1m., Apr. '10	158,919	105,573	53,346	50,546	2,800
	1 " " '09	143,581	103,887	39,694	46,001	6,307
	12 " " '10	1,927,477	1,291,724	635,753	591,378	44,375
	12 " " '09	1,685,618	1,115,632	569,986	526,627	43,359
SYDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., Apr. '10	20,730	11,660	9,070	5,049	4,021
	1 " " '09	16,511	11,209	5,302	5,056	247
	12 " " '10	254,757	144,231	110,526	60,636	49,890
	12 " " '09	240,348	141,767	98,580	59,623	38,957
TAMPA, FLA. Tampa Elec. Co.	1m., Apr. '10	48,362	31,209	17,154	4,590	12,564
	1 " " '09	46,432	28,634	17,797	4,797	13,001
	12 " " '10	609,325	346,822	262,503	55,700	206,803
	12 " " '09	570,137	363,376	206,761	49,539	157,222
TOLEDO, OHIO. Toledo Rys. & Lt. Co.	1m., May '10	238,226	148,213	90,013	76,174	13,839
	1 " " '09	213,156	126,612	86,544	70,871	15,673
	5 " " '10	1,220,320	730,317	490,034	379,910	110,093
	5 " " '09	1,086,241	621,110	465,131	354,652	110,479
WASHINGTON, D.C. Washington, Baltimore & Annapolis Elec. Ry.	1m., May '10	68,990	30,640	38,350	.....	.....
	1 " " '09	58,990	36,026	22,964	.....	.....
	11 " " '10	584,295	336,359	247,936	.....	.....
	11 " " '09	546,502	378,511	167,991	.....	.....

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, JULY 9, 1910 No. 2

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

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CLEVELAND OFFICE.....1015 Schofield Building

PHILADELPHIA OFFICE.....Real Estate Trust Building

EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 9, 1910.

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Summer Uniforms

The advent of hot weather again brings to the front the question of a comfortable costume for the platform men. The sentiment that the dignity of a railway company requires each of its conductors and motormen to wear his usual tight-fitting coat, regardless of the temperature in summer, has largely disappeared in those cities which are visited by periods of almost tropical heat during July and August. Even in New York a variety of costumes can be observed on the front and rear platforms of cars just as it can in the office buildings and on the streets of the city. One metropolitan company has authorized its men to discard coats and wear a shirtwaist, the trousers being supported by a belt. A second provides its motormen with a blouse, which renders the use of a coat unnecessary. A third provides khaki uniforms which are lighter and cooler than the usual blue cloth suits, while another permits the men simply to discard the standard coat during very hot weather. The men of still another road, with the permission of the management, have substituted straw hats for the standard caps. The variety in practice thus exemplified in one city suggests the desirability of a further study of this question, preferably by a committee of the association, which would have an opportunity of learning the practice and obtaining the opinion of companies in different parts of the country. The problem is more serious with the conductor than with the motorman because the former requires pockets for his transfers, punch, and so forth. Khaki has many qualities to recommend it, as its efficiency as a non-heat absorbent has been shown by its extended use in the United States Army, both for home and tropical service, and as it has become associated with military affairs, it gives the car men a desirable soldierly appearance. It is not necessarily, however, the most desirable costume to adopt, and the experience of other companies on the general subject of summer uniforms should prove very instructive.

City Planning and Transportation Systems

When Napoleon III improved Paris by cutting avenues through city blocks, widened narrow streets, spanned the Seine with new bridges and laid out squares to beautify the city, he was but setting an example which has been followed in other cities, although perhaps not on so extensive a scale. Abroad, the question of city planning has become a definite science, in which the transportation needs of the territory to be served are very carefully considered. In this country the subject is left largely to the whims of real estate promoters and speculators and the transportation companies are often obliged to install their tracks as best they may after the rest of the work is completed, or at least decided upon. Pittsburgh, however, hopes to prove an exception to the usual careless method of city development in this country and the report of the Pitts-

burgh Civic Commission on city planning, just published, indicates at least a serious attempt to make the city more convenient, more economical and more healthful, as well as to improve it esthetically. The methods of accomplishing these results are outlined in a report adopted by the commission and prepared in collaboration by Bion J. Arnold, of Chicago; John R. Freeman, of Providence, and Frederick Law Olmsted, of Boston, whose recommendations are divided into nine topics, among which the future functions of the electric railway system form a conspicuous part. The experts did not attempt to outline a complete course of precedure, as that would have required a more thorough study than they were able then to give it, but the further data required for this purpose are outlined in the report. The plan of the commission and of its experts is a commendable one and if the step is taken up with the earnest spirit for which Pittsburgh is famous and is carried out with the enterprise which has distinguished the commercial undertakings in that city, it may be that Pittsburgh will eventually be known as the City Beautiful of the American continent, as well as what is equally or more important, the City Useful, Economical, Convenient and Healthful.

Policing the Power Consumption on the Car

The vast differences in the skill and care of motormen running over the same routes, as regards the economical use of power, are clearly brought out in Mr. Putnam's A. I. E. E. paper on the Manhattan Railway coasting clock tests. This paper and the ensuing discussion are abstracted elsewhere in this number. Taking the Manhattan Elevated Railway system as a whole, it was found that the average car acceleration of different motormen varied from 0.9 m.p.h.p.s. to 1.47 m.p.h.p.s., and the corresponding times spent in coasting varied from no per cent to 40.5 per cent of the time spent in making the trip. In terms of energy, this difference in practice corresponded to a saving of the most economical motormen over the most wasteful motorman of 36 per cent. Of course, these figures represented extremes, but even the average result on the Second Avenue line showed that a power economy of 25 per cent was attainable. According to a statement made in the discussion by Mr. Stillwell, who checked the original tests for the Interborough Rapid Transit Company, the last percentage represents a money saving of $1,000 a day. Perhaps the most interesting feature of the tests is that these astonishing results were obtained with such a comparatively simple device as the coasting clock described. Formerly it was believed that some power measuring device like an ampere-meter or watt-meter was needed for this purpose, but experience proved that they were not only unnecessary but less desirable than the simple time registering device. In a way, the New York contrivance is the converse of that used on the Berlin and other German street railway systems. In the latter, a shunt circuit operates an ordinary clock only when power is passing through the controller, whereas in New York the clock runs only when the car is coasting. In Berlin, the use of these clocks enabled the company to increase the schedule speed 10 per cent besides securing an appreciable reduction in power consumption. Moreover, comparisons of the records of these current-hour instruments with watt-hour meters used on the same service showed remarkably like results. Apparently, the policing power of instruments of this character is sufficient to attain the desired comparisons of running skill and of saving in power.

PEAK LOAD CONGESTION AND ITS REMEDY

The first step in securing a reform in public matters is to call attention to the abuse; the second is to find the remedy, and the third is to keep everlastingly talking about both the trouble and the remedy until the latter is adopted. For a long time the only remedy for the street railway congestion problem, in the minds of the public, was the operation of more cars, but the part which the public itself can do in relieving congestion is becoming more generally appreciated. A continuous line of cars would be insufficient in number to give every one a seat in most of our manufacturing towns if all the employees in the various factories wish transportation at the same time. The suggestion was made in this connection a few years ago by Mr. Fassett, general manager of the United Traction Company of Albany, that the manufacturers in Troy should so arrange the working hours of their employees that the latter would not all have to go to work and would not stop working at exactly the same time. Mr. Fassett's efforts to induce the Troy manufacturers to adopt this plan did not prove successful, as both employers and employees had become so used to certain working hours that it was not considered possible to alter them, even by a few minutes. But it is interesting to note that this remedy for traffic congestion was strongly indorsed in a speech made last week at the banquet of the New York State Street Railway Association by John N. Carlisle, Public Service Commissioner of the Second District of New York.

The Pennsylvania State Railroad Association, in its opinion just rendered upon the condition and situation in Pittsburgh, has also called attention to the necessity of some action on the part of the public to reduce traffic congestion. This opinion was based on the report recently submitted to the commission by Emil Swensson. According to the report, during the crowded period in Pittsburgh, every one insists upon taking the first car. Continuing, the Commission says: "For those whose day's work has been hard and long, and whose hours at home are necessarily limited, there is some excuse for such insistent haste; but those who can control their own time and movements should ordinarily set a better example by the exercise of a little patience, and thus contribute to the comfort of themselves and others. A complaint of overcrowding comes with bad grace from such persons, for by their action in boarding a crowded car they but intensify and augment the trouble about which they complain."

The commission likens the congestion problem in Pittsburgh, and the example applies equally in other cities, to a three-legged stool, and says that unless the three necessary factors in the situation, the company, the public and the municipality, do their duty, the whole attempt at reform will fall to the ground. The part of the company is to furnish the cars when needed, but it alone cannot solve the problem. The duty of the public has already been described. The duty of the municipality is partly to grant authority to the railway companies to make such changes in routes as may be necessary to simplify and expedite the operation of cars, partly to facilitate car operation through the widening of streets and improvement of the street surface and partly through the police department to insure a regulation of street traffic, so that car operation will not be impeded. The trouble in the past has been that people unthinkingly have assumed the stool had only one leg

and that the railway companies should supply all the cars necessary to give every one a seat at all times of the day, and should then be able to carry passengers quickly to their destinations.

ACCIDENT INSTRUCTION FOR SCHOOL CHILDREN

We have already referred to the notable paper on accident prevention presented at the March 24 meeting of the Central Electric Railway Association by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway. As our readers will recall, Mr. Schneider told how the injuries and claims account on his lines had been cut down from an average for 10 years of 6.35 per cent of the gross receipts to 1.25 per cent, partly through talks to the trainmen, but principally through a campaign of education among the school children on methods of avoiding accidents. By inaugurating this course Mr. Schneider attacked the accident problem at its root. Warnings to adults, whether patrons or employees, are well enough in their way, but at best it is not an easy matter for grown-up folk to change set habits readily. The woman who gets off a car backward and the man who makes a flying leap for the running board usually have done so too long to pay much heed to the counsel of anybody. Instruction of this kind most properly should begin with the child before it has formed the careless habits of its elders.

The most obvious method of conveying this instruction is through the school teachers. Mr. Schneider tried this method first, but soon learned the truth of the adage "If you would have a thing well done, do it yourself." It must not be inferred, however, that the teachers really were indifferent or unwilling to help. The average pedagogue has too many direct duties to leave much time or enthusiasm for matters which are not in the curriculum drawn up by his or her superiors. The school-room talks by Mr. Schneider or his aides usually varied in length from 10 to 20 minutes during which the children were told many important points about the need for care on the streets and on the cars. The effect of these talks may be judged from the fact that during last year not a single accident occurred to a child on a total of 217 miles of city and interurban track. In all, some 360 addresses were made to 42,000 pupils from kindergarten to high school age. It is needless to add that the parents of these children cordially appreciated this evidence of "soul" on the part of this corporation.

Our object in directing attention to this particular case is to point out that campaigns of this character can be followed in other localities. Thus the Portland (Ore.) Railway, Light & Power Company has been giving lectures to public school children and stimulating their interest by prizes for essays on accident topics. Last month, the Cincinnati Traction Company cooperated with the local boards of public service and education in the preparation and distribution of an accident instruction pamphlet for school use. The United Railways & Electric Company of Baltimore has also gotten out for the same purpose a poster which illustrates most effectively the right and wrong way of getting off a car and is suitable for permanent display on the school-room walls. The publication of such literature is greatly to be commended and should assist in reducing accidents. It is especially valuable when combined with a lecture system, for it helps to strengthen and fix in the minds of the children the impression made upon them by the oral instructions.

ENGINE ROOM ILLUMINATION

Adequate lighting plays an important part in the operation and maintenance of engines and turbines. The increasing size of prime movers renders it more and more necessary to avoid mistakes in handling generating equipment and to forestall impending trouble by close and frequent inspection. The larger the engine room, the more difficult it is to secure a good distribution of light at moderate cost. Much can be accomplished by breaking away from the old practice of attempting to light the engines and turbines by a large number of carbon filament lamps placed high up on the roof trusses, with the usual accompaniment of dull-finished walls and enamelled tile wainscoting.

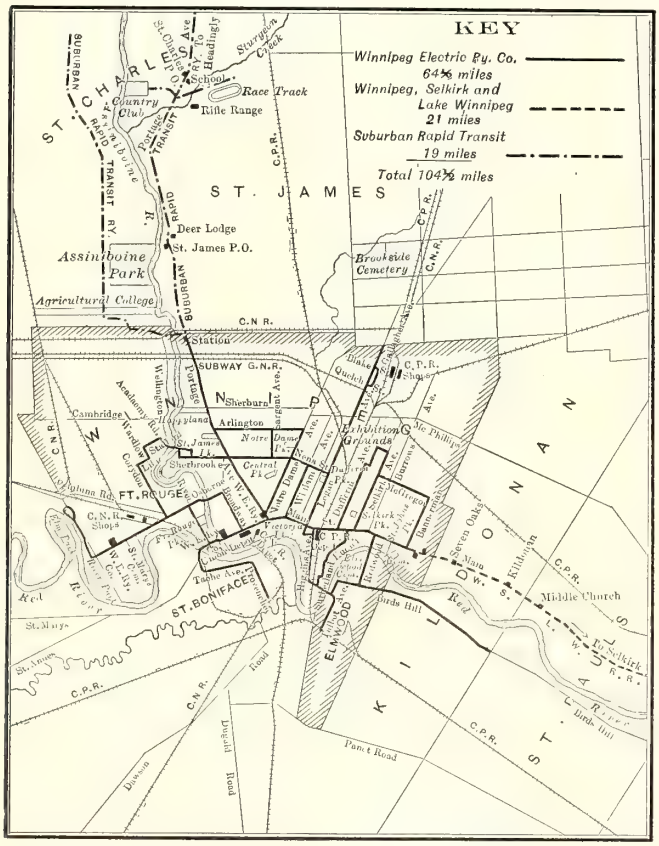
Two plants, recently visited, illustrate the point that the amount of electrical energy expended in illumination of the engine room is not always a measure of the effectiveness of the illumination. In the first station the engine room was 90 ft. long and 50 ft. in width, the bottom chords of the roof trusses being about 35 ft. above the floor. The lighting was accomplished by about 100 16-cp carbon incandescent lamps, located 24 in. apart on the underside of the trusses, a few side lamps on the walls, and twelve 16-cp incandescent lamps on each of the three engine and generator units. The energy expenditure was about 1.6 watts per sq. ft. of floor area. The resulting illumination, however, was poor on account of the absence of reflectors above the lamps on the truss chords, the constant accumulation of dust and dirt on the relatively large number of small lighting units employed, and the comparatively wide spacing between trusses in proportion to the size of the room. The machinery was painted black, and the walls were not tiled.

The second station had a turbine room 112 ft. long by 43 ft. wide, the height from the floor to the roof girders being 53 ft. Here 56 tungsten lamps were installed, with concentrating reflectors on the underside of the roof trusses. The lamps were suspended in rows of eight, spaced 60 in. apart on the girders, which in turn were spaced 14 ft. apart. The side walls were painted a dull red color, and the expenditure of energy for the room was only 1.17 watts per sq. ft. of floor area. The diffusion was excellent, and shadows were practically eliminated. The smaller number of lamps installed facilitated their being kept clean and the reflectors utilized a large proportion of the light rays, which in the first plant was either absorbed by the ceiling, or scattered at all angles, without definite direction toward the machinery.

The use of high efficiency lamps with reflectors in general gives much better results for the same expenditure of energy than using carbon lamps with an efficiency of but 3.5 watts per cp. With walls completely finished with enameled tile the results can be still further improved. Broadly speaking, it is better to spend money for first-class tiling than to attempt to secure the same intensity of illumination by increasing the number of lamps used in connection with dull finished walls. It also pays to subdivide the lighting circuits where a considerable number of lamps is used, the usual plan being to arrange each alternate line of lamps on the trusses on the same circuit. Economy of operation can be secured in this way, since there are many times each year when suitable illumination can be obtained by burning only half the engine room lamps. Whatever the system, the results are dependent upon clean globes, perhaps, more than upon any other single factor.

CONSTRUCTION AND OPERATING FEATURES OF THE WINNIPEG ELECTRIC RAILWAY

The Winnipeg Electric Railway was one of the first roads in Canada to be operated by electricity. Service was started in June, 1892, after the horse-railway property of the Winnipeg Street Railway, built some years before, had been re-equipped. The growth of the city and community has been steadily accelerating until now the population increases at the rate of



Winnipeg System—Map of Local and Suburban Lines

10,000 new inhabitants per annum. In 1908 at the taking of the last official census Winnipeg had a population of 123,250; less than 40 years before it was a trading post of 200 people. The railway company's property likewise has grown from a short horse-car line with two cars in 1888 to a system now including 104.5 miles of track, a 30,000-hp hydroelectric station and 65-mile transmission line, and the residence and commercial gas, electric lighting and power services for the entire community. In 1900 the railway carried 3,000,000 passengers; last year the total was approximately 26,383,000.

The following statistics showing the importance of Winnipeg may be of interest:

Area of city, acres	13,990
Miles of paved and graded streets	300
Park acreage	316
Building permits for January-April, 1910	1,006
Total assessment city property, 1908	$116,101,390
Railway lines serving city	22
Grain handled yearly, bushels	200,000,000
Banks and branches	59
Bank clearings, 1908	$614,111,801
Bank clearings, January, February, March, 1910	$182,448,550

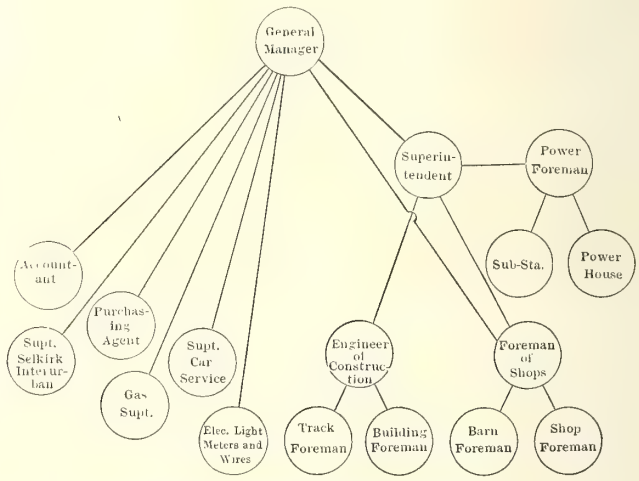
While the city grows at a remarkable rate, nevertheless the stores and residence buildings are handsome and substantial structures. The property of the Winnipeg Electric Railway Company, likewise, is of interest because during its rapid expansion the management has designed and built the roadway and other structures with an eye for permanency and low cost of operation and maintenance.

The statistical statement below shows the growth of the property in a financial and traffic way during the last five years.

A single organization handles the operation of the railway, electric light and power and gas properties. The officers of the Winnipeg Electric Railway Company are: William Mackenzie, president; William Whyte, vice-president; F. Morton Morse, secretary-treasurer; manager of all properties, Wilford Phillips, who also is chief engineer. The manager is assisted in the engineering work by Wilson Phillips, who has the title of superintendent. The inter-relations of the operating organization are shown by the accompanying chart.

TRACK CONSTRUCTION

The Winnipeg Electric Railway Company operates 104.5 miles of track owned by the following companies: Winnipeg Electric Railway Company, 64.5 miles; Winnipeg, Selkirk & Lake Winnipeg Railway, 21 miles; Suburban Rapid Transit Company, 19 miles. With the exception of the suburban and interurban lines, practically all of the mileage is double-tracked. The construction of the Selkirk interurban line will be described in a later article.



Winnipeg System—Organization Chart

Winnipeg is located on a broad, level plain at the junction of the Red and Assiniboine rivers. The city is laid out with wide streets. On boulevards the double tracks are built along a parkway in the center. The generous width of the streets permits intersecting curves of long radius; also, this road is perhaps unique in that all its track is on level grades, except at subways under steam railroads. These features have assisted in the building up of an excellent track system. Another feature, however, which has called for particularly careful work and heavy construction in building track is that of soft soil. The prairie on which Winnipeg is located is covered with a deep layer of loam and has practically little fall for natural drainage. The city has 300 miles of paved and graded streets,

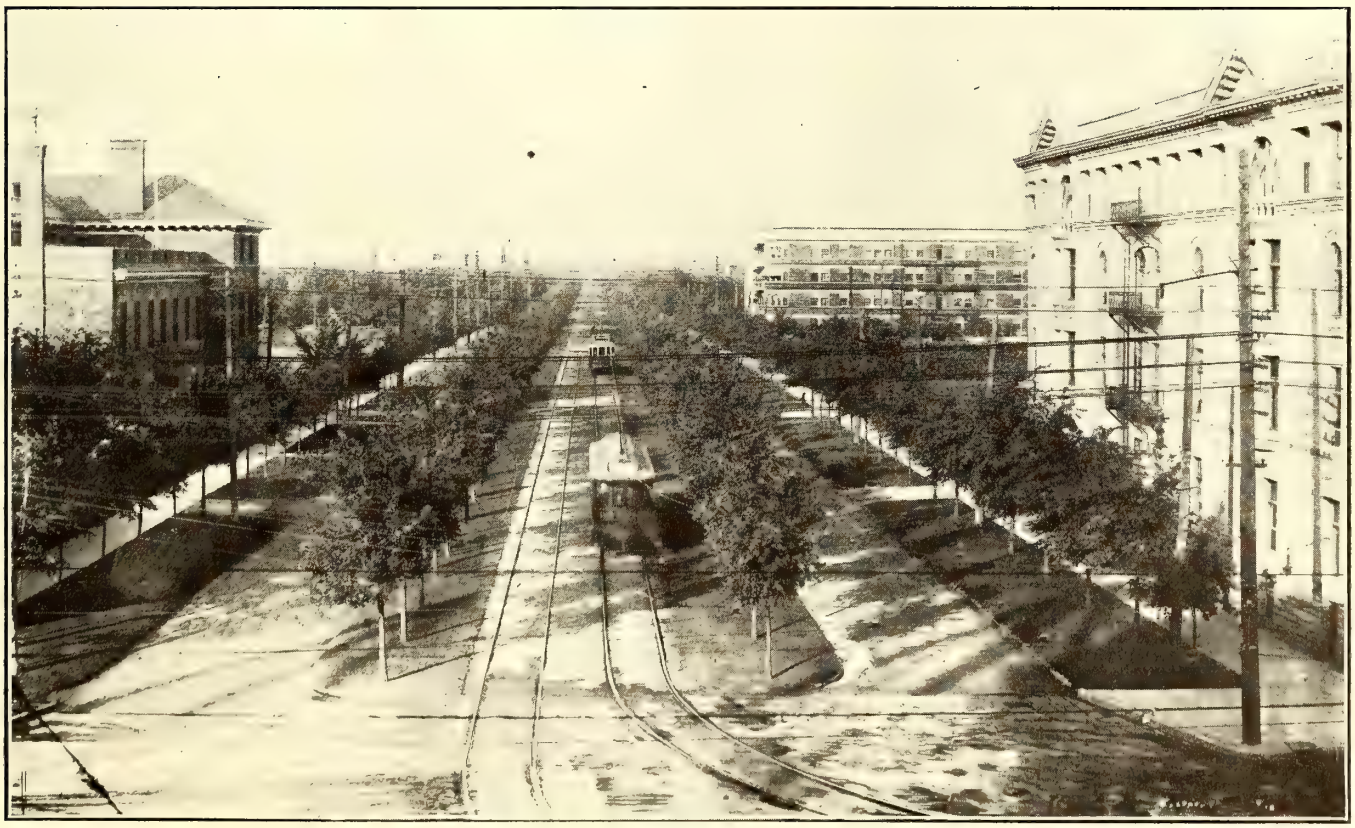
	1909.	1908.	1907.	1906.	1905.
Gross receipts	$2,623,731.41	$2,206,094.88	$1,722,406.69	$1,416,305.04	$1,119,768.85
Increase 1909 over 1908—18.93 per cent	$417,636.53				
Operating expenses	$1,320,665.09	$1,088,872.50	$775,731.02	$701,963.72	$575,747.29
Increase 1909 over 1908—21.29 per cent	$231,792.59				
Operating expenses, per cent of earnings	50.34	49.35	45.05	49.56	51.42
Net earnings	$1,303,066.32	$1,117,222.38	$946,675.67	$714,341.32	$544,021.56
Increase 1909 over 1908—16.63 per cent	$185,843.94				
Net income per cent of capital	14.39	13.14	12.01	11.17	9.86
1909, $6,000,000.					
1908, $5,669,541 average.					
1907, $4,664,200 average.					
1906, $4,144,480 average.					
1905, $4,000,000.					
Passengers carried	26,382,773	22,019,507	20,846,317	17,229,554	13,081,249
Increase 1909 over 1908	4,363,266				
Transfers	8,925,849	7,777,315	5,954,067	3,109 094	1,682,685
Railway earnings per capita	10.03	9.80	9.84	8.30	6.80

the major portion of the surfacing having been done with asphalt. On unpaved streets, however, the railway company has been obliged to use special care in constructing its tracks so that the substructure will be well drained. All double-track lines, with the exception of two, are laid with 12-ft. track centers. On Main and Portage streets, the principal business thoroughfares, the tracks are laid with a center distance of 25 ft. 3 in. These streets have the remarkable width of 132 ft.

in. below the bottom and 4 in. above the tops of the ties. Beneath this concrete foundation is a 3-in. layer of broken stone extending the full width of the trench and draining into a 4-in. tile line, also laid in broken stone, and extending under the entire city trackage. The tile subdrains discharge into the city sewerage system. Between the inside ends of the ties a foundation for the pavement of the devil strip is made by placing a 10-in. layer of concrete on 3 in. of broken stone.



Winnipeg System—A Scene in the Retail Section of Winnipeg



Winnipeg System—View of Double-Track Parked Boulevard Construction

An illustration on the next page shows the design of track structure which has been found satisfactory. The rail adopted as standard is a 7-in. 80-lb. high T-section with a 2½-in. head. These are laid on large tamarack ties, which cost from 50 cents to 60 cents each. Tamarack ties have been found to be good after having been underground for seven years. The ties are supported and enclosed in a layer of concrete, which extends 6

The major part of the pavement is asphalt surface and binder 3 in. thick. The city has its own asphalt plant and is employed by the company to put down the street surface between the rails and in the devil strip. The company has a granite quarry near its hydroelectric station from which stone is obtained for stretcher and filler blocks. Kettle River sandstone also is used, and the railway company now has on hand

an order for vitrified clay blocks, 6 in. x 6 in. x 8 in. in size, which will be laid as an experiment. The stone setts are 6 in. deep and grooved to fit under the heads of the rails so that they come in contact with both sides of the web. In some of the earlier track construction stretchers of wood, dressed to fit the contour of the rails and provide flangeways, were used in asphalt paved streets. Criticisms of this construction are that it admits water to the substructure and does not wear as long as the pavement.

The special track work used is built partly of 90-lb. and



Winnipeg System—City Car

partly of 80-lb. section rails. Some all-manganese intersections, built by the Montreal Steel Company, are used, but the larger part of the special track work has been furnished by the Lorain Steel Company and the Pennsylvania Steel Company, embracing the designs with manganese wearing pieces known as "Guaranteed" and "Manard." Continuous six-hole plates are used at joints. Several types of rail bonding are in use. The first rails laid were bonded with round wire and bonding caps. On later construction American Steel & Wire flexible bonds with pins and Ohio Brass Company all-wire bonds with compressed terminals were employed. At the present time all new track is being bonded with one No. 0000 flexible copper bond electrically welded to the rail by a bonding car supplied by the Electric Railway Improvement Company. The track near substations is double-bonded, and all special track work is passed with 500,000-circ. mil cable electrically welded to the rails. Cross-bonds also are welded to the rails at intervals of 1000 ft.

EXTENSIONS

The Suburban Rapid Transit line extends 12 miles directly west of Winnipeg, serving the rifle range, race track, country club and the town of Headingly. Six miles of this suburban



Winnipeg System—Car Storage at Repair Shops

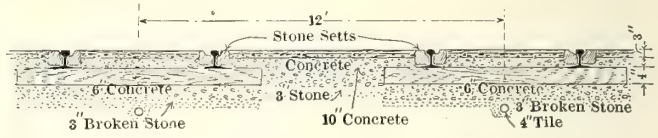
line between the race course and Winnipeg are double-tracked. An extension of 10 miles west of Headingly is under consideration. Another extension now being planned is that to the new shops of the Grand Trunk Pacific Railroad, 6 miles east of Winnipeg. The track construction department has as a storage yard a part of the 35-acre tract of land on which the car construction shops are located. The material yard here is laid out according to a definite plan and is provided with a large derrick for transferring heavy freight from steam to electric cars.

OVERHEAD CONSTRUCTION

For the most part the trolley wires of the Winnipeg Electric Railway are carried by span wires. The poles used are cedar and tamarack from British Columbia. The company now is planning to use steel center poles on some of the wider streets. No. 00 wire is standard, and this is supported by uninsulated hangers protected by strain insulators in the steel-strand span wires.

TRANSPORTATION FEATURES

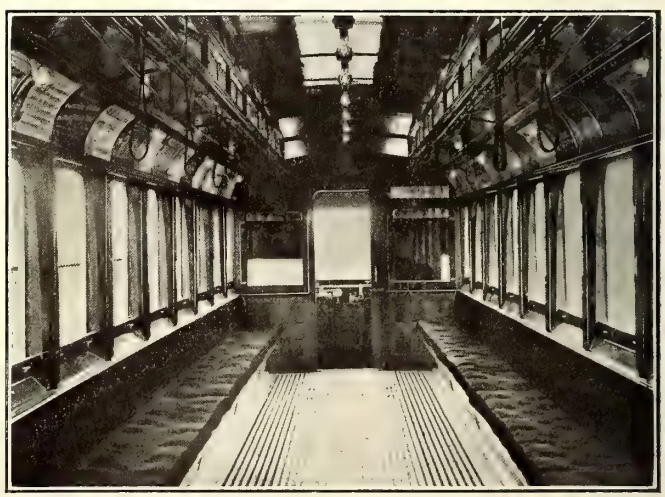
The Winnipeg Electric Railway regularly operates 106 cars in its week-day schedule, except at the morning, noon and evening rush hours, when 150 cars are required. During the summer months open cars and trailers are used in addition to large double-truck closed cars, so that the total number of



Winnipeg System—Track Construction

units in service reaches nearly 200. No service is given between 2 a. m. and 6 a. m. Practically all of the lines in the city run over some portion of the Main Street track through the retail district, and thus the traffic passing the intersection of Main and Portage streets reaches 185 cars an hour. The transportation organization includes 600 motormen and conductors and 18 supervisors.

The rates of fare are: Cash fare, 5 cents; tickets six for 25 cents and 25 for $1; workingman's tickets, eight for 25 cents, good week-days from 6 to 8:30 a. m. and 5 to 6:30 p. m. and all day Sunday; school children's tickets, 10 for 25 cents. In 1906 the company was first granted permission to operate its cars on Sundays and the low fares for tickets resulted from the negotiations for Sunday operation. About three-fourths of the receipts are received for tickets. The cash fares last year amounted to $663,000 out of the total gross receipts of $2,623,731. Universal transfers are issued. Each line has a transfer of different color identified by the month, date and a serial number. The distinguishing feature of this transfer, which was illustrated in the issue of Oct. 16, 1909, on page 882, is the use of three vertical columns, one containing the names of the inter-



Winnipeg System—Interior of City Car

secting line, another the hour and the nearest 10 minutes with a space below to be punched for p. m. use, and a third column on the left-hand side of the transfer with a shaded space opposite the name of each connecting line. At the bottom of this column are spaces to be punched for the going direction. The purpose of the column of shaded blank spaces headed "via" is for the validating the transfer for the second use. When a transfer is collectable on a car and the passenger is entitled to continue his journey on another line, the conductor does not collect the transfer and issue a new one, but indicates the second transfer by

a punch mark in the "via" column opposite the name of the line on which he is operating. Each conductor is supplied with tickets and change to the amount of $25.

COLLECTION OF FARES

Fares are collected with the Coleman portable fare box. The executives of the company are fully satisfied with the results from the use of this box, which is in line with the practice of many other street railways of Canada. This fare box is about 2 in. x 4 in. x 8 in. in size. It has a substantial handle on one side and a protected slot in the top. Conductors are not allowed to insert fares in the box and are required to handle no money except in making change. Transfers are not put in the fare boxes. This method of fare collection meets with the approval of the riding public and is not thought to require as much time as would be needed to register fares.

When a man starts on his run in the morning he signs for a fare box and retains it until his relief; then the box is turned in to the receiver and the conductor's signature made at the time of getting the box is checked by the cashier so that a record may be had of the return of all boxes. In turning in a box at his relief a conductor inserts in the hollow handle of the box a small report noting the route, car number, box number, date and conductor's number. After relief, when the conductor starts on his next run, he signs for another fare box, which is checked off when turned in at the end of his run. At night he makes out his transfer ticket report and indicates thereon the identification numbers of the boxes which he has used during the day. When the fare boxes are received they are taken to counting tables where each is opened separately and a record is made of its contents in cash and tickets of various kinds. A force of 9 or 10 girls does the counting.

The platforms of the Winnipeg cars are arranged with a dividing railing to separate the in-and-out traffic. When these railings were placed on the cars it was found possible to shorten the time on some runs because of the reduction in the length of stops. Smoking is not permitted on the cars and no passengers are allowed to stand on the platform if there is room within the car body.

RIVER PARK

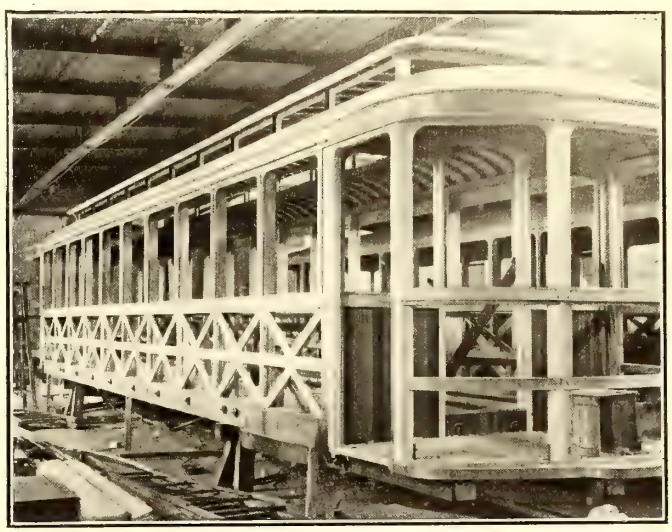
The railway company owns a park of 200 acres located on the Red River at the south end of the city. This park has been developed to afford the usual amusement features and to encourage picnic parties. No liquors are sold, but other refreshments may be purchased and the railway company supplies hot water for making tea. One of the chief attractions of this park is the section devoted to wild animals. Here are found deer, buffalo, bear, Rocky Mountain goats and many other interesting animals of the Canadian Northwest.



Winnipeg System—Repair Shops

ROLLING STOCK

The rolling stock equipment of the Winnipeg Electric Railway includes 175 closed, double-truck, 40-passenger motor cars, 13 open cars, three sweepers, one Ruggles rotary snowplow and a complement of line and work cars. The company is prepared to build all of its cars. Last year 30 double-truck city cars were built, and this year a similar order is in course of construction in the shops. The standard city passenger car is 32 ft. long over body, 45 ft. long over vestibules, 8 ft. 4¼ in. wide over sheathing and 13 ft. high from top of rail to trolley base. The car body is carried on an underframe made up of two 7-in. I-beam center sills and two side sills of wood 6 in. x 8 in. in section. The needle beams are 7 in. deep. All bodies are built for single-end operation and have front platforms 4 ft. long and rear platforms 7 ft. long. The platforms are supported by four angle-iron knees ½ in. x 5 in. x 5 in. in section, which extend to the bolster. An accompanying illustration of one of these car bodies shows the step and platform arrangement. The steps leading to the rear platform are 6 ft. long and are subdivided by a stanchion and pipe rail which serve to divide the incoming and outgoing passengers. The front vestibule is entirely enclosed, and is reached by the motorman through the usual bulkhead door and also a swinging side door.



Winnipeg System—Car Under Way in the Company's Shops

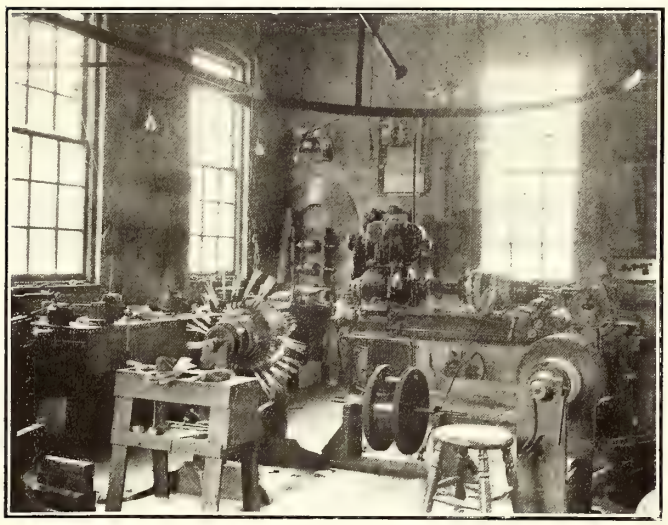
The general design of the upper structure of the Winnipeg standard car is illustrated. Large windows are provided on each side of the car body, which is framed of ash. The upper deck is supported by continuous steel carlins at each window post. Below the window rail the bodies are sided with narrow matched strips of cherry filled with oil, rubbed and varnished in its natural color. The belt rail and window posts and upper woodwork of the body are painted cream color. A guard rail of 1¼-in. pipe is placed along the outside of the car close to the bottom of the sheathing. This pipe is supported firmly in malleable castings and serves to protect the varnished wood from being injured by wagons.

Storm sash are provided for all the windows, including those of the vestibule. The glass in the window sash is 32 in. x 34 in. in size. No curtains are provided in the city cars, except for the windows and door of the front bulkhead. The sash are arranged to drop in pockets. Wire net window guards are provided for the blind side of the car. The upper deck has 10 hinged sash on either side. The deck rails are reinforced by ½-in. truss rods extending from end to end of the body and supporting the clerestory structure from below by three queen posts. The car body is provided with a fir floor of single thickness covered with maple slats. The platforms have double floors of maple.

Longitudinal seats are provided with deep cushions covered with dark-red plush, which presents an attractive appearance in combination with the cherry finish. The seating capacity is sufficient for 40 passengers, and within the unobstructed center of the car there is a large space for standing passengers. The interiors of the car bodies are illuminated by 20 16-cp lamps

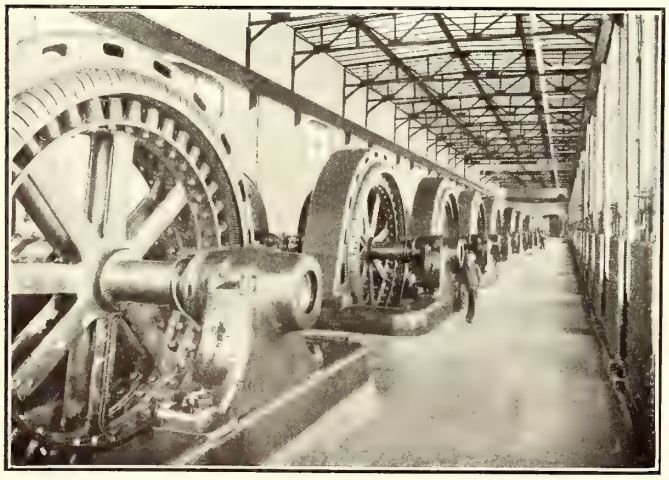
arranged 10 along the center of the upper deck and five above each sign rail. The interior hardware and fittings are bronze and were manufactured by the Ottawa Car Company. A push button is provided at each window post.

The truck-center distance is 22 ft. and trucks of Brill, Baldwin and Curtis design are used. Those cars built within the last two years are mounted on Brill trucks. Steel wheels of Carnegie and Midvale manufacture are placed on axles 4 in.



Winnipeg System—Armature Department

and 5 in. in diameter. The wheels are 33 in. in diameter, have treads 3 in. wide and flanges ¾ in. deep. The air-brake equipments used are manufactured by the National Brake & Electric Company and the Westinghouse Traction Brake Company. K-6 and K-28 controllers are operated with the four GE-80 motors. The fenders are of local design and manufacture. They are of the protruding type and are provided with an automatic trip. In addition to the fender a guard made of strap iron or heavy netting encloses the entire space under the front platform and ahead of the forward truck. Some of the special fittings and parts used on these cars are as follows: Roller designation signs; Peacock hand brakes; Consolidated electric heaters; Ohio Brass Company sanders, and Kalamazoo trolley



Winnipeg System—Interior of 30,000-Hp Hydroelectric Station at Lac du Bonnet

wheels. The type of car body here described weighs 20,000 lb. and the car complete weighs 47,000 lb.

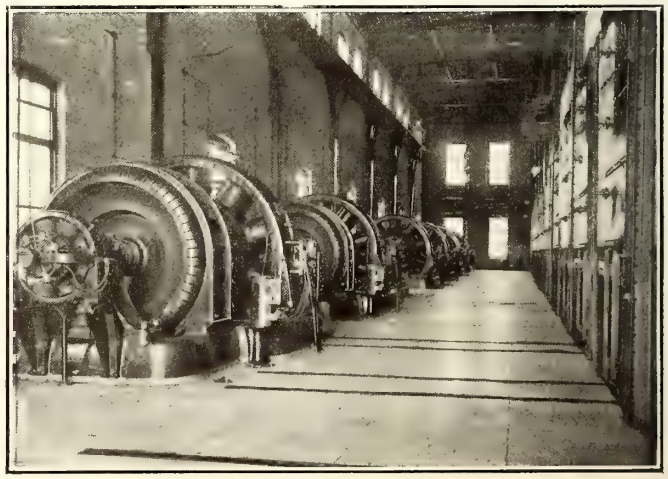
CAR CONSTRUCTION AND REPAIR SHOPS

In addition to the car construction shops, which are located at the south end of the city on a property of 35 acres, the company has a large operating car house and repair shop close to the business district, and a car house with three tracks at the north city limits. The latter structure is now being increased in size so that it will have eight storage tracks within a fireproof building of brick, concrete and steel. The car construction shop is used only for building new cars and making extensive repairs to old equipment. The group of shop buildings includes divisions for carpenter, paint, wood and blacksmith work and has an equipment of good tools. In connection with these shops, which are built of brick, is a sheet-steel car-storage house with nine tracks, each 300 ft. long. Forty men are employed in the car-building shops and the output for the last two years has been one double-truck city or high-speed interurban car every two weeks. A view of a double-truck city car body in course of construction is shown.

Other illustrations present the interior and exterior appearance of the Fort Rouge operating car house and general repair shop. This building includes 12 storage tracks, 175 ft. long, at the front end, and machine and electrical shop, storeroom and an office section at the rear. The buildings are located on the same property with the steam relay station, which supplements the hydroelectric power equipment. The mechanical department employs 125 men, 40 of whom are engaged in car construction, and 85 in maintenance of equipment.

The car repair shop subdivision devoted to electrical work also is illustrated. This is a well-lighted room equipped for testing and repairing motors and control apparatus. A chain block supported from an elevated runway encircling the room, serves for handling heavy parts. The equipment of the electrical shop includes a direct-driven American lathe used for general work, several home-made winding tools, field and armature testing sets and a large bake oven. This oven is built of brick and is 10 ft. x 14 ft. in floor area and 8 ft. high. Its opening into the electrical repair-room is provided with double steel doors. The oven is heated with 10 car heaters and a ventilating duct is provided to carry away the gases. A steel truck has been built especially for carrying armatures and motor coils in and out of the oven. It is the practice to slot all commutators to a depth of ⅛ in. This work is done by hand with a hacksaw. The freedom from grades and the high character of the repair and inspection work are illustrated by the fact that only three men are required to care for the electrical shop repair work on 750 motors.

The machine shop equipment is in a bay at one side of the car repair floor. At this point the repair shop is 12 tracks wide. The tool equipment of the machine shop includes a large wheel-



Winnipeg System—Main Sub-Station with Step-Down Transformers and Railway Motor-Generator Sets

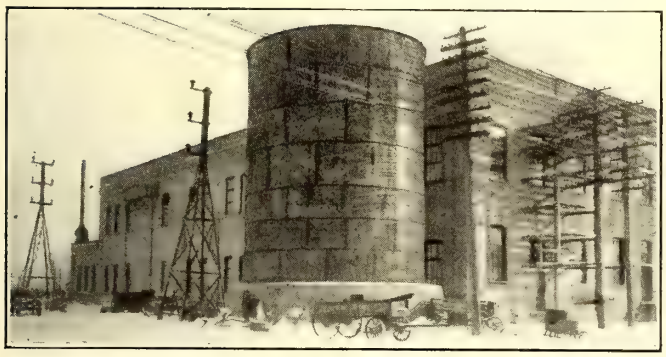
turning lathe, built by John Bertram & Sons Company, Dundas, Ontario. This lathe is direct-driven by a 15-hp motor. Three other lathes for general work, hydraulic wheel press, several drilling and boring machines and smaller tools are group-driven by an Edison bipolar motor. The blacksmith shop has four forges and a power hammer.

POWER SUPPLY

In 1906 the Winnipeg Electric Railway put into service a

water-power generating station of 30,000-hp capacity located at Lac du Bonnet, on the Winnipeg River, 65 miles from Winnipeg. Previously the railway and lighting power had been supplied from the central steam station, described later. This station is now held in reserve. The hydroelectric station is connected with a large receiving station in the city by a 60,000-volt, steel-tower transmission line carrying duplicate circuits. The normal daily peak load carried is 20,000 kw, including street commercial and residence lighting, six railway substations and both a. c. and d. c. power. Curves showing the afternoon and evening load for all these services except the d. c. commercial power, are presented.

The transmission plant has furnished current for nearly four years with a total interruption of but 25 minutes, except at the time of an accident to one of the penstocks, which occurred last November. The continuity of service over a 65-mile line through an undeveloped territory is credited to the stability of

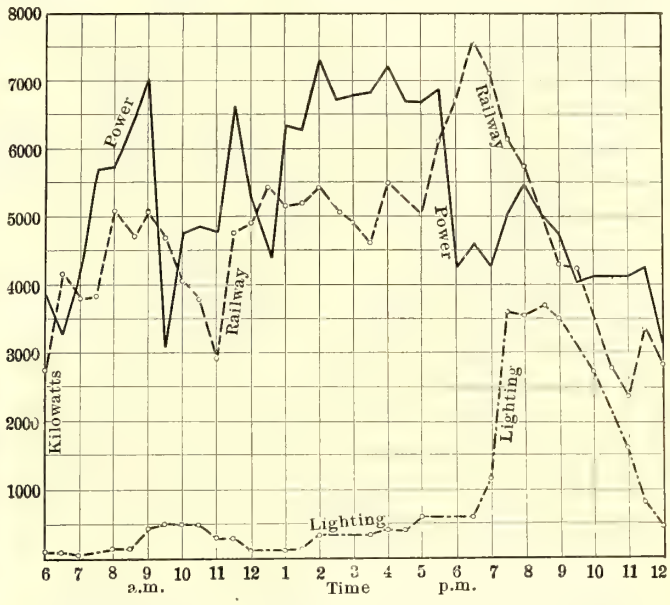


Winnipeg System—Main Receiving Station and Sub-Station

heavy steel towers and to careful inspection. Two No. 000 circuits are carried by the line of towers, and switch-over facilities are provided so that repairs can be made to one circuit while the other is under load. The whole line is inspected daily by a crew of patrolmen. Each man is responsible for a 12-mile section and rides over his section on horseback. Two pairs of telephone wires connect the generating station and the receiving station at Winnipeg. One line is carried on the steel towers and the other on wooden poles. The long-distance transmission line from the hydroelectric plant terminates at a large receiving station located close to the commercial center of the city. From this station current is distributed for railway, lighting and commercial services.

STEAM RELAY STATION

The old steam generating station which furnished current for the railway and lighting service of the city before the construction of the hydroelectric plant burst and necessitated shutting down the whole plant for six days; the steam railway station was called upon to handle a great overload. In fact, the power demand for railway, lighting and commercial use had become so largely in excess of the demand four years ago when the water-power plant assumed the load that it was impossible for the older relay station to generate sufficient current to handle both railway and lighting service simultaneously. The water-power plant was flooded and thus conditions had to be met as best they could with the old steam equipment. To do this set periods were announced when current would be furnished for railway, lighting and commercial use. The street cars were operated from 6 to 8:30 a. m. and from 4:30 to 7:30 p. m. The commercial power customers were furnished with current from 8:30 a. m. to 4:30 p. m. and from midnight to 5 a. m. Full lighting service was given from 7 until midnight. The Board of Trade and City Council approved of this emergency schedule for furnishing current, which, it will be noted, was arranged to prevent the overlapping of the peaks of



Winnipeg System—Daily Load Curves of all Circuits

the railway, lighting and commercial services and thus permit the steam relay station to give nearly full service to each during its appointed hour. An account of the unusual accident at the water-power plant was published in the issue of the ELECTRICAL RAILWAY JOURNAL for Dec. 25, 1909.

The steam relay station building is in three sections: a boiler house, an old engine-room and a new engine-room. The plant is located on the same property with the railway company's general repair shop and is situated on the bank of the Assiniboine River, from which stream circulating water is obtained. The present boiler equipment is made up of 2800 hp in B. & W. and 1500 hp in Heine boilers. In addition to these six 500-hp B. & W. boilers are being installed so that the plant will have a total of 7200 boiler-hp capacity. The older boiler equipment had two brick stacks and a Sturtevant induced draft fan equipment. The new boilers will exhaust into a new stack 8 ft. in diameter and 125 ft. high. In the enlargement of the boiler plant and the rearrangement of the equipment, which is now under way, coal bunkers will be built over the firing aisle and a chain-belt conveyor will be installed to handle ashes and coal.



Winnipeg System—Downstream View of Hydroelectric Station

In the new engine-room are two direct-driven 800-kw, 60-cycle, 2200-volt generators connected to Goldie & McCullough cross-compound engines, which are operated condensing, and with an initial steam pressure of 125 lb. One of the generators is of Allis-Chalmers-Bullock manufacture and the other was built by the Canadian General Electric Company. Every two

weeks these engine-driven units are brought up to speed and run in parallel with the Lac du Bonnet hydroelectric plant. The direct-driven units in the new engine-room are served by a 30-ton capacity Whiting traveling crane.

The older part of the generating machinery includes the following lighting and railway apparatus: One 600-kw and two 325-kw, 2200-volt flywheel generators with marine engines; one 400-kw, one 850-kw and one 500-kw direct-current railway generators driven by cross-compound engines manufactured by the Laurie Engine Company, Montreal. Another cross-compound engine drives a shaft fitted with a friction clutch to which are belted two 75-kw a. c. generators and four 50-kw d. c. generators. These machines are so arranged in connection with the shaft and clutch that the engine can be disconnected conveniently and the generators run as a motor-generator plant to assist the a. c. or d. c. generating equipment according to load demands.

RAILWAY SUBSTATIONS

The railway equipment at the main substation includes three 800-kw General Electric motor-generators sets, shown in the interior view of the station. The rail distribution feeder and trolley wires are supplied with 550-volt current from the main receiving substation and from three smaller new substations which are built for railway use only. The smaller substations are located at the north, west and south city limits. Two of these stations are equipped with 1000-kw units and the third with an 800-kw unit. The substation at the north city limits supplies current for city lines and for the southern end of the Winnipeg & Selkirk interurban railway. The substation at the west limits supplies current for the Portage Avenue division of the city system and for the 12-mile suburban line to Headingly. The substation at the south end of the city supplies current for the city lines only, and is located not far from the company's amusement park on the Red River.

The park substation building is 24 ft. x 42 ft. in ground dimensions and 21 ft. 6 in. high from machine-room floor to ceiling. The building has a basement under the entire structure and the machine-room is served by a 10-ton, hand-operated Whiting crane. Space is provided for two motor-generator sets, but one of which has been installed. This set is made up of a 2200-volt, 60-cycle synchronous motor driving a 1000-kw G. E. 500-volt interpole generator. Alternating current at 2200 volts is fed to the substations by an overhead line from the receiving station.

The railway substations were all designed and built by the engineers of the Winnipeg Electric Company. They are of a thoroughly fireproof construction employing reinforced concrete for floors, foundations and roofs, yellow brick for walls and metal window sash and casings. The only combustible material in any of these structures is a single wooden door.

CENSUS REPORT ON MUNICIPAL ELECTRIC LIGHTING STATIONS

According to the census report on central electric light and power stations there were in the United States in 1907, 1252 municipal, electric light and power stations. Of these 150 were in the North Atlantic States; 158 in the South Atlantic; 727 in the North Central; 166 in the South Central and 51 in the Western States. Most of these municipal stations are in places of small population, nearly seven-eighths of the total number being located in places of less than 5000 population and less than 3 per cent in places having a population of 25,000 and over. In the three divisions—the South Atlantic, the South Central, and the Western—together only one station was reported in 1907 for cities of over 100,000 population. In the North Atlantic division there were 16 cities of this class, with only two municipal plants in 1907; and in the North Central, 14 cities, with 9 municipal plants. The one station reported for the South Atlantic division was in Baltimore, while the four stations in the "500,000 and over population" class of cities in the North Central division were all located in Chicago.

POWER ECONOMY IN ELECTRIC RAILWAY OPERATION—COASTING TESTS ON THE MANHATTAN RAILWAY, NEW YORK*

BY H. ST. CLAIR PUTNAM.

Engineers have long recognized that a material saving in power could be realized in electric railway operation if the motormen could be induced or trained to operate the trains in a manner approximating the speed-time curve used in the

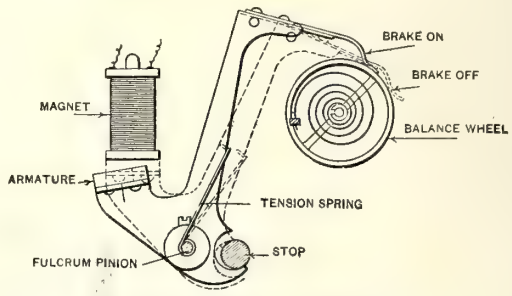


Fig. 1—Coasting Tests—Clock Mechanism

preliminary calculations. It is proposed in this paper to describe some tests made on the Manhattan elevated division of the Interborough Rapid Transit Company, New York, in which a clock was used to record the amount of coasting employed in the operation of trains, the object of this device being to obtain from the motormen a better manipulation of the trains with the resulting economy in the use of power.

The clock consists of a mechanism of the type manufactured

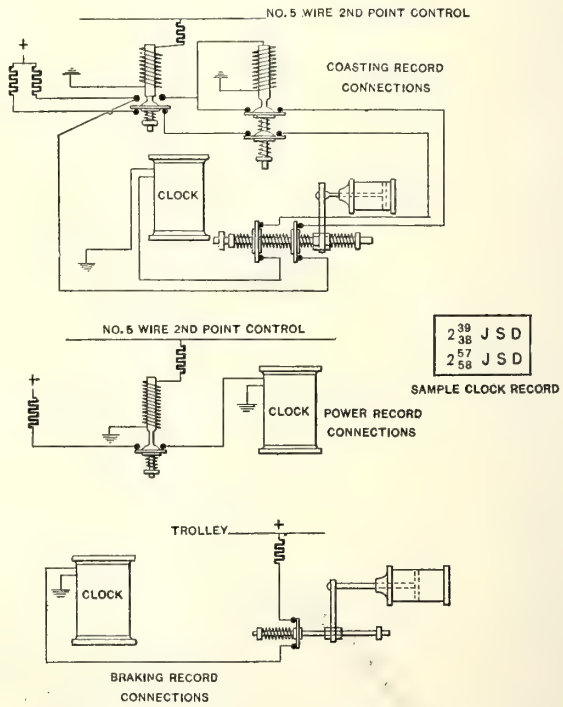


Fig. 2—Coasting Tests—Clock Connections

for recording the time of employees. To the balance wheel escapement a braking device has been added, as shown in Fig. 1, which is lifted free from the balance wheel by an electromagnet which is energized only during the coasting of the train. This permits the clock to record the coasting time only. Each motorman has an individual key which he inserts on taking charge of the train and again on leaving. The turning of this key records his number or initials and the time as shown by the clock mechanism; the difference in the time between the two records made by the key represents the total time of

*Abstract of a paper presented at the Twenty-seventh Annual Convention of the American Institute of Electrical Engineers, Jefferson, N. H., June 28-July 1, 1910.

coasting during his run. The slip record is torn off by the motorman and turned in to the proper official. This is checked up with his running time, and the motorman is rated according to the percentage that the coasting time is of the total time of his run, allowance being made for schedule variation.

The electric circuits controlling the clock are interlocked with the master controller and the brake mechanism and arranged so that the coasting clock will start only after the two actions of turning the power on and then off. The connections used are shown in Fig. 2. The clock is stopped as soon as the air brakes are operated and the brake cylinder has started to move to the braking position. If, for any reason, after the brakes are applied, the air is released and additional coasting obtained before the train stops, this additional coasting is lost from the amount of coasting recorded unless power is again applied. This is not an important factor in normal operation as the actual amount of coasting of this character is small.

SPEED TIME CURVE CHARACTERISTICS

While the principles involved in speed time curve calculations are well understood, the following discussion of the factors entering into electric operation is given to make clear the possible economies from better operation.

Acceleration. The rapid acceleration of trains, providing the schedule speed is unchanged, results in an important saving of power for two reasons, first, the maximum speed reached is less with a high acceleration, and consequently the train resistance is somewhat less; second, and of much greater importance, is the fact that with a high rate of acceleration, the speed at the start of braking is less than with a lower rate and, consequently, the energy absorbed and lost in braking is less. A quick acceleration is one of the most feasible methods of saving power in such service as exists on the Manhattan Railway. Fig. 3 shows the typical average run on the Second Avenue line, using the same rates of acceleration and braking and length of stop as in the original calculations for the electrification of the Manhattan system, but using the train resistance as derived from tests made in 1905. This run as shown is representative of the average run on the Second Avenue line where the coasting clock tests have been made, and is also representative of the average run of the entire Manhattan system. The distance between stations on the portion of the Second Avenue line tested, between Canal Street and 127th Street, is 1768 ft. as compared with 1763 ft. for the entire Manhattan system. In this typical curve the acceleration used is 1.33 m.p.h.p.s. and the schedule speed is

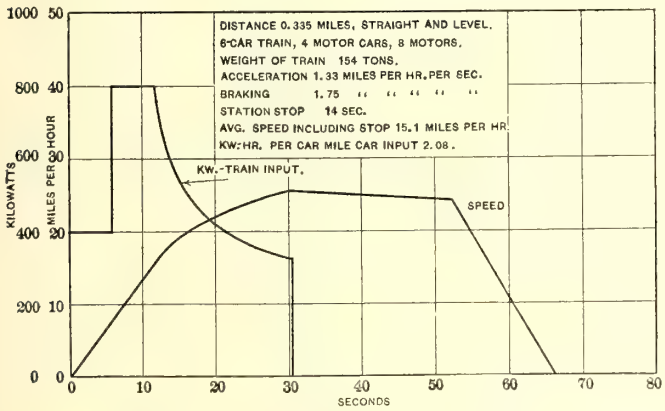


Fig. 3—Coasting Tests—Typical Run

based upon the printed schedule of the road. In Fig. 4 is shown the percentage increase in coasting time resulting from the increase in the rate of acceleration from 0.9 m.p.h.p.s. to 2 m.p.h.p.s., and the resulting decrease in power consumption, based upon an average run on the Second Avenue line. In the tests on the entire Manhattan system conducted on March 22, 1910, the acceleration of different motormen was found to vary from 0.9 m.p.h.p.s. to 1.47 m.p.h.p.s. Providing other factors of train operation remain the same (that is, the braking, running time and time of stop) the increase in the rate of acceleration from 0.9 to 1.47 m.p.h.p.s. will result in an increase in the percentage of coasting time from 0 to 40.5 per cent of the total time, and a saving of 36 per cent in energy consumption. A motorman on the Manhattan system on full runs will average about 600 car miles a day, and the power used at the car with 0.9 acceleration will approximate 2.82 kw-hours per car mile. As between these two motormen, therefore, providing the scheduled speed is maintained, the motorman who accelerated his train at an average rate of 0.9 m.p.h.p.s. will waste during the day 610 kw-hours at the

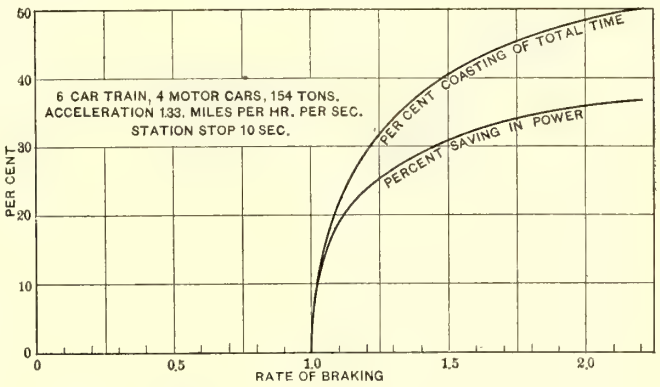


Fig. 4—Coasting Tests—Influence of Acceleration

car. With 80 per cent efficiency to the power house, this becomes 762 kw-hours. In practice the full saving of power resulting from better acceleration is not realized, owing usually to the better running time made by the good operator. This results frequently in his having to wait for the train ahead and by so doing, lose a large part of the savings in power which should follow his good operation. The clock should give, however, a material increase in coasting time under such circumstances, with a resulting saving in power. The men will learn to gage their trains, and instead of stopping for the man ahead, will utilize the surplus time in coasting. However, some penalty must be imposed to prevent the motorman from over-doing the coasting at the expense of the running time.

Series Running. It was found that an increase in the percentage of coasting obtained by reducing the amount of series running does not effect a corresponding saving in power. This is due to the fact that while the total time during which power is applied is increased and the time of coasting reduced by holding the controller in the full series position, say for four or five seconds, the actual power used remains practically the same because the additional power required on account of the longer time of power application is offset in large measure, if not entirely, by the saving in rheostat losses owing to the reduced time that the rheostat is in circuit in passing to full multiple. A limited amount of series running, therefore, is not objectionable, and under certain conditions it is better to run in series for a short time than to pass to the multiple position, especially where power is cut off almost immediately after the multiple position is reached as under certain conditions in approaching a station. The decrease in coasting time resulting from a moderate amount of series running does not, therefore, necessarily represent an increase in power consumption, unless the series running has been excessive. In this respect the coasting clock will give misleading results; but as under normal conditions there is little occasion for running in series, excepting around curves, the error thus introduced into the record is not important.

Braking. A high rate of braking results in a reduction in power consumption for reasons similar to those existing as to the rate of acceleration. It permits the power to be cut off at an earlier point, a longer time of coasting introduced, power otherwise wasted in the brakes to be recovered and the train brought to a quick stop. Perfection in braking is much more difficult of attainment than acceleration, as the train must be stopped at the station within a space limited to a few feet. Many motormen feel their way into stations, with a

material increase in the power used if schedules are maintained.

In Fig. 5 is shown the percentage of power saved on account of the increased percentage of coasting introduced by increasing the rate of braking from 1 m.p.h.p.s. to 2.25 m.p.h.p.s. These limits are frequently found in the operation of Manhattan trains. Carefully conducted tests have shown 2 m.p.h.p.s. to be entirely practical. An increase in the rate of braking

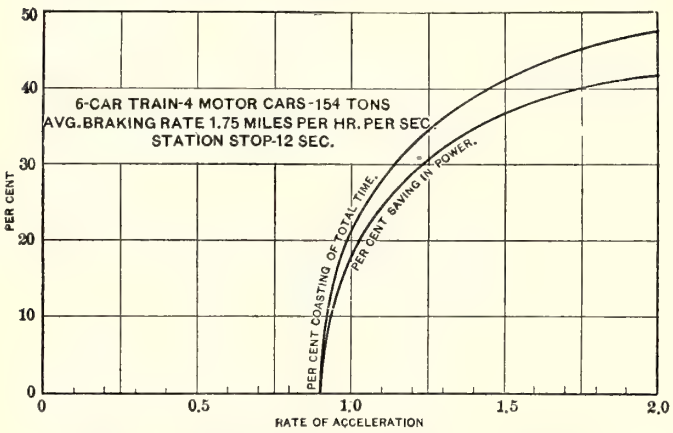


Fig. 5—Coasting Tests—Influence of Braking

between the limits of 1 m.p.h.p.s. and 2 m.p.h.p.s. results in increasing the coasting to 48.5 per cent of the total time with a saving in power of 35.5 per cent.

In the tests made over the Manhattan system on March 22, the trains were not equipped for getting the braking rate. The average time required by the motorman in bringing the train to a stop varied from 10.2 seconds to 20.2 seconds. This would indicate approximate braking rates of 1.15 and 1.90 m.p.h.p.s. The higher rate would increase the coasting time from 26 per cent for the lower rate, to 47.5 per cent, and result in saving approximately 280 kw-hours per day.

Station Stops. On the Second Avenue line, the average run is 0.335 mile and the maximum possible stop with the maintenance of the schedule, and with no coasting, is 16.2 seconds, assuming an average run as typical. A reduction in the time of stop to 10 seconds results in an increase in coasting time to 45 per cent of the total time and a reduction of 40 per cent in the power used.

Coasting. The amount of coasting which a motorman can obtain and still maintain his schedule, is obviously the result of the factors of operation. The theoretical coasting is 27.5 per cent of the total time including stops. It is possible to obtain this amount of coasting and even to exceed it by changes in operation which are entirely within the range of practicability. In Fig. 6 is shown the percentage of change made in these operating factors, and the resulting percentage of coasting obtained, and the corresponding percentage of power saved. It will be noted that it makes but little difference which factor is altered. The percentage of power saved is substantially the same, however the increased coasting is obtained. This, of course, is to be expected. It is well to point out the very large saving in power consumption which results in reducing the stop from say 15 seconds to 10 seconds, assuming that the schedule speed remains the same. This saves 25 per cent in power through increased coasting.

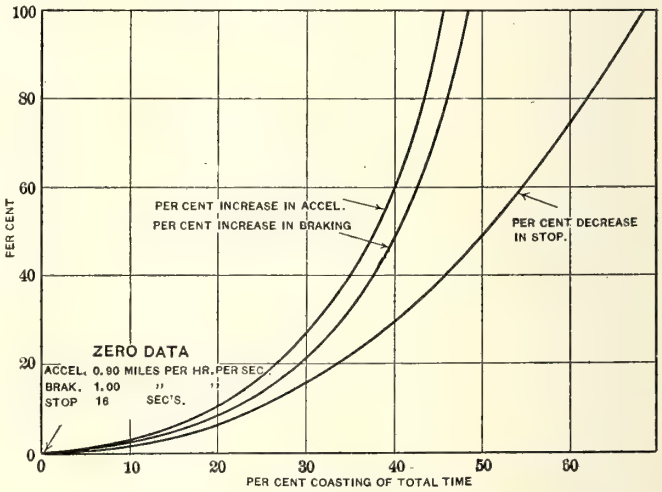
After all trains on the Second Avenue line were equipped with clocks several tests were made, due allowance being made for heaters, lighting, wattmeter calibration, etc. The results obtained were necessarily approximate but were remarkably consistent and showed a material improvement in coasting and also a reduction in the power required for the car operation, namely, an increase in the time of coasting from 10 per cent as it was prior to the installation of the clocks to 38 per cent following such installation, resulted in a saving of 25 per cent in the power required for traction.

TESTS ON ALL LINES

In order to compare the operating conditions existing on the Second Avenue line with the conditions on the other lines of the Manhattan system, on March 22 a test train was run in actual service over all divisions of the Manhattan system. A seven-car train composed of four motor and three trail cars was used. Each trail car was equipped with one of the recording clocks. These clocks were connected as shown in Fig. 2. One clock was used to record the coasting time, the second the time of power application, and the third the time of braking. Stop watch records were also made of the time of series running and total power application, time of coasting, time of braking and time of station and signal stops.

The results of the tests over the Second Avenue line reduced to an average run are plotted in Fig. 7 and are given as "Running Charts" for each of the three tests on this division. These curves approximate speed-time curves in form, but naturally as the different factors which enter into the characteristics of the curve are averages, the resulting curve does not pretend to give the correct area and distance. It simply pictures the average operating conditions of the run.

It will be noted that motorman *S* in test No. 2 obtained 50.5 per cent coasting, the largest amount recorded during the day. Of the three tests on Second Avenue, motorman *O* in test No. 5 obtained the smallest amount of coasting, 41.4 per cent and carried power for the longest time, 31.6 per cent, yet he was the better operator of the two. If he had used the same time in making the run as motorman *S* in test No. 2, it would have been possible for him to obtain as high as 58.5 per cent coasting as shown by the broken line



Percentage change in operating conditions and resulting percentage of coasting

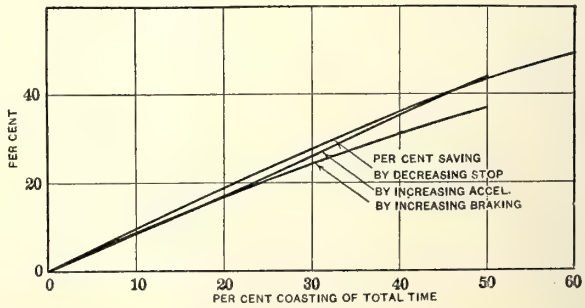
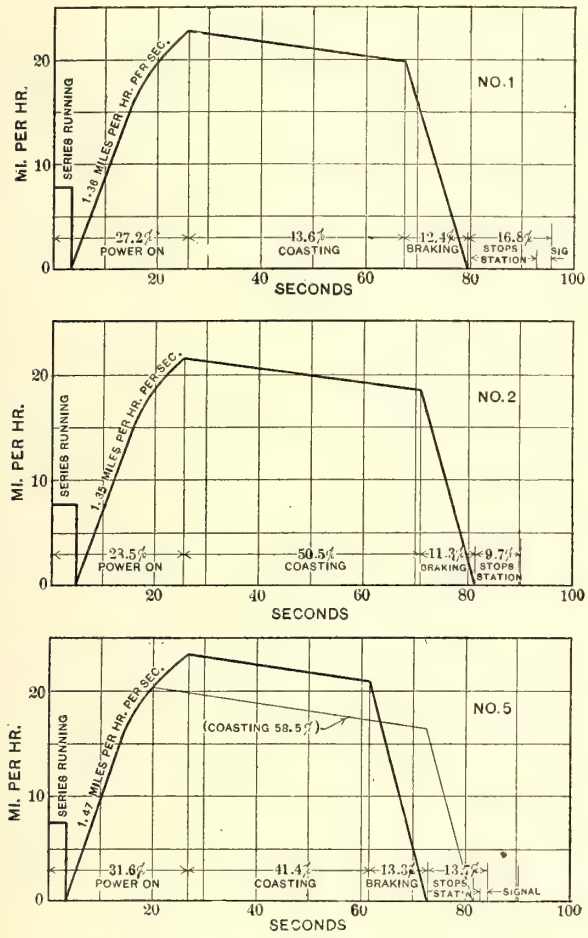


Fig. 6—Coasting Tests—Influence of Various Factors

on test No. 5, and he could have cut his power application down to 22.2 per cent with a saving of 8 per cent in power as compared with motorman *S* in test No. 2. The good results in test No. 5 were obtained with an acceleration of 1.47 m.p.h.p.s. and braking of 1.85 m.p.h.p.s. (approximate) as compared with an acceleration of 1.35 m.p.h.p.s. and braking of 1.75 m.p.h.p.s. (approximate) in test No. 2 The rate of braking indicated on these curves is approximate only, as the average braking includes the signal braking between stations and at curves in addition to the braking at station stops. The slope of the braking curve, however, indicates quite ac-

curately the relative rate of braking used by the motorman. The motormen who operated the trains in the tests on the Second Avenue line were selected men and the runs were made to illustrate what could be accomplished after a thorough training of several months. The average coasting obtained in the three runs is 45.2 per cent, corresponding to 1.70 kw-hours per car mile at the car. This indicates a saving in



No. 1. Typical running chart, 129th Street to South Ferry—8:01:20 a. m. to 8:40:43 a. m.—Motorman S—Schedule time 35 min.—27 runs—Average run 1723 ft.—Average speed 12.3 miles per hour.
No. 2. Typical running chart, South Ferry to 127th St.—8:45:20 a. m. to 9:24:23 a. m.—Motorman S—Schedule time 34.5 min.—26 runs—Average run 1752 ft.—Average speed 13.2 miles per hour.
No. 5. Typical running chart, 129th Street to South Ferry—1:23:15 p. m. to 2:0:45 p. m.—Motorman O—Schedule time 35 min.—27 runs—Average run 1723 ft.—Average speed 13.9 miles per hour.

Fig. 7—Coasting Tests—Running Charts

power consumption amounting to 34 per cent as compared with the conditions existing on this line prior to the installation of the clocks. This, of course, is in excess of the average saving of all the men as these men were specially selected.

In the Third Avenue tests, the run south was made with the motorman whose turn it happened to be. This run showed 13.2 per cent coasting. The run north was made with an experienced man and showed 27.6 per cent coasting. The difference was due mostly to the difference in the rate of acceleration, but partly to the braking rate and partly to an excessive amount of series running in the third test. These two runs showed an average of 20.4 per cent braking which indicates 2.22 kw-hours per car-mile at the car. These men, therefore, used 30.6 per cent more power than was used by the men on the Second Avenue test.

For the two tests made on the Sixth Avenue line, the motormen were taken as they come, and their handling of the train was in fairly close agreement. On account of the number of turns on this line, the amount of necessary series running was considerably in excess of that obtained on the other lines. The average coasting obtained was 22.3 per cent. This corresponds to a power consumption of 2.17 kw-hours per car-mile. As compared with the average obtained in the Second Avenue tests, this represented an excess consumption of power of 27.7 per cent.

For the Ninth Avenue tests the motormen were taken as they came, and as in the Sixth Avenue tests, the trains were run very much alike. In both cases the acceleration was poor and the braking somewhat below the standard. Both used a large amount of series running. The Ninth Avenue line is an ideal one on which to obtain a large amount of coasting on account of the longer runs, easy schedule and long grades, yet the coasting obtained by these two men was but 18.9 per cent and 21.2 per cent, respectively, and averaged 20.1 per cent. As compared to the average obtained in the Second Avenue tests, this represents an excess consumption of power of 31.8 per cent.

CLOCKS RECORDS ON ALL LINES AND RESULTS

In the tests conducted on March 22, the motormen were conscious of being under observation by the test crew as well as by their own road officials, and under such circumstances they naturally tried to do their best. The results obtained, therefore, cannot be regarded as representative of actual conditions, but can be taken as fairly representing the best that these men could do, and, therefore, as illustrating the knowledge of the motormen in general. The tests were too few in number, however, and the conditions under which they were made were such that they are not regarded as representative. To determine the fair average conditions as to coasting existing on all divisions of the system, tests were made on the Second and Third Avenue lines last fall and two trains equipped with clocks were put in regular service this spring on the Sixth and Ninth Avenue lines.

The average of these results should be fairly representative of the coasting conditions at present, as well as prior to the installation of the coasting clock on the Second Avenue line. The men soon become aware of the trains equipped with clocks, however, and consequently are more careful in the operation than usual. It is probable, therefore, that the coasting data obtained from these tests are above rather than under the average conditions. A coasting summary of the coasting data for all lines follows:

SUMMARY—COASTING DATA

	Car miles per day.	Per cent coasting.
Second Avenue	28,863	10.0
Third "	79,403	10.2
Sixth "	46,571	11.9
Ninth "	33,826	19.1
Average	188,663 (total)	12.2

In the table below is given the average coasting obtained during five weeks on the Second Avenue line, where the coasting clock has been in service for slightly over three months. The average run on this part of the Second Avenue line, as already pointed out, closely approximates the average run for the entire Manhattan system.

SECOND AVENUE LINE—COASTING DATA. COASTING CLOCK INSTALLED FOR THREE (3) MONTHS

			Average running time	Average coasting time	Per cent coasting
Week ending	March	5	28.7	10.5	36.8
" "	"	12	28.7	11.1	38.8
" "	"	19	28.5	10.8	37.7
" "	"	26	28.5	10.6	37.0
" "	April	2	28.4	10.1	35.4
	Average		28.6	10.6	37.1

The result of these calculations and tests shows that an increase in the percentage of coasting from 12 per cent to 37.5 per cent as shown above, will effect a saving of 24 per cent in the power required for traction.

Coasting is the recovery of power already used, and, hence, is the key to the problem. The coasting clock, therefore, gives a direct measure of the power recovered by the motormen and as this recovery can also only be made by cutting off the power application sooner, it is believed that it is the most effective element in train operation to measure. At the same time it concentrates the motorman's attention on that operating element which is the direct reason for saving power.

THE DESIGN OF THE ELECTRIC LOCOMOTIVE*

BY N. W. STORER AND G. M. EATON

The features to be embodied in an ideal electric locomotive depend entirely on the point of view. The man who is responsible for hauling trains on schedule time sees in the electric locomotive only a means for keeping trains moving on schedule time. His conception of efficiency is represented by the number of trips made on schedule time, divided by the total number of trips. He accepts an electric locomotive only as a last resort, and then recommends the incorporation of as many as possible of the features of successful steam locomotives. The eyes of the motive power man see much the same features as those of the operating man, but his eyes magnify details of design in a greater degree. Both will insist on the strength of all parts being ample to withstand every phase of the service such as bumping, speeding, overhauling, etc. Their ideal locomotive will operate safely at high speed, in either direction. It will be able to make up a reasonable amount of lost time, and will always be ready for service. It will not require long layovers, and will be in the shop the least possible time. They would like, if possible, a single type of locomotive which would perform any service that might be required of it, from making up and hauling a 2500-ton freight train to making a high-speed run with a "limited." The amount of power consumed and the excessive weight involved in an interchangeable locomotive of this type are a matter of little importance to them. To the general manager or president the cost of the locomotives will appeal most strongly.

At first sight it appears to be a very simple problem to transmit the power from rotating motor armatures to rotating wheels. However, there are more or less serious objections and limitations to every type of transmission that has been proposed. These include:

a. General motor with armature pressed on driving axle. "New York Central."

b. Gearless motor with armature carried on a quill surrounding axle and driving the wheels through flexible connections. "New Haven passenger."

c. Geared motor with bearings directly on axle and with nose supported on spring-borne parts of locomotive. "St. Clair Tunnel."

d. Geared motor with bearings on a quill surrounding axle, and (1) nose supported on spring-borne parts of machine (New Haven motor car) and (2) motor, rigidly bolted to spring-borne parts of machine, the quill having sufficient clearance for axle movements. "Four-motor New Haven freight."

e. Motor mounted rigidly on spring-borne parts, armature rotating at same rate as drivers, power transmitted to drivers through cranks, connecting rods and countershaft on level with driver axles. "Pennsylvania."

f. Motor mounting and transmission as in (*e*), but motor fitted with double bearings, one part for centering motor crank axle and the other for centering the armature quill which surrounds and is flexibly connected to the motor crank axle. "Two-motor New Haven freight."

g. Motors mounted on spring-borne parts, armature rotating at same rate as drivers, power transmitted to drivers through offset connecting rods and side rods. "Latest Simplon locomotives."

h. Motors mounted on spring-borne parts, armature rotating at same rate as drivers, power transmitted to drivers through Scotch yokes and side rods. "Valtellina locomotives."

j. Motors mounted rigidly on spring-borne parts, power transmitted through gears to countershaft, thence to drivers through Scotch yokes and side rods.

Further classification of electric locomotives on the basis of framing and wheel arrangement is also of assistance in gaining a clear understanding of existing locomotives.

a. Cab and framing an integral structure. All weight carried on drivers. Drivers contained in a single rigid wheelbase. "St. Clair Tunnel."

b. Cab and truck framing separate structures, all weight carried on drivers. Drivers contained in two rigid wheelbase trucks. Draw-bar pull transmitted through center pins or through truck frames. "P. R. R. 10,001 and 10,002."

c. Same as (*b*), but with added idle wheels for guiding and weight carrying. "Modified New Haven passenger and New Haven freight."

d. Any of the foregoing forms permanently coupled in pairs or articulated. "Pennsylvania."

e. Same as (*a*), but with added idle wheels for guiding and weight carrying. "Valtellina or New York Central."

f. Cab and framing an integral structure. All weight carried on drivers. Driver wheelbase partly rigid and partly flexible. "Simplon Tunnel."

From an operating standpoint it would be very desirable to have one locomotive which would be capable of handling at the desired speed any train from the heaviest freight to the fastest limited. While such a locomotive can be built, it would have a prohibitive cost. Where the weight of trains to be handled and the speeds at which they operate vary as widely as they do on most trunk lines, an absolutely interchangeable locomotive is impracticable.

SERVICE REQUIREMENTS

In switching service the locomotive operates to a great extent over the curves and special work. This track construction is expensive and hard to maintain. The locomotive should, therefore, embody primarily in its design such features as will enable it to negotiate this kind of track with the least effort. The features are:

(*a*) Short rigid wheelbase.

(*b*) Minimum dead weight per axle.

(*c*) Minimum total weight per axle needed for adhesion.

(*d*) Concentration of weight near midlength of locomotive, and short cab overhang.

(*e*) Effective equalization, preferably of the three-point type.

(*f*) Flexibility of framing under longitudinal twist to assist equalizing system.

(*g*) High center of gravity. While this is of helpful tendency it is probably not worth the expenditure of much money or weight on account of the slow speed of operation.

These features tend to produce a locomotive whose wheels may be deflected by the rails with the least attendant movement of the mass of the locomotive.

Most of the transcontinental railroads are to-day limited in their carrying capacity by long mountain grade divisions. The present practice is to run the heaviest freight trains that can be operated over these divisions. This service is now handled by consolidation or mallet steam engines, which haul 2000-ton to 2500-ton trains at 8 m.p.h. to 10 m.p.h., and electric locomotives are expected to handle the same or heavier trains at higher speeds to increase the capacity on the line.

The type of locomotive best suited for slow heavy freight service, with speeds of 12 m.p.h. to 15 m.p.h. is one having a motor geared to each axle. The feature of prime importance in the design of these locomotives is the absence of weight in excess of that necessary for adhesion. Every ton of excess weight in the locomotive means a ton less trailing load. A slow-speed freight locomotive should be designed with all weight on the drivers. A greater dead weight per axle can probably be tolerated than is wise in switching service. If complete spring support of the motors can be achieved without excess total weight, then the decrease in maintenance charges should much more than offset the increased first cost attendant upon such spring support.

The wheelbase of the slow-freight engine should be as flexible as possible so as to curve easily and prevent flange wear, and should take switches and turnouts without undue stress on the track. No idle leading or trailing truck axles are necessary. The remarks on high center of gravity, equalization, concentration of weight at midlength of engine and flexible framing apply almost equally on switching and slow-freight services.

* Abstract of paper presented at the annual convention of the American Institute of Electrical Engineers, Jefferson, N. H., July 1, 1910.

Trunk lines which are able to operate freight trains at speeds of 30 m.p.h. to 40 m.p.h. require a locomotive with a range of speed from 30 m.p.h. to 60 m.p.h., which is well suited to handle both freight and all but the highest-speed passenger trains. The high speed makes it advisable to provide leading wheels of small size and light dead weight to assist in guiding and to iron the rails down gently to an actual bearing surface on the roadbed and thus avoid the knocks attendant on hammering the free rail down with the heavy drive wheel.

The most important requisite of a locomotive designed to operate at 60 m.p.h. and over is its ability to run at the highest speed without injury to the track. Extensive speed tests have shown that almost any kind of a locomotive will stay on the track at 40 m.p.h. without serious damage to tangent track. As the speeds increase the bad riding qualities rapidly appear, due principally to lateral forces set up.

There are certain features that tend to reduce the intensity of the lateral forces on the track. First is "high center of gravity." The higher the mass of the locomotive is placed above the axles, the less will be its restraining influence against lateral motion on the part of the wheels. The mass of the locomotive may take the general direction of the track, while the wheels follow all the little irregularities in its surface and alignment.

Assume that a locomotive is running at high speed on tangent track and that some rail defect imposes a sudden transverse movement upon the wheels. The mass of the wheels and axle and any other masses rigidly associated with them will deliver a shock approximating a hammer blow to the side of the rail head.

The blow delivered by the spring-borne parts of the locomotive is radically different from this in both low and high center of gravity machines. In the case of a locomotive whose center of gravity of spring-borne parts is at the same height as the center of the transverse restraint, i.e., about the center of the axle, the transverse movement of the leading driver would impose a rotation of spring-borne parts about a vertical axis. The lateral force necessary to produce such a movement would be very great, due to the great moment of inertia about this axis. In the case of a locomotive whose center of gravity is high above the center of transverse restraint, the movement of the spring-borne masses by transverse movement of the leading driver is a composite of two rotations, viz., about a vertical axis and about a horizontal axis parallel to the rails. As the moment of inertia about the latter axis is much less than that about the former, it is evident that the lateral forces involved in the high center of gravity machines will be less. The forces opposing rotation about the horizontal axis are provided by the semi-elliptic riding springs, which will transmit their resultants ultimately to the running face of the rail and will not aggravate flange pressures. Were it not for the dampening effect of the friction of the semi-elliptic springs and the internal friction of the machine, this rotation about a horizontal axis would be a simple harmonic vibration. The period and amplitude of this vibration would be functions of the characteristics of the semi-elliptic springs and of the polar moment of inertia of the masses moved.

Suppose, for example, that with the low center of gravity locomotive first considered, some combination of lateral springs were applied which would impose on the spring-borne weights a vibration about the vertical axis of period and amplitude and dampening action identical with that occurring on the high center of gravity machines. There being no rotation about the horizontal axis, the forces required to control the vibration would be greater than with the high center of gravity machine, because of greater moment of inertia about the vertical axis; and, further, the transverse rail stresses would be greater because the reactions of the controlling forces are transverse. Probably transverse springs as heavy and with as great amplitude of motion as the semi-elliptic riding springs would be none too powerful to perform the required service, and it should be noted that their friction is almost as important as their spring action. Production of an ideal high-speed, low center of gravity engine of the type noted, while perhaps theoretically possible, is attended by difficulties which are serious even if they are not insurmountable.

Considering further the horizontal rotation of the spring-borne masses of a locomotive with medium height of center gravity, there is a zone that is neutral as regards transverse motion relative to the track. If in such a locomotive certain of the lower masses were hung from longitudinal trunnions located on the center line of the locomotive and in this neutral zone, it is evident that the rotation of the spring-borne masses would be more easily accomplished, due to the lessening of the masses moved. Possibly gearless concentric motors could be hung in this way, in connection with a drive of sufficient flexibility to allow free wheel play.

This is not a combination that could be recommended solely because of good riding qualities. It is, however, entirely possible for such a machine to have sufficient attendant simplicity to make it a better compromise than an engine where simplicity and mechanical efficiency are directly sacrificed to secure high center of gravity. The New Haven passenger locomotives have a motor mounting that approximates this condition. There is not as great amplitude of springs to allow unrestrained wheel play either vertically or laterally as might be desired, but there is enough to cushion all blows that the track receives from the mass of the motors, and the reports of track maintenance since the addition of the leading wheels eliminated the nosing tendency, are very gratifying.

Almost equally advantageous with the high center of gravity is the concentration of the mass of the locomotive about the center of gravity, both vertically and longitudinally. It is conceivable that if the mass of the locomotive could be so concentrated longitudinally about the center of gravity as to decrease the radius of gyration about the vertical axis to a value well within the rigid wheelbase, there would be no more serious lateral disturbance on the track with a low center of gravity machine than with one having higher center of gravity, but with a much longer radius of gyration about the vertical axis. Every effort should, therefore, be made to locate the mass of the heavy parts of the locomotive as near the middle as possible.

The action of a low center of gravity locomotive can be very materially improved by locating the point of side restraint below the level of the driving axles. Every inch that this point is lowered is equivalent to raising the center of gravity of the spring-borne parts by an equal amount.

EQUALIZATION

The most successful high-speed steam locomotives of to-day are designed with a three-point equalization, having one point ahead and two trailing. This is apparently a very desirable arrangement for any locomotive, and the electric locomotive designer is at once confronted with a new problem in adapting it to a locomotive which must be designed to operate equally well in either direction. The only means by which the actual three-point equalization can be secured on such an engine is to devise some means for shifting the equalization when the engine is reversed. It is possible to arrange air cylinders interlocked to the reverse lever, which will automatically alter the equalization system, so that a single point of equalization will always lead and two points will always trail. This should, however, be reserved for a last resort, as it does not seem wise to accept such weight and complication unless it proves essential. A symmetrical arrangement of wheels on the two ends of the locomotive has been criticised by some as lending itself to a nosing tendency in high-speed engines. While there is some evidence to support such contention, it is not regarded as absolutely proven.

Whatever system of equalization is used, it is very desirable that the springs on an electric locomotive should be very flexible. This in itself will tend to equalize the loads on the drivers without the complete three-point equalization system. Some of the best engineers contend that a four-point equalization system with flexible springs is better than the three-point equalization system.

INTERCHANGEABLE LOCOMOTIVES

The impracticability of performing all classes of service economically with a single machine is apparent. The locomotive for the heavy high-speed passenger train will require motors of large capacity. This capacity, however, can be utilized only at the high speeds with a corresponding low tractive effort. The electric locomotive is not so well suited for interchangeable service as the steam locomotive because of the fact that its continuous tractive effort is practically constant regardless of the speed at which it is operated. An electric locomotive designed to develop its continuous capacity of 60 m.p.h. if operated in freight service at 30 m.p.h. will be developing only one-half of its capacity. On account of the necessity of having the best riding qualities at high speed, the locomotive will be very much heavier than one designed especially for freight service having the same continuous tractive effort. The cost also will be much greater. An economical mechanical design for a locomotive which is thoroughly satisfactory for freight service will not be at all suitable for the high-speed passenger service.

TRANSMISSION

While many types of transmission are in successful operation, none is above criticism from some point of view. Gearless motors in which the armatures are carried dead on the axle while having the simplest transmission of all are destructive to roadbed when operated at high speeds. The mounting of the motor on a quill driving the wheels through springs is also objectionable from some standpoints, but it is open to less objection because its weight is all spring supported against both vertical and lateral shocks. There is a definite, though somewhat restricted field where the gearless concentric motor is most successful. High speed is essential to allow a rate of revolution sufficient to secure an economical power output per unit weight of motor. The gearless concentric motor for slow-speed operation cannot compete with the geared motor, as the weight and cost will be prohibitive. The power demanded per axle must not be so great as to result in wheel overloads.

GEARS

In the present state of the art, gears can be designed which will perform satisfactorily in any class of railway service. There should be no hesitancy on the part of the locomotive designer in recommending gears for service where a reduction from the armature speed is desirable, as in low-speed locomotives.

An advantage of gearing the motor to a quill having large clearance around the axle, as in the New Haven geared freight locomotive, is that it enables the motor to be mounted rigidly on the truck, and directly above the axle, thus permitting the greatest economy of space by bringing the driving axles close together. It also raises the center of gravity of the spring-borne parts and brings the motor well above the dust and dirt of the roadbed. And as the motor projects through the floor into the cab, the commutator, brushes and oil boxes are rendered accessible at all times. It also facilitates the use of forced ventilation, which greatly increases the capacity of motors of the enclosed type. This type of transmission has been in use but a short time, but the performance thus far has been so satisfactory as to give promise of its success in a wide range of application. It is believed that on account of the extreme flexibility of the drive that the pitch line speed may be raised to a much higher value than has ever before been deemed possible. The flexibility effectually prevents the extreme shocks which are ordinarily received by the gear teeth of a high-speed locomotive when the gear is pressed directly on the axle.

The use of gearing which permits the armature to run at a higher speed of rotation than the driving axle places a limit on the speed of the locomotive. For economical designs it is not advisable to allow a maximum armature speed of more than 2 or 2.5 times the continuous rating speed. If a greater ratio than this is required, the armature speed must be reduced. The weight and cost of motor for a given continuous capacity will increase directly with this ratio.

With theoretically perfect gears a very high pitch line speed should be operative. In regular interurban mounting of motors heavy strains are imposed on gear teeth in high-speed operation by sudden vertical displacement of wheels due to track irregularities, with attendant acceleration or retardation of armature. In such applications a maximum pitch-line speed of 3500 ft. to 4000 ft. per minute is used. With complete spring support of motor and flexible connection to wheels, or with flexible gears, a higher speed will be permissible. There are insufficient data at hand to approximate the limit under these conditions. Even better results probably can be obtained by the use of helical gears which are now coming into use. The success of this type of gear, which is used for the Melville-McAlpin steam-turbine drive, indicates a sphere of usefulness for gears which has scarcely been touched.

Experience thus far indicates that a pressure of 1000 lb. per inch width of gear face is perfectly practicable for continuous rating of large gears. With special steel pinions and high-grade gears it is probably safe to exceed this figure. For short hauls pressures far above 1000 lb. per inch are now in daily successful operation. In the locomotives for the St. Clair Tunnel, for instance, the pressure is carried on a single gear having a 6-in. width of face. The normal loads at which the locomotive operates on the up-grade give a pressure of from 1500 lb. to 2000 lb. per inch width of face on the gears. With this pressure the pinions have a life of 40,000 miles to 50,000 miles, and none of the gears has yet worn out, although the locomotives have been in continuous operation for over two years. With twin gears there is a possibility of further increase in unit pressure as the absence of relative skewing of pinion and gear shafts produces a better application of the tooth load. Motors of 500-hp continuous rating are about as large as can be geared to a single axle.

SIDE RODS

The wish to get the good riding qualities of the high-speed steam locomotive, and at the same time to avoid the difficulties and limitations imposed by mounting the motor concentric with the axle, had led to the adoption of side rods for transmitting the power from the motor to the wheels. There is a very strong tendency in this direction both in Europe and in this country. This type permits the use of a single powerful motor to drive two axles. The motor is mounted in the cab instead of under it so that all parts are readily accessible and are thoroughly protected from the dust, dirt and water from the roadbed. The location of the heavy motor so high in the cab raises the center of gravity of the locomotive to height corresponding to that of high-speed steam locomotives. It is susceptible of perfect mechanical balance and gives a uniform tractive effort.

In case of a steam locomotive there are at least two independent sources of mechanical forces, viz., the cylinders. Each piston constitutes a "free end" of the transmission system. The distance from the center of cylinder to the center of main driver axle is not a hard and fast value.

In an electric locomotive with a single motor crank and rod connected to a countershaft there are no "free ends." Great accuracy of tram and parallelism of motor shaft and countershaft are essential, any error being accompanied by serious stresses in the transmission with associated low mechanical efficiency and high maintenance charge, especially for bearing brasses. The motor exerts a constant turning moment or torque throughout the entire revolution. This constant torque must be transmitted to the driving axle without modification except for the losses in bearings. At certain points in the cycle all the torque of the motors is transmitted through one crank; at certain other points it is transmitted through the opposite crank. At intermediate points it may or may not be transmitted through a single crank, as the interchange of work is different in different machines, being a composite function of journal and pin clearances together with bending and torsional deflections of all elements of the transmission and framing. All the driving effort is transmitted through four running pins in series before any useful work is performed. This results in considerable loss of mechanical efficiency. It may be noted that the use of knuckle pins would avoid one or possibly two of the running

pins mentioned. Knuckle pins have caused so much trouble from breakage that they will have to be modified considerably before they will be acceptable. The trouble seems to lie in the twisting of the rods due to uneven track.

The side-rod type of locomotive is at a disadvantage when compared with the high-speed geared type described, because of the fact that the mechanical parts of the locomotive and also the motor frames must necessarily be much heavier to withstand the reciprocating stresses imposed on them. They will also require much more careful work in assembling and will, therefore, be more expensive. On the other hand, it would seem that after the side-rod locomotive is once completed, the mechanical parts should be very cheap to maintain.

The Scotch yoke side-rod drive has been used to the greatest extent with the three-phase locomotives in Italy and has apparently given excellent results. The motors, being flexibly attached to the spring-borne parts, are not subject to severe cranking strains and can therefore be made light mechanically. The other parts also can be made considerably lighter because of the fact that no jack-shaft is required, and the cranking strains are taken directly on the armature shafts which are supported in bearings in the side frames. The design, however, sacrifices high center of gravity, and some alternate plan for securing easy riding qualities must be adopted. One which has been suggested utilizes a plan somewhat in line with that suggested for the gearless concentric motors; namely, having springs between the motor and side frames for cushioning lateral shocks. The mechanical efficiency of this type should be higher than that of the rod-connected design, because of the fact that the power is not transmitted through so many running pins. It has the objectionable feature of a sliding connection between the driving yoke and the pin on the middle driving wheel, but this apparently causes no trouble whatever. In fact, the locomotives as observed on the Valtellina Railway operate smoothly, and apparently with small friction loss. This may be ascribed in part to the fact that all bearings are kept flooded with oil. This type of drive will give probably a lighter locomotive than is possible with any other drive having motors operating at the same speed as the driving axles. It has thus far not met with favor in this country, but its merits will undoubtedly bring it into use for moderate speed work where gearless motors are desired.

Where slower speeds are desired than can be secured by the use of motors operating at the same speed as the axles it is sometimes more economical to use two motors geared to jackshafts and connected to the drivers by means of the "Scotch yoke" in the same way as just described. This scheme permits the use of large motors and gives much greater space for them than can be secured between the drive wheels where the motors are geared either to the axles or to quills surrounding the axles. The motor is mounted so that its center of gravity is high, and as it extends through the floor into the cab, the bearings and brushes are easily accessible. In this respect the motor has all of the advantages possessed by the rod-connected motor. Gears can be located outside of the driving wheel so that they can be replaced without dismantling the locomotive any further than required by the removal of the side rods. Locomotives involving this principle have been built in Europe, and a large one is now under construction for the Midi Railway in France.

In the three-phase locomotives now in use in the Simplon Tunnel the motors are located as close together at the middle of the locomotive as possible, and their crank pins are connected together by a frame. From pins on this frame on a line with the center of the axle rods are carried to the nearest driving wheels, and thence other rods connected to the axles of the outer drivers, there being four pairs of driving wheels. It is, of course, essential where side rods are used that all axles should remain substantially parallel, and in order to secure the radial motion of the wheels at the ends of the locomotives it is necessary to mount the wheels on quills which surround the axles and connect them together only at the middle point by a kind of universal joint. By these means the wheels are able to move in a radial direction, while the axles which drive them are kept parallel to the inside driving axles. This seems to be operating very satisfactorily, and with some modifications will probably meet other conditions where all the weight is carried on the drivers, and a rigid frame locomotive with flexible wheel base is required.

The possible combinations of locomotive framing, motors, and transmission between motors and drivers which have not been mentioned are almost limitless.

ECONOMY OF CAR OPERATION*

BY CYRIL J. HOPKINS.

The value of increasing the coasting time on a given run is well illustrated by the experience of the Philadelphia Rapid Transit Company on its subway and elevated division. As a result of installing coasting signs showing when to shut off the motors the energy consumption was reduced about one-third and the cost of brake shoes, which is one of the largest items of equipment maintenance, was reduced by almost the same amount. Recent tests made on the Atlantic City & Shore Railroad confirm this experience and also demonstrate the saving in current made possible by the use of anti-friction journal bearings which cut down the bearing resistance during acceleration and increase the permissible coasting time.

The interurban section of this road is 15.2 miles long, of which some 13½ miles are double track. Two series of tests were carried out, one making all, and the other only compulsory stops. The tests were carried out with two cars, exactly similar, except that one had ball bearings on the main journals, and the other had ordinary brass bearings. Ten complete trips were made first with the plain bearing car. Conditions of running were then imitated as nearly as possible with the ball bearing car. The cars used in these tests weigh 36 tons empty and carry 8 tons of passengers when crowded. One long stretch of about 4¾ miles between stops exists, while the other stretches of track between stops are nearly equal and can be averaged to 2,900 ft. in one case, and 5,490 ft. in the other.

For train resistance with ordinary brass bearings the Armstrong formula has been generally accepted. It is required to give a formula that will represent equally well the train resistance of a car or train with anti-friction bearings. Considering the Armstrong formula, the last term, referring to wind resistance, is independent of the type of bearing and, therefore, remains unchanged, while the first two terms, which represent track and bearing resistance (which have not so far been satisfactorily separated) will be decreased. One-third of the amount given by the Armstrong formula for the total of the first two terms has been found to be substantially accurate.

Acceleration curves for ball and plain bearing cars at first glance appear to have very little difference in the accelerations for the two types of cars, but during the first 20 seconds, in which a speed of 25 m.p.h. (a little more than half speed) is attained, the advantage of anti-friction bearings is less important than during the latter part of the acceleration period, which consumes the greater portion of the time. In this latter period the ball bearing car has an advantage of 25 to 100 per cent over the plain bearing car. The benefits to be derived from coasting from an energy point of view are quite marked. With a plain bearing car making a run of 2,900 ft. the least time in which the car covered the distance was 82 seconds, which admits of no coasting. Under such conditions the car consumes 110 watt-hours per ton-mile. If it is satisfactory to make this same run in 83 seconds, a 16-second coast is admissible, bringing down the energy consumption to 94 watt-hours per ton-mile or a saving of 17 per cent. If, again, it is satisfactory to make this run in 85

*Abstract of a paper read at the annual convention of the American Institute of Electrical Engineers, Jefferson, N. H., July 1, 1910.

seconds, 30 seconds coasting may be employed and a saving of 25 per cent attained in energy consumption.

It is often claimed that it is impossible to make the motormen carry out the coasting as desired. They should not be expected to do it unless they are instructed. As to whether this instruction is worth while or not is readily borne out by the above statement of savings in reference to the Philadelphia subway. This is also emphasized by the importance which the Interborough Rapid Transit Company of New York is attaching to it, by the employment of coasting registers on the cars.

Calculated runs with ball and plain bearing cars over a distance of 2,900 ft. in 83 seconds show that the increased coasting time of the ball bearing car is 11 seconds. This means that the controller is shut off that much earlier and, consequently, the motor losses, which are a high percentage of the motor output at high speed because of low current consumption, are reduced. The greater saving, however, results in the elimination of the bearing friction. The figures representing the elements of loss are given in the following table:

2900-FT. RUN IN 83 SECONDS. FOUR MOTORS GEAR RATIO 2,625. WEIGHT OF CAR 26.3 TONS

Losses in	Watt-hours. Plain bearings.	Ball bearings.	Saving per cent.
Starting resistance	200	190	5
Windage	165	165	0
Track and bearings	330	110	67
Braking	905	850	6
Motors	275	245	11
Total	1,875	1,560	17 or 0.57 kw-hr. per car mile

A comparative analysis of a longer run on the same railway is given below:

5490-FT. RUN IN 136 SECONDS. FOUR MOTORS. GEAR RATIO 2,625. WEIGHT OF CAR 36.3 TONS.

Losses in	Watt-hours. Plain bearings.	Ball bearings.	Saving per cent.
Starting resistance	170	165	3
Windage	380	375	1
Track and bearings	655	215	67
Braking	780	830	6
Motors	395	300	24
Total	2,380	1,885	21 or 0.48 kw-hr. per car mile.

It will be noted that the saving in watt-hours per car-mile in each case is about 0.5 kw-hour irrespective of the number of stops, but that in short runs the amount represents 17 per cent and in the long runs 21 per cent.

The following are the average results per trip over 15.2 miles, the same motorman being employed for comparative runs:

TRIPS WITHOUT PASSENGERS—20 STOPS—NORMAL RUNNING TIME

Car bearings	Time running with power on minutes.	Average speed in motion m.p.h.	Loss in rheostat kw-hr.	Loss in motors and gears kw-hr.	Loss in train resistance and brakes kw-hr.	Total kw-hr. for traction.
Plain	27.07	25.4	3.62	8.11	32.43	44.16
Ball	26.08	25.2	3.30	7.04	28.18	38.52
Difference	4%	1%	9%	13%	13%	13%
In favor of...	Ball	Plain	Ball	Ball	Ball	Ball

SECOND TEST—11 STOPS

Car bearings.	Time running with power on minutes.	Average speed in motion m.p.h.	Loss in rheostat kw-hr.	Loss in motors and gears kw-hr.	Loss in train resistance and brakes kw-hr.	Total kw-hr. for traction.
Plain	25.04	28.3	1.81	6.93	27.71	36.45
Ball	22.44	28.7	1.76	5.77	23.08	30.61
Difference	9%	1%	3%	17%	17%	16%
In favor of....	Ball	Ball	Ball	Ball	Ball	Bal.

It will be noted that, with the greater distance between stops, the saving as an absolute amount is about the same, but that as a percentage it is increased. The amount of time with the current on is 9 per cent less with a ball bearing car than with a plain bearing car, while the speed of the former is slightly in excess of that of the latter.

ANTI-FRICTION BEARINGS

Long rollers for anti-friction bearings are unsatisfactory mechanically where continuous service is required. However, if the rollers are made short, they will become bent less easily, but will still tend to wear taper. Balls will neither deform nor wear appreciably out of shape, with reasonable protection from grit. The ball bearings on the Atlantic City car and other railway equipment, including mining and street railway motors, that have been equipped with this type of ball bearing, have not shown any appreciable radial wear after nearly two years' service, have not had any repairs and, with the exception of mining motors, have been lubricated something less than twice a year.

With regard to hot bearings city railways on account of their relatively low speed are not troubled much, but interurban roads finds such occurrences more common. Even though the hot bearings may not always result in delays, still when they occur on motors they prevent satisfactory radiation, producing defective insulation, especially in field coils. In a recent series of tests made by a railway company, the average difference in temperature rise on field coils for motors with ball bearing armatures as compared with babbit bearing armatures was 6½ deg. Cent. or 20 per cent. These tests extended over nine test days with each type of car and continued for about eight consecutive hours each day. The ball bearings on the main journals of the Atlantic City car will operate continuously all day without a rise in temperature, due to heat generated within themselves, sufficient to be detected by the hand.

The following statements of cost illustrate in a general way the commercial situation, for interurban cars of the Atlantic City type.

From the tests it is evident that at least 0.5 kw-hour per car-mile can be saved, hence, with an annual car-mileage of 60,000 (or 200 miles per day and nine weeks layoff per year) and assuming 1 cent per kw-hour at the power house with 88 per cent efficiency of trolley line, this amounts to $340. The total cost of a set of bearings and boxes per car is $688, as against $120 for plain bearings. The interest on the difference in cost and an allowance for depreciation amounts to $150. The net saving per year, therefore, is $190 in favor of ball bearings.

MINIMUM HEADWAY FOR CARS IN CONGESTED STREETS

In a paper read at the annual convention of the American Institute of Electrical Engineers, Jefferson, N. H., July 1, 1910, R. W. Harris, field electrical inspector of the Wisconsin Railroad Commission, described the methods used in determining the adequacy of the service given by the Milwaukee Electric Railway & Light Company during the latter part of 1908. Some particulars of this investigation were included as an appendix to the annual report of the Wisconsin Railroad Commission for 1909 and were published in abstract in the Electric Railway Journal for April 9, 1910, page 664.

The first step of the investigation was to compile "car demand" curves for each of the lines, showing the number of passengers carried during different periods of the day and on different sections of each line. These "car demand" curves also showed the comfortable load for each car. The excess number of passengers carried over and above the comfortable load determined the amount of additional equipment required to be operated in order to give adequate and satisfactory service.

Following this part of the investigation a study was made of the schedules on each line to determine what, if any, additional equipment could be safely operated during the rush

hours in the congested districts. This led to a study of car delays. The minimum time spacing of cars is the determining factor which fixes the full-load capacity of any section of track. In determining the safe minimum headway from observed data, the following basic elements were considered separately:

(A) The minimum safe practicable time spacing of cars when in continual motion, unaffected by any delay.

(B) The average delay of cars due to causes arising from other cars operated over the same or intersecting tracks.

(C) The average delay due to causes having their origin within the car under consideration—that is, delays due to passengers boarding and alighting.

A calculation for the safe headway between cars would require an allowance to be made, first for the space covered in one section at full speed to allow the train's crew to act; second, for the distance required to stop the car from an assumed or observed maximum speed with an assumed negative acceleration of 1½ miles per second; third, for a clear space of 15 ft. between cars when stopped. As an example, a headway of 8 3/10 seconds would be calculated from the following observed data: Length of car, 41 ft.; safe space between cars with stops, 15 ft.; observed speed, 12.27 ft. per second; speed in miles per hour, 8.4; distance car travels after braking, 34.22 ft.; safe minimum spacing, 102.49 ft.; number of cars passing a given point per hour, 433. The safe minimum spacing in feet is the sum of the length of the car, the space between cars when stopped, the observed speed in feet per second, and the distance traveled after braking.

The delays specified under (B) include for a typical intersection the following:

(1) Car ahead going in the same direction upon approaching the intersection, but taking a curve.

(2) A car taking the curve in nearest quadrant, but resulting in going in the opposite direction.

(3) One car crossing at right angles.

(4) Two cars crossing at right angles, but going in opposite directions.

(5) Regular service stops.

(6) Unusual vehicle or pedestrian traffic.

(7) Delay due to hesitancy of motorman and signalman.

(8) Delay due to hesitancy of cars approaching switches before taking the curves.

From observed data at a typical intersection 34 per cent of cars are delayed from cause 1; 34 per cent are delayed due to cause 2; 187 per cent due to cause 3, this percentage being used as a measure of the tendency to interruption; 10 per cent are delayed due to cause 4; 100 per cent are delayed due to cause 5; 10 per cent are delayed due to cause 6; 50 per cent due to cause 7, and 75 per cent due to cause 8. Any car may be delayed approximately two seconds for other reasons. From a large number of observations the composite delay was calculated by weighted averages and found to be 10 seconds. The minimum safe practicable headway, therefore, would be the safe headway for cars in continual motion unaffected by delays, plus the time due to delays, or 18.3 seconds. Data was obtained from other cities showing the operating speeds and average delays, and it was found that the operating speed in Milwaukee is somewhat faster than that in other cities. A minimum safe practicable headway of 20 seconds was, therefore, selected in studying the problem involved in routing cars through the congested districts.

The delays due to passengers boarding and alighting were shown for various cities by a curve published in the abstract of the report of the commission printed in the ELECTRIC RAILWAY JOURNAL for April 9, 1910, page 665.

The committee on construction of schedules and timetables of the American Street & Interurban Railway Transportation & Traffic Association has sent out, through Secretary Donecker's office, data sheet No. 58 asking for information on the methods used for the preparation of schedules and timetables for different times of the day and different days of the week. The questions on interurban work are separate.

DISCUSSION OF RAILWAY PAPERS BY AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

The annual meeting of the American Institute of Electrical Engineers was held at Jefferson, N. H., June 28 to July 1. At the session of Friday morning four papers on railway subjects were presented and discussed. Abstracts of these papers are printed elsewhere in this issue.

ELECTRIC LOCOMOTIVE DESIGN

A paper on "Electric Locomotive Design," by N. W. Storer and G. M. Eaton (see page 76) was first read. In opening the discussion on the paper, A. F. Batchelder, General Electric Company, said he believed that no bad effect on the track was produced by a moderate amount of dead weight on the axles provided the rotating parts were balanced. The height of the center of gravity of the locomotive was important, but the distance between side springs was equally important. It was desirable to get the springs as close together as possible. Concentrating the weight longitudinally near the center of the locomotive was good practice, but it was also necessary to introduce a dampening effect on the springs to prevent cumulative lateral oscillation. He exhibited a drawing of a new design of heavy electric locomotive consisting of two units, each having a four-wheel guiding truck and two drivers, as is in the Pennsylvania tunnel locomotives. The locomotive had inside frames and each driving axle was connected to a separate motor with rods and gears on each side.

Frank J. Sprague pointed out that the track and the locomotives are closely tied together and neither can be sacrificed for the other. He did not think that a high center of gravity was as important as the authors of the paper had claimed. What was vital was that every wheel should be free to move slightly either vertically or horizontally without affecting the mass of the entire locomotive. Nosing was due, in his opinion, largely to the coning of the wheels which caused them to tend to move first to one side and then to the other. The higher the speed the freer is this movement, and the blows delivered to the side of the rail are correspondingly more severe. He explained in this way the nosing tendency of the first New York Central locomotives when running on tangent track. When the side motion of the guiding trucks was dampened the nosing was largely stopped. He did not believe that the Woodlawn accident was caused directly or indirectly by the effect of the low center of gravity of the locomotive. The use of four-wheel guiding trucks and lateral motion springs on the driving axle boxes effected a marked improvement in the riding qualities of these locomotives. Mr. Sprague referred to tests of a double-truck locomotive on the New York Central which had a decided nosing tendency when run with the two trucks not connected together. When the two trucks were connected with a link the nosing tendency disappeared. The speaker believed that a locomotive with a symmetrical wheelbase was superior to one with an unsymmetrical wheelbase. Under certain conditions it might be very desirable to build locomotives which could be used interchangeably in freight or passenger service. On most mountain grade divisions the use of pusher engines which can be picked up or dropped off afford the most economical method of operation. These engines should be equally suitable for assisting freight and passenger trains up the grade.

A. H. Armstrong, General Electric Company, also thought that there were many cases in which interchangeable freight and passenger locomotives would be very desirable.

G. M. Eaton, in closing the discussion, spoke favorably of the use of plate frames for locomotives which provide some degree of flexibility. Referring to the speed tests of locomotives on the West Jersey & Sea Shore Railroad the speaker said that electric locomotives Nos. 10,001 and 10,002, which were of the coupled double-truck type with geared and gearless motors, respectively, proved very destructive to the track at speeds above 60 m.p.h. The side-rod locomotive No. 10,003, which had a high center of gravity, rode easily at all speeds up to the maximum of nearly 100 m.p.h.

COASTING CLOCK TESTS

H. St. Clair Putnam presented his paper on "Coasting Clock Tests" on the Manhattan Elevated Railway (see page 72).

A. H. Armstrong asked if any change in the substation peak loads had been observed as a result of the rapid acceleration obtained by the motormen in striving for good records. It was possible to carry rapid acceleration so far that an unduly large investment in substation capacity was necessary. The best method of obtaining rapid acceleration was to increase the speed quickly while running in the series position and thus reducing the rate of acceleration somewhat when the motor connections are shifted to parallel. This keeps down the peak loads.

N. W. Storer thought the coasting clock was a better device for saving current than the wattmeter.

L. B. Stillwell referred to the statement in Mr. Putnam's paper that the increase in coasting time on the Second Avenue division from 12 per cent to 35 per cent resulted in a saving in power consumption of 24 per cent. He said that the cost of power for this division, including overhead charges, was about $4,000 a day, and that the saving of 24 per cent represented nearly $1,000 a day. Answering Mr. Armstrong, he said that the use of current clocks had resulted only in increasing the coasting time up to the economical point which the engineers had used in designing the electrical equipment.

Frank J. Sprague said the coasting clock apparently had worked as great an improvement in braking as the use of automatic relays had improved acceleration. It removed the motorman's last chance to waste power.

C. J. Hopkins asked if any inducements were offered to the train and platform guards to shorten the station stops and thus permit of longer coasting periods between stations for the same running time. N. W. Storer said it was perfectly feasible to arrange the automatic control as Mr. Armstrong suggested so as to accelerate at a high rate in the series position and at a lower rate in the parallel position.

Mr. Putnam in closing the discussion said that the mechanism and connections of the current clocks had been worked out very carefully so as to prevent any tampering. Each motor car is equipped and as there are usually three motor cars in a train, each clock would have to be manipulated separately to obtain a false record. The point raised by Mr. Armstrong regarding excessive peak loads was not serious on a system with as dense traffic as is handled on the Manhattan elevated. The great saving obtained with these clocks was due not so much to improvement in acceleration, but in manipulation of the trains when running close together. The ordinary motorman would run up close behind a preceding train, stop, and then pull up again when the preceding train moved ahead. The motorman who is trying to make a good coasting record, however, will drift cautiously up to a preceding train and if the latter pulls out of the station before the following train has stopped the motorman of the following train will drift into the station without using power. Nothing is gained by running up too close to a preceding train. Referring to the matter of inducements to train guards to shorten station stops, Mr. Putnam said the motormen, who were held responsible for their own coasting records, were quick to report a guard who caused any delay which would shorten the possible coasting time. Station stops have been reduced materially on this account as the train men do not like to be reported. Failures of the clocks have been few, and when a failure does occur the faulty record is thrown out.

ECONOMY IN CAR OPERATION

C. J. Hopkins presented a paper entitled "Economy in Car Operation," which is abstracted on page 79 of this issue.

A. H. Armstrong asked why advantage had not been taken of the opportunity to use a lower gear ratio on the car equipped with ball bearings which could have been done owing to the reduction in friction. N. W. Storer thought the author of the paper went too far in claiming for ball bearings all the advantages which accrued from an increase in the coasting time. The motors could be pushed a little harder to give the same acceleration with plain bearings as with ball bearings and the only actual saving was that due to the difference in friction. By eliminating all bearing and track friction the gain would not exceed 20 watt-hours per mile.

Frank J. Sprague predicted the future use of ball bearings on railway motor armatures. He thought the saving to be effected there was greater than in the journal bearings.

Mr. Putnam said that the only proper credit to be given to ball or roller bearings was the difference in the number of foot-pounds of energy required to move the car from one point to another. Any other saving was due to a change in the speed characteristics of the motors. The effect of using roller bearings in the tests cited by Mr. Hopkins was to increase the maximum speed from 43.5 m.p.h. to 47 m.p.h., and the obvious thing to do in such a case would be to reduce the gear ratio. The method of applying Armstrong's formula for train resistance as used by Mr. Hopkins, he believed, was erroneous, and the reduction in bearing resistance claimed for ball bearing he thought was excessive. The maximum rolling friction found by test on the New York subway and elevated lines was less than 5 lb. per ton, and the speaker did not think that the first term of the Armstrong formula should be reduced by as much as two-thirds.

A paper by R. W. Harris on "A Method of Determining the Adequacy of an Electric Railway System" was read but not discussed. This paper is abstracted on page 80 of this issue.

PITTSBURGH SUBWAY REPORT

Under date of June 29 B. J. Arnold submitted to Mayor Magee, of Pittsburgh, a report on a proposed subway line in that city. The report first states that topographically the city is not well adapted for elevated railways, but that a subway between the downtown business district and certain centers in the outlying districts appears to be a natural development and eventually will be a necessity. An abstract of the principal parts of the report follows:

FIRST COST AND OPERATING EXPENSES

The first cost of a double-track subway, fully equipped, may be estimated as between $1,000,000 and $2,000,000 per mile of single track, depending upon the physical difficulties, size, elaborateness of design, number of stations, amount of rolling stock and other equipment, value of real estate necessary for stations, terminals, shops, yards, etc. A subway system for Pittsburgh should hardly be undertaken unless an expenditure of at least $30,000,000 is contemplated, half of this amount, at least, to be spent for the sections first built.

The ratio between operating expenses and gross earnings under subway conditions varies between 40 per cent and 60 per cent, with a fair average at 50 per cent. The average operating expense of a surface system is from 60 per cent to 70 per cent of passenger earnings, and it is owing to the fact that subways can be operated at a relatively less percentage that justifies the larger investment in situations where the density of traffic is great.

EARNINGS

The annual earnings from operation should amount to not less than 10 per cent of the first cost, and seldom it will amount to more than 15 per cent, for before reaching this latter figure there would no doubt arise demands for extensions. These figures indicate on what narrow margins enterprises of this character must be financed. Under Pittsburgh conditions I believe that an average annual earnings from passengers equal to at least 12 per cent of the first cost of the system will be necessary to make a subway practicable.

If the first section of the subway must earn an amount equal to $12 per cent on $15,000, or $1,800,000 per year, when will it be possible to build it?

The earnings per capita of the surface system is now about $10 as an average, but certain residence sections of the city run as high as $28 per unit of "sleeping population" of the district.

Earnings per capita increase at a rate not less than the rate

of increase in population, and often at a faster rate, depending on the riding habit of the community. Therefore, at $10 per capita, the subway must serve 180,000 people to earn $1,800,000 yearly, or at $20 per capita only one-half this number, or 90,000 people would be required. A conservative estimate would be that if a subway can be designed to serve 150,000 people contributing $12 each per annum to the subway in addition to their use of the surface system, then an initial investment of $15,000,000 would be justified or at the rate of $100 per person served.

DENSITY OF POPULATION

At present the maximum density of population in Pittsburgh over any considerable area is about 100 persons per acre. In New York the density per acre for the lower "East Side" is about 700 per acre, and in Harlem, which is the best contributing district for the New York subway, the density is 150 per acre, which is the same as the average for the entire Island of Manhattan. At 100 per acre, 150,000 people would occupy 1500 acres, or 2.35 sq. miles, while at 50 per acre the district required for 150,000 people would be twice as much, or 4.7 sq. miles. It is very probable that, with the opportunities which Pittsburgh has of spreading out, that there will not be sufficient increase in land values to justify whole blocks of high apartment buildings such as are found in New York City. But there will be, no doubt, considerable development in the line of apartment dwellings, which will raise the present average density of population in many sections, although it will not be safe to count on large contiguous residence areas where the average density will reach as high as 100 per acre. This would indicate that the first section of the subway would be designed to serve an area of about 4 sq. miles.

COMBINED SURFACE AND SUBWAY SYSTEM

To reach the amount of territory to secure a patronage which will justify a subway it will be wise to count on a combined system using the subway as a main trunk line and the surface railway as a means of collecting and distributing the passengers over a wide area. Furthermore, in order to use the tubes to best advantage, they should be located and designed so as to accommodate suburban trains coming into the city over the various lines of the present railroads, which eventually may be electrified. With these two auxiliary systems contributing to the earnings of the subway, it would be unnecessary to be so dependent on the earnings of the territory directly contiguous to the main trunk line.

However, to secure this "transfer" and "through" business it would be necessary to design a subway for real rapid transit by eliminating the stops in the short-haul territory just outside the business center of the city and to operate trains instead of single car units.

FINANCIAL CONSIDERATIONS

Any public transportation utility to be permanently successful should be able to carry the following financial burdens:

First.—Operating expense, including taxes, damages, insurance and maintenance which will vary from 40 per cent to 60 per cent of the passenger income, depending upon the volume of traffic.

Second.—Depreciation fund, which will vary from 3 per cent to 5 per cent annually upon the cost of equipment only.

Third.—Amortization fund, which at 1 per cent per year on cost of construction (compound at 2.5 per cent) will retire the investment in structure in 50 years, or at ½ per cent per year would amount to the first cost of construction in 75 years.

Fourth.—Contingent reserve fund to take care of extraordinary accidents and other unforeseen contingencies, which should accumulate and be kept invested until it reaches about 5 per cent of the total cost.

Fifth.—Interest on cost, which may vary from a maximum of 8 per cent with private capital down to 4 per cent with municipal credit.

Sixth.—Discount fund, which should offset the discount on bonds or other similar indebtedness in about 20 years.

Seventh.—Surplus profits, which in case of private ownership should be divided with the city or used to build extensions.

RETURN ON INVESTMENT IN SUBWAY

The earnings and net returns will depend on the following:

(1) The density of the population to be served and upon the rides per capita.

(2) Equitable arrangement for exchange of transfers between the subway and the collecting and distributing surface system.

(3) Use of subway as a downtown terminal by the electrified branches of present steam lines.

In my opinion a subway in Pittsburgh will pay eventually, but there will be a loss during the first years of operation, and particularly if it is built too soon or upon too large a scale. To insure the stability of the enterprise, this deficit must be offset by the profits made during subsequent years and therefore in order that the turning point when earnings exceed operating expenses plus annual fixed charges be not too long deferred, the subway should not be constructed until definite arrangements have been made with existing transportation systems for the joint use of the subway to the mutual advantage of the companies and the traveling public.

The operating expenses may be controlled to a certain extent as the service rendered may be made to suit within limits the traffic available, but the annual fixed charges will be the result of preliminary arrangements which cannot be reduced without financial loss to the original investors.

For instance, the first cost will depend upon:

(a) The actual cash cost of the property.

(b) The profit to be allowed the contractor.

(c) The interest paid during construction.

(d) The discount for underwriting funded debt.

(e) The profit to be allowed the promoter.

And the annual fixed charges, after paying operating expenses (including maintenance, taxes, damages and insurance) will depend on what is allowed for:

(a) Interest on funded debt.

(b) Depreciation.

(c) Sinking fund for retiring cost of construction.

(d) Reserve fund for contingencies.

(e) Discount fund to offset discount on bonds.

(f) Dividends to reward enterprise or to cover a fair return on the investment.

(g) Percentage, if any, to be paid the city for its share of gross or net earnings.

PROBLEMS REQUIRING INVESTIGATION

To determine more definitely the prospects of building a subway in advance of actual needs, so that it may become an important factor in influencing the extent and character of the growth of the city and district, it will be desirable to proceed along the following lines of inquiry:

(1) Ascertain the "best terms" which private capital will offer or accept for building, equipping and operating the subway and giving the city the right to purchase.

(2) Secure by legislation the right for the city to issue bonds, of a type self-supporting and independent of the debt limit, so that money for purchasing or constructing a subway and possibly for equipping it also, can be secured by means of the city's credit, and thus reduce to a minimum the fixed charge for interest.

(3) Determine what the present street surface railway company will do in regard to interchanging transfers with the subway.

(4) Determine what the steam railroad companies will do in regard to electrification of their suburban tracks and renting the use of the subway as a downtown terminal or for a through-passenger connection for suburban trains.

(5) Determine by comparing the present census with others, the rate of growth of the sections which may be affected by rapid transit development.

(6) Ascertain the probable increase in value of the real estate in the districts to be served in order to determine whether or not this increase in value of land will justify the building of apartment houses in sufficient numbers to result in a density favorable to subway operation.

UNIT COSTS OF ELECTRIC RAILWAYS

In a paper to be read at the joint meeting of the American Society of Mechanical Engineers and the British Institute of Mechanical Engineers in London, July 29, 1910, W. B. Potter, of the General Electric Company, gives some interesting estimates of cost of equipping steam railways and interurban railways with electric apparatus. Table I, reproduced herewith, relates to trunk line electrification. In discussing the relative merits of the four systems Mr. Potter says in part:

"Direct-current at either 600 volts or higher may be considered the most economical for city and interurban service, and for the electrification of steam railways where the density of traffic is sufficient to require a relatively large investment for rolling stock, as compared with that required for the secondary distribution system and the substation apparatus. Single-phase and three-phase rolling stock equipments are applicable only to exceptional conditions. The reason for this is the greater first cost of such equipments. This is especially true when comparing single-phase with direct-current. The type of equipment used on the rolling stock may well be a more important factor in the economy of investment and operation than the scheme of power distribution.

TABLE 1. COST OF TRUNK LINE EQUIPMENT

	600 v. D. C.	1200 v. D. C.	11,000 v. 1-Phase	11,000 v. 3-Phase
SUB-STATIONS				
First cost per kw, complete	$26	$28	$11	$12
Comparison of installed kw, %	200-250	100-125	100	100-125
Load factor, machines in service, %.	20-40	35-70	40-80	30-60
Average efficiency, %	78-88	87-92	97-98	97-98
Yearly operation and maintenance, each station	$5000	$5000	$2500	$2500
CONTACT CONDUCTORS*	Third Rail		Overhead	
First cost, per mile	$5000 to $7000	$5500 to $7500	$3500 to $7000	$4500 to $8000
Efficiency, %	88-92	90-96	93-97	93-97
Maintenance per mile per year	$75-$125	$100-$150	$100-$200	$125-$250
ROLLING STOCK†	600 v. D. C.	1200 v. D. C.	11,000 v. 1-Phase	11,000 v. 3-Phase
Locomotives				
First cost, each	$44,000	$47,500	$64,000	$58,000
Weight, tons (2000 lb.)	125	125	160	160
Average efficiency, locomotive wheels of trolley, %	85	85	79	81
Maintenance per locomotive per mile, cents	4	4	8	5
Motor Cars (Complete)				
First cost, each	$12,000	$13,500	$20,000	.....
Weight, tons (2000 lb.)	43	44	54	.....
Average efficiency, wheels to Trolley	82	81	73	.....
Maintenance per car mile, cents	2	2.2	3.5	.....

*Variation in cost of third rail due to different weights of rail which may be required. Variation in cost of overhead due to variation in the class of construction, such as wooden poles or with steel bridges.

†Other weights of locomotives will cost more or less about in proportion to their weights. With gearless direct-current locomotives, the average efficiency of locomotive wheels to trolley is approximately 88 per cent.

"Under the conditions which exist in America, direct-current and single-phase are applicable to either level or grade work; while three-phase will probably be limited to the latter where its regenerative feature of returning energy to the line may be of value. The relative economy of the different systems of electrification is dependent on the density of traffic and the character of power available, rather than on the length of the railway. In cases where purchased power is used, or is depended on as a reserve, the frequency of the current supplied by the power company will have a bearing on the cost of substations, and will thus affect the choice of the system. For direct-current operation, rotary apparatus is used for converting the alternating into direct current, and the frequency of the supply is therefore relatively unimportant. For single-phase operation under the usual conditions, a frequency of not more than 15 cycles is desirable; and to provide this frequency, rotary frequency-changers are as necessary as are rotary converters in the case of direct current, since the frequency of existing power companies ranges from 25 to 60 cycles. With power supplied at the proper frequency for single-phase operation, permitting the use of static transformers and dispensing with frequency changers, the amount of energy required for a given trunk line service is in many cases nearly the same as for direct current, the greater weight of the equipped rolling stock, and the lower efficiency of the single-phase equipments, offsetting the rotary converters and trolley-line or third-rail losses of the direct current."

"In the selection of the electrical system best adapted to a particular set of conditions there are three items to be considered: (*a*) substations, (*b*) contact conductors, (*c*) rolling stock. A comparison of these items determines the relative economic values of the systems."

Mr. Potter gives the following outline of the effect of differences in the physical characteristics of the road and the operating requirements:

"From a level country to a limiting grade of 1 or 1½ per cent there will be little difference in the relative values of the systems. With steeper grades the conditions will be more favorable for alternating current.

"Heavy individual train units favor the alternating-current system with the exception of the locomotives; light trains or multiple-unit operation favor the direct-current system.

"Infrequent service with a relatively small number of locomotives favors the alternating-current, frequent service the direct-current. With increase in number of trains, the direct-current systems gain relatively faster than the alternating-current in economy of operation, due to relatively decreased substation operation, increased substation efficiency, and lower cost of equipment maintenance. It is therefore well to consider what the ultimate traffic density may be and select the system best suited to meet these requirements.

"Variations in the distance between stops and schedule required will not affect the relative value of systems unless extreme requirements, such as high schedule speed with short runs, make the use of direct current imperative.

"For a similar character of service throughout, the railroad may be of any length without affecting the relative desirability of the various systems. What is suitable for the first 50 miles will be equally suitable for any extension."

In the author's opinion the single-phase system, by reason of the apparent simplicity of its elements and the utilization of higher potential for the contact conductor than is possible with direct current, is admittedly very attractive. There is the other side of the question, that it is impossible to build a single-phase commutating motor comparable in first cost and maintenance with a direct-current motor. Comparative results obtained up to the present time are in favor of direct current.

Referring to the establishment of a standard system Mr. Potter says: "Desirable as would be a standard system for all classes of service, we cannot hope to establish such a standard should it impose an additional expense without adequate return. A summing up of all the elements of each electrical system will generally lead to a definite showing of which system is most desirable to meet specific conditions. For trunk line service a higher potential than 600 volts will unquestionably be used; 1200 volts direct-current will prove economical in some cases, but a still higher voltage is required to provide economically for the heavier intermittent service. Whether this potential will be 1800 or 2400 volts direct current or 11,000 volts alternating current cannot be settled arbitrarily."

INTERURBAN RAILWAYS

Mr. Potter discusses the interurban railway situation in the United States with regard to the various available schemes of electrification. These are, 600-volt direct current, 1200-volt direct-current, and single-phase, the three-phase being debarred on account of the complications of the necessary double overhead-distribution system. He says:

"The application of single-phase to new projects has been practically abandoned, there having been but one or two new installations in the last three years. This arrested development of a system which for a short time held forth considerable promise has been brought about by a general recognition of its limitations which experience has shown to be:

"(a) Excessive weight of rolling stock."

"(b) Excessive cost of rolling stock."

"(c) High cost of equipment maintenance."

"(d) Increased power consumption."

"(e) Rapid depreciation of motor."

"(f) Rapid depreciation of car bodies and trucks."

"(g) Increased cost of maintaining track and roadway."

"Moreover it is recognized that any interurban road in the United States must be capable of operating over existing city tracks from 600-volt direct-current trolley, a condition which hampers the single-phase system on account of increased complications in the control system.

TABLE II. GENERAL DATA FOR CARS

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Number of cars	15	15	18
Seating capacity, passengers	60	60	60
Distance between stops, miles	3	3	3
Schedule speed, miles per hour	33	33	33
Maximum speed, miles per hour	48	48	55
Weight each car, tons (2000 lb.)	35	36	43
Car miles per day	3000	3000	3000
Miles per car in service per day	300	300	300
Miles per car per day, average*	200	200	166
Estimated maintenance per car mile, cents:			
a Electrical	0.70	0.77	1.50
b Mechanical	1.00	1.00	1.25
Total car barn expense	1.70	1.77	2.75
Amperes starting car	520	280	75
Amperes running car	174	94	24
Kilowatt hours per car mile at car	2.8	2.88	3.78
Cost each car complete	$10,000	$11,500	$17,000

*On 12 American single-phase interurban roads the average miles per day called for on the published time tables, divided by the number of cars owned, is 138; on four 1200-volt roads which have been operating over a year this number is 237, the larger number of alternating-current cars being required on account of the fact that a greater number are necessarily held in the barn for inspection and maintenance purposes. This explains why in the table above 18 alternating-current cars are assumed and 15 direct-current cars.

TABLE III. SUBSTATIONS

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Number of substations	9	4	2
Estimated momentary demand:			
Cars starting	1	1	2
Cars running	1	1	0
Peak load, kilowatts	416	448	670
Average load, each substation, kilowatts	52	120	275
Size each unit, kilowatts	300	300	300
Number of units	2	2	3
Load factor (machines in service)	0.17	0.40	0.46
Average efficiency	0.76	0.87	0.96
Cost each substation complete	$24,000	$26,400	$10,000

TABLE IV. FEEDER COPPER REQUIREMENTS.

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Maximum momentary demand midway between substations:			
Cars starting	1	1	2
Cars running	0	1	0
Amperes	520	374	150
Distance between substations	11.8	28	66.6
Equivalent stub-end feed	2.9	7	16.6
Feeder required addition to 4/0 trolley	4/0	1/0	none
Cost overhead construction per mile, including both trolley and feeder	$2,300	$2,100	$1,900

Bonding taken as $400 per mile of track.

Transmission line taken in each case at $840 per mile of track and assumed to run entire length of right of way.

Power house: No power house is included, but it is assumed that power is purchased at the power station bus at one cent per kw-hr. and fed at any convenient point into the transmission line.

"To show clearly the relative merits of the systems an analysis is made of an interurban railroad 100 miles long with cars operated in each direction every hour. This condition represents practically the minimum car requirements in the United States, and is therefore favorable to the single-phase. Any increase in traffic density will be relatively more favorable to the direct-current system on account of the lower first cost of cars, lower car maintenance and relatively lower cost of substation operation." The general data required are approximated in Tables II to VII on this page.

Commenting on these data Mr. Potter says: "There will be an additional cost of operation and maintenance with the single-phase system for the items of track and roadway, due to additional weight of cars, car shop expenses in providing greater facilities for shop inspection and repairs, and greater skill in superintendence of equipment. In a number of instances this has been found to amount to several cents per car-mile. A conservative estimate would require at least 1 cent per car-mile to be added for these items.

"The comparison in Table VII brings out the fact that even for conditions selected as favorable to the single-phase system, the 600-volt direct-current system is the more economical considering operation, maintenance and fixed charges. An examination of the elements which enter into the first cost and operation of a system will show at once that as the density of traffic increases there is a rapid gain in the relative advantage of the direct-current over the single-phase system."

TABLE V. POWER CONSUMPTION.

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Total kilowatt-hours per day at cars	8400	8650	11,400
Efficiency, secondary distribution	0.90	0.90	0.94
Substations	0.76	0.87	0.96
Transmission line and power house step-up transformers	0.94	0.94	0.94
Combined efficiency	0.64	0.74	0.85
Kilowatt-hours per day at power house	13,100	11,700	13,400

TABLE VI. SUMMARY OF COSTS

First Costs

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Transmission	$84,000	$84,000	$84,000
Substations	216 000	106,000	20,000
Secondary distribution	230,000	210,000	190,000
Bonding	40,000	40,000	40,000
Cars	150,000	172,500	360,000
Total	$720,000	$612,500	$694 000

Annual Fixed Charges

Depreciation	Life, years	Annuity 5%	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Transmission	20	30.34	$2,500	$2,500	$2,500
Substations	20	30.34	6,500	3,200	600
Secondary distribution	15	46.34	10,600	9 700	8,800
Bonding	10	79.50	3,200	3,200	3,200
Cars (A. C.)	12	62.83	.....	....	22,600
Cars (D. C.)	15	46.34	6,900	8.000	.....
Total depreciation			$29,700	$26,600	$37,700

Interest and Taxes

Interest 5%, taxes 1.5% of cost of electrical material	$46,000	$39,800	$45,000

Insurance

1.5% of substation and car costs	$5,500	$4,200	$5,700
Total fixed charges	$81,200	$70,600	$88,400

Annual Operation and Maintenance

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
Transmission	$3,500	$3,500	$3,500
Substations	17,000	7,600	500
Secondary distribution, including bonds	9.000	9,000	10,000
Cars	18,500	19,500	30,100
Power at one cent per kw-hr.	47,800	42,700	49.000
Additional cost maintenance of track and roadway, shops and supervision, due to heavier cars and more expert supervision required for the single-phase	.....	.....	10 900
Total	$95,800	$82,300	$104,000

TABLE VII. COMPARISON OF COST OF SYSTEMS.

	600 v. D. C.	1200 v. D. C.	6600 v. A. C.
1 First cost	$710,000	$612,500	$694,000
2 Fixed charges	81,200	70,600	88,400
3 Operation and maintenance	95,800	82,300	104 000
4 Annual cost (Item 2 plus Item 3)	$176,000	$152,900	$192,400
Based on 1,095,000 car miles per year, additional annual charge per car mile above the cost for 1200 volts, in cents	2.1	0	3.6

In conclusion the author says that the saving effected by the 1200-volt direct-current system is so marked that a great increase in the adoption of this potential for this class of interurban railroading may be anticipated. On the other hand, it will not be surprising if the single-phase interurban system is entirely discarded in America, unless some improvement is made in the art and a more economical equipment made available.

ENGLISH TRAMWAY STATISTICS FOR COMPARATIVE WEEKS IN JUNE 1909 AND 1910.

The Tramway and Railway World states that the official tramway traffic returns of 64 of the principal undertakings of the United Kingdom for the week ending June 4, 1910, amounted to £199,330, or £18,665 less than for the corresponding week last year, while the track mileage was 2462, or 124 more than for the corresponding week. The receipts were at the rate of £80 19s. 3d. per track mile, a decrease of £12 5s. 6d. per mile as compared with last year. The receipts from the London County Council and Liverpool Corporation tramways included in the above return are for the preceding week, as these two corporations issue their returns later.

SUMMER CONVENTION OF WISCONSIN ELECTRICAL ASSOCIATION

While the attendance was not large, and extremely warm weather was encountered, the summer convention of the Wisconsin Electrical Association at Oshkosh, Wis., on June 28 and 29, well repaid those who attended, owing to the practical nature of the discussions. There was no formal program and no papers were prepared in advance. Two sessions were held, and the principal subject for discussion was rates, both for electric railway and electric service plants. Some other matters received attention, however. A fair-sized delegation of supply men was in attendance, but there were no exhibits. The meetings were held at the handsome house of the Oshkosh Yacht Club, fronting the broad expanse of Lake Winnebago, and the Wisconsin Electric Railway Company placed special cars at the disposal of the visitors to transport them between the hotel and the place of meeting. The president of the association, Clement C. Smith, of Milwaukee, was unable to be present owing to illness, and Irving P. Lord, of Waupaca, vice-president, occupied the chair. An account of the discussions on railway matters follows:

THE ELECTRIC RAILWAY RATE SITUATION

The first speaker was C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company. He referred to the effort of the city of Milwaukee to compel the company to carry people on the local street railway system for 3 cents each. At present six tickets are sold for 25 cents. The question has been argued exhaustively, and it now rests with the Wisconsin Railroad Commission to decide the matter on the evidence submitted. In the presentation of the Milwaukee case it became apparent, according to Mr. Duffy, that under existing conditions, including the high cost of labor and material, the demands of the public in relation to service, and the demands of the municipality, it is a grave question whether the average city electric railway can haul people at 5 cents a head and secure a reasonable return on the investment, this return to include proper operating expenses, the due share of city taxes, and a proper provision for reserves of all character, especially depreciation and amortization of the franchise, so that the investment made by the stockholders may be held intact.

In the old days electric railway companies boasted of operating for 40 per cent, 50 per cent or 60 per cent of the gross receipts, but they did not know how to keep their accounts. Such matters as setting aside a proper amount for depreciation, amortization and unknown contingencies were not taken into account, or only dimly and partially taken into account. Compared with other industries, a very high proportion of the actual values of public utility companies is on the tax books.

The speaker alluded to the history of the Chicago City Railway Company, with which he was formerly connected. In 1905 this company operated 220 miles of track and was earning from 12 per cent to 15 per cent on $18,000,000 of capital stock and paying 9 per cent. The company had no bonds, and it was considered that from the standpoint of transportation and of earning power no other company in the United States approached it. In the year mentioned, J. P. Morgan & Company, of New York, supposing the company had a long franchise, bought and paid $200 a share for the stock. The next year the courts decided that the franchise did not run until 1959, as was supposed. What happened? The famous Chicago traction settlement ordinance was adopted, and after the owners had put about $40,000,000 into the property, for there had been some betterments since $36,000,000 was paid for the stock, the company was allowed $21,000,000 in the franchise settlement. This instance shows the necessity of preserving the investment in public utility companies—the investment not only in the physical property, but in intangible things, which may be affected by unforeseen contingencies. This possibility must be taken into account, just as the wages of conductors and motormen are taken into account.

It takes very careful management for a street railway company to operate for a 5-cent fare or for an interurban company to operate at 2 cents a mile. These should be the minimum rates, or rather, the basic rates. It is of the greatest importance that the companies study the situation and find out the true cost of conducting their business. Electrical operating companies are producers of rides and electrical energy. They must at all hazards find out all the elements entering into the cost in order to determine the proper rates.

Mr. Duffy spoke of the Cleveland street railway situation. He knew Tom Johnson, and gave some account of his early career when Mr. Johnson was in the street railway business, but did not operate on a 3-cent fare. Mr. Duffy was of the opinion at the time of the Cleveland agitation that Mr. Johnson could not do so in Cleveland, and especially as at that time Mr. Johnson was operating a company in Allentown, Pa., on a 5-cent fare. The speaker was emphatic in saying that street railway companies cannot carry passengers for 3 cents. He does not believe they can do so for 5 cents, really, although it is a fact that, including transfers, people are being charged only 3.15 cents in Milwaukee. Statistics were given of the Milwaukee street railway systems, and it was shown that, exclusive of provisions for contingencies, it costs 3½ cents a passenger to carry the people.

Unless the cost of carrying passengers can be reduced, Mr. Duffy does not believe that the street railway companies of the United States can continue to do business at the present prices. Something must be done—either for the establishment of a zone system of fares, the readjustment of the transfer system, or something else. The companies themselves are to blame for the situation. Until very recently they did not themselves know what their cost actually was.

Turning to Massachusetts it was remarked that if the companies in that State had not made their rates too low there would be no necessity of raising them. The same observation applies to Oshkosh, Wis., where the interurban company has asked the State commission for an increase of rates. The steam railroads have uniformly tried to uphold their passenger rates, and Mr. Duffy admired them for it. In concluding this portion of his address, he again asserted with emphasis that electric railway companies should not consider anything less than a basic rate of 2 cents a mile on interurbans, with a 5-cent minimum.

Mr. Duffy concluded his interesting address by a discussion of rates for electric light and power. In this service the speaker believed in a liberal and flexible schedule as well as a comparatively simple scale of rates, and referred to the rates in use in Milwaukee, where the price for electricity used for lighting varies from 12 cents to 4 cents a kw-hour, depending on the consumption, and the rate for electricity used for power varies from 8 cents to 3 cents per kw-hour. The fundamental question is to make a cost analysis covering all elements that enter into the service. Still, it is essential to put out a practical, flexible schedule of rates for electric service. The company ought to have such an installation in the power house and such a rate schedule that nobody shall have an excuse for making his own electrical energy.

RAILWAY TESTIMONY FROM MANITOWOC

Thomas Higgins, president of the Manitowoc & Northern Traction Company, of Manitowoc, Wis., agreed with Mr. Duffy that a mistake was often made in the early days of electric railroading in establishing too low rates on interurban lines. For instance, on the line connecting Manitowoc and Two Rivers a 10-cent rate was made in the early days, with a 5-cent rate in the city of Manitowoc. A year ago it was decided to increase the interurban rate to 15 cents. There was no objection on the part of the citizens generally, but some politicians got busy and secured an injunction. The case came up in court and the judge recommended that it be taken to the Supreme Court. The city refused to give an appeal bond to indemnify the company in case the decision was favorable to the latter, and therefore the case was dismissed. The increase in rates has been established, and the travel has not diminished.

Commenting on the general situation, Mr. Lord said there was something like a mania for reducing rates, both for electric service and in the electric railway business. The people

sometimes clamor for reduction; public utility companies are good targets, and too often they give way to the pressure of the public. In this rate situation the companies should be very careful, not arrogant or grasping, but safe. The holders of the securities have a right to expect payment in full. This expectation cannot be realized unless there is an adjustment of rates on a policy involving 100 cents on the dollar.

INCREASE IN INTERURBAN RATES FROM OSHKOSH

J. P. Pulliam, of Oshkosh, manager of the Wisconsin Electric Railway Company, told how his company had raised its interurban rates within the last few months. The company operates several interurban lines. One of them, between Oshkosh and Neenah, is 15 miles long. The rate of fare has fluctuated rather curiously. Originally it was 20 cents, then it was increased to 25 cents, then decreased to 20 cents and recently has been again increased to 25. With the increased rate the actual amount of traffic has shown increase also. The line from Oshkosh to Fond du Lac is 18 miles long and the rate here has been raised from 30 cents to 35 cents. The rate of fare on the line to Omro has also been increased. In every instance the traffic has increased following the increase in rate of fare. In Oshkosh there is a straight 5-cent fare, with universal transfers. A workingman's rate of 3 cents is made between the hours of 6 and 7 a. m. and 6 and 7 p. m. The local conditions are such that the street railway system is badly laid out, and the rate of fare should be 6 cents, or really 7. In Fond du Lac the conditions are such that the company can make a fair profit at a 5-cent fare.

BUSINESS AND ENTERTAINMENT FEATURES

After adjournment on Tuesday afternoon some of the delegates enjoyed the bathing facilities provided. In the evening there was an enjoyable open-air concert at Electric Park, the Wisconsin Electric Railway Company supplying a special car for the trip and making all other arrangements.

At the Wednesday morning session an invitation was received from William Wallen, manager of the Oshkosh Gas Light Company, to inspect the Oshkosh central station, which this company owns. Later in the day several of the visitors availed themselves of this invitation.

Vice-President Lord and Secretary Allen brought up the question of the payment of dues. The dues of active paying members are one-twentieth of 1 per cent of the gross business of the preceding year, or of the electric light, power and railway departments of joint companies. There was a general discussion on the scope of the association. It was pointed out that its educational work is very important. It should educate the people and the legislators of the State on the real conditions of the electric light and railway business. Ernest Gonzenbach, of Sheboygan, moved that a pamphlet be prepared giving the constitution and by-laws and list of members of the association, together with other information about the organization, to be printed for general distribution. This motion was adopted.

CONCLUDING BUSINESS

Secretary Allen said that his office receives many requests for information, and he might undertake to furnish the members the important rulings of the State Railroad Commission if desired. The secretary might also establish a sort of employment exchange, bringing unengaged men and open positions together.

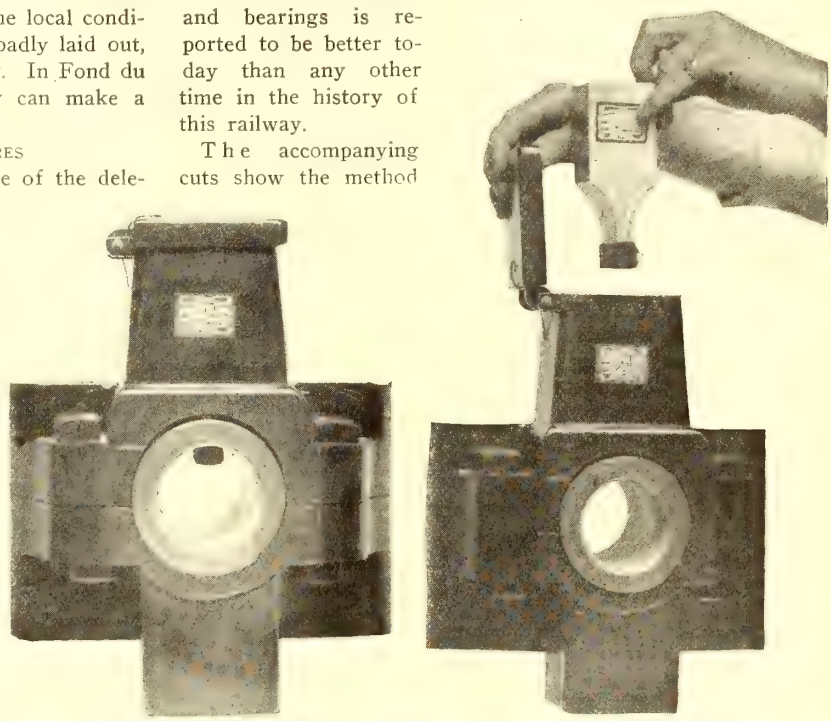
Mr. Allen also mentioned the fact that the Madison Gas & Electric Company, of Madison, Wis., has been most helpful to the association in days past, and that it would be an act of simple justice for the association to show its appreciation in some manner. On motion, the matter was made a special order for the annual convention of this association to be held in Milwaukee next January.

The thanks of the association were extended to the Wisconsin Electric Railway Company, and particularly to Mr. Pulliam, of that company, the Oshkosh Gas Light Company, and particularly to Mr. Wallen of that company, and also to the Oshkosh Yacht Club for extending the courtesies of its beautiful building.

AN ECONOMICAL OIL CUP

The accompanying illustrations show the "Economy" oil cup, made by the Economy Oil Cup Company, Augusta, Ga., to eliminate grease lubrication. The cup is of the felt base type, and was invented by E. M. Crozier, now superintendent of the Augusta-Aiken Railway. Before the cup was tried the cost of motor lubrication on the Aiken division was as much as $1.14 per 1000 car-miles. The new cups were first placed on a number of trial cars during May and June, 1908, and by their use Mr. Crozier succeeded in reducing the charge of lubricating to about 70 cents per 1000 car-miles, with less than one-third of the cars on this division using this cup. In view of this result the Augusta-Aiken Railway & Electric Company at once equipped its entire system with the new cup, thereby reducing the lubricating cost to 18 cents per 1000 car-miles. The condition of armatures and bearings is reported to be better today than any other time in the history of this railway.

The accompanying cuts show the method of installing the cup and the simplicity of its construction. The body is composed of block tin shaped to fit the old grease box and made in various sizes to conform to different style motors. The felt base fits the bearing slot and rests upon the shaft to which it conveys the oil. The weight of the cup causes it to follow the shaft as the felt wears, thus assuring a free and constant uniform feed of oil. The base is made of one piece of sheet felt extending up into the body of the cup, as shown in one of the cuts; all oil passes through this base direct to the shaft, thus preventing dirt, grit or dust from entering the bearing. There is no drip from the bearing when the cars are standing in the car-house or stations along the road, as the cup feeds oil only when the shaft is in motion. The oil does not leave the cup until the shaft is reached. It cannot leak out around loose bearings, as the cup rides the shaft at all times with the felt base below the top of the bearing slot. The removable feature of this cup permits inspection of the bearing at all times simply by lifting the grease box lid. It has been found that an oiling of one-half gill per bearing will furnish perfect lubrication for operating over 37 hours, or 275 miles to 300 miles.



Oil Cup with Felt Base, Showing Application to Bearing

THE USE OF COMMUTATING POLE MOTORS IN THE UNITED STATES

The General Electric Company has just issued some statistics on commutating pole railway motors, which were introduced about four years ago. The sales of this type by the largest two railway equipment manufacturers in this country were 17 per cent of the total number of railway motors sold by them in 1907, while in 1908 and 1909 this increased to 51 per cent. These motors, varying in size from 50 hp to 275 hp, are operating successfully in all parts of this country and Europe under various service conditions. It is held that the improved commutation and protection against flash-overs afforded by commutating poles has made possible the very satisfactory results in decreased maintenance of commutators, brush holders, brushes and windings.

The average non-commutating pole motor cannot be relied on for more than 50 per cent to 75 per cent current overload when the car is required to make up lost time, accelerate on heavy grades or meet other emergency conditions. On the other hand, the commutating pole motors as a type will take care of from 150 per cent to 200 per cent overload for emergency intervals without apparent injury.

The following data on the performance of recent locomotives will illustrate to what extent these overloads have proven practical. It is assumed that in the great majority of instances the locomotive starts are made at the slipping point of the wheels.

Road	Type motor	Amp. rating	Weight per driver	Amp to slip 25% coef.	Amp to slip 30% coef
Detroit River Tunnel.....	GE-209	400	50,000	525	610
Baltimore & Ohio Railroad..	GE-209	400	45,000	650	750
Chicago & Milwaukee Electric Railway	GE-205	144	18,000	310	360

Some of these locomotives have been in operation over two years, and as far as known these overloads have shown no injurious effects. Less wear of commutator might reasonably be expected with the decreased sparking as the etching effect of the spark is largely accountable for this wear. The following figures are taken from car equipments in actual service:

Road	Motor	voltage	Motor mileage per motor
Indianapolis & Louisville Traction Company.	GE-205	600/1200	200,000
Pittsburg, Harmony, Butler & New Castle Electric Railway	GE-205	600/1200	200,000
Third Avenue Railroad, New York.....	GE-210	600	70,000
Chicago Railways	GE-216	600	50,000

On none of these roads has the commutator wear been enough to be distinguishable by the eye or enough to enable one to feel any indication of a ridge on the commutator. It is safe to say that the life of the commutators is at least five times as long as that of non-commutating pole motors. The life of brushes has also been greatly increased owing to the smoother commutator and decreased burning of the brush. The local current on the face of the brush may amount to as much as the actual line current, and is largely responsible for the deterioration of the bearing surface; this local current is greatly reduced in commutating pole machines.

Records of brush wear on the same roads and motors mentioned above indicate 1 in. wear for about 150,000 miles running for the city equipments and 750,000 miles for the interurban equipments. Non-commutating pole motors showing one-half of these mileages might be considered as doing very well. This represents a material saving in cost of brushes as well as in time saved in inspection. With less copper and carbon dust it follows conclusively that a cleaner, safer motor and one requiring less attention is obtained.

The first General Electric 1200-volt motors were put in operation on the Indianapolis & Louisville line in October, 1907, and since that time about 40,000 hp in 1200-volt motors have been installed on some eight different roads. These motors and the entire equipment are operating in a manner which seems to indicate the entire practicability of the higher voltage for railway work, though the commutating pole becomes a practical necessity with motors designed for use on this voltage.

ASSOCIATION BULLETIN ON CONVENTION ARRANGEMENTS WITH ATLANTIC CITY HOTELS

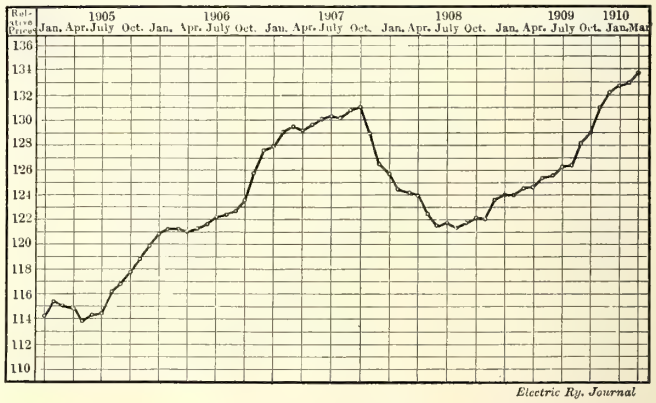
The American Street & Interurban Railway Association has issued Convention Bulletin No. 2, which describes the arrangements for the Atlantic City convention with particular reference to the hotels. As in 1908, Young's Million Dollar Pier will be used for exhibits and most of the convention meetings will be held there. The Marlborough-Blenheim has been selected as the headquarters of the American Association and the Manufacturers' Association. The Accountants will establish headquarters at the Chalfonte, the Engineering Association at the Dennis, the Claim Agents and Transportation & Traffic Associations at the Traymore. A list is published of the principal hotels in Atlantic City, together with rates for the different classes of rooms. Hotel reservations should be arranged directly with the hotels, and to avoid error statement should be made that the reservation is desired in connection with the convention. The special rates made by the hotels have been given with the understanding that the hotel charges will be for the full time of reservation. The hotels have agreed to provide a detailed list of their room numbers and respective rates, which will be in the hands of a committee as a check-up in registration hours during the convention. If information of this kind is desired prior to the convention week it may be obtained by communicating with the secretary's office for the American and affiliated associations and with W. L. Conwell, 165 Broadway, New York, for the Manufacturers' Association.

The present bulletin includes illustrations of Young's Pier and a plan of the boardwalk and vicinity showing the location of the hotels and piers. It is announced in conclusion that details of transportation, programs, meeting halls and other convention subjects will be treated in subsequent bulletins.

PRICES OF COMMODITIES

Bulletin No. 87 of the Bureau of Labor of the Department of Commerce and Labor, giving prices of a large number and variety of raw and manufactured commodities, has just been published. This bulletin is supplementary to bulletins 71, 77 and 81 issued by the same bureau, and brings the records of prices quoted up to March, 1910. The figures are particularly interesting because of the effect of high prices of commodities on the operating expenses and cost of construction of electric railways.

[Average price for 1890 to 1899 = 100.0]



Relative Prices of all Commodities by Months from January, 1905, to March, 1910

Bulletin 87 contains a chart, from which the accompanying diagram is reproduced, and gives in graphical form the figures quoted on page 25 of the last issue of this paper. As shown, the prices were higher in March, 1910, than at any other period shown on the chart and this includes the entire period since 1890 for which records have been compiled. Prices were higher even than in October, 1907, which constituted the period of highest prices up to that time.

News of Electric Railways

The Detroit Situation

Mayor Breitmeyer, of Detroit, Mich., is preparing a special message to the City Council which will review the traction situation in Detroit and contain suggestions to the Council for action looking toward a settlement of the minor controversies that have seriously interfered with the progress of the negotiations between the city and the Detroit United Railway. Frederick T. Barcroft, who appraised the property of the company in the interest of the city, but refused to defend his figures, has been in communication with the Mayor, and has now stated that when the Council is a party to the proceedings he will permit the organization which assisted him in his original work to resume its labors on behalf of the city. In response to the request of the Mayor that he outline some procedure for the Mayor to submit to the Council for approval, Mr. Barcroft has written the Mayor a letter in which he says that the city should decide definitely upon the following:

"1. Council should state what the city wants; then, being advised by its legal department, the disposition of the matter will be proper, sane, legal and just.

"2. A purpose having been established to which the valuation is to be applied, it can be kept constantly in mind in its application and the subject ended.

"3. Is more than a scrap value to be given the lines upon which franchises have expired?

"4. Are the original costs to be applied on this property or the 1909 prices on the few lines where the franchises have not expired?

"5. Are all the old cars in operation to be included, or just the modern ones?

"6. Are the power houses to be included? If so, is their present usefulness to be the basis of judgment of their value?

"7. Are all the buildings the company owns to be included, or only those of modern construction, used for railway purposes?

"8. Are both shops to be included precisely as they are without analysis of what they are used for, or is the fact to be recognized that two-thirds of their force and equipment is utilized for the care of interurban and small suburban town cars in the vicinity of Detroit?

"9. Are overhead charges to be considered at all on lines where franchises have expired? Are overhead charges to be figured on a basis of the original cost of the Pack-Everett lines applied to the D. U. R. system, or a basis of 1909 prices?

"10. Is the real estate to be charged at its value when purchased, or 1909 prices?"

According to Mr. Barcroft, to carry out the work based on these questions would involve a further outlay by the city of $10,500.

The company has replied to the communication from the city which contained the two resolutions adopted by the City Council, one under date of June 14, 1910, requiring the company to pay $50 a day additional to the city, and one under date of June 21, 1910, requiring the company to make a further payment of $100 per day for the privilege of operating on streets on which the franchises are said to have expired. The company said substantially:

"We are compelled to advise you that we deny the statement contained in the preamble in each resolution to the effect that the rights of the company have expired on the streets mentioned in said resolution. We are also advised that the requirements to pay said sums of money are illegal for other reasons. We are therefore compelled to advise you that we must decline to pay said sums.

"Perhaps it may not be inappropriate to say to you that the increase of the ad valorem tax which has been made this year, added to the excessive demands now being made, has prevented us from completing our arrangements for borrowing the money necessary to make all the extensions required by your recent resolutions which we accepted. These resolutions, with other necessary improvements and betterments which we have contemplated, call for the expenditure of nearly $2,000,000. The addition of such burdens as you seek to impose upon us and the threat to add still others puts it beyond our power to raise the money for the purposes above indicated.

"When your honorable body adopted the resolution regarding the payment of $300 per day, we then advised you that we did not regard the requirement as a legal one, but in the hope of avoiding litigation and further friction between us, and without waiving our legal rights, we have paid that sum, and for the present will continue to pay it, under the conditions named in our letter advising you that we would. This was with the belief that no further burdens would be added.

"We do not believe that you have fully considered the necessary effect of the imposition of these heavy financial burdens upon the company, and therefore respectfully call your attention to it.

"We believe we should again call your attention to the failure of the city to maintain the track properly, and paving foundations, and the paving on the lines known as the Detroit Railway system, and in this connection we beg to call your attention to our letter to his honor, the Mayor, concerning this matter. This company is at all times ready to co-operate with your honorable body in bringing about a better state of affairs concerning these and all other street railway lines in this city, consistent with a reasonable protection of the property in its charge."

Cleveland Traction Situation

J. J. Stanley, president of the Cleveland Railway, has asked the City Council for an increase of 1 cent per car mile in the allowance for operating expenses to cover the advance in the wages of motormen and conductors, made by the board of arbitration. The city named G. M. Dahl, street railway commissioner, to represent it in conference with the officers of the company regarding the matter. Mr. Dahl opposed the increase. Mr. Stanley says that the additional cost of operation must be defrayed. Refusal on the part of the city to make a change of this kind in the ordinance would remove the obligation of the company to the men by imposing conditions on the company that are impossible. The legislative committee of the Federation of Labor called upon Mr. Dahl on June 30, 1910, and urged that he place nothing in the way of the advance that has been recommended in wages.

Owing to the supposed unsafe condition of the Superior Avenue viaduct draw, Mr. Stanley has instructed conductors to give transfers good over the Central viaduct, from West Side lines, if passengers desire them. The Superior viaduct may be abandoned as soon as connections are completed between the Abbey Street and other West Side lines.

A number of accidents have occurred recently because people put their heads through the car windows on the devil strip side, and orders have been issued that the last two windows on the side of all cars be kept closed. The wire grills which at present extend well up the windows of the cars, will probably be extended so as to inclose the whole window.

Traction Fund in Chicago Applicable to Subway Work

The Supreme Court of Illinois has sustained the decision of Judge Carpenter of the Circuit Court that the City of Chicago is authorized to use for building subways the fund of about $4,500,000, which has accumulated as a result of the participation of the city in the earnings of the Chicago City Railway and the Chicago Railways. The decision of the Supreme Court says in part:

"Our conclusion is that the city has power to acquire or construct street railways, and that street railways, properly construed, mean elevated, surface or underground railways; that the City of Chicago may exercise this power in ac-

cordance with the traction ordinance of 1907, and may expend for such purpose either the special traction fund or any other available corporate funds belonging to the city.

"No one would seriously contend that a city had the right to grant the exclusive use of its streets to a street railway, and thus compel all persons who used the street to travel upon the street cars of such company.

"No such unlimited grant is contemplated by the traction ordinances. The clear meaning of the ordinance is that the city will not permit any other street car company to use the tracks in the subway that are leased to the present traction companies.

"We have no doubt that if the city owned a certain street railway it would have the right to lease such track and give the lessee the exclusive right of operating its cars upon such track, but the rights of the public in the street would be the same as they are where the street railway owns its own tracks."

Ohio State Board of Arbitration and Threatened Strike at Columbus

The employees of the Columbus Railway & Light Company, Columbus, Ohio, who claim that the company has discriminated against them, have asked Governor Harmon to remove Judge Noah H. Swayne and Joseph Bishop from the State Board of Arbitration. Judge Swayne had been reappointed a few days previously, but resigned when he heard that the men objected to him. The law provides that the Governor shall appoint one person to represent the employers and one to represent labor, and that these two shall recommend a third to be appointed by the Governor. It was alleged that Judge Swayne does not represent the employers of labor. Mr. Bishop is affiliated with an association composed of iron, steel and tin workers, and was appointed a member of the board by William McKinley when he was Governor of Ohio. The motormen and conductors say that he is not an employee and was not an employee at the time of his appointment. Attorneys representing the carmen conferred with Governor Harmon about the removal of Mr. Bishop, who intimated that he would not tender his resignation. They claimed that labor has been dissatisfied with Mr. Bishop for several years, but that complaint had not been made before because the board had not arbitrarily ordered a hearing. The Governor stated that he would take no action until he had an opinion from the Attorney-General. That official says that Mr. Bishop is technically an employee, and the Governor has refused to remove him. Albert F. Sparks, general manager of the James Leffel Company, Springfield, Ohio, manufacturers of water wheels, has been appointed to succeed Judge Swayne on the board.

New Indiana Road Opened.—The Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind., which connects Indianapolis, Greenfield, New Castle, Muncie, Richmond, Winchester and Toledo, was placed in regular operation on June 28, 1910.

Franchise Matter at Toledo.—The proposal of Mayor Whitlock, of Toledo, that an inventory should be made of the property of the Toledo Railways & Light Company was considered by the directors of the company at their meeting held during the week ended July 2, 1910, but no decision was reached.

Interurban Terminal in Columbus.—The Columbus Interurban Terminal Company, incorporated by J. B. Foraker, Jr., F. A. Healy, Dana Stevens, W. H. McAllister and W. Kesley Schoepf, with a capital stock of $10,000, will erect an interurban station and provide an interurban terminal at Third Street and Town Street, Columbus, Ohio.

Some Changes in the Space Numbering at the Atlantic City Convention.—The American Street & Interurban Railway Manufacturers' Association has just issued a circular giving the plans of the pier at Atlantic City, which show a slight change in the numbering of the spaces at the end of the pier. The circular also gives the dimensions for all of the booth spaces, head room and area, and complete instructions for applying for space.

Decision Against Chicago City Railway.—The Supreme Court of Illinois has decided in favor of Clarence H. Venner in his mandamus proceedings against the Chicago City Railway for an inspection of its books and records, and has reversed the decision of the Appellate Court, which was in favor of the company. The company contended that it was not subject to the general corporation law entitling stockholders to such inspection, because it was incorporated by special charter before the corporation law was passed. This contention the Supreme Court has overruled in the decision just rendered.

Unused Tracks Not a Trespass in New York.—Justice Erlanger, in the Supreme Court, has sustained a demurrer interposed by the receiver of the Fulton Street Railroad, New York, N. Y., to the complaint in a suit brought against him and the company by the city of New York for the removal of the tracks of the corporation, on the ground that they constitute a trespass and a nuisance. The company was authorized to operate a street railway along Fulton Street, West Street and other streets. The grant, or franchise, was originally acquired by the North & East River Railway, and was subsequently transferred to the Fulton Street Railroad. The basis of the action was that no cars had been run on the line since June 1, 1908.

Spokane Transportation Club.—At the meeting of the Spokane Transportation Club, on June 17, 1910, the subject of through billing was discussed with particular reference to the billing of freight direct from New York and Chicago to points on the Spokane & Inland Empire Railroad. Other subjects considered were largely of interest to the steam railroad officials in attendance. It was voted to accept the invitation extended by Waldo G. Paine, second vice-president and traffic manager of the Spokane & Inland Empire Railroad, and J. C. White, of the Red Collar Steamboat Line, to hold the annual outing of the club on July 20, 1910, on the St. Joe River. The cars of the Spokane & Inland Empire Railroad will be used as far as Coeur d'Alene. The party will then journey by boat on Coeur d'Alene Lake to the mouth of the St. Joe River.

Electric Railways in Michigan.—The State Railroad Commission of Michigan reports that in the year ended Dec. 31, 1909, 19 electric railways, with 1268.90 miles of track, were operated in Michigan. The cost of the electric railways up to June 30, 1909, was $90,591,665. Only 8.19 miles of new track were laid during 1909. The electric railways have $38,693,100 of stock outstanding par value. The dividends last year amounted to $90,901.79. The income statements showed 12 companies with a surplus for 1909 of $3,632,308, while seven had a deficit of $211,551. The total passenger revenue of the electric railways was $9,713,275.37, and the total revenue from transportation $10,500,523. The operating expenses were $6,500,745. There were 7153 employees on the electric railways of the State, including 98 general officers, 223 clerks, with 29 superintendents. There were 1726 passenger cars and 544 other cars in use. During the year 43 persons were killed and 375 were injured. Five passengers were killed and 222 were injured.

San Francisco Municipal Railway Bonds Declared Legal.—The Supreme Court of California handed down a decision on June 25, 1910, in which it was declared that the course of the city officials of San Francisco in connection with the plan to issue bonds for the reconstruction of the Geary Street, Park & Ocean Railway by the city has been regular and construed the city charter and the State Constitution in such a way that no question is left as to the city's right to construct, complete or purchase a municipal street railway. The decision says: "Whatever basis there may be for the doubt expressed as to the wisdom of the policy of the acquisition and operation by the City and County of San Francisco of the proposed municipally-owned street railways, we have no doubt that the city and county has the power to construct and operate the same and the power to incur a bonded indebtedness for such purpose, and also that the proceedings in that behalf presented for review on the appeal are free from substantial irregularity. It necessarily follows that the conclusion of the trial court was correct. The judgment is affirmed, as is also the order denying the plaintiff's motion for an injunction." The Board of Supervisors of San Francisco has set the date for receiving bids for the bonds for July 11, 1910. The first issue of bonds will be $260,000, and will provide funds sufficient for getting the work on the municipal line started.

Financial and Corporate

New York Stock and Money Market

When the market reopened this morning after the three-day holiday Wall Street was hopeful that the persistent selling pressure would be lifted. The opening sales were at advances, but almost immediately large quantities of stock were offered and rapid declines followed, there being little professional support. Several of the more active issues made new low records for the year, and many were only fractionally higher than the low point of June 30. There was a slight recovery at the close, but net losses were generally recorded for the day.

Money was easy at: Call, 2 to 3¼ per cent; 90 days, 3¾ per cent.

Other Markets

The Philadelphia market was affected by Wall Street to-day, and was generally lower with considerable selling pressure. Rapid Transit has declined about 1 point and Union Traction less than 2 points.

Massachusetts Electric issues and Boston Elevated have been fairly active in the Boston market both before the holidays and to-day. There has been some pressure to sell these issues and they have declined under the liquidation.

In the Chicago market, the Elevated issues were affected by Mr. Blair's announcement that conditions were unfavorable for the proposed elevated consolidation. Metropolitan preferred, which sold a week ago at 70, closed to-day at 58½, and the common, which sold at 24 a week ago, closed at 20. South Side Elevated dropped to-day from 69 to 55.

There continues to be some buying of United Railways certificates in the Baltimore market, but the price remains about 13½ to 14. Bond prices are unchanged.

Quotations of various traction securities as compared with last week follow:

	June 28.	July 5
American Railway Company	a44	a42½
Anrora, Elgin & Chicago Railroad (common)	a60	a*60
Aurora, Elgin & Chicago Railroad (preferred)	a91	*91
Boston Elevated Railway	a126	a126
Boston & Suburban Electric Companies	a14	*14
Boston & Suburban Electric Companies (preferred)	a74	*74
Boston & Worcester Electric Companies (common)	a10½	a10½
Boston & Worcester Electric Companies (preferred)	a40	a40
Brooklyn Rapid Transit Company	76¾	73⅞
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	83¼	82
Capital Traction Company, Washington	a129½	a130
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a17	a17
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4s	a6½	a6½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a76	a75
Consolidated Traction of N. J. 5 per cent bonds	a103	a103
Detroit United Railway	*50½	*50½
General Electric Company	143	140
Georgia Railway & Electric Company (common)	a108	a108
Georgia Railway & Electric Company (preferred)	a87	a87
Interborough-Metropolitan Company (common)	18	17
Interborough-Metropolitan Company (preferred)	49½	49
Interborough-Metropolitan Company (4½s)	80	79½
Kansas City Railway & Light Company (common)	a25	a25½
Kansas City Railway & Light Company (preferred)	a73	a73
Manhattan Railway	130	125
Massachusetts Electric Companies (common)	a15⅞	*15⅞
Massachusetts Electric Companies (preferred)	a80	*80
Metropolitan West Side, Chicago (common)	a23¾	a23½
Metropolitan West Side, Chicago (preferred)	a70	a58½
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68	65
Northwestern Elevated Railroad (common)	a22	a25
Northwestern Elevated Railroad (preferred)	a65	a63
Philadelphia Company, Pittsburg (common)	a48	a42½
Philadelphia Company, Pittsburg (preferred)	a43¾	a43
Philadelphia Rapid Transit Company	a19⅛	a18⅛
Philadelphia Traction Company	84½	84½
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs.	a101	a100
Seattle Electric Company (common)	a110	*110
Seattle Electric Company (preferred)	a100	*100
South Side Elevated Railroad (Chicago)	a72¾	*72¾
Third Avenue Railroad, New York	a7⅜	7½
Toledo Railways & Light Company	8	6¾
Twin City Rapid Transit, Minneapolis (common)	109½	106¾
Union Traction Company, Philadelphia	a46	a44¾
United Rys. & Electric Company, Baltimore	a14¼	a14½
United Rys. Inv. Co. (common)	30	*30
United Rys. Inv. Co. (preferred)	55	50
Washington Ry. & Electric Company (common)	a33½	a33½
Washington Ry. & Electric Company (preferred)	a88	a87½
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	a100	a100
Westinghouse Elec. & Mfg. Company	62	60
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. *Last Sale.

Progress of Metropolitan Street Railway Reorganization

It is expected that the plan for the reorganization of the Metropolitan Street Railway, New York, N. Y., prepared by the bondholders will be submitted to the Public Service Commission of the First District of New York for consideration on July 11, 1910. No official statement in regard to the details of the plan has been made, but it has been estimated that $12,000,000 will be required to meet the present needs of the company. Of this amount $5,500,000 will probably be available as a result of the offer made to W. W. Ladd, receiver of the New York City Railway, to end the litigation brought by him against the Metropolitan Securities Company and the Interborough-Metropolitan Company. The remainder of the $12,000,000 will be secured by assessing the stock of the Metropolitan Street Railway, for which income securities will be offered. It is, of course, expected that the stock of the Metropolitan Street Railway will be scaled down. It is proposed to refund the existing $12,500,000 of 5 per cent bonds of 1898, and the $16,000,000 of 4 per cent bonds of 1902, and to care for the accident judgments held by the tort creditors of the New York City Railway. The tort creditors of the Metropolitan Street Railway proper, whose claims have grown out of accidents since the receiverships of September, 1907, are not affected by this settlement. Such tort claims are being met, as they accrue, as a part of the operating expenses of the road. According to the New York *Times*, it is expected that there will be an increase in gross earnings of about 3.5 per cent a year and that the operating ratio, with the present burden of taxes and rentals, will be about 70 per cent of the gross. That gives the following estimated income, applying the percentages to the figures compiled by Chairman Tripp, of the reorganization committee, as of Dec. 31, 1909:

Gross from operation, $13,258,412 for 1909, plus 3.5 per cent.	$13,722,448
Operating cost and taxes, (70 per cent)	9,605,711
Net from operation	$4,116,737
Interest and rentals on underlying securities	2,353,978
Net income	$1,762,759
Other income	200,000
Gross income	$1,962,759
Interest (6 per cent) on $12,000,000 new cash	720,000
Balance applicable to existing 4s and 5s	$1,242,759

Following the announcement that the bondholders' committee was soon to submit to the Public Service Commission a plan of reorganization which involves a discontinuance of the litigation between the receivers and the Interborough-Metropolitan Company and the Metropolitan Securities Company interests, Robert W. de Forest made the following statement:

"The plan has received the approval of the bondholders' committee and is now before Judge Lacombe.

"The gentlemen who are providing the funds for this adjustment have been actuated by a desire to terminate the costly and vexatious litigation which has been in progress throughout almost the entire period of receivership and to enable the early reorganization of the Metropolitan properties in the interest of both the security holders and the public. Another important reason for the adjustment, which commends itself to all, is that it seems to afford, through the action of the bondholders' committee, the only means of providing relief for the holders of personal injury claims who have recovered judgments against the New York City Railway to the amount of almost $2,000,000, whose judgments would otherwise have been been rendered valueless by foreclosure. The salient features of the adjustment are as follows:

"The sum of $5,500,000 is paid to the receivers in settlement of the claims of the receivers against the Metropolitan Securities Company and through that company against the Interborough-Metropolitan Company, its principal stockholder, representing the balance of the purchase price of $8,000,000 of Metropolitan Street Railway Company improvement notes issued prior to the receivership and on account of the purchase price of which only about $3,000,000 had been paid at the time of the appointment of receivers, and also in settlement of the claim of the receivers of the New York City Railway, based upon the redemption at par of notes of the New York City Railway which had been originally issued at 70. The receivers claimed that the

Metropolitan Securities Company was liable to the extent of this difference, and they also contended that a corresponding liability rested upon directors, although they did not in any way individually profit from the transaction. Former directors have accordingly provided the sum of $1,500,000 as part of the general readjustment which terminates a litigation, the continuance of which might have prevented reorganization of the property for an indefinite length of time without offering any means of providing for the payment of the claims of those who had suffered personal injury through accidents.

"All pending litigation will be ended by this adjustment."

Theodore P. Shonts, president of the Interborough-Metropolitan Company, issued the following statement:

"The Interborough-Metropolitan Company has agreed to contribute to the settlement announced by Mr. de Forest, not as any part of a plan to participate in a reorganization of the surface lines, for that question has not been determined, but in order to put an end to all existing and threatening litigations against it.

"The Interborough-Metropolitan Company is the holder of about 97 per cent of the stock of the Metropolitan Securities Company upon which over $7,000,000 is still unpaid. As such stockholder it has been sued with the minority stockholders by the receiver of the New York City Railway to compel it and the minority stockholders to satisfy out of their personal stock liability the judgment amounting with interest to over $4,600,000 recovered by the receiver against the Metropolitan Securities Company. The receiver disputes the right of the Interborough-Metropolitan Company to any counterclaim to offset this liability. The company is also threatened with further similar litigations as the result of a pending suit brought by said receiver against the Metropolitan Securities Company, in which former directors of the New York City Railway are joined as defendants to recover with interest over $4,000,000 on account of the issue to the Securities Company of the New York City Railway debentures at 70 and their redemption by the New York City Railway at par. It is also threatened with litigation by the receiver of the Metropolitan Securities Company in aid of the collection from the Interborough-Metropolitan Company of the said judgment and claims of the receiver of the New York City Railway.

"To put an end to this litigation, existing and threatened, the Interborough-Metropolitan Company has made a cash contribution of $4,000,000 in the form of payment upon its stock liability, the cash for this purpose being raised by the sale of its five-year 6 per cent notes at par. The remainder of the sum required, $1,500,000, has been contributed by certain of the directors of the New York City Railway already referred to.

"The Interborough-Metropolitan Company also releases the New York City Railway and the Metropolitan Street Railway from certain uncollectible claims, and agrees not to participate directly or indirectly in the receivers' funds; but it retains all its valuable collateral. As a result of the settlement, provision has been made by the bondholders' committees of the Metropolitan Street Railway, subject to the approval of the Public Service Commission."

Judge Lacombe, in the United States Circuit Court, has adjourned the sale of the property of the Metropolitan Street Railway under foreclosure until Sept. 27, 1910.

Sale of New Jersey Line

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, announced on July 2, 1910, that the Public Service Corporation had acquired by purchase from Ford, Bacon & Davis, New York, N. Y., a large majority of the stock of the New Jersey & Hudson River Railway & Ferry Company and that the latter will hereafter be operated as part of the Public Service Railway. A meeting of the board of directors of the Hudson River Railway & Ferry Company was held in New York on July 2, 1910, at which the officers of the company resigned and the officers of the Public Service Corporation were elected to succeed them.

The New Jersey & Hudson River Railway & Ferry Company operated chiefly in Bergen County in territory which had not been touched by the Public Service Corporation's lines. It also controlled the Fort Lee Ferry from Edgewater, N. J., to the foot of West 130th Street, New York. It possesses more than 48 miles of track, nearly half of which is built on private right of way. The terms of the sale were not disclosed, but it is understood that the same offer made by the Public Service Corporation for the majority of the stock was extended to all of the stockholders of the New Jersey & Hudson River Railway & Ferry Company and that under it the Public Service Corporation will acquire practically all of the stock of the company.

Federal Light & Traction Company, New York, N. Y.—The Federal Light & Traction Company, the organization of which was noted in the Electric Railway Journal of June 11, 1910, page 1041, has filed for record a certificate of the increase of its authorized capital stock from $2,000,000 to $11,000,000, one-half of which is preferred.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Judge Carter of the Superior Court has consented to have Charles L. Henry, receiver of the Indianapolis & Cincinnati Traction Company, file a petition on Aug. 20, 1910, for the sale of the property of the company. The hearing on the petition will be heard on Sept. 7, 1910. Mr. Henry reported to the court that all the holders of the $2,000,000 of outstanding bonds had signed agreements for the reorganization of the company except the holders of about $21,000 of the bonds.

International Traction Company, Buffalo, N. Y.—A committee consisting of H. H. Littell and George R. Teller, Buffalo, N. Y., and John W. Green, Louisville, Ky., has called for deposits of the 50-year collateral trust 4 per cent bonds of the International Traction Company with the Commonwealth Trust Company, Buffalo, N. Y., or the Columbia Trust Company, Louisville, Ky., or a trust company in New York to be designated later, in opposition to the plan announced in the Electric Railway Journal of June 25, 1910, page 1114. The committee contends that the plan previously outlined undertakes to obtain from the bondholders funds for improvements and extensions which should properly be contributed by the shareholders.

Nevada Water, Light & Traction Company, Nevada, Mo.—The Nevada Water, Light & Traction Company has been incorporated by Edward Willard, Clifford Phillips and Mary Hopkins, Nevada, Mo., and Harry C. Barker and W. W. Seibert, St. Louis, Mo., with a capital stock of $350,000, as the successor to the Missouri Water, Light & Traction Company, the property of which was sold recently under foreclosure to A. Mitchell, St. Louis, Mo.

Third Avenue Railroad, New York, N. Y.—F. W. Whitridge, receiver of the Third Avenue Railroad, has paid off $500,000 of receivers' certificates from cash on hand. Another $500,000 will be paid off shortly. This will leave outstanding $2,500,000 of the $3,500,000 of certificates which have been issued. This is the amount provided for in the proposed reorganization now under consideration by the Public Service Commission of the First District of New York.

Tampa-Sulphur Springs Traction Company, Tampa, Fla.—Control of the Tampa-Sulphur Springs Traction Company has been sold to new interests, and Walter L. Weston, New York, has been elected president of the company; Peter O. Knight, Tampa, vice-president and general counsel; B. F. Hathaway, treasurer; C. Fred Thompson, secretary. A. G. Turner, C. C. Whitaker and C. O. Brewster have been elected directors of the company.

West Penn Traction Company, Connellsville, Pa.—A special meeting of the stockholders of the West Penn Traction Company has been called for Sept. 1, 1910, to vote to increase the indebtedness of the company from nothing to $25,000,000 by executing a mortgage to secure an issue of bonds and to take action on the proposed agreement between the West Penn Traction Company and West Penn Railways as set forth in the amended proposition of the American Water Works & Guarantee Company, made to the stockholders of the West Penn Railways on Feb. 10, 1910, and accepted by the stockholders of that company on Feb. 23, 1910. A special meeting of stockholders of the West Penn Railways has been called for Sept. 1, 1910, to vote to authorize $6,000,000 of bonds. This is an increase of $6,000,000 over present bonded indebtedness. At the same time action will be taken on the proposed agreement between West Penn Railways and the West Penn Traction Company as set forth in the amended proposition of the American Water Works & Guarantee Company.

Traffic and Transportation

Manitowoc & Northern Traction Company Increases Fares

On April 20, 1909, the Manitowoc & Northern Traction Company, Manitowoc, Wis., announced an increase in the fare from 10 cents to 15 cents on its line between Manitowoc and Two Rivers, 7¾ miles distant, effective on May 1, 1909. Shortly after the increase went into effect an injunction was secured by the city attorney of Manitowoc on behalf of the city, restraining the company from charging more than 10 cents fare between Manitowoc and Two Rivers. On June 4, 1910, the injunction was dissolved and the case dismissed. The increase was therefore declared in effect on June 15, 1910, and the following notice was issued on June 8, 1910, in regard to the change:

"On April 20, 1909, the following announcement was made relative to fares on our cars:

"'On and after May 1, the fare between Manitowoc and Two Rivers will be 15 cents if paid on the car. City tickets will be sold as in the past, 24 for $1, and three of such tickets will be accepted as an interurban fare, making the fare when tickets are used, 12½ cents.

"'Those tickets will be sold at the National Bank of Manitowoc, at Kirst's drug store in Two Rivers, and at the office of the company. Workingmen's tickets will be sold as formerly at 7½ cents per ride, good on morning and evening cars going to and from work.

"'The increase of fare has become necessary on account of increased expense due largely to new legislation recently put in force, one feature of which is a change of basis of taxation causing an increase in our taxes amounting to about 120 per cent.'

"About a week after putting those rates into effect, the City of Manitowoc secured an injunction restraining the company from charging more than 10 cents for a ride between Manitowoc and Two Rivers, and the case has been in the courts up to June 4, when the injunction was dissolved and the case dismissed. Now notice is hereby given that the rates put in force at that time as above set forth will be reinstated on June 15 next."

Recommendations Regarding Service in Watertown

The Public Service Commission of the Second District of New York has sent a communication to the Black River Traction Company, Watertown, N. Y., in regard to service on the lines of the company. The commission is of the opinion that Watertown has outgrown the existing street railway facilities; that the city is entitled to more extensive service over territory not now covered by existing tracks, and that additional service could be provided upon the present lines of the company. The commission asks whether the company has under consideration any plans for the extension of its service, and calls attention to the fact that there are no directors of the company who are residents of Watertown. It suggests that the management of the company be put in more direct touch with the needs and requirements of the city by the election of a suitable number of directors residing in the city who are interested in the company's welfare. The company is reminded of its promise to extend its present terminus to a point nearly opposite the works of the New York Air Brake Company, provided the necessary local franchises and local consents can be obtained, and directs that immediate application for such franchise be made to the city authorities. The commission also asks for assurance regarding the reconstruction of the track on State Street. Open cars should be provided during the summer months. This would add to the convenience and comfort of the patrons and enhance the revenues of the company. The company is requested to state whether it will not continue on its own motion to place open cars in service.

Meeting of the Central Electric Traffic Association.—The regular monthly meeting of the Central Electric Traffic Association will be held at Dayton, Ohio, on July 19, 1910.

Cincinnati Union Depot Ordinance Passed.—On June 27, 1910, the City Council of Cincinnati passed an ordinance giving the Union Depot & Terminal Company permission to build a depot and terminal for the railroads and electric railways which enter Cincinnati. John E. Bleekman is largely interested in the new company.

Calgary P.-A.-Y.-E. Notices.—The Calgary Street Railway, Calgary, Alta., Can., has posted notices in its pay-as-you-enter cars to the effect that "Passengers are required to voluntarily place fares in the box. Neglect to pay is a criminal offense, subject to a fine or imprisonment." The Calgary system belongs to the city.

Improved Service on the Winona Interurban Railway.—The Winona Interurban Railway, Winona Lake, Ind., plans to adopt a five-hour passenger schedule between Goshen and Indianapolis by way of Milford, Warsaw, Peru and Kokomo. The freight and express service will also be improved, and live stock and carload lots of grain, wood, tile, etc., will be handled.

Excursion of Train Dispatchers' Association of America.—The Spokane & Inland Empire Railroad, Spokane, Wash., and the Cœur d'Alene & St. Joe Transportation Company on June 22, 1910, conducted a trolley outing to Liberty Lake and Cœur d'Alene Lake and a steamer trip on Lake Cœur d'Alene for the members of the Train Dispatchers' Association of America, who were in session at Spokane.

Another Trade Excursion in Indiana.—The Indianapolis Trade Association has planned a second trip in Indiana in the interest of the trades people of Indianapolis. July 15, 1910, has been set as the date for this excursion. The route will include 14 towns on the line of the Indianapolis & Cincinnati Traction Company and the Chicago, Cincinnati, Cleveland & St. Louis Railway between Indianapolis, Rushville and Shelbyville.

Hearing on Commutation Rates Before the Interstate Commission.—The Interstate Commerce Commission has ordered a hearing in Washington on July 12, 1910, on the recent advances in commutation rates announced by the New York Central & Hudson River Railroad, New York, New Haven & Hartford Railroad, Erie Railroad, Central Railroad of New Jersey, Philadelphia & Reading Railroad, Pennsylvania Railroad, Lehigh Valley Railroad and the Delaware, Lackawanna & Western Railroad.

Meetings of Seattle Employees to Consider Prevention of Accidents.—The first meeting of officers of the operating and claim departments of the Seattle (Wash.) Electric Company, and trainmen of the company, planned for the campaign of education to prevent accidents, was held at the Fremont barn on June 21, 1910. A. L. Kempster, superintendent of transportation; Geo. Carson, C. M. Carter, J. M. Wilmot, C. F. Young and Gustave Newberg, of the claim department; G. A. Richardson, assistant superintendent of transportation, and J. E. Allison, superintendent of employment, all addressed the meeting.

Arbitration in Connecticut.—The sessions of the board of arbitrators which is to consider the questions of wages and terms of service of the employees of the Connecticut Company are to be held in the County Court House at New Haven. They will be begun on July 9, 1910, at 10 a. m., and will be open to the public. The men will present their case first. As previously stated, the members of the board of arbitration are Clarence Deming, David E. Fitzgerald and Judge William S. Case of the Superior Court. Mr. Deming was selected by the company, Mr. Fitzgerald by the men, and Judge Case by Mr. Deming and Mr. Fitzgerald.

Complaint by Electric Railway Against Steam Railroad Sustained.—In the complaint brought by the Wilkes-Barre & Hazleton Railway, Wilkes-Barre, Pa., against the Lehigh Valley Railroad regarding rates on coal the commission is of the opinion that "the rate of 40 cents per ton on anthracite buckwheat coal from Jeddo No. 4 Colliery via the Ebervale branch to the Wilkes-Barre & Hazleton Railway Junction, a distance of 5.9 miles, as compared with the rate of 30 cents per ton from the same originating point on the same commodity to Hazleton via Lumber Yard, a distance of 8.7 miles, is unreasonable." The commission therefore recommends that the Lehigh Valley Railroad shall not hereafter charge a higher rate from Jeddo No. 4 Colliery to the Wilkes-Barre & Hazleton Railway Junction than is charged from the same colliery on the same commodity to Hazleton.

Wages and Terms of Service in Toronto.—After considering the questions of terms of service and pay since May 16, 1910, the representatives of the employees of the Toronto (Ont.) Railway and the officers of the company are unable to agree, and it is probable that the differences will be submitted to the conciliation board under the Lemieux Act. The company is willing to renew the present agreement for three years. If any changes are made, however, it insists that there shall be no badges for union men; that there shall be a reduction in the hours of pay on Sunday; that there shall be no guarantee of a 12-hour day; that one more new uniform shall be purchased by new men, and that if the matter goes to the conciliation board the advisability shall be considered of reducing the pay of the employees to the scale in force in Montreal, which is 20 cents an hour to first-year men and 21 cents an hour thereafter. The employees of the Toronto Railway demand 25 cents an hour for first-year men and 28 cents an hour thereafter.

Increase in Wages on Third Avenue Railroad, New York.—On June 29, 1910, F. W. Whitridge, receiver of the Third Avenue Railroad, addressed the following communication to the employees of the Third Avenue system, New York, N. Y., including the Third Avenue Railroad, Union Railway, Dry Dock, East Broadway & Battery Railroad, and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway: "The year ended June 30, 1910, has been a prosperous one for this road, and its earnings have exceeded my anticipations. This result is due in part to the diligence and courtesy of the employees of the road, and I am happy to be able to recognize their share in producing the prosperity of the company by raising the wages of the motormen and conductors 2 cents per hour, after July 1, 1910. I believe the men of the Third Avenue system—when the advantages of the benefit and insurance association are considered—are by this increase in pay, put in a better position than any other men engaged in the same business."

Third Arbitrator Selected in Massachusetts.—E. C. Foster and W. P. Hayes, members of the board of arbitration selected to decide the question of wages of the employees of the New England Investment & Security Company, have chosen Charles S. Hamlin, a Boston lawyer, as the third member of the tribunal. A preliminary meeting was arranged to be held in Mr. Hamlin's offices in Boston, on July 5, 1910, at which plans were to be made for continuing the conferences. Mr. Hamlin was graduated from Harvard in 1883, and later studied at the Harvard Law School and at Washington and Lee University. He served as Assistant Secretary of the Treasury under President Cleveland and represented the United States at the Japanese conference in 1897 and in the fur seal fishery cases with Great Britain in the same year. In 1905 he was a member of the executive committee of the Civic Federation of New England. The arbitrators are to meet daily except on Sundays, until all the evidence has been presented and the finding reached. The finding of the board is to be effective from June 1, 1910, to June 1, 1911, and both the company and the men are to be bound to the terms imposed by the arbitrators.

Wages Fixed in Yonkers.—Justice Keogh, of the Supreme Court, to whom the settlement of the question of the wages of the employees of the Yonkers (N. Y.) Railroad was referred, has decided that the pay of one-year men should be increased to 23 cents an hour, and the pay of all men who have worked longer than a year should be increased to 26 cents an hour. Justice Keogh, in his decision, said: "The intelligent and candid statement submitted by the receiver has been of great assistance to me in the investigation which I have made. I will increase the pay of one-year men to 23 cents an hour, and I will increase the pay of all the men who have worked longer than one year to 26 cents an hour. I am adopting the sliding scale of compensation because I found it in force on the Yonkers Railroad. I have had neither the time nor the evidence to decide between the relative merits of the flat rate and the sliding scale rate of compensation. I will sign an order accordingly." The men demanded a flat rate of wages of 30 cents an hour. The course pursued by Leslie Sutherland, receiver of the company, following the strike, and the reasons for the submission of the matter to Judge Keogh for settlement were referred to in the Electric Railway Journal of July 2, 1910, page 50. Judge Keogh subsequently made the order applicable to the employees of the Westchester Electric Railroad.

Personal Mention

Mr. Walter L. Weston has been elected president of the Tampa-Sulphur Springs Traction Company, Tampa, Fla., to succeed Mr. A. R. Swann.

Mr. Peter O. Knight has been elected vice-president of the Tampa-Sulphur Springs Traction Company, Tampa, Fla., to succeed Mr. L. Brill.

Mr. L. E. Woodward has been elected treasurer of the Gary & Interurban Railway, Gary, Ind., to succeed Mr. C. W. Chase, formerly secretary and treasurer of the company, who retains the office of secretary.

Mr. H. S. Cooper, retiring general manager of the Galveston (Tex.) Electric Company, was summoned to the car house of the company recently at midnight and presented with a gold watch and fob as a token of esteem.

Mr. S. E. Simmons has been appointed superintendent of transportation of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. H. N. Hurt, resigned. Mr. Simmons was formerly assistant superintendent of transportation of the company.

Mr. C. M. Witt has been appointed auditor of the Indianapolis, New Castle & Toledo Railway, Indianapolis, Ind. Mr. Witt was formerly connected with the Indiana Union Traction Company, Anderson, Ind., which he served for the last five years in the mechanical and auditing departments.

Mr. M. J. Kehoe, superintendent of power in charge of operation of the main plant of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., has also been appointed superintendent of the light and power department of the company which does the commercial lighting in Fort Wayne.

Mr. C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., and Mr. G. G. Moore, one of the receivers of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., have been retained by Judge Grosscup as advisor to assist him in passing on the claims of the holders of the securities of the Cicero & Proviso Street Railway, Chicago, Ill., that the plan for the reorganization of the Chicago Consolidated Traction Company does not offer them a fair settlement. The first meeting to consider the claims of those interested in the Cicero & Proviso Street Railway will be held in Chicago on July 12, 1910.

Mr. W. I. Sturtevant, manager of the Everett Railway, Light & Water Company, Everett, Wash., has recently been appointed manager of the Seattle-Everett Traction Company. Mr. Sturtevant was graduated from the Massachusetts Institute of Technology with the degree of electrical engineer in 1901. He immediately entered the Boston office of Stone & Webster. Soon thereafter he was transferred to the Seattle (Wash.) Electric Company, with which he filled various positions for about three years, when he was transferred to the Paducah Light & Power Company, Paducah, Ky., as general superintendent in charge of the railway, lighting, steam heat and gas departments. Mr. Sturtevant remained in Paducah about 18 months, and was then appointed superintendent of the Pensacola (Fla.) Electric Company, also controlled by Stone & Webster. In 1907 Mr. Sturtevant was appointed manager of the Everett Railway, Light & Water Company, Everett, Wash., in charge of the railway, lighting and water systems of Everett. In addition to the duties of his office as manager of the Everett Railway, Light & Water Company, Mr. Sturtevant will also act as manager of the Seattle-Everett Traction Company, which operates a high-speed interurban electric railway between Everett and Seattle.



W. I. Sturtevant

Mr. W. A. Carson, general manager of the Evansville (Ind.) Railways, who was also recently appointed general manager of the Owensboro (Ky.) City Railroad and the Henderson (Ky.) Traction Company, was born on October 4, 1881, on a farm in Shelby County, Indiana. Mr. Carson's parents moved to Indianapolis when he was seven years old, and he was educated in the schools of that city, and was graduated from the Indianapolis Manual Training School in 1901. Mr. Carson immediately took a clerical position in the office of the National Automobile Company, where he remained more than two years. In December, 1903, Mr. Carson became associated with the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., as chief clerk to Mr. A. A. Anderson, general superintendent of the company in charge of operation and construction. This company was then operating 28 miles from Indianapolis to Shelbyville and constructing 40 miles of single-phase line from Indianapolis to Shelbyville. During Mr. Carson's connection with the company the Shelbyville line was extended 22 miles to Greensburg and changed from 600-volt d.c. to 3300-volt a.c., and the Rushville line was extended 16 miles to Connersville, completing a system of 107 miles. Mr. Anderson resigned from the Indianapolis & Cincinnati Traction Company in October, 1906, to become general manager of the Indianapolis, Columbus & Southern Traction Company and the Indianapolis & Louisville Traction Company, and Mr. Carson accepted the position of assistant general manager of the Indianapolis, Columbus & Southern Traction Company. In October, 1907, an extension of the Indianapolis, Columbus & Southern Traction Company's lines from Columbus to Seymour was placed in operation, and the same month the Indianapolis & Louisville Traction Company opened its line between Sellersburg and Seymour, completing the line between Indianapolis and Louisville, 117 miles, and through limited service was inaugurated. Mr. Carson remained in the capacity of assistant general manager of the Indianapolis, Columbus & Southern Traction Company until July, 1908, when he was appointed general manager of the Evansville Railways, which position he still retains. A syndicate composed of men interested in the Evansville Railways recently took over the Owensboro City Railroad and the Henderson Traction Company, and Mr. Carson was appointed general manager of both properties.

The Boston (Mass.) Elevated Railway has for several years published a descriptive folder of its system for the benefit of visitors interested in its engineering and operating details. A new edition has recently been brought out, showing the latest additions to the rapid transit system, including the Forest Hills elevated extension, and the extensions now under way toward Malden, Everett and East Cambridge. The subway now being built by the company in the city of Cambridge is also shown, together with the subway authorized by law under the south embankment of the Charles River in Boston. The folder consists of a single sheet, which folds into six 4½ x 9-in. pages, the first page giving a map of the rapid transit system, exclusive of surface lines, and illustrating in comprehensive form the inter-relations of subways, tunnels and elevated lines.

The interior of the folder is devoted to a pithy outline of the engineering features of the elevated structure, Washington Street and East Boston tunnels, Tremont Street subway, and extensions mentioned above, including dates upon which different sections of the rapid transit system were opened for traffic, ownership, terms of leases, and distances. This is followed by a description of the elevated division, covering its organization, routes of trains, operation of transfer and ticket systems, rates of wages paid to employees, distances on the elevated system, curves and grades, details of track construction, signal system, drawbridge, repair shops, and car equipment details. A list of the number and character of elevated cars is given in the folder, including construction, tool and wrecking cars used on the overhead and tunnel lines. The company owns two electric locomotives which are used in shifting cars in its yards, and in miscellaneous car and material transportation. The folder has been warmly received by technical men visiting the elevated system, and also has proved advantageous in giving employees a summarized sketch of the more important features of the road.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Hanford & Summit Lake Railway, Hanford, Cal.**—Application for a charter has been filed in California by this company to build an electric railway through Grangeville and Hardwick, into the Summit Lake region, and to return through Lemoore and Armona. The railway, including an extension to Laton, will be 15 miles long. Capital stock, $15,000. Incorporators: Charles R. Harwick, J. O. Hickman, Geo. C. Ayedelott, Hanford; Ralph W. Heins, Santa Cruz, and Clifford McClellan, San Francisco.

***Alton & Southern Railroad, East St. Louis, Ill.**—Incorporated in Illinois to build an electric railway from the right of way of the Southern Railway, in East St. Louis, to the right of way of the St. Louis & Belleville Electric Railway, near Louisiana Boulevard. Principal office, East St. Louis. Capital stock, $10,000. Incorporators: Arthur V. Davis, R. B. Mellon, Pittsburgh, Pa.; Charles M. Hall, Niagara Falls, N. Y.; C. B. Fox, Filbert McCulloch, Charles Souder and W. H. Hebenstreit, East St. Louis, Ill.

***Cincinnati, Lexington & Licking Valley Railroad, Frankfort, Ky.**—Incorporated in Kentucky to build an electric railway through Fayette, Pendleton, Kenton and Campbell Counties, connecting Lexington and Newport. Capital stock, $30,000. Officers: Don G. McVean, Covington, Ky.; R. W. Day, Scranton, Pa.; F. L. Fuller, New York; T. J. Foster and W. L. Connell, Scranton, Pa.; R. H. Reese and Wade H. Lain, Cynthiana, Ky.

***Croft Railroad, Alexander, W. Va.**—Chartered in West Virginia to build a railroad to be operated by steam or electricity from a point near Alexander to Zenders Farm. Capital stock, $8,000. Incorporators: J. H. Henderson, J. L. Kendall, S. A. Kendall and Milton J. Henderson, Pittsburgh; J. Gibson McIlvain, Hugh McIlvain and W. B. McIlvain, Philadelphia.

FRANCHISES

Hot Springs, Ark.—The Little Rock & Hot Springs Electric Railway, Little Rock, has asked the City Council for a franchise for an extension of its line in South Hot Springs.

Glendale, Cal.—E. D. Goode, representing the Glendale & Eagle Rock Railway, Los Angeles, has been granted a franchise to build an extension to the northern city limits of Glendale. [E. R. J., June 18, '10.]

Columbia City, Ind.—The Ft. Wayne & Winona Traction Company, Ft. Wayne, has been granted a franchise to build a railway in Columbia City. This is part of a plan to build a proposed 40-mile interurban railway to connect Ft. Wayne, Arcola, Coesse, Columbia City, Larwell, Pierceton, Wooster, Winona and Warsaw. J. A. Barry, Ft. Wayne, is interested. [E. R. J., June 25, '10.]

Ft. Wayne, Ind.—The Ft. Wayne & Winona Traction Company, Ft. Wayne, has been granted a franchise by the Commissioners of Allen County to build a railway through Allen County, provided the company completes its projected line by January, 1910. This is part of a plan to connect Ft. Wayne, Arcola, Coesse, Columbia City, Larwell, Princeton, Wooster, Winona and Warsaw. J. A. Barry and E. T. Hoffman are interested. [E. R. J., June 25, '10.]

Lansing, Mich.—The Michigan United Railway, Lansing, is planning to secure a franchise from the City Council to build a loop on Ottawa Street and Grand Avenue.

***Schenectady, N. Y.**—Messrs. Angle & Strong, Schenectady, have asked the Common Council for a franchise to build a double-track line into Erie, along East Twelfth Street to State Street.

Fostoria, Ohio.—J. D. McDonel, representing the Fostoria & Fremont Electric Railway, has filed an application with the Seneca County Commissioners asking for a 25-year franchise to build a railway across the public highways. This is part of a plan to build a 21-mile electric railway from Fostoria to Fremont, via Havens, Burgoon, Kansas and Amsden. J. D. McDonel, secretary. [E. R. J., Dec. 25, '09.]

Chattanooga, Tenn.—D. J. Duncan and associates have been granted a franchise by the Board of Aldermen to build a new street railway in Chattanooga. This is part of a plan to build a line over the main valley road from Hamilton County Court line to Rhea Springs. [E. R. J., Jan. 29, '10.]

***Austin, Tex.**—C. V. Burkhead, San Antonio, and associates, have been granted a franchise by the City Council to build a street railway in South Austin.

***Spokane, Wash.**—The Washington Water Company have been granted a franchise to build a railway on Cannon Hill to connect with its other lines.

TRACK AND ROADWAY

Helena Street & Interurban Railroad, Helena, Ark.—This company has extended its lines four miles from Helena to West Helena.

Selma Street & Suburban Railway, Selma, Ala.—This company is said to be considering plans for the extension of its line from the northern part of Selma to Summerfield, a distance of 9 miles.

***Texarkana, Ark.**—W. J. Wood, Jr., is said to be interested in promoting an electric railway to connect Texarkana and Hot Springs, via Hope.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company will extend its lines to Millside in the near future and work on the Lulu Island section will be started soon.

Monterey & Del Monto Heights Electric Railway, Monterey, Cal.—This company has completed the preliminary arrangements and construction has been started on its projected 4-mile railway to connect Monterey and Del Monte Heights. F. M. Fairchild, 1707½ Oak Street, San Francisco, general manager. [E. R. J., July 24, '09.]

Oakland (Cal.) Traction Company.—This company is building a double-track line and installing sidings along the right of way leading to Leona Heights.

Pacific Electric Railway, Los Angeles, Cal.—This company has opened its Wilmington-Long Beach branch to passenger traffic. It has also completed another 12-mile section toward Riverside. The company is said to be considering plans to build a railway between the Cahuenga Valley and the San Fernando Valley, over the Cahuenga Pass.

San Diego, El Cajon & Escondido Railway, San Diego, Cal.—This company is reported to have started grading preliminary to the construction of its proposed 65-mile electric railway to connect San Diego, La Mesa, El Cajon, Bostonia, Lakeside, Morton, San Pasquel, Bernardo and Escondido. It is expected to have the line completed within a year. G. W. Pursell, San Diego, general manager. [E. R. J., Nov. 2, '09.]

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—The Supreme Court has granted this company permission to build a railway between Bridgeport and Danbury. It will also connect Stepney, Monroe, Botsford, Hattertown, Newtown, Dodgingtown and with the lines of the Danbury & Bethel Street Railway, Danbury. Morton Plant, New London, Conn., is interested. [E. R. J., June 11, '10.]

Connecticut Company, Bridgeport, Conn.—This company has awarded the contract for construction of the extension of the Barnum Avenue line from Bridgeport to Stratford to Bryan F. Mahan, New London.

Georgia Railway & Electric Company, Atlanta, Ga.—This company has begun rehabilitating its line from East Lake Junction to Decatur, so that through cars will be run from Atlanta to Decatur.

Fairburn & Atlanta Railway, Fairburn, Ga.—Grading has been completed by this company on its 20-mile line between Atlanta and Fairburn, with the exception of a 1-mile stretch in Fulton and De Kalb Counties. Track-laying will begin at once. The company is said to be considering the advisability of installing Edison storage battery cars. W. T. Roberts, Fairburn, president. [E. R. J., Oct. 2, '09.]

Egyptian Traction Company, Eldorado, Ill.—This company has nearly completed preliminary arrangements, capital has been obtained and construction will soon start on its proposed 100-mile railway from Mt. Vernon, Ind., to Murphysboro, Ill. T. E. K. Hixon, Eldorado, general manager. [E. R. J., June 25, '10.]

Waukegan, Rockford & Elgin Traction Company, Palatine, Ill.—This company, it is said, will start construction as soon as $100,000 in stock is subscribed for its proposed electric railway from Palatine to Lake Zurich and Wauconda, and ultimately to Volo Lake, Pistake Lake and Fox Lake. [E. R. J., Oct. 23, '09.]

Ft. Wayne & Winona Traction Company, Ft. Wayne, Ind.—This company, recently incorporated, advises that it will start construction as soon as deeds can be secured on its proposed 40-mile interurban electric railway to connect Arcola, Coesse, Columbia City, Wochester, Pierceton, Winona and Warsau. Officers: J. A. Barry, Ft. Wayne, president and treasurer; G. M. Leslie, vice-president, and Ralph Barry, secretary. [E. R. J., June 25, '10.]

Muncie & Portland Traction Company, Portland, Ind.—This company is said to be considering a plan to extend its line eastward from Portland to Celina, via Coldwater and Fort Recovery, Ohio.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company, it is said, will extend its line to Muscatine.

Iowa City (Ia.) Electric Railway.—This company advises that it will start work July 21 on its proposed 4-mile railway in Iowa City. Power will be purchased from the Iowa City Light Company, and it will operate six cars. Capital stock authorized, $100,000. Bonds authorized, $60,000. Officers: J. O. Schulze, president, general manager and purchasing agent; J. H. Rober, vice-president, and D. A. Reese, secretary and treasurer. [E. R. J., June 25, '10.]

Haverhill & Amesbury Street Railway, Merrimac, Mass.—This company has nearly completed the work of rebuilding its railway between Haverhill, Merrimac and Amesbury.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company has surveyed between Lansing and Detroit, and has now started surveys from Brighton to Detroit, on its proposed 150-mile railway between Detroit and Grand Rapids. It is expected to start work this fall. [E. R. J., June 18, '10.]

***Nixa, Mo.**—H. M. Wilson and W. H. Schrieber are said to be promoting an electric railway to connect Nixa and Springfield.

Westchester Northern Railroad, White Plains, N. Y.—This company has been authorized by the Public Service Commission, Second District, to issue $60,000 par value common capital stock. The proceeds are to be used for the acquisition of right of way of the company's line. This company is one of the subsidiary companies of the New York, New Haven & Hartford Railroad, and was recently authorized by the commission to construct its line in Westchester. The line also extends into Connecticut. [E. R. J., June 4, '10.]

Ohio Electric Railway, Cincinnati, Ohio.—This company reports that it expects to build new track between Williamsburg and Hamilton, which will make the line from Dayton to Hamilton standard construction, above high water, and will enable the operation of heavy equipment.

Central Ohio Promoting Company, Columbus, Ohio.—This company is engaged in securing rights of way for its proposed 60-mile railway to connect Columbus and Zanesville. James L. Holden, Columbus, president. [E. R. J., June 4, '10.]

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—This company has recently completed three miles of track from Nelsonville, and expects to build to Athens, a distance of 13 miles, this summer.

Johnstown (Pa.) Traction Company.—It is stated that this company proposes to extend its main line to New Hope, with a branch to the bridge at Washington's Crossing.

South Dakota Interurban Railway, Centerville, S. D.—This company, which expects to build an interurban railway from Parkston to Bijou Hills, Chamberlain and Sioux City, has recently perfected its organization by electing the following officers: W. E. Miller, Bijou Hills, president; A. F. Grimm, Parkston, vice-president; F. E. Graves, Bijou Hills, secretary, and R. W. Thwing, treasurer. [E. R. J., Feb. 19, '10.]

Virginia Railway & Power Company, Richmond, Va.—This company has been asked by the citizens from Prince George and Surry Counties to extend its lines from the present terminal at Petersburg to Norfolk.

Roanoke Street Railway & Electric Company, Roanoke, Va.—This company has awarded the contract to Messrs. Huggins & Bates for the survey of its entire system.

Graham (Va.) Electric Railway.—James F. Dudley, president of this company, which was recently chartered to build a 2-mile railway from East Graham to West Graham, writes that the company is now completing preliminary arrangements, and it is expected that it will soon receive its franchise. [E. R. J., June 25, '10.]

Clarksburg & Weston Electric Railway, Clarksburg, W. Va.—Work has been started by this company on the first seven-mile section of its proposed 24-miles railway to connect Clarksburg and Weston. The company is said to have purchased three bridges across the Ohio River, from the Baltimore & Ohio Railroad. James O. Watson, Fairmont, general manager. [E. R. J., June 11, '10.]

Elkins (W. Va.) Electric Railway.—This company reports it will build 7 or 8 miles of track during the next three months. P. B. Bloomfield, general manager.

Middle Island Railroad, Middlebourne, W. Va.—This company, recently incorporated, advises that it is making surveys and that construction will be started in the near future on its proposed 60-mile railway to connect Sistersville, Kidwell, Middlebourne, Shirley and Clarksburg. It will furnish power for lighting. Bonds authorized, $450,000. Officers: T. Moore Jackson, Clarksburg, president; I. M. Underwood, Middlebourne, vice-president; John F. Shore, Middlebourne, secretary and treasurer. [E. R. J., April 9, '10.]

SHOPS AND BUILDINGS

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company will build a car repair shop 60 ft. x 300 ft., enclosing three tracks and an equipment of car-repair tools. The structure will be built of brick and steel, and will be similar in design to the Decatur shop buildings of the Illinois Traction System.

Union Street Railway, New Bedford, Mass.—This company has awarded the contract to H. P. Converse & Company, Boston, for building its new car house at New Bedford. Estimated cost is $156,000. Louis E. Dectremps, New Bedford, architect.

Worcester (Mass.) Consolidated Street Railway.—This company has prepared plans for a large addition to the Gates Lane car house in Worcester.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Vancouver, B. C.—This company will soon start work upon its new power plant in the Chilliwack district, northeast of the Popkum Indian reserve. The site of the proposed plant is a 100-acre tract. Power to be derived from Jones Lake, 18 miles east of Chilliwack, and Chilliwack Lake, 23 miles southeast of Chilliwack. The tunnel from Jones Lake is to be 10,200 ft. long. The tunnel from Chilliwack Lake is to be 14 by 16 ft. in size and 5¼ miles long.

Ohio Electric Railway, Cincinnati, Ohio.—This company states it expects to build three new substations between Dayton and Richmond and Dayton and Union City and connect them with transmission line so as to furnish power from the Lindenwald power plant. It has purchased six substation equipments from Westinghouse Electric & Manufacturing Company for the Dayton and Richmond and Dayton and Union City divisions. F. A. Healy, secretary.

Richmond & Henrico Railway, Richmond, Va.—This company has awarded the contract to the Babcock & Wilcox Company for forged steel boilers for its new power house to be erected on Louisiana Street, in Fulton. Estimated cost is $10,000.

Twin City Light & Traction Company, Centralia, Wash.—This company, it is said, has let the contract for building a power plant to be located 4 miles southeast of Centralia on Coal Creek. Estimated cost of plant is $150,000.

Elkins (W. Va.) Electric Railway.—This company will build a new power station this summer. P. B. Bloomfield, general manager.

Manufactures & Supplies

ROLLING STOCK

Calgary (Alta.) Street Railway is said to be planning to purchase 12 new cars.

Brooklyn (N. Y.) Rapid Transit Company is understood to be in the market for new snow-fighting equipment.

Portland, Eugene & Eastern Railway, Portland, Ore., is said to be considering the purchase of several additional cars.

Oregon Electric Railway, Portland, Ore., has ordered one electric locomotive from the American Locomotive Company.

San José & Santa Clara Railroad, San José, Cal., is planning to buy several broad-gage cars and other new equipment.

Los Angeles & Redondo Railway, Los Angeles, Cal., is building 10 passenger cars and 20 additional freight cars at its shops in Redondo.

Iowa City (Ia.) Electric Railway, which expects to begin work shortly on a 4-mile street railway in Iowa City, is considering the purchase of six cars.

Charles City Western Railway, Charles City, Ia., which is building a 20-mile line from Charles City, has purchased one 55-ft. gasoline motor car from the McKeen Motor Car Company.

Woodstock & Sycamore Traction Company, Sycamore, Ill., has purchased one 55-ft. gasoline motor car from the McKeen Motor Car Company, for use on its line, which is now being built between Woodstock and Sycamore. Additional cars of this type will be put in service on this line when track laying is completed.

Havana (Cuba) Central Railroad, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 26, 1910, as having placed an order with The J. G. Brill Company for 10 semi-convertible cars, has specified the following details for these cars:

Length of body.....28 ft.	Fenders or wheelguards.H. B.
Over bumpers.....38 ft.	Gongs.....Brill Dedenda
Width over sills..7 ft. 11½ in.	Hand brakes.....Brill
Over posts at belt.8 ft. 2 in.	Motors, type and number,
Body .....wood	GE-67
Interior trim.....mahogany	Registers .....International
Underframe .....composite	Sanders.....Brill Dumpit
Bumpers.....Brill angle iron	Seats.....Hale & Kilburn
Couplers .....Brill-Hovey	Trolley base.....Union
Curtain fixtures.....Forsyth	Trucks, type.
Curtain material....pantasote	Brill No. 27-GE 1

TRADE NOTES

I. R. Nelson & Company, Newark, N. J., have moved their headquarters to 85 Columbia Street, Newark, N. J.

McKeen Motor Car Company, Omaha, Neb., has delivered two 70-ft. gasoline motor cars to the Chicago, Rock Island & Pacific Railroad.

Crocker-Wheeler Company, Ampere, N. J., has filed an amended certificate of incorporation increasing its capital stock from $2,000,000 to $5,000,000.

Massachusetts Chemical Company, Walpole, Mass., is enlarging its plant at Walpole by the addition of buildings which will have two and a half acres of floor space.

Asbestos Protected Metal Company, Canton, Mass., has opened an office at 100 Broadway, New York, N. Y. P. M. Stewart, formerly building commissioner, is resident manager.

L. R. Pomeroy, assistant to the president of the Safety Car & Lighting Company, New York, N. Y., has resigned to become connected with J. G. White & Company, Inc., New York, N. Y., as chief engineer of their railway and industrial division.

United States Electric Company, New York, N. Y., announces that it has secured the services of W. E. Harkness, who has been identified for a number of years with the Western Electric Company, New York, N. Y., in the development of train dispatching. Mr. Harkness will devote his entire attention to telephone, telegraph and selector equipment.

Indian Refining Company, Cincinnati, Ohio, has secured for its railway lubrication department the services of Isaac B. Connor, formerly with the Galena Signal Oil Company, and Adolph J. Varrelmann, formerly connected with the Pay-As-You-Enter Car Corporation. Mr. Varrelmann will have his headquarters at 30 Church Street, New York, N. Y.

St. Louis Steel Foundry, St. Louis, Mo., which is owned and operated by the Curtis & Company Manufacturing Company, has recently completed an extensive addition to its steel plant in St. Louis. The new apparatus installed includes additional crane and grinding equipment. By the addition of this extension the floor space of the plant has been increased nearly 100 per cent.

S. K. Elliott Electric Company, Cleveland, Ohio, on July 1 discontinued the sale of Westinghouse generators, motors, etc., and has taken up the sale of apparatus manufactured by the Fort Wayne Electric Works, Fort Wayne, Ind. The line of apparatus manufactured by the Fort Wayne Works covers all sizes of a.c. and d.c. generators, motors, switchboards, transformers, etc.

George E. Austin Company, New York, N. Y., has been appointed export representative for the following manufacturers: Cleveland Rubber Works of the Mechanical Rubber Company, Eureka Tempered Copper Works, Samson Cordage Works, American General Engineering Company, Imperial Rubber Company, Massachusetts Chemical Company, Macomber-Whyte-Moon Company and A. W. Chesterton & Company.

Lord Manufacturing Company, Lord Electric Company and Lord Construction Company, New York, N. Y., are taking contracts for lighting installations for amusement parks, railway shops and factories. In these contracts the companies are supplying their Luminator flaming arc lamp, which gives a very brilliant light, and when hung at a sufficient height above the ground makes an even, pleasing glow. The ability of these companies to take contracts of this kind and to supply and install equipment complete has proven of interest to many large operators.

Edgar Allen American Manganese Steel Company, Chicago, Ill., has purchased the Chicago Heights plant of the American Brake Shoe & Foundry Company, devoted to the manufacture of manganese steel castings. The Edgar Allen American Manganese Steel Company has a similar plant at New Castle, Del. The Chicago Heights plant employs 500 men, and extensions under consideration will more than double the force. Stockholders of the American Brake Shoe & Foundry Company are represented in the directorate of the new company and in the personnel of its officers. Edgar Allen & Company, Ltd., Chicago, Ill., and Sheffield, England, have also become identified with the corporation. The Edgar Allen American Manganese Company was incorporated in Maine, with an authorized capital of $3,000,000. The company's Chicago office is in the McCormick Building, 193 Michigan Avenue. The directors are: R. Ortmann, president; J. B. Terbell, J. C. Ward, Otis H. Cutler, Joseph C. Gallagher. J. C. Ward is also a director of Edgar Allen & Company, Ltd., Sheffield, England, and is general manager of its American business.

Allis-Chalmers Company, Milwaukee, Wis., has elected David Van Alstyne vice-president in charge of manufacture, with headquarters at Milwaukee. Mr. Van Alstyne was born in Louisville, Ky., on June 14, 1865, and was graduated from the Massachusetts Institute of Technology in 1886. He became a machinists' apprentice on the Louisville & Nashville Railroad, and was connected with that railroad for eight years, during which time he served in various capacities. For three and a half years he was engaged in the foundry business in Louisville, after which he was for one year master mechanic on the Louisville, Henderson & St. Louis Railroad. In 1899 Mr. Van Alstyne entered the service of the Chicago Great Western Railroad as a division master mechanic, but was shortly afterward made superintendent of motive power, remaining in that position until May, 1904, when he accepted a position as mechanical superintendent on the Northern Pacific Railroad. In 1907 he was elected vice-president in charge of manufacture of the American Locomotive Company. During the past few months Mr. Van Alstyne has been retained in a consulting capacity for a Western railroad.

ADVERTISING LITERATURE

National Electrical Manufacturing Company, Elgin, Ill., has issued a folder describing and illustrating the National crossing signal for electric railways.

Edison Storage Battery Company, Orange, N. J., has issued a leaflet calling attention to the Edison storage battery for ignition and lighting purposes.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a 48-page catalog describing briefly many of the graphite products which it manufactures.

Chicago Concrete Machinery Company, Chicago, Ill., has issued a 40-page catalog illustrating and describing the various types of Chicago mixers which it manufactures.

Cairnduff Automatic Register Company, Syracuse, N. Y., has issued an illustrated folder which contains a comprehensive description of its automatic register step. The Cairnduff system is applicable to prepayment cars.

American Mason Safety Tread Company, Boston, Mass., has issued a booklet describing Karbolith flooring. In connection with the booklet, the company is mailing samples of the approximate shade of its No. 50 red Karbolith.

Uehling Instrument Company, Passaic, N. J., has published a series of pamphlets, among which is one devoted to a description of the Uehling gas composimeter, and another describing the Uehling pneumatic pyrometer.

General Electric Company, Schenectady, N. Y., describes in Bulletin 4739 the Mazda tungsten filament incandescent lamp, which gives three times as much light as a carbon filament lamp with the same consumption of energy.

Alexander Milburn Company, Baltimore, Md., has issued a 48-page catalog, in which are described and illustrated the various sizes of Milburn portable acetylene lights which it manufactures. This type of light is constructed to meet the demands for contractors, railways, tunnels, steam shovels, etc.

Electric Service Supplies Company, Philadelphia, Pa., in the "Keystone Traveler" for July discusses the merits of its "Pay-Within" type car. Many of the company's specialties are also described, among them the lock-on controller handle, Garton-Daniels lightning arrester, protected rail bond, the automotoneer, Keystone compound, International fare register, and the Lyon reinforced steel gear case.

Stone & Webster Engineering Corporation, Boston, Mass., has reprinted in booklet form an article entitled "The Wages of Faith," which appeared in the Stone & Webster *Public Service Journal* of October, 1909. The article contains deductions from correspondence with several engineers and employers of contractors regarding forms of construction contracts. The company has also published a booklet which contains a record of construction contracts completed or in progress during the second quarter of 1910, with classifications, locations and totals.

Ohio Brass Company, Mansfield, Ohio, calls attention to several features of its new No. 8 and "H" catalogs. The first contains a number of new and improved devices on electric line material, such as a rigid cross-over; small porcelain insulators; feeder wire splicer; mechanical feeder; wire strain clamp; track drill; bond compressor; two types of third-rail insulators; sander valve; sand trap; O-B electric car signal system, and Tomlinson couplers and accessories. Catalog "H," on steam specialties, lists a pressure regulating valve which is said to be meeting with great success; also gage cocks, water gages, and various lines of ordinary valves.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has reprinted in full Judge Cross' opinion filed in the United States Circuit Court, District of New Jersey, May 24, 1910, in the split motor frame case involving the Schmidt patent No. 609,977, in which the Westinghouse Electric & Manufacturing Company was complainant and the Allis-Chalmers Company defendant, and the order on the motion for a preliminary injunction filed on June 6, 1910, in the United States Circuit Court, Southern District of Ohio, Western Division, involving the Lange and Lamme patent No. 518,693, in which the Westinghouse Electric & Manufacturing Company was complainant and the Cincinnati, Milford & Loveland Traction Company defendant.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, JULY 16, 1910 No. 3

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. McGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

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CLEVELAND OFFICE.....1015 Schofield Building

PHILADELPHIA OFFICE.....Real Estate Trust Building

EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 16, 1910.

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Rail Wear in the New York Subway

The New York subway has been in operation only five and one-half years, but every one of the Bessemer steel rails originally laid has been worn out and replaced. On curves the rails last less than six months in spite of liberal superelevation. For the last three years open-hearth steel rails have been used for all replacements and it is interesting to note that a much longer life is being obtained with them than formerly was obtained with Bessemer rails. The open-hearth rails, however, are no more free from corrugation than the Bessemer rails, and many peculiar examples of this mysterious phenomenon have been noted on both straight and curved track. The longer life of the open-hearth rails no doubt is due to the greater hardness obtained with 70 to 75 points of carbon, but this hardness does not prevent corrugation. An order for 100 tons of rolled manganese steel rails for use on curves has recently been placed and it will be interesting to learn whether corrugations are found on the surface of these rails as quickly and as sharply defined as on the hard and soft carbon steel rails which they will replace.

Track Department Equipment

Because the track department handles only heavy, rough material its equipment of work cars and tools is often supplied from the odds and ends of the other departments and is allowed to deteriorate to a shocking degree of dilapidation. The result is invariably reflected in the labor costs and the intangible expense due to delays to regular cars. A powerful work car, well built and well maintained, is an invaluable tool. It saves time in transporting men and material and can be depended upon to get to a designated point and get back without holding up traffic. If equipped with a motor-driven crane it can be used for many operations which otherwise would require a large gang of men. A piece of special work, for example, can be set with a crane by four men in as many minutes, whereas 15 or 20 men might be required to lift and place it. Counting their time from the beginning to the end of the operation, not less than half or three-quarters of an hour would be taken. Only a few jobs of this kind are needed during a working season to save in cost the interest on the investment in the car. Economical maintenance of track requires efficient tools just as much as economical maintenance of cars requires adequate shop facilities.

Shortening Delays in Interurban Service

It is not easy to discover new aspects of the problem of delays in interurban service, but repeated observation of the handling of through cars over routes occupied by several companies forces attention upon the importance of making crew changes quickly at system boundaries. The cost of time lost in this way in the course of a few weeks on a busy system is by no means inconsiderable. Where the volume of traffic warrants the maintenance of a starter at the junction of roads

forming part of a through route much good can be accomplished in the way of minimizing the length of stops while crews are changed. With proper discipline every man will be on the alert to take his car at the required time; the starter or other designated employee will take register readings immediately after the stop is made, and there will be no discussion and perhaps telephoning to headquarters to determine who is to make specified runs. The establishment of rules stating precisely what each man is to do in changing cars will help to minimize delays, and in some cases the plan of requiring the crew which arrives early to meet the on-coming car at the first stop beyond the system terminus might work out advantageously, since the starter could watch the car which had arrived while the crew was losing no time in waiting for passengers to enter and leave the car which is due. The main point, however, is to get rid of the discussion and delays in getting upon the platforms when the moment for the crew change arrives. Better team work is possible in countless instances. Another possible source of speed improvement is in operating the car with full multiple controller service to a safe distance inside the urban system, instead of cutting in the half-speed commutating switch at the system boundary. Sharper work on branch lines is also desirable, not only for its own sake, but because it tends to reduce the waits of main line cars for connections. The car with the shorter run should be the one to do most of the waiting.

Exactitude in Legislation.

A lesson in the elementary principles of law making was recently read to Congress by the Court of Appeals of the District of Columbia. As the occasion of the lecture related to street railway service and as the legislation criticised was of that slovenly character which is passed not infrequently in State as well as in national capitals, it should be of interest to companies elsewhere. About two years ago Congress enacted a law requiring the street railway companies in the District of Columbia "to give expeditious passage to all persons desiring to use the cars, without crowding the cars." It authorized the Interstate Commerce Commission to make all needful rules, to compel obedience with this law, and imposed a fine of not more than $1,000 a day as a penalty to a violation of either the act itself or of the regulations of the commission based upon it. Although the Interstate Commerce Commission issued no regulations of the kind authorized, the United States Attorney for the District of Columbia brought suit under the law against both of the principal companies in Washington, alleging that the cars were being unlawfully overcrowded. But as the court clearly pointed out, a condition which one judge or jury might consider crowded, another might think should not come under that definition, so that the act was void on account of its vagueness and uncertainty. This principle of law was reiterated by the court in a large variety of ways, a fact which is refreshing in these days of general legislation and condemnation. Thus the court said: "In a criminal statute, the elements constituting the offense must be so clearly stated and defined as to reasonably admit of but one construction. Otherwise, there would be lack of uniformity in its enforcement. The dividing line between what is lawful and unlawful can not be left to conjecture. The citizen cannot be held to answer charges based upon penal statutes whose mandates are so uncertain that they will reasonably admit of different constructions. A criminal statute can not rest upon an uncertain foundation. The crime, and the elements constituting it, must be so clearly expressed that the ordinary person can intelligently choose, in advance, what course it is lawful for him to pursue. Penal statutes prohibiting the doing of certain things, and providing a punishment for their violation, should not admit of such a double meaning that the citizen may act upon one conception of its requirements and the courts upon another." Evidently the court thought that this axiom in penal legislation was not thoroughly understood and wished to drive the lesson home. As to the question as to whether the Interstate Commerce Commission had the power to supply what the statute lacked, the court declined to say. No such regulations had been passed and the question was not up for adjudication.

LOADING SPEED OF PREPAYMENT CARS

The widespread acceptance of the prepayment principle of fare collection has caused a complete re-equipment of many types of old cars. Practically all of the companies which have purchased new prepayment cars have added various fittings to their older equipments with a view of obtaining greater receipts and lessened accidents. In various instances these changes have brought about a reduction in car-hours, because the more orderly handling of passengers has shortened the time required for loading. In other instances local conditions have been thought to be of such moment as to warrant considerable variation from platform designs found to be satisfactory elsewhere, and the cars, while giving better results than before re-equipment, have not gained the success that was expected with them.

At first, long platforms were thought to be a necessary feature of successful prepayment operation. Figures now available show that within certain limits the length of the platform exercises only a slight influence on the speed of loading and is effective only during the rush-hour periods when the progress of the car is so delayed by other causes that fast schedules could not be attained in any event. On the other hand, short platform cars weigh less per seat and cost less to move than long-platform cars, so that their economy during the hours of light travel should be considered in connection with any slowness of schedule during rush hours.

Some interesting testimony upon the effect of width of entrance upon loading time with the prepayment type of car has recently been adduced from tests of several types of prepayment cars now operated in Chicago. The observations were made in the congested retail section of the city during the evening rush hours, and the loading time per passenger was obtained by noting the total time required for all passengers to board 100 succeeding cars at one street intersection, and dividing this total by the number of passengers.

The car with the widest passenger entrance in Chicago is the new type of pay-as-you-enter equipment of the Chicago Railways Company, having a clear space of 40 in. between the vestibule post and the dividing stanchion at the top of the rear step. The average time required for passengers to board this type of car was 1.05 seconds. The new pay-as-you-enter cars of the Chicago City Railway have a similar entrance, 34½ in. wide, and the count showed that the average loading time with this narrower entrance was 1.15 seconds per passenger. The latter company has rebuilt some older cars without lengthening the platforms and these cars have pay-as-you-enter en-

trances 22¼ in. wide. A count showed that 1.66 seconds were required for each passenger to board one of these cars. That is to say, the speed of loading is by no means proportional to the width of entrance. This condition is of course due to the fact that but one passenger can enter the car at a time with either the largest or the smallest entrance.

The Chicago Railways Company, before the completion of its rehabilitation, operated about 400 double-end, vestibuled closed cars of the St. Louis type with open platforms. The average time required for a passenger to board one of these cars was 0.92 seconds and this low figure was obtained because both ends of the car were thrown open at all stops. The difference in loading time per passenger, however, between the old go-as-you-please method and the prepayment method with the 40-in. entrance is only 0.13 seconds per passenger, so that the new cars are not at a great disadvantage, certainly not so great as to overweigh the advantages which the new type offers in the way of better fare collection and less platform accidents, to say nothing about comfort to passengers. These comparisons may be useful to those companies which are hesitating about adding prepayment features to old equipment.

THE COMMITTEE REPORT ON WAGES AND THE PRICES OF COMMODITIES

Part I, containing 138 pages, of the report of the select committee of the Senate on wages and the prices of commodities has just been made public. This committee was appointed last February with Senator Lodge of Massachusetts as chairman and statements relating to its hearings have occupied considerable space in the daily papers since that date. A summary of the findings of the committee was published about two weeks ago but the report now at hand contains some very interesting statements. The subject is of special interest to electric railway companies because an increase in wages and in the prices of commodities is synonymous with a decrease in the purchasing power of the fare received from each passenger.

It seems, from the report of the committee, that the advance in prices has been world-wide, although farm and food products have advanced more rapidly in price than have manufactured articles. The advance in prices for commodities has been more rapid since 1900, however, in the United States than in the other countries from which statistics were obtained by the committee, except possibly in Canada and Russia. This is explained partly on the theory that the prices in most European countries, especially in England, were at a higher level 10 years ago than in this country. A further analysis of the prices of materials in the United States shows that farm products have advanced in price twice as much in percentage as any other group of commodities.

Wages have not advanced as rapidly as the prices of commodities, but they have increased more rapidly in the United States than in European countries. In fact, in some European countries, practically no advance has been made in wages during the 10 years under consideration. Moreover, wages have not advanced in the United States as rapidly in proportion as food prices, with the exception of the wages of farm hands which the committee found had increased from 45 to 75 per cent during the period from 1900 to 1910. This increase, of course, has been an important factor in the increase of the price of food, but it is by no means the only one. The selling price of farm lands seems to have doubled on the average Two or three decades ago the richest of land could be secured from the Federal Government for a merely nominal cost, but the supply of governmental land suitable for general farming is now largely exhausted. The richness of the virgin soil is also disappearing and the fertility of the land can be maintained only by the use of expensive fertilizers. Other causes which have tended to increase the cost of farm products are better financial facilities in the agricultural districts which enable the producers to market to better advantage than formerly, higher standards of living in agricultural districts, pure food laws, local sanitary and other regulations, etc. The increased costs of production of farm products, however, would not have been sufficient to create the conditions of sale prices found by the committee if the demand for farm products had not also increased rapidly, in fact more rapidly than the supply.

The committee did not consider that the tariff had any material effect on the situation, because the groups of articles which have shown the greatest advances are those for which there has been no change in tariff during the past ten years. The same cannot be said, however, of industrial combinations. While the prices of many of the trust-produced commodities have not advanced as rapidly as those of other commodities, the community in most cases has not enjoyed the benefit of the economies of production and distribution afforded by combination, and the conditions of purchase have been made more arduous. Undoubtedly the increased gold supply has been an element in the increased prices, but to what extent it is difficult, if not impossible, to determine. Immigration is also held to have been an important factor in increasing the cost of food. During the last ten years over 8,000,000 immigrants arrived in the United States, but of this enormous number only a very small per cent entered agricultural pursuits. Instead, practically all engaged in industrial work, so that instead of becoming producers of food they have become consumers.

A study of the report as thus far issued does not hold out any encouragement of a material reduction in prices. Each of the factors of importance mentioned by the committee, so far as present indications and prospects go, seems to be of a permanent character. Some improvement can be made probably in scientific farming, but reductions in costs thereby effected would undoubtedly be more than counterbalanced by other conditions which will have the effect of increasing prices. It is natural to expect that there will be fluctuations in the cost of commodities in the future just as there have been in the past, but the general trend is undoubtedly upward.

Those most severely affected by any increase in costs are those whose income remains upon a basis fixed by previous conditions of a higher purchasing power of the standard of value. This class is by no means confined to investors whose income is derived from bonds and mortgages, but includes many corporations, notably city transportation companies. The condition of these latter can be improved, indeed must be improved, if they are to serve properly the communities where they exist. In the latter sixties aand early seventies, when prices were on an inflated paper basis and gold was at a premium, the standard fare on most street railways was 6 cents. Revision should not always be downward, and with the much longer ride now given for a single fare and with prices for labor and materials higher than at any period in the last 20 years, it is time that some step should be taken either to revert to the old rate or in some other way to increase the receipts so as to compensate for the increased cost of operation.

THE 1200-VOLT D.C. INTERURBAN LINES OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

BY JOHN R. HEWETT

The Milwaukee Electric Railway & Light Company besides its extensive city service of street railways, lighting and other public utilities owns and operates the more important interurban roads radiating from Milwaukee. It also furnishes both light and power for most of the towns served by these interurban lines. The size and importance of the system will be appreciated by studying the accompanying map, Fig. 1.

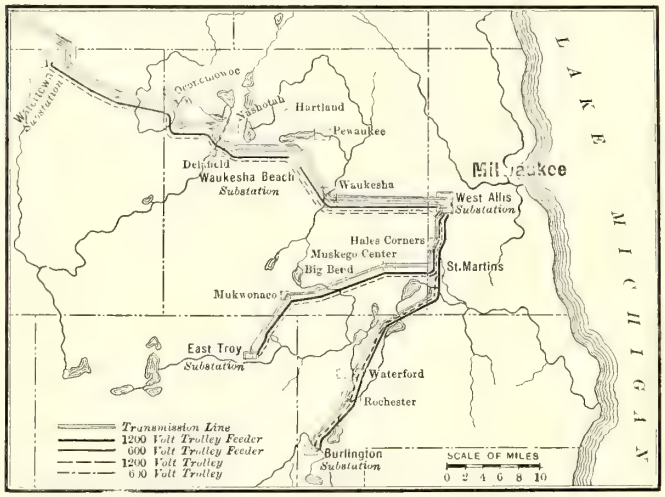


Fig. 1—Milwaukee 1200-Volt Line—Map

The interurban lines to be dealt with in the present article traverse remarkably beautiful sections of Wisconsin which are rich in lakes, rivers and other attractions which makes the summer schedule very severe at certain times, although generally speaking the country through which the roads pass is sparsely populated.

The three most important interurban roads are those running to Watertown, East Troy and Burlington. Of these lines those sections between Waukesha Beach and Watertown, between St. Martins and East Troy and between St. Martins and Burlington, were formerly operated with a 3300-volt single-phase trolley but they have now been changed over for 1200-volt d.c. operation. In addition the track between West Allis and St. Martins will be operated by 1200 volts in the near future and it is likely that the 1200-volt trolley will be adopted between Waukesha Beach and West Allis.

The following distances will show that at present there are 67.99 miles of road operating with the 1200-volt system: Waukesha Beach to Watertown 27.42 miles, St. Martins to East Troy 20.75 miles, St. Martins to Burlington 19.82 miles. It is also of interest to note that the distance between Milwaukee and Waukesha Beach is 23.86 miles, Milwaukee and Watertown 51.28 miles, Milwaukee and St. Martins 15.07 miles, West Allis and St. Martins 7.25 miles and West Allis and Milwaukee 7.82 miles.

GENERAL SCHEME OF ELECTRIFICATION

There are three main sources of power feeding into the transmission system. These are the two power houses in Milwaukee, one at Oneida Street and the other at Commerce Street; the third source is derived from the new hydraulic development of the Southern Wisconsin Power Company at Kilbourn which is about 70 miles from Watertown and over 120 miles from Milwaukee. Overhead transmission lines serve all of the interurban roads, while the energy is transmitted to and from Milwaukee and West Allis underground at 13,200 volts.

At present the tension of the system is 38,100 volts, but when some additions at present under way have been completed the transformer connections will be changed from delta to *Y* and the potential will be raised to 66,000 volts at three-phase, 25-cycles. The 1200-volt d.c. substations that affect the interurban divisions now under consideration are as follows: For the Watertown road, at Watertown and Waukesha Beach and for the East Troy and Burlington roads, at East Troy, Burlington and West Allis. Feeders are strung on the trolley poles for the entire length of the interurban lines and are tied to the trolley wire at suitable intervals.

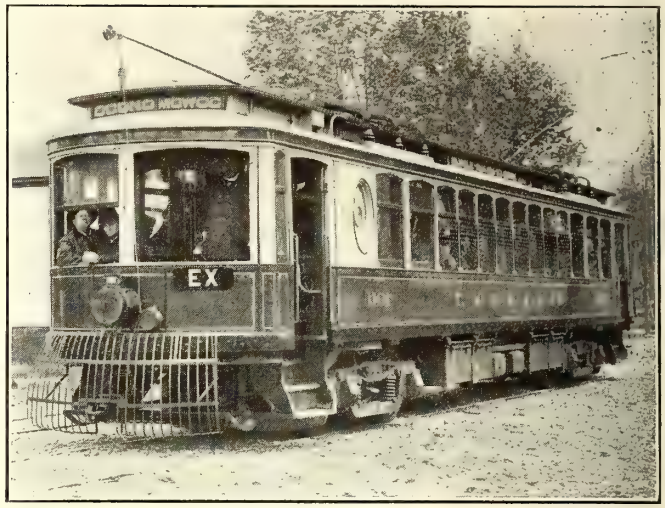


Fig. 3—Milwaukee 1200-Volt Line—Interurban Car

ROLLING STOCK

The initial rolling stock for service on these interurban roads consists of 30 cars, 25 passenger and five utility cars. Fifteen of these cars are new at the present date and were manufactured by the G. C. Kuhlman Car Company of Cleveland, Ohio, and are equipped with GE-207 motors. The 10 other passenger cars were constructed by the St. Louis Car Company and are now equipped with GE-205 motors, whereas they formerly had single-phase apparatus. The remaining five cars used as utility rolling stock have GE-205 motors.

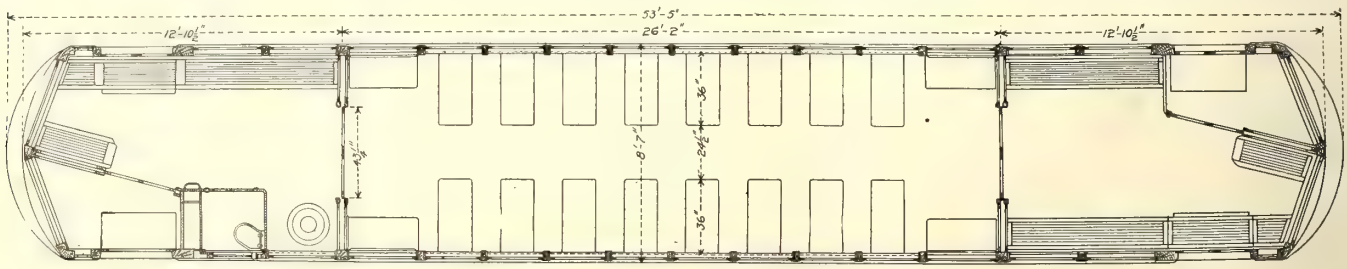


Fig. 2—Milwaukee 1200-Volt Line—Plan of Interurban Car

The electrical equipments of all these cars are so similar, being all four motor equipments, that they can be described collectively after the different ratings of the GE-205 and GE-207 motors have been stated. The former is a 75-hp unit, while the rated capacity of the latter is 125 hp. Both motors are of the General Electric commutating pole type and are designed for operation on both 600-volt and 1200-volt trolleys. The GE-207 equipments are furnished with 60-tooth split gears and 22-tooth steel pinions, while the GE-205 equipments have gears with 53 teeth and pinions with 21 teeth, giving gear

ratios of 3.05 and 2.525 respectively. The motors are connected two in series when running on 1200 volts.

The control is the type "M," non-automatic design. As is usual with this type of equipment a dynamotor is used to supply current at 600 volts for the control and lighting circuits during 1200-volt operation. In this instance the compressor

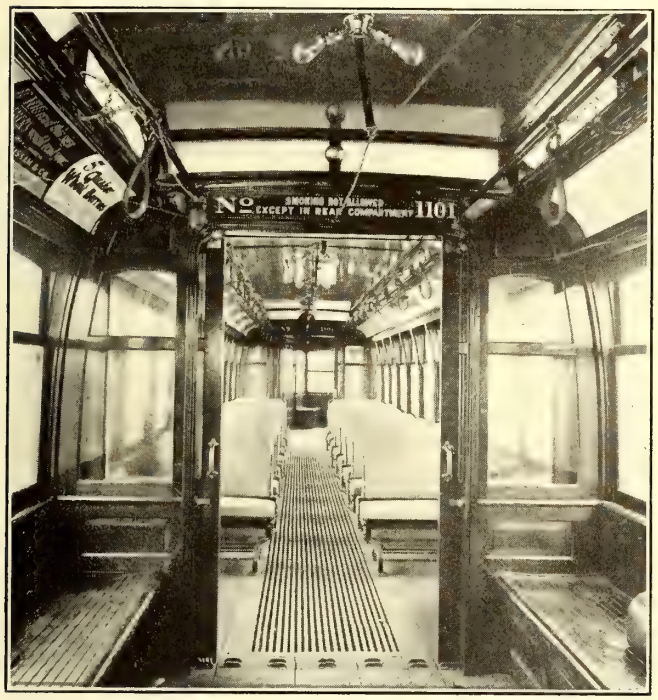


Fig. 4—Milwaukee 1200-Volt Line—Interior of Interurban Car

motor is insulated for 1200 volts and is run on both voltages with a decreased speed on 600 volts. The commutating switch is placed under the car and is operated from either end by a lever in the motorman's cab. This switch has a dual function; first, it changes the motor connections from series to series-parallel during 1200-volt operation and from series-parallel to parallel during 600-volt operation, thereby giving full speed at both voltages; second, it transfers the auxiliary circuits (excepting the compressor circuit) from the trolley to the 600-volt tap of the dynamotor during 1200-volt operation and vice-versa during 600-volt operation.

The balance of the electrical equipments is substantially 600-volt apparatus with additional insulation to withstand the greater electrical potential. The current is collected by a standard type of trolley pole and wheel and passes through a circuit breaker, contactors, reverser and commutating switch to the motors. This circuit breaker, the contactors and reversers are electrically operated and as stated are of standard 600-volt construction.

The car bodies of the 15 new cars have many features of special interest. Fig. 2 shows a plan from which it will be noticed that the arrangement is somewhat unusual. In general the two ends are symmetrical, the rear compartment always being used as a smoking compartment and the front serving for seating passengers and taking baggage when there is any to be handled. This front compartment is practically an observation end. These cars are of the semi-steel type. The deep plate side sills are girders and form the principal members of the underframing which extends from side door to side door on both sides of the car. There are no bulkheads in the car, the load of the car ends being carried by 4-in. channel center sills and two diagonal trusses constructed of 4-in. I-beams. All the other smaller members of the underframing are steel.

The floor is a composition laid on Keystone galvanized iron flooring. The surface of this composition is ⅝-in. above the iron flooring and covers the entire floor and platforms. It somewhat resembles cement in appearance. The covers of the motor trap doors are filled with the same composition.

The more important data concerning these cars are as follows:

Length over all	53 ft. 5 in.
Length over corner posts	40 ft.
Extreme width	8 ft. 7 in.
Height from rail over roof boards	11 ft. 6 in.
Distance between truck centers	28 ft. 4 in.
Weight of car body and trucks	48,000 lb.
Total weight	80,000 lb.
Seating capacity	64

TRUCKS

Type	Brill M. C. B.
Wheel base	6 ft. 1 in.
Diameter of wheel	36 in.
Weight, exclusive of motor	14,000 lb.



Fig. 5—Milwaukee 1200-Volt Line—Motor Car and Three Trailers

Figs. 3, 4, and 5 show respectively the exterior of one of these cars, an interior view and a car hauling three trailers.

SUBSTATIONS

The substation at Watertown is situated on the banks of the Rock River and besides housing the 1200-volt railway appar-

atus it contains two frequency changer sets for the lighting and power business of Watertown; in addition to these maclines there is one 300-kw generator driven by a hydraulic turbine to take care of the day lighting and power load of Watertown. Fig. 6 is an interior view of this substation, showing the railway apparatus in the foreground and the frequency changer sets and water wheel unit in the background.

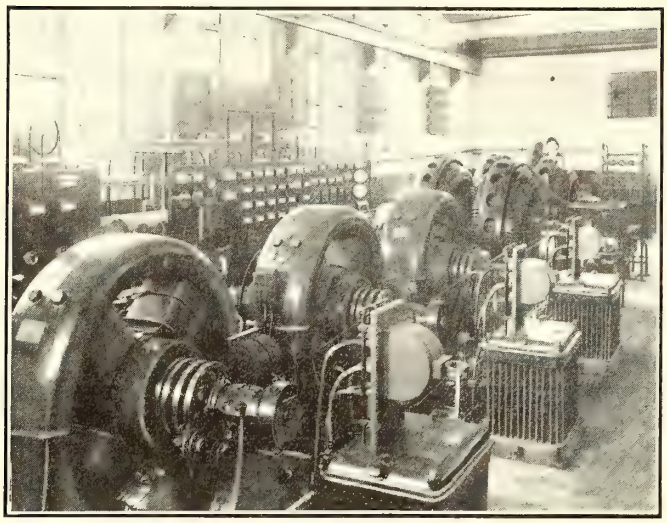


Fig. 6—Milwaukee 1200-Volt Line—Interior of Watertown Substation

The West Allis substation is very large. It takes care of both city lighting and 600-volt city railway apparatus, and also contains apparatus for generating current at 1200 volts for the system being described. The energy from Kilbourn is received over the transmission line and transformed by six 2000 kva 66,000-volt, 13,200-volt O-I-W-C transformers, Figs. 7 and 10 are two exterior views of the West Allis substation and in the latter it will be seen that car house and office facilities are provided under the same roof.

The Waukesha Beach substation and those at East Troy and Burlington, are typical 1200-volt substations. Their layout and functions are the same with the one exception that at Waukesha Beach 600-volt current is fed in the direction of West Allis and 1200-volt current towards Watertown. Both the 600-volt and 1200-volt feeders are fed from the same rotary converters, which are connected in series. As these three substations are practically identical in design and are used solely for railway work, one description will cover all of them. Fig. 8



Fig. 8—Milwaukee 1200-Volt Line—Exterior of Burlington and Waukesha Substations

shows the exterior of the Burlington and Waukesha Beach substation. The building is of very neat design and is constructed of cream-colored brick with concrete floors. Fig 9 shows a plan of the East Troy and Burlington substation, while Fig. 11 gives sectional views which apply to all three substations. This latter illustration with but slight modification would also apply to the Waukesha Beach substation. Figs. 12 to 15 are interior views of the Waukesha Beach substation. The buildings are each divided into a high tension compartment and a machine compartment. The former contain the lightning arresters and oil switches, etc., is very roomy and provides ample spacing between all high tension leads.

The leads from the high tension transmission line are brought into the substation through vertical roof bushings in the high tension compartment roof and pass through double-throw, triple-pole switches, then through choke coils, K-10 automatic oil switches and disconnecting switches to the primaries of the transformers. The secondaries of these transformers are double. The leads from the secondaries go to the reactances and thence to the collector rings of the rotary converters. The rotaries are 600-volt machines connected in series to give 1200 volts for the trolley. The lightning arresters are tapped from the high tension leads immediately after they have passed the double-throw triple-pole switches. They are of the G. E. aluminum cell type and have horn gaps.

The number of rotary converters and transformers installed in each substation is shown in the accompanying table, which also gives their capacity. There are three rotaries in the Waukesha Beach substation, two of which are connected in series to form a pair giving 1200 volts while the third serves as a spare.

SUBSTATION APPARATUS

	—Rotary-Converters—		—Transformers—	
	Number	Capacity each	Number	Capacity each
Watertown	4	300 kw	6	200 kw
West Allis	2	500 kw	6	185 kw
East Troy	4	300 kw	6	200 kw
Burlington	4	300 kw	6	200 kw
Waukesha Beach	3	500 kw	9	185 kw

Note: There are also two 500-kw rotary converters and six 185 kw transformers installed in the existing substation at West Allis.

ROTARY CONVERTERS

The twelve 300-kw rotary converters are General Electric



Fig. 7—Milwaukee 1200-Volt Line—Exterior of West Allis Substation

four-pole machines. They run at 750 r.p.m. and have a full load direct current of 500 amp. The five 500-kw rotary converters are six-pole units with a speed of 500 r.p.m. and have a full load direct current of 834 amp. A number of short circuit tests were made in the factory which showed that the ef-

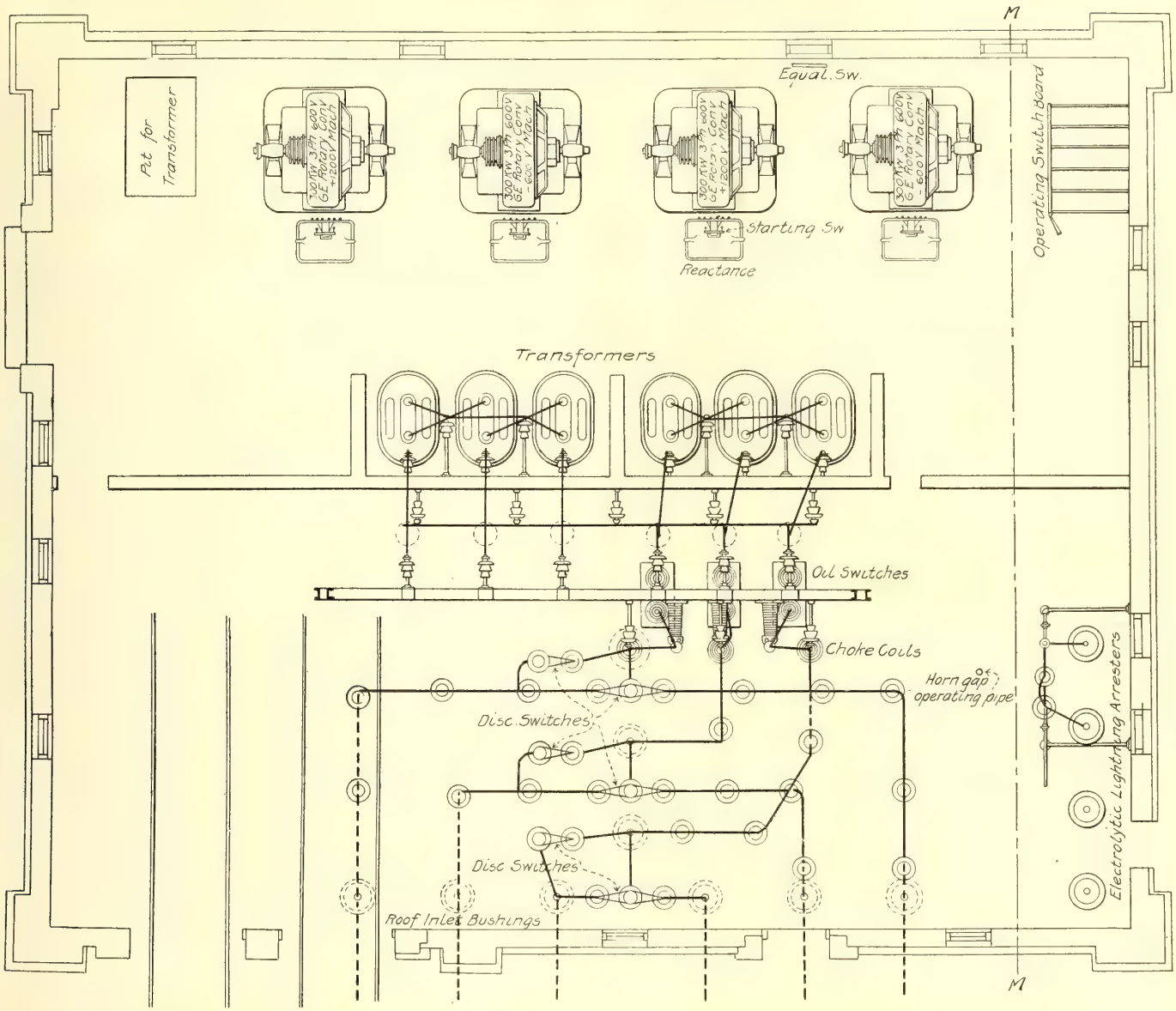


Fig. 9—Milwaukee 1200-Volt Line—Plan of East Troy and Burlington Substations. (For Section, See Fig. 11)



Fig. 10—Milwaukee 1200-Volt Line—Exterior of West Allis Substation

fects of flashovers on the brush rigging and commutators was no more serious than in the case of 600-volt machines. There is no tendency to hunt and the factory tests also showed that these rotaries can stand very severe overloads.

The potential of each machine is 600 volts and two units are connected in series to give the desired 1200 volts. In all essentials the machines are standard 600-volt units with addi-

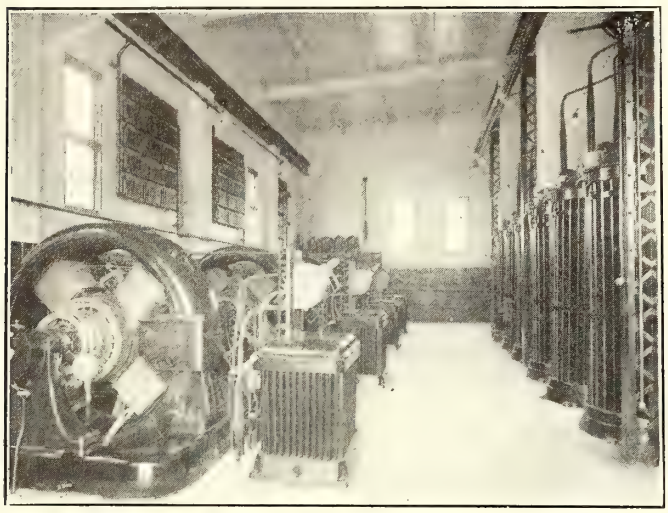


Fig. 12—Milwaukee 1200-Volt Line—Interior of Waukesha Station

tional insulation. They are compound wound with the shunt fields excited from the individual machine, and the series fields of each pair connected in series on the grounded side. Each machine is provided with a speed limiting device and a magnetic oscillator, while metallic graphite brushes are used on the a.c. side, making lubrication unnecessary and decreasing the amount of dust from brush and ring wear. The d.c. brush riggings are all supported from the magnetic frame so that there will be no metal around the commutator on which an arc could hold should a flash-over occur from a short circuit. The projecting ends of the commutator clamping rings are entirely insulated and the metal shell and bolts of the collector rings which are usually exposed are covered with insulation.

The reactive coils used with the 300-kw rotary converters have a capacity of 45 kva and those used with the 500-kw machines are 75 kva. They are all oil-cooled and have standard starting switches with protecting covers, mounted on the top.

TRANSFORMERS

The 18-200-kw transformers are General Electric single-phase units of the oil-cooled core type with primaries multiple wound for 38,100 volts when delta-connected and 66,000 volts when Y-connected. The secondaries are wound with two distinct windings for supplying the rotaries in series, each winding giving 370 volts; 50 per cent starting taps are provided in the secondary windings. Those transformers are used in conjunction with the 300-kw rotary converters, there being three single-phase transformers to each pair of rotary converters.

The nine 185 kw transformers used in conjunction with the 500-kw rotaries at Waukesha Beach, have the same arrangement of primaries as above, but the secondaries are wound for 430 volts and have 1/3 and 2/3 starting taps. The six transformers installed in the West Allis substation are also single-phase, 185-kw units, but the primaries are wound for 13,200 volts and the secondaries for 430 volts. These secondaries also have 1/3 and 2/3 starting taps.

OIL SWITCHES

The high-tension oil switches (see Fig. 13) in all of the substations described are of the K-10 type, which is a top-connected switch designed for open wiring. It is made up of single pole elements and may be operated either by hand or by solenoid. This switch requires no masonry cells, each single pole element incorporating the advantages of a brick compartment in itself. The oil receptacles which constitute the body of the switch are made of steel boiler plates and support the switch leads and operating parts. The insulators are of the built-up type, having porcelain ends, and intermediate sections of a special insulating material with projecting washers to give a very large creepage surface. After these insulators have been assembled they are filled with compound and are clamped and supported separately on iron plates which are in turn bolted to the top of the oil tank. This construction permits the removal of parts without dismantling the switch. The stationary contacts are supported at the bottom of the insulator and consist of a double set of flared fingers which prevent pitting at the contact surfaces. A horizontal contact bar with wedge-shaped blades closes the circuit. This bar is connected to the operating mechanism by a series of treated wooden rods and in a set of three switches, forming a three-phase group; these bars are in parallel and are operated in a vertical direction to open or throw the switch. The drop of these contact bars interrupts the circuit, producing a double break or two breaks in series in each of the single pole elements.

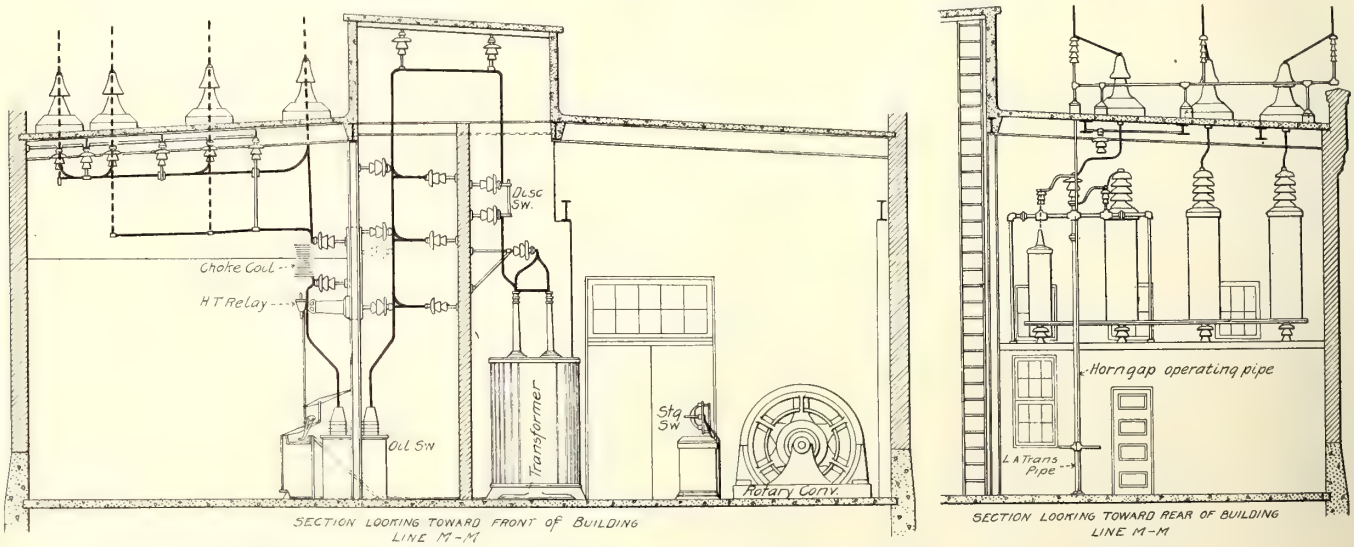


Fig. 11—Milwaukee 1200-Volt Line—Sectional View of Typical Substation. (For Plan, See Fig. 9)

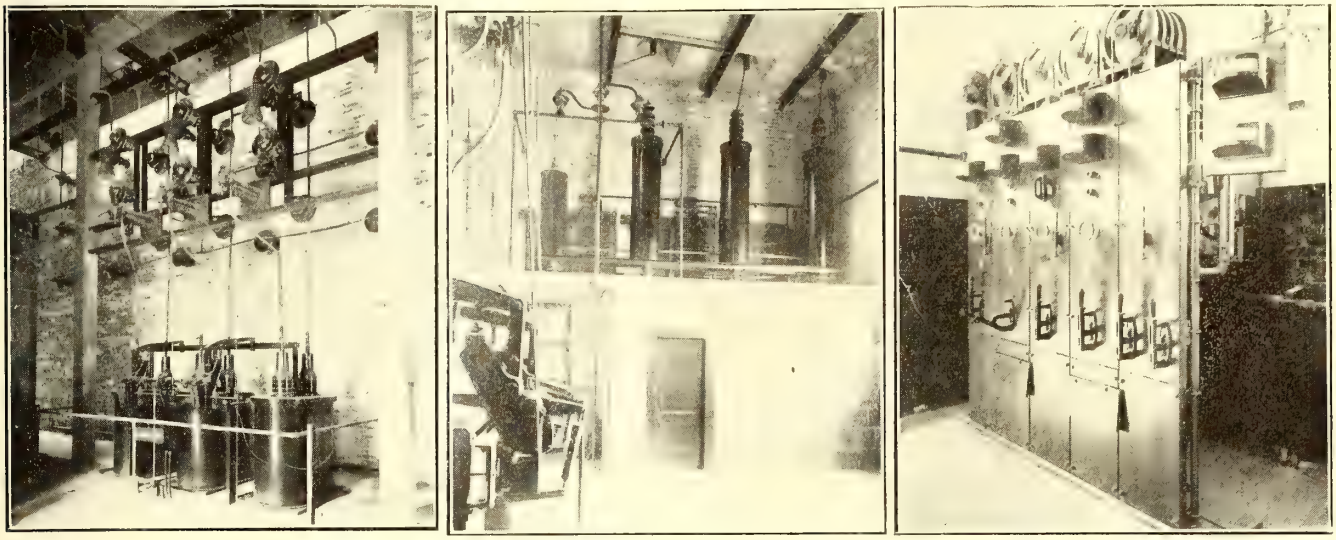
LIGHTNING ARRESTERS AND SWITCHBOARD

The lightning arresters are of the electrolytic type, being aluminum cone-shaped plates housed in steel tanks. The tanks are of such a capacity as to hold an ample quantity of electrolyte and oil. Fig. 14 gives an illustration of these lightning arresters as installed in the Waukesha Beach substation. The three-phase legs are shown with the latest type of high tension

out-door bushings. The horn gaps are placed on the roof of the substation just above the ceiling bushings and are operated by a rod brought down into the substation.

The switchboards each consist of five panels, two low machine panels, two high machine panels and one 1200-volt feeder panel. There is also a swinging bracket. The most important items of equipment on the high machine panels are the circuit breakers, rheostat hand-wheel and power-factor meter. The circuit breakers are mounted on the back of the board and barriers are provided to eliminate all danger of flashovers; they are operated by handles mounted on the point. The equipment of the low machine panels is similar to that of the high machine panels, with the exception that a switch is substituted for the circuit breaker and an ammeter is provided.

The 1200-volt feeder panel is equipped with both a circuit breaker and a switch with the circuit breaker tripping device brought to the front of the board. The swinging bracket is furnished with two volt-meters and the sub-bases are provided with the wattmeters. Fig. 15 shows a view of one of these switchboards and it will be noted that in this instance the rheostats are mounted above the board. This is because there was no room on the ground at the back of this particular board for their reception, where there is sufficient room they are installed on the ground. All of the switchboard equipment, including instruments, was manufactured and supplied by the General Electric Company, but the panels were made and equipped in the shops of the Milwaukee Electric Railway & Light Company.

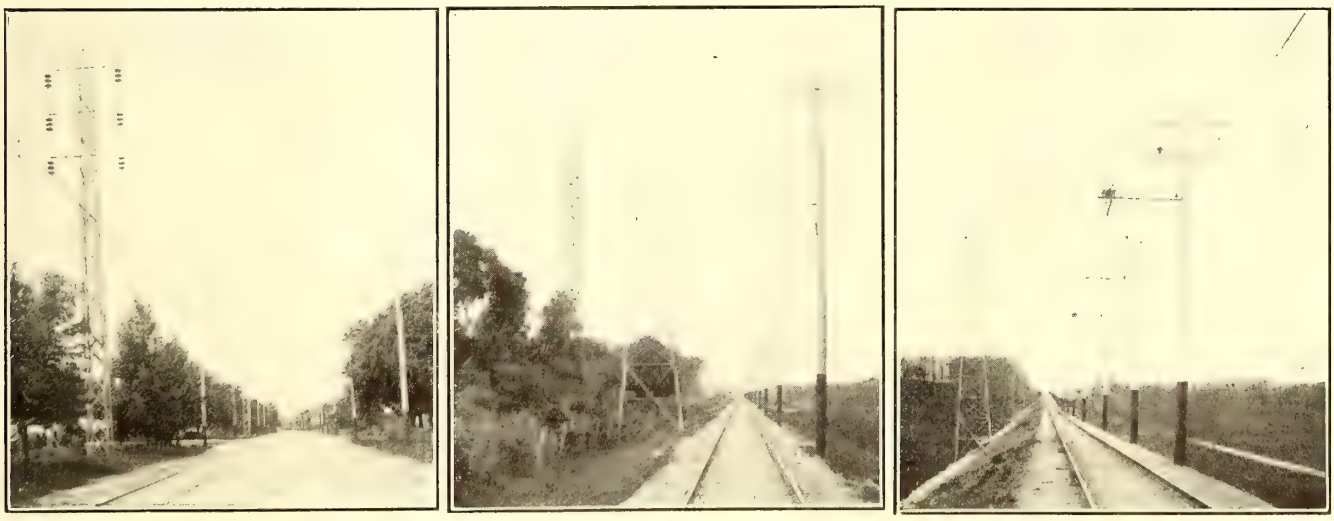


Figs. 13 to 15—Milwaukee 1200-Volt Line—Waukesha Beach Oil Switches, Lightning Arresters and Switchboard

TRANSMISSION LINE

The transmission line from Kilbourn to Watertown is owned by the Southern Wisconsin Power Company and was constructed to feed the railway system of the Milwaukee Electric Railway & Light Company from the hydroelectric development on the Wisconsin River.

The distance between Kilbourn and Watertown is approximately 70 miles. At present the potential is 38,100 volts with the transformers connected in delta, but eventually connections at 66,000 volts will be used. The transmission line is in duplicate for the entire 113 miles from Kilbourn to West Allis and is carried on steel towers between Kilbourn and Waukesha Beach, the remainder being carried on wooden poles. The steel tower line will extend to West Allis in the near future and then the voltage will be raised as explained. Stranded copper wire of No. 0 gage is employed between Kilbourn and Watertown, while stranded aluminum is used between Watertown and West Allis, the aluminum conductors having a current carrying capacity equivalent to No. 0 copper wire. Between West Allis and St. Martins the transmission line is also in duplicate and consists of No. 2 copper wires carried on wooden poles. From St. Martins to East Troy and from St. Martins to Burlington the transmission line is single (three wires); it is carried on wooden poles and consists of No. 2 copper wires. A ground wire if desirable will eventually be strung throughout from West Allis to Watertown, and between Watertown and Kilbourn it is possible that two ground wires will be employed.



Figs. 16 to 18—Milwaukee 1200-Volt Line—Examples of High-Tension Towers and Combined Trolley and Feeder Line

The transmission line throughout is a most excellent piece of construction work consisting of galvanized steel towers bolted together on the ground. Figs. 16 and 17 are representative of the transmission line. The insulators are of the suspension type and each consists of three units. Fig. 19 gives a close view of the high-tension roof bushings. Fig. 20 shows very clearly the way the transmission line is carried on the

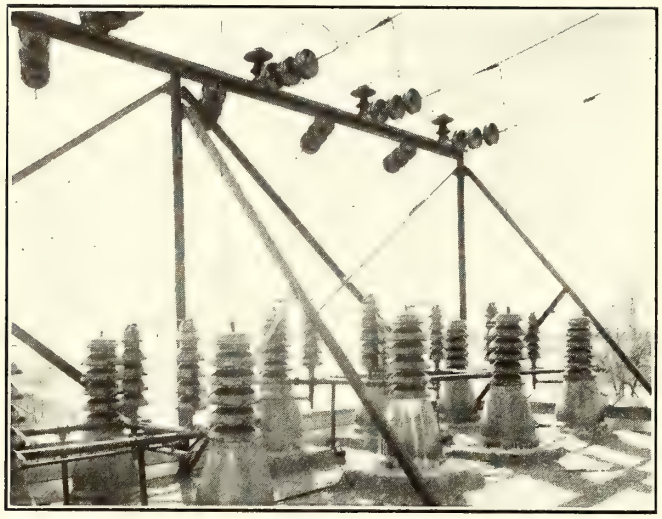


Fig. 19—Milwaukee 1200-Volt Line—High-Tension Roof Bushings

roof of substations and the manner of tapping. The horn gaps for the lightning arresters are in the background.

OVERHEAD CONSTRUCTION AND TRACK

The overhead construction on the interurban roads is the same as when single-phase equipments were in use. It is of the catenary suspended type on all 1200-volt sections. The accompanying table will give the more important detail covering the trolley, track and feeders. For convenience the distances between the substations is also given in this table:



Fig. 20—Milwaukee 1200-Volt Line—Tapping Transmission Line on Substation Roof

	Watertown to Waukesha	Waukesha Beach to West Allis	West Allis to East Troy	West Allis to Burlington
Feeder material	Aluminum	Copper	Aluminum	Aluminum
Feeder size	795,000 circ. mil.	500,000 circ. mil.	795,000 circ. mil.	795,000 circ. mil.
Trolley type	Single bracket catenary	Double span	Single bracket catenary	Single bracket catenary
Trolley size	No. 00	No. 000	No. 00	No. 0000
Track	Single	Double	Single	Single
Distance	27.42 miles	16.04 miles	28 miles	27.07 miles

The feeders are carried on the same poles as the trolley. Fig. 18 gives a good general idea of the construction. The pole lines are a splendid example of interurban railroading; the poles are all painted, are perfectly straight and are kept in perfect alignment. The track is well ballasted throughout the entire system; 80-lb. rails are used for the major portion of the distance.

SERVICE

The density of traffic varies with the season of the year. During the winter months the trains running on two hourly headway in each direction take care of the business, but in summer trains are run on one hour headway regularly and often several sections of two, three and four car trains are necessary to take care of the traffic. The holiday traffic is abnormally heavy. On holidays it is a common practice to haul as many as three trailers with one car and during the busy hours every day one or two trailers are usually hauled. The weight of each trailer is about 35,000 lb. The 1200-volt cars run right into the city of Milwaukee to the terminal station in the Public Service Building.

INTERLINE BAGGAGE

At the meeting of the Central Electric Accounting Conference on the steamer Greyhound on June 25 Water Shroyer, auditor Indiana Union Traction Company, led a discussion on the subject of "Interline Baggage." Supplementing the reference to the discussion on this subject in the report published in the issue of the Electric Railway Journal for July 2, 1910, Mr. Shroyer has furnished the following statement of his remarks:

"The subject of interline baggage is one that has not been discussed heretofore by the members of this conference, presumably for the reason that it has not been considered important from a revenue point of view.

"While to my knowledge there has been no serious objection to the present system of handling this class of business, it appears that some improvement might be made that would assist materially in the auditing work. I would suggest, therefore, that an interline excess baggage check be adopted, providing a coupon for each road over which such baggage is handled, thus conforming with the present method of handling interline tickets and freight way bills. As additional coupons are necessary only in case of a movement over more than two lines, the check may be printed separate from the regular form and on light weight paper. These forms may be made up and forwarded by the auditor's office of the forwarding line to the auditor of the intermediate line, thereby giving the latter a record of the movement, which he does not have under the present system.

"The form of the interline excess check proper need not differ materially from the present form, but in order that such checks may be readily identified they should be printed on a different color tag board and be given an entirely different serial number, using the prefix 'I,' indicating 'Interline.' This will not only save time in assorting in the accounting office, but it will also enable the agents at junction points to identify the checks readily, thereby insuring a prompt transfer to connecting line. A different serial number will assist to some extent in verifying the foreign line's report, enabling a check to be made from the conductor's train record of baggage handled.

"Another matter that might be given consideration at this time is the proper method of accounting in connection with the checking of interline baggage on Central Electric Traffic Association mileage. The Traffic Association has this matter under consideration at this time, and as it will probably recommend the use of a mileage ticket, it would seem advisable for the accountants to be ready to make such recommendations as are necessary to avoid any complications in the accounting work and establish uniform practice relative to reports and manner of settlement between lines."

The Bluegrass Traction Company, Lexington, Ky., has tendered Gov. A. E. Willson, of Kentucky, the use of a special train of cars to tour the Bluegrass country when the Governors' conference is in session in Kentucky in November, 1910.

ANOTHER VOLUME OF THIRD AVENUE RAILROAD CORRESPONDENCE

Frederick W. Whitridge, receiver of the Third Avenue Railroad Company and of the Union Railway Company, of New York, has published Volume III of his correspondence with the Public Service Commission of the First District of New York. Vols. I and II were reviewed in the ELECTRIC RAILWAY JOURNAL of Feb. 20 and Aug. 7, 1909. Volume III contains 464 pages exclusive of index, and is prefaced by the following statement:

"This third volume of correspondence with the Public Service Commission, like the preceding volumes, requires little comment.

"The flood of communications from the commission has somewhat abated, and it has a new transportation engineer, who is a man of sense and some experience, but generally speaking, time, experience and even the breath of adversity which touches us all, have passed over the commission and left it unchanged and scathless. Its work in regulating me is here recorded, but I am informed (I hope correctly) that in other directions it has done marvelous things, and that having secured from the Long Island Railroad Company copies of its schedules for the last five years—amounting to some tons of printed matter—it has been able, after a study of those data, to find a method by which all the trains on the Long Island Railway will hereafter be on time.

"I had intended to print in this volume the report of a speech of the chairman of the commission made on May 25. That report contains, however, such gross misstatements of fact and is in such shocking taste, that the chairman probably is, and his colleagues much more probably are, by this time, ashamed of it. 'Keep your temper' and 'Tell the truth' are sound rules of controversy, and it is also true, and the chairman ought to be able to find comfort in the thought of it, that honest laughter is incompatible with malice and far removed from spite.

"I assume that some plan for the reorganization of the Third Avenue Railroad Company will shortly be approved by the commission, or otherwise be carried into effect, and this receivership will end. This, therefore, will probably be the last volume I shall have occasion to publish, and I hope that students of State regulation may, hereafter, find this record of what the commission has actually accomplished in one branch of its business, and of the manner in which the commissioners went about that business, of interest and possibly of value.

"From it all, I think it appears that, while the Public Service Commission in the First District might have been useful and even valuable, it is almost incredible that it should in this instance have caused the needless expenditure of so much time and money to so little purpose.

One of the early letters in the volume gives Mr. Whitridge's views on appraisals in answer to the request by the commission for certain data. Mr. Whitridge's reply to Mr. Eustis was as follows:

"I have yours of the 17th inst., in which you request me to furnish you with certain data which you say is most urgently needed in connection with your 'Appraisal Work.'

"In reply thereto I have to say that in view of my correspondence with your commission on the subject of appraisals and of the apparent unwillingness of the commission to define its position in respect thereto, I have come to the conclusion after the examination of the statutes that your 'Appraisal Work' is one that you have no business to undertake at the public expense. It is extra legal, if not illegal, and may prove very mischievous. I shall, therefore, be unable to furnish you with any information whatever for use in your 'Appraisal Work' except upon an order of the Court, the request of the Third Avenue Bondholders' Committee or such legal order as the commission may itself make. I am sure you will understand that I very much regret to come to this decision, for I am particularly anxious to work in harmony with the commission, and I dislike any disagreement with them, but I think you will recognize that my views being what they are, I cannot do otherwise."

A few other letters addressed by Mr. Whitridge to the secretary of the commission, giving his views on various subjects, follow:

"NEW YORK, Oct. 22, 1909.

"I have your letter of the 21st, informing me that all of my reports require correction in respect to certain matters mentioned therein. I do not quite understand what is referred to. All of the interest paid by me and all of the taxes are shown in full properly proportioned in each monthly report. Of course, I do not keep any depreciation account, because I have no capital account, and it is obvious that there is no sense in keeping a depreciation account when all the money we can get from any source is being expended upon the property.

It occurs to me that you may possibly refer to the unpaid franchise tax, but the courts and the railroads have been endeavoring for nine years to find out what that tax is, and I am not in position to apportion it or take any cognizance of it until I do so ascertain. I may mention, however, for your information, that some months ago I made a proposition for the settlement of these taxes for all prior years and for the fixing of an amount for future years. On reference to the Attorney General, the Honorable William N. Cohen was appointed by him to consider the matter, and he thought it necessary to obtain an opinion from the Court of Appeals upon one point, which has now been rendered, and I hope within thirty days to carry that compromise through to pay all the back taxes through the issue of receiver's certificates, and thereafter, of course, we will have a definite amount which can be charged pro rata each month."

"NEW YORK, Nov. 27, 1909.

"I have your letter of the 23d instant, enclosing final order in case No. 1170, by which I am directed to see that all my cars are equipped with suitable apparatus for heating, and that the temperature in all of them shall be maintained at not less than 40 nor more than 65 degrees Fahrenheit, and that a copy of these regulations be placed in the cars; and finally, you ask whether this order of the commission is accepted and will be obeyed.

"In reply, I would say that all the cars controlled by me are equipped with the best heating apparatus known, and I sent to you, months ago, a copy of my regulations in respect to the same, all of which I assume you approved, as I have heard nothing to the contrary. I consider that I have thus done everything in my power to effect the result you have seen fit to order.

"I accept your order No. 1170, and so far as it is applicable to me personally I shall obey it cheerfully. But whether the temperature will be maintained as you have ordered that it shall be maintained, the Lord only knows."

"NEW YORK, Jan. 31, 1910.

"I have yours of the 29th, in which you ask me to report defects in my cars classified under forty-five different heads, and also request that in case any defects occur to the cars which are not included in any of these forty-five heads they should be reported under some other head.

"I have no doubt that these statistics will be enormously interesting, and I shall take great pleasure in supplying them. I think it is possible that you may be able to employ somebody, if you will pay sufficient salary, who will agree to read them."

The three following letters relate to a complaint filed by a passenger against the condition of the Fort George cars:

"NEW YORK, Jan. 28, 1910.

"SECRETARY PUBLIC SERVICE COMMISSION, New York City.

"Dear Sir: The undersigned desires to complain about the filthy condition of the cars leaving Fort George about 7.30 a. m.

"As they are a serious menace to the health of the people who are compelled to use them, a complaint will also be made

to the Department of Health and to the receiver of the Third Avenue Railroad Company.

(Signed) Irving C. Lavendol."

"New York, Feb. 2, 1910.

"Secretary, Public Service Commission, New York City.

"My Dear Sir: I have yours of the 1st instant, referring to the complaint of Mr. Irving C. Lavendol. I have investigated Mr. Lavendol's complaint in consequence of a letter received from him a few days ago, and I really do not know what he is talking about, except that the cars at the time he speaks of are as they are left by the persons who use them between 6 and 7 in the morning. The cars are clean when they go out. I enclose a copy of my previous letter to Mr. Lavendol.

"Receiver."

"New York, Jan. 29, 1910.

"Mr. Irving C. Lavendol, New York City.

"My Dear Sir: I have yours of the 28th, in which you speak of the filthy condition of the cars leaving Fort George about 7.30 a. m., and say that, as they are a serious menace to the health of the people who use them, you propose to inform the Board of Health and the Public Service Commission; inferentially I suppose of my misconduct in allowing them to remain in that condition.

"In reply thereto I beg to inform you that between the hours of 6 and 7 a very large number of your fellow citizens, who are engaged in rough manual labor, use the cars going in the direction of Fort George to reach the scene of their labors. They are much less particular than you in their habits, and after they have used the cars, which were clean when they got into them, I find that they are apt to be in the condition which is so offensive to you and to all right-minded people. This, I believe, is a temporary condition, as the labors in which they are now engaged will, within a few months, be completed, and this travel will cease.

"In the meantime I do not feel justified in building a barn at Fort George for the purpose of washing the cars after these particular fellow citizens of yours and mine have got through using them, and I suggest that you should invite the Board of Health, and above all the Public Service Commission, to examine these gentlemen or what other cause there may be for the condition of the cars to which you refer, and get them to provide, suggest, or order some immediate remedy for these conditions; perhaps they or some of them will be able to prevent these particular fellow citizens of ours from chewing tobacco or gum, from expectorating, from drinking absinthe, from abstaining from soap and water and from exuding offensive effluvia from their bodies. Receiver."

The following letters refer to the operation of pay-as-you-enter cars by the Third Avenue Railroad Company:

"New York, April 13, 1910.

Receiver, Third Avenue Railroad Co., New York City.

"Dear Sir: By resolution of the Board of Aldermen, the Public Service Commission has been requested to take such steps as might be necessary to eliminate the inconvenience which passengers are subjected to on pay-as-you-enter cars at the various terminals, from which such cars are operated. As you well know, due to the fact that the majority of passengers do not have the proper change, passengers are compelled to wait in line while the conductors make change and collect the necessary fares before they can enter the cars. These conditions could be eliminated if cashiers, whose duty it would be to make change, were installed in a small booth at such points. All passengers could then be required to obtain the necessary change before boarding the car. Please take this matter under consideration and reply by the 25th inst. Secretary, Public Service Commission."

"New York, April 14, 1910.

"Secretary, Public Service Commission, New York City.

"Dear Sir: I have yours of the 13th, referring to the resolution of the Board of Aldermen requesting me to take steps to eliminate the inconvenience to which passengers are subjected on pay-as-you-enter cars, adding that, as I well know, 'the majority of passengers do not have proper change.'

"As a matter of fact, I do not know anything of the kind. My personal observations have given me the impression that at least three-quarters of the passengers who get on the pay-as-you-enter cars have their nickels ready. If, however, I am mistaken about this, I am not at all sure that the conditions could be eliminated by installing cashiers in small booths at terminal points and endeavoring to compel passengers to obtain the necessary change at those booths. I do not know how they could be 'required' to do it. They could be requested to do it, but I doubt whether it is possible for railroads to eliminate inconveniences caused by the stupidity of the people themselves, any more than it is possible to keep cars invariably clean and sweet smelling which are used by people with filthy habits, which seemed to be the notion underlying the last resolution the Board of Aldermen levelled at me.

"I am disposed, as you know, to do anything I can to gratify the Honorable Board of Aldermen and the Public Service Commission, and if you can get me a permit to put a small booth in front of the Post Office, at which a cashier can be stationed to make change for the patrons of the road, and will tell me how either you or I or the Aldermen can compel people to go there to get change, I am prepared to go to the expense of paying for the cashier and building the booth. My notion is that the experiment would disappoint the Aldermen and yourselves, and therefore I should only be willing, in the first instance, to install one booth at the most crowded terminal as a matter of experiment. Receiver."

"New York, May 5, 1910.

"Receiver, Union Railway Co., New York City.

"Dear Sir: Following a resolution from the Board of Aldermen, we made investigations as to conditions at the 155th Street terminal of your lines. Our observations show that in this special case the delays to passengers boarding pay-as-you-enter cars are not caused by the necessity of conductors making change, but by the passengers leaving the car at the forward end when the car is entering the terminal. This delays opening the entrance doors, making it impossible for passengers to enter until all those wishing to alight have left the car.

"It is believed that if the man who is stationed at this point would assist in this, by opening the doors corresponding to the front exit on the return trip, and by announcing that the passengers should leave by this door, considerable time in some cases could be saved, and the conductor could then start collections as soon as the station was entered. Please reply.

"Secretary, Pub. Serv. Commission."

"New York, May 7, 1910.

"Secretary, Public Service Commission, New York City.

"My Dear Sir: I have yours of the 5th instant in respect to a recent resolution of the Board of Aldermen about pay-as-you-enter cars. In your letter of April 13 you informed me that 'the inconvenience to passengers was, as I well knew, due to the fact that the majority of passengers do not have the proper change,' and you suggested a remedy which, in my opinion, would not be a remedy, and which is impracticable, although I offered to try it experimentally.

"In your present letter you inform me that you have been making certain investigations and observations, the result of which shows that the inconvenience to passengers in the case which you observed and investigated, was not due to the cause to which you attributed it, in your letter of the 13th. The remedy which you propose in your letter of May 5th for the inconvenience which your observations and investigations had detected in the case therein referred to, would involve either the employment of an additional conductor, which I cannot afford, or the practical abolition of the pay-as-you-enter feature, to which I am unwilling to assent.

"I submit to you and to the Board of Aldermen that the real objection to the pay-as-you-enter cars is that people are obliged to pay their fares before they can enter the cars.

"Receiver."

The volume concludes with a letter which Mr. Whitridge sent to the commission enclosing reports on inspectors of the

commission, published on page 953 of the ELECTRIC RAILWAY JOURNAL for May 12, and a letter from Mr. Whitridge to James N. Wallace that he would be glad to retire as receiver of the Third Avenue R. R. if any considerable number of bondholders should consider that his services were imperiling the property. This letter was published on page 1112 of the ELECTRIC RAILWAY JOURNAL for June 25.

REPORT OF THE COMMITTEE OF FIFTY

The Committee of Fifty, appointed in Detroit to investigate the street railway situation, has embodied the results of its consideration of the problems involved in a full report, which has been published in book form. The book covers the conclusions reached on every subject but that of the value of the property. No decision in which the full committee joined was reached on that matter. The sub-committee on appraisal presented a report concerning the valuation of the property made by Frederick T. Barcroft, but the values as determined were not accepted by the full Committee of Fifty.

The introduction to the report states that expert engineers and other experts were employed to assist the committee and its sub-committees wherever the services of trained men and minds were deemed essential in gathering the facts and figures necessary to a complete investigation. The labors of the committees extended throughout practically a year.

The action of the various sub-committees on the many questions concerned is shown by the following abstracts of the reports:

STATISTICS AND REGULATION

The committee on this subject secured information from railway companies in Buffalo, Cincinnati, Chicago, Detroit, Denver, Minneapolis and St. Paul, New Orleans, Pittsburgh and Philadelphia, and compiled the data in tabular form. Table I, published herewith, is a summary of the figures relating to earnings, expenses, population, traffic, etc. Table II shows comparative fares and various costs as compiled by the committee. Other costs are shown in Table III.

The committee also submitted diagrams to show that the peak load in Detroit from 5 to 6 p. m. is greatly in excess of that in the other cities, due to the fact that the workingmen's tickets, which are sold at eight for 25 cents, may be used during that hour. The committee recommended the adoption of the point of destination transfer used in Buffalo. The members of this committee were Frank H. Conant, William C. Noack, Frank Danzer, A. J. Dunneback, Russell A. Alger, John H. Brown and Joseph E. Schiappacasse.

APPRAISALS

The report on this subject, independent of the detailed report on the appraisal, contains brief references to several of the points brought out in the investigation, including the following:

"No more buildings should be erected by this corporation without approval by the new civic plan and improvement commission.

"Power plants, including buildings, have been appraised like the entire property, as a going concern, and the values reached upon them have been arrived at by considering them from their output standpoint absolutely.

"The track has been classified to various types of construction, and investigation discloses that there are 21 types of rail used in this city, 91 types of track formations, and 204 classes of track construction, including pavement.

"Two of each type of cars were examined very carefully and checked with the original specifications in every detail, and then every car in the city was inspected for its present condition and classified to the proper type to which it belongs. The electrical equipment was gone into equally thoroughly, and also the equipments as they came into the shop for repairs were checked in order to reach a fair idea as to the general condition of the equipment as a whole.

"It was impossible to ascertain what proportion of the shops should be charged off to the outside lines.

"Overhead charges are based on the necessary charges required in register, interest charges, interest items during construction, engineering and administration charges and such other charges as are incident to any similar construction. This item has not been depreciated due to the lack of any defined purpose to which this appraisal is to be applied. Expiring franchises naturally destroy this amount to a large degree, and it becomes non-existent.

"The engineers and others who have been associated as assistants, collaborators and advisors of the director of appraisal, Frederick T. Barcroft, on the various parts of this work, have done their work thoroughly, conscientiously and well, and it is a pleasure to give publicity to their names. They are: Frank E. Johnson, Walter H. Evans, Fred H. Froehlich, John C. McCabe, William D. Ray, Albert H. Sisson, Harry Knowlton, William E. Richards, H. D. Sanderson, Edward C. Dunbar, Fred G. Simmons, Herbert L. Russell, Henry D. Miles, Frank W. Hall, Daniel M. Deininger, Fred S. Quackenbush, George D. Mason, Charles Kotting, Edward I. Stimson, John H. Tigchon, Claude M. Harmon, James B. McKay and Homer Warren.

"The report of Prof. Henry C. Adams on franchise values is based on the physical valuation of the property as found by Mr. Barcroft, applied to car-mileage under operating conditions as they now exist. The present value of the unexpired franchises as determined under above conditions is $2,810,613.

"The net earnings for the year 1908 from the lines upon which the franchises have expired was $799,319. Deducting 6 per cent allowance on physical values as determined by appraisal, $234,376, would leave an earning power of $564,942.77 per annum, or the rental value to the city of the expired franchises conditioned upon operating conditions continuing as at present."

The members of this committee were Edwin A. Burch, acting chairman; Louis R. Geist, William M. McMahon, W. W Hannan, Fred C. Hees and D. W. Simons.

The report of Professor Adams on the valuation of franchises said in part:

"The significant fact in a municipal railway franchise consists is the right conferred by the common council to invest capital on the city streets. The right conferred is the right of limited and conditioned occupancy, and the value of such a right is measured by the unusual profit that may be gained from its exercise. Commercially speaking, the basis of franchise value is the revenue which accrues from operation in excess of operating expenses and of a reasonable return upon the investment in the physical plant. This remainder is, in fact, a surplus revenue which, in the case of a street railway operating on a franchise, is protected against competition by the terms of the ordinances concerned, and, provided the amount of this permanent excess profit can be determined for a year, the value of the underlying franchise is obtained by computing its present worth for the number of years which the franchise has to run.

"In this report I have not undertaken to express an opinion upon any of the strictly legal questions that arise in the interpretation of the ordinances and resolutions which confer operating rights upon the Detroit United Railway. The report of Mr. Webster, chairman of the legal committee, is accepted as final in regard to all such points.

"With regard to minor points concerning which differences of opinion may exist, this report assumes that the use made by the company of the rights conferred is the interpretation which must be placed upon the ordinance, or the ordinances, granting those rights.

"The assumption that the franchise should be valued according to the actual use made of the rights which they confer, rather than the possible use that might be made of them, enables the problem before the appraisal committee to be stated as follows: What were the several rights to operate an electric railway over the streets of the City of Detroit worth on March 1, 1909, under the conditions of actual operation.

"The financial arrangements of the corporations included in

the system are somewhat interdependent, but that fact has no bearing on the problem in hand. It is not necessary to consider the mortgages or the manner in which they are placed, or to inquire whether the securities issued on one property are in any way bound up with the securities issued on the other properties. The question of the present worth of an operating right must be determined from the point of view of operation exclusively.

"It is evident that any feasible method of computing the value of the unexpired rights of operation must conform to the accounts as kept by the operating companies.

"Each of the main companies, namely, the Detroit United Railway, the Rapid Railway, the Detroit, Jackson & Chicago Railway, and the Detroit, Monroe & Toledo Railway maintains an independent set of operating books from which may be taken the operating revenues and operating expenses of the respective companies. With one minor exception, each of the above-named companies has its own power plant, and furnishes its own power, so that no embarrassing questions touching the rental of power are involved.

"The treatment in the accounts of the three independent interurban companies operating within the city of Detroit is as follows: The revenue collected up to the city limits is credited to the revenue accounts of the interurban companies, but the revenue collected within the city limits is credited to the Detroit United Railway and is separately stated in the accounts of that company. As against this revenue the Detroit United Railway pays each of the interurban companies named two cents per car mile within the city limits, this payment being regarded as an operating rental charge and is assumed to cover repairs, maintenance, depreciation and rental proper for interurban cars not the property of the Detroit United Railway, operating within the city limits.

"The Griswold street passenger station, which is used jointly by the three independent interurban companies above named, and by the interurban cars of the Detroit United Railway (as, for example, the Pontiac cars) is maintained and operated by the Detroit United Railway, but the three independent interurban companies pay a flat rental of $60 per month as their portion of the expense of maintenance and operation. The difference between these amounts and the actual expense, chargeable to the maintenance and operation of the station is regarded as an expense incident to the several divisions of the Detroit United Railway assigned to interurban service.

"No accounting record is made of the fact that motormen and conductors on the pay roll of the independent interurban lines operate cars within the city limits, for the reason that a sufficient number of crews on the pay roll of the Detroit United Railway is assigned to the operation of interurban cars outside of the city limits, to balance the interurban crews running cars within the city limits. I see no reason to question the propriety of the above-named adjustments so far as they have any bearing upon the franchise values within the city. The accounts of the Detroit United Railway Company permit, with one or two exceptions, an exact separation of revenue as between the city lines and the divisions of the Detroit United Railway operating outside the city.

"The usual rule for separating operating expenses in cases of this kind is to accept car-mileage as a basis of separation. When, however, one considers the many differences which exist between the operation of an interurban and of a city line, the propriety of accepting car-mileage as the basis for the localization of expenses at once arises. The rule adopted by this report in place of the straight car-mileage pro rate is as follows: The expense per car-mile on the interurban roads which maintain independent operating expense accounts is first computed and the rate of expense thus determined is applied to the car-miles made on the interurban divisions of the Detroit United Railway; the sum thus arrived at is then subtracted from the total operating expense of the Detroit United Rail-

TABLE I.—EARNINGS, EXPENSES, PASSENGERS CARRIED, POPULATION, ETC., IN 10 CITIES. COMPILED BY COMMITTEE ON STATISTICS AND REGULATION, DETROIT.

Cities.	Population per mile of track.	Miles of track.	Annual interest charges.	Operat. expenses: Gross earnings per car-mile.	Operat. expenses: Per cent of gross earnings.	Operat. expenses: Per car-mile.	Cars in daily use.	Passenger car-miles.	Passenger car-hours.	Revenue passengers.	Transfer passengers.	Employee and passes.
Buffalo	1,074	372.59	$700,633	$0.2632	61.92	$0.1629	503	19,555,087	2,217,464	93,922,696	44,452,165	1,336,884
Cincinnati	1,933	219.88	.....	.225	....	...	600	.....	.....	88,334,477	30,057,624	721,330
Chicago Railways Company	4,340	306.445	1,462,057	.248	66.83	.161	879	43,857,066	5,757,994	217,400,335	153,295,766	2,947,287
Chicago City Railway	4,340	252.29	815,693	.252	64.81	.176	809	33,646,585	3,887,087	167,508,745	104,468,226	10,814,229
Detroit	1,171	399.22	966,390	.2305	59.93	.1452	481	23,496,579	2,287,242	115,044,608	35,958,059	5,008,743
Denver	733	212.75	668,269	.273	48.22	.131	231	11,024,181	1,146,883	59,760,693	17,749,726	1,126,057
Minneapolis and St. Paul	1,455	368.39	951,122	.295	49.47	.146	570	21,683,889	2,367,510	123,508,388	39,830,225	.....
New Orleans	1,909	196.49	.....	.216	60.88	.131	378	18,660,238	2,080,890	77,459,499	15,492,363	1,479,657
Pittsburgh	1,114	491.44	1,883,300	.278	58.4	.175	877	36,463,500	4,206,628	201,622,863	28,787,509	4,279,933
Philadelphia	1,455	626.32	897,220	.228	52.7	.120	1,558	81,161,348	10,263,800	426,606,891	83,448,725	2,733,407

TABLE II.—FARES AND COSTS OF DIFFERENT ITEMS. COMPILED BY COMMITTEE ON STATISTICS AND REGULATIONS, DETROIT.

Cities.	Average fare, total passengers.	Average fare, revenue passengers.	Costs per passenger, exclusive of fixed charges.	Cost of power per kw-hour.	Coal per ton.	Cost of track construction per mile: Single track, 90-lb. rail, concrete foundation.	Second track, 90-lb. rail, concrete foundation.	Single track, 140-lb. rail, concrete foundation.	Second track, 140-lb. rail, concrete foundation.	Paving per mile, single track: Brick on concrete foundation.	Asphalt on concrete foundation.	Granite block on concrete foundation.
Buffalo	.03607	.05365	.037	$0.00622	$2.25	$18,835	$37,670	$24,711	$49,422	$9,240	$14,492	$14,492
Cincinnati	.0366	.0493	...	.006	2.50	21,000	40,000	....	....	....	....	....
Chicago Railways Co.	.02883	.04055	.033	.010	2.13	32,000	64,000	....	....	....	....	11,000
Chicago City Railway	.0295	.0498	.03297	.009	1.80	32,000	64,000	....	....	....	....	11,000
Detroit	...	.0461	...	.005125	1.65	28,566	59,378	....	....	6,101	6,748	10,267
Denver	.0374	.0492	.040	.006	1.69	14,000	25,000	....	....	....	....	14,000
Minneapolis and St. Paul.	...	.0513	.033½	.005	2.259	....	....	25,978	51,955	....	....	13,860
New Orleans	.0412	.0502	.031	.006	2.81	18,500	37,000	....	....	....	12,145	14,000
Pittsburgh	.0429	.05	.03	.006	1.037	26,500	53,000	....	....	5,000	9,000	12,500
Philadelphia	.03564	.042	.03564	.007	2.58	17,160	35,000	29,040	58,080	7,392	8,290	9,240

TABLE III.—COSTS OF DIFFERENT ITEMS, COMPILED BY COMMITTEE ON STATISTICS AND REGULATION, DETROIT.

Cities:	Cost of track and paving per mile with 2 track 90-lb. rail: Brick 90-lb. rail complete.	Asphalt 90-lb. rail complete.	Granite Block 90-lb. rail complete.	Cost of double truck cars and life average: Cars.	Years.
Buffalo	$56,150	$66,654	$66,654	.....	.....
Cincinnati	.....	.....	.....	$2 750 to $9,000	15 to 20
Chicago Railways Co.	.....	.....	86 000	6.000	.....
Chicago City Railway	.....	.....	86.000	6,500	.....
Detroit	77,682	79.618	90,178	5.300	.....
Denver	.....	.....	56,000	6,500	15
Minneapolis and St. Paul	.....	.....	.....	5,760	10
New Orleans	.....	68,000	72,000	4,000	12
Pittsburgh	6?,000	71 000	78,000	7,500	10 to 12
Philadelphia	56,172	58,760	61,506	5,500	15

way and the remainder is accepted as the amount of expenses properly assignable to the operation of city lines.

"In order to understand the operation of cars within the city limits, and of the statistics and accounts pertaining thereto, it will be necessary to hold in mind a technical definition of a 'line' and of a 'route.' By a 'line' is meant the unit of operation used in the compilation of revenue; that is to say, the revenue collected upon any particular operating line may be taken directly from the books of the company.

"The difficulty so far as computing the value of unexpired operating rights is concerned, arises from the fact that the ordinances of the council give the company the right to operate over streets; whereas two or more lines, as above defined, may operate over the same street, which results in the fact that certain streets are covered by lines operated under grants that expire at varying dates. Moreover, certain streets belonging to a line are used more frequently than other streets belonging to the same line. It becomes necessary, therefore, to divide the line into routes; and a 'route' in this connection is defined as the trip scheduled for cars and crews. For this reason it is necessary in order to work out the problem in hand, to localize density of traffic on certain streets, and also to separate the traffic thus located according as it pertains to lines which operate under grants which expire at different dates. To meet this necessity streets over which franchise rights are conferred are divided into 'accounting units.'

"The revenues which accrue to the several lines may be taken directly from the books of the company (excepting $7,081.96 out of a total, which is distributed to lines on the basis of the revenue earned by each) but the revenue and routes of which the lines are composed are not a matter of record. Car-mileage by routes, however, may be computed from the statements rendered daily to the car accountant showing the number of trips made over each route each day. It is assumed that the revenue of an operative line localizes itself to any portion of the line in proportion to car mileage. Not only is this assumption in harmony with the generally accepted unit theory as applied to street railway operation, but it is inferentially recognized by the common council of the City of Detroit in the requirement that a car started over an advertised route must run to the end of the route. It is not necessary for the localization of revenue to take into consideration the varying weights or types of cars used, for the reason that, as a rule, the same type of car is used on all routes of a given line. The important point to be held in mind is that the revenue is assumed to vary on different parts of the same line according to car mileage.

"The allocation of expenses presents a more difficult problem; for, in the first place, the books of the company do not show the expenses separately by lines, and, in the second place, car-mileage cannot be accepted as a satisfactory basis of assignment for the reason that a light car used on one line should not carry with it the same ratio of expense as a heavy car used on another line. In strict theory, it would be necessary to standardize car-mileage. I endeavored to secure from the company data as to the weight and type of the cars used on the various lines and other pertinent data by which a standardization of cars in service might be made, but was informed that this could not be given without considerable trouble and expense. Moreover, the frequency of stops made is quite as important as the weight and type of cars, in determining the normal unit of expense incident to the operation of electric cars. Information of this sort could not be obtained from the company. The rule adopted by this report localizing expenses is not claimed to be a perfect rule, but it is believed that it leads to more trustworthy results than would be the case should expenses be localized on the straight car-mileage basis. The following statement expresses the rule.

"First: The operating expense accounts kept by the company permit the separation of expenses incurred for the 'operation of cars' from other expenses. This class of expense covers wages paid conductors and motormen, expense of sanding track, removal of snow and ice, cleaning cars, and other similar expenditures, all of which are independent of the weight or type of the cars. The expense for 'operation of cars,' which amounts to between 43 and 44 per cent of the total operating expenses is, therefore, properly distributed on a straight car-mileage basis.

"Second: The remainder of operating expenses, amounting to between 56 per cent and 57 per cent of the total, is assigned on the basis of passengers carried, rather than on the basis of car mileage. The justification of this portion of the rule rests upon the fact that different kinds and types of cars are assigned according to the demands of the service, and in such a manner that the average loading of a car in proportion to the weight or size of the car is about the same for all lines. Whether this part of the rule for the localization of expense be entirely satisfactory or not, it is certain that it will lead to more nearly correct results than the distribution of expenses on a straight car-mileage basis.

"In one particular it was found necessary to modify the above rule to meet a peculiar condition in the franchises upon which street railways are operated in the City of Detroit. According to the ordinances passed, the so-called '3-cent' lines are excused from any expenditure for 'paving, repaving, or repairing' on the streets, whether within or without the rails, while the 5-cent lines are obliged to provide for such expenditures. It was not possible to obtain the amount expended for this purpose in the case of the 3-cent lines. From an examination of the accounts it is believed that this expense would amount to about 5 per cent of the total operating expense. In order to give the 3-cent lines the benefit of this provision of the ordinance, it was necessary to make a corresponding allowance in the assignment of expenses. The important point in explaining the plant is that expense incurred in the 'operation of cars' is localized on the basis of car-mileage, the remaining expenses being assigned on the basis of passengers carried.

"The Detroit United Railway adopts the rule of a single transfer. This being the case, it is assumed that each of the two lines which unite in carrying a passenger will receive an equal amount of revenue; that is to say, as many transfers will be used in one direction as in the other. It is not claimed that revenue allocates itself equitably as between the 14 operating lines. The deficit on the Depot line, for example, is explained in large measure by the fact that this line carries an unduly large number of non-paying passengers. This, however, is a condition of operation which is reflected in the revenue of the properties operated.

"It has been urged that the 3-cent lines will suffer a loss on account of the expiration of the franchises of the 5-cent lines and that this prospective loss should be reflected in the present value of their franchise rights. The loss referred to will arise, if I properly understand the contention, from the fact that at present the 3-cent lines now collect five cents from a passenger who asks for a transfer, whereas after the expiration of the 5-cent lines' franchises the 3-cent lines will be benefited to the extent of 1½ cents only from the passengers who use transfers. This assumes that the new franchises to be granted will demand a 3-cent service over the streets now occupied by the 5-cent lines. I find nothing in the ordinances which warrant such a conclusion.

"It is clear from the description under which the railways of the City of Detroit are operated that the value of franchises can not be computed without determining the net revenue of operation for selected portions of the streets over which the railway operates. These selected portions are called computing units, and are determined by two considerations:

"First, the fact that traffic on one portion of an operating line is more dense than on another portion of the same line; and, second, the fact that two or more lines operating under different grants may operate over the same street sections.

"It is necessary in order to properly localize net revenue for the purpose of the problem in hand to treat a street as though it were made of a series of sections, each section possessing the same density of traffic and affected by the same franchise conditions.

"The basis of the computation to determine franchise value is the net revenue from operation, and it is evident that this unit may be arrived at by lines, by streets, or by combinations of streets. Assuming the valuation of the physical property to be classified in the same manner, or that by combination of computing units, this net revenue from operation can be determined for whatever classification of physical values is reported to the committee, the next step in the determination of a franchise value is to subtract from the net revenues from operation a reasonable charge for the support of the capital invested as stated in the report on physical values. What remains will be the surplus revenue accruing to the company from the exercise of its rights to occupy the streets for a definite period, and to charge for the service rendered, for that period, the price named in the ordinances. The final step in the determination of the value of unexpired franchise, so far as computation is concerned, consists in computing the present worth of the surplus revenue considered as an annuity continued up to the date when the franchise shall expire.

"A complication arises on account of the fact that lines resting on grants expiring at different dates have operating rights over the same streets. This means that the physical value located on such streets must pertain to the operation of both lines until the expiration of the shortest franchise, but after the shortest franchise has expired, the entire value of the track and overhead constructions must be used for the operation of the line or lines operating on more extended franchises. To meet this difficulty it is proposed to use the net revenue accruing from the operation of both lines, as also the entire physical value pertaining to the streets in question, until the date of the expiration of the shortest franchise. At that date, so far as the franchise problem is concerned, it is assumed that that portion of the surplus revenue which accrues to the line operating on the expiring franchise will have ceased to exist, and that the surplus revenue accruing to the other line or lines is alone concerned; the physical value of the computing unit in question should, however, be reduced by the rolling stock and other elements of physical value which pertain exclusively to the operation of the line whose franchise expired.

"There are not many cases of this sort, but the rule is necessary for working out the problem in hand. It should further be added that it is proposed to apply this rule in the case of those streets over which the lines resting on extended franchises operate by contract as well as over those streets on which the ordinance compels no construction.

"It should be further noted that, quite apart from franchise values, the data supplies the basis of an estimate of the commercial value of the right to occupy certain streets for transportation purposes. The accompanying statement, Table IV, is instructive in this connection. It gives the net revenue for each of the 14 operating lines separately for the calendar year 1908.

"The above rule does not consider the increased value of the unexpired franchises due to the probable increase in the population of the City of Detroit. There is, of course, no way of computing this value. It is purely speculative. In case the committee deems it wise to allow a present value on account of the probable increase in the density of traffic during the years to come, it would seem to me that the amount of such an allowance could best be determined by the committee itself."

Table V shows the franchise valuations as computed by Professor Adams.

TABLE IV.—STATEMENT SHOWING CERTAIN RESULTS OF OPERATION OF LINES OPERATED WITHIN THE CITY LIMITS OF DETROIT, YEAR ENDED DEC. 31, 1908. COMPILED BY PROF. HENRY C. ADAMS.

Line.	Car-miles.	Passengers carried.	Expenses for operating cars.	Expenses other than operating cars.	Total expenses.	Gross revenue.	Net revenue or deficit.	Net revenue or deficit per car-mile (cents).
Jefferson	2,628,121	18,988,855	$160,806	$213,317	$374,123	$642,639	$268,516	10.217019
Woodward	2,837,059	21,022,732	173,590	236,166	409,756	792,219	382,463	13.480965
Michigan	2,703,939	19,949,297	165 445	224,107	389,552	714,085	324,533	12.0022437
South Chene	203,529	1,199,990	12,453	13,481	25,934	27,583	1,649	0.8102727
Third	658,127	5,564,828	40,269	62,514	102,783	197,132	94,349	14.336053
Baker	1,272,866	9,213,990	77,882	103,509	181,391	310,524	129,133	10.145057
Brush	518,067	3,827,819	31,699	43,001	74,700	125,512	50,812	9.808005
Trumbull	915,465	6,411,932	56,014	72,030	128,044	225,049	97,005	10.596286
Depot	110,621	363,480	6,769	4,083	10,852	9,131	*1,721	*1.555256
Fort	2,214,417	13,693.981	135,493	153,836	289.329	457,915	168,586	7.613137
Sherman	2,318,989	16,572,714	141,891	182,940	324,831	456,663	131,832	5.684878
Springwells	252,054	503.168	15,459	5,653	21,112	14,197	*6,915	*2.730873
Crosstown	1,966,697	11,876,230	120.336	131,097	251,433	261,145	9,712	0.4938137
Fourteenth	2,378,603	19,651,849	145,539	216,929	362,468	521,524	159,056	6.686944

*Deficit.

TABLE V.—FRANCHISE VALUATIONS IN DETROIT AS COMPUTED BY PROF. HENRY C. ADAMS.

Franchises classified according to date of expiration.	Net revenue earned under franchise for 1908.	Six per cent on value of physical properties.	Earning power of franchises for 1908.	Franchise life from Nov. 14, 1909.	Present value of franchise.	Present value assuming an annual increase of 6 per cent in future net revenue.
Expired ..... Nov. 14, 1909	$799,320	$234,377				
Fort Street ..... June 30, 1910	113,398	49,741	$564,943			
Woodward Avenue ..... Oct. 17, 1915	88,572	21,941	63,657	7 mos. 16 days.	$39,785	$39,785
Grand River ..... Jan. 1, 1916	225,978	69,978	66,632	5 yrs. 11 mos. 3 days	324,127	394,793
Fort Street ..... Mar. 29, 1917	14,701	4,111	155,980	6 yrs. 1 mo. 17 days	780,549	956,245
Fort Street ..... June 24, 1919	4,989	2,195	10,590	7 yrs. 4 mos. 15 days	61,606	78,097
Chene Street ..... Jan. 28, 1921	3,171	1,090	2,794	9 yrs. 7 mos. 10 days	19,958	26,855
Jefferson Avenue ..... Apr. 14, 1921	37,792	13,260	2,081	11 yrs. 2 mos. 15 days	16,625	23,320
Gratiot Avenue ..... May 7, 1921	42,334	12,260	24,532	11 yrs. 5 mos.	198,559	280,072
Fort Street West ..... Dec. 14, 1921	44,439	19,493	30,074	11 yrs. 5 mos. 23 days	244,372	345,267
Detroit Railway ..... Dec. 4, 1924	298,451	225,724	24,946	12 yrs. 1 mo.	210,129	301,432
Michigan Avenue ..... July 1, 1927	13,764	3,551	72,728	15 yrs. 20 days	707,938	1,094,953
Dix-Toledo ..... May 14, 1928	6,595	8,534	9,213	17 yrs. 7 mos. 17 days	98,557	162,422
Jefferson Avenue East ... May 3, 1935	32,119	10,801	15,129	18 yrs. 6 mos.	166,310	.....
			21,318	25 yrs. 5 mos. 19 days.	274,720	542,967
	$1,711,433	$677,076	$1,034,357		$2,810,615	$4,246,208

BALANCE OF REPORT

The rest of the report, which will be abstracted in next week's issue, relates to cost of service, municipal ownership, etc.

ACCIDENT CLAIMANT RECORD

The American Street & Interurban Claim Agents' Association has made an arrangement with the Hooper-Holmes Information Bureau of New York by which members of the association will have the use of the files of that association in checking accident claims. All reports will go through the main office of the American Street & Interurban Railway Association. Under the plan adopted members of the association will file with Secretary Donecker the names of claimants with whose history they may not be familiar or about whom they may have doubts. These reports will be turned over to the bureau and if no previous record is found of the individual no reply will be sent. If, however, another claim record is found the road will be notified promptly. The Hooper-Holmes Bureau has about 1,700,000 claim records increasing at the rate of 225,000 a year, so that the service should be of great value to the member companies. The association has mailed to member companies instructions as to the proper method of preparing reports.

BOSTON & EASTERN HEARINGS RESUMED

On July 6, 1910, the Massachusetts Railroad Commission resumed public hearings upon the petition of the Boston & Eastern Electric Railroad for a certificate of exigency. The petitioners were represented by Charles S. Baxter, counsel, and in opposition the following counsel appeared on behalf of the transportation companies in the territory through which the Boston & Eastern Electric Railroad desires to operate: Melvin O. Adams, Frederic E. Snow, Bentley W. Warren, William H. Coolidge and Woodward Hudson. The petitioners referred to the finding of the board in 1908 that public necessity and convenience have been shown, and stated that the Legislature of 1910 has passed a law enabling the company to build a tunnel under Boston Harbor to complete its enterprise. The petitioner then rested his case, and counsel in opposition were heard.

Frederic E. Snow, for the Boston Elevated Railway, pointed out that at the time the board found that additional facilities were necessary in the densely populated territory north of Boston no certificate of exigency was issued because there was no authority then to build a tunnel under Boston Harbor, as shown by the petitioner's plans. The whole matter was referred to a joint board consisting of the Railroad Commission and the Boston Transit Commission, and that joint board unanimously reported to the Legislature that no tunnel ought to be located under Boston Harbor except in connection with other questions which were then under consideration by the board. Mr. Snow said that the law of 1910 was merely an enabling act giving the necessary authority to adopt whatever plan might finally be determined to be the wise one. The Legislature expressly stated that it did not in any way pass upon the question of exigency. Mr. Snow said that what may have been a public exigency in 1908 may be an entirely different question now. Since 1908 the Boston Elevated Railway had completed its location for its elevated structure to Malden Square; it had changed its facilities at Sullivan Square, and the possibility of using that terminal as an entrance into Boston was very different now than it was at the time the matter originally come before the board.

Bentley W. Warren, for the Boston & Northern Street Railway, pointed out the necessity of suspending judgment upon the enterprise pending further deliberations of the joint commission with respect to metropolitan improvements. He contended that it would be highly prejudicial to the respondents and other public interests to issue a certificate at the present time, in view of the questions before the various boards studying the transportation situation at Boston. He considered that an informal expression of the board's opinion on behalf of the project, although representing its best judgment at the time it was rendered, was not binding on the board, the public or any other interest. Conditions have changed since the board indicated its favor regarding the necessity of the road, and if the road was built the East Boston tunnel could handle the traffic into and out of the city proper.

Mr. Warren contended that if the Boston & Eastern Railroad should be built, the electrification of the railroads would be retarded at Boston, and the construction of an interstation tunnel might be prejudiced.

William H. Coolidge, for the Boston & Maine Railroad, said that if the new line should be built, and the Boston & Maine Railroad electrified, there would be two electric railroads in one territory, with a duplication of facilities. This would be disastrous. The interstation tunnel, to cost $15,000,000, could not be justified unless it could be used to handle suburban business. The Boston Elevated Railroad was attending to the business of the metropolitan district, but beyond that area was a great territory to be served by electric motive power and the interstation tunnel in Boston.

The hearing was continued on July 11, when F. E. Snow, for the Boston Elevated Railway, emphasized the importance of maintaining a single system of transportation in Boston. He stated that the Boston Elevated Railroad would never have considered making its present huge investments and leases in subways and tunnels, elevated extensions, etc., unless it had felt assured that it would be protected in its right to handle the traffic entering and leaving the business center. If the board grants the Boston & Eastern Railroad a certificate, Mr. Snow said that the whole attitude of the company toward future rapid transit extensions would be altered, as it would not feel safe in its investments in the face of competing lines allowed to enter the city. He desired an extension of time in which to present evidence that the East Boston tunnel could be utilized by the company to bring in the Boston & Eastern Railroad passengers, the work being done by the Boston Elevated Railway. C. S. Sergeant, vice-president of the Boston Elevated Railway, stated that it would be possible to operate the trains of the Boston & Eastern Railroad with proper car clearances in the tunnel together with a single car service, since the latter cars are already equipped for multiple unit operation when necessary. The Boston Elevated Railway desires to handle all incoming and outgoing traffic. The hearing was continued to permit the preparation of further evidence for the Boston Elevated Railway.

HEARING BY MASSACHUSETTS COMMISSION ON SOUTH FRAMINGHAM FARES

The Massachusetts Railroad Commission gave a hearing on June 16, 1910, upon the petition of the Selectmen of Framingham and Holliston for a reduction in fares between South Framingham and Holliston on the Milford & Uxbridge Street Railway. The petitioners were represented by Walter Adams, Joseph P. Dexter, and Maxham E. Nash, and the company's case was conducted by Wendell Williams, counsel, and Walter L. Adams, superintendent. The principal issue was the increase in the fare from 5 cents to 10 cents between South Framingham and Holliston, which went into effect on June 1, 1910. During the presentation of the petitioners' case the company showed that only 65 employees out of 2600 in the plant of the Dennison Manufacturing Company, South Framingham, had signed the petition for a reduction in the fare and that only three employees had left on account of the raise in rates. The officials of the Dennison Manufacturing Company were unable to say what proportion of their employees traveled between South Framingham and Hopkinton by the Boston & Albany Railroad and what proportion traveled by the Milford & Uxbridge Street Railway.

Arguments on the case were heard by the Board on June 24. For the company Wendell Williams stated that on June 1, 1910, in accordance with a vote of the board of directors, the Milford & Uxbridge Street Railway increased its fare between South Framingham and Holliston from 5 cents to 10 cents, as a reasonable means of increasing the revenue. The company had been compelled to make large expenditures in building and maintaining its road, and had been obliged for several years to carry a large floating indebtedness through the credit of individual stockholders, who have received no return. In the same manner only was it possible to fund a portion of this floating indebtedness by means of issues of preferred stock and bonds. Only two officers of the company outside the superintendent and attorney receive any salary, and those are nominal. For years the public alone has received substantial benefit from the operation of the road.

Mr. Williams stated that the stock of the company was divided among 134 holders more than 60 of whom are women. They purchased the stock about 10 years ago when 8 per cent in dividends was paid and was believed to be a good investment at about $140 per share. For years there have been no sales of the stock, and its appraised investment value would be not more than $25 per share. Soon after the operation of the road was begun it was found that the dividend could not be continued and the road maintained. During the last six years the company's earnings have not averaged 2⅓ per cent per year on its stock, and irregular dividends have been paid, in no year in excess of 3 per cent, with an average of less than 1½ per cent per year. The cost of maintenance was constantly increasing and wages have been raised 10 per cent.

The fare from Holliston to South Framingham, 5.7 miles, has been 5 cents, and from Holliston to Milford, 6.5 miles, 10 cents. The fare limit in Holliston extends as far as Highland Street. There was no reason why the fare from Holliston to South Framingham should be practically one-half as much as for the same distance on other portions of the road. The earnings from the portion of the road in question do not warrant it. The cost of operation per car mile on the system for the year ending Sept. 20, 1909, was 21.61 cents, making the cost between Holliston and South Framingham for the year $29,461. The receipts between the same points were $23,757, showing a loss of $5,704. The cost will undoubtedly be greater this year and with no probability of increased earnings. The following table of fares on the roads running out of Worcester, South Framingham and Milford shows that for 10 years Holliston and South Framingham have had the benefit of a fare much below that in force in other towns similarly situated.

TABLE OF FARES AND DISTANCES.

	Miles.	Fare.
Worcester to		
Milbury	6	$0.10
Wilkinsonville	8	.15
Saundersville	9	.15
Fisherville	10	.20
Farnumsville	11.5	.20
Rockdale	13	.25
Riverdale	15	.30
Whitinsville	17	.35
Linwood	19	.35
Uxbridge	21	.40
South Framingham to		
Natick	3.75	.06
Wellesley	5.75	.12
North Natick	3.75	.06
Wellesley Hills	8.5	.12
Newton Highlands	11	.18
Chestnut Hill	14	.25
Ashland	3.75	.06
Hopkinton	7	.12
Woodville	9.5	.18
Westboro	13.5	.24
Holliston	6.7	.10
Last-named fare was 10 cents prior to June 1, 1905		
Milford to		
Franklin	9	.15
Woonsocket	11	.20
Medway	7.25	.10
Hopkinton	6.5	.10
North Grafton	17	.30
Hopedale	2	.05
Uxbridge	9	.15
South Framingham	12.2	.20
Last-named fare was 15 cents prior to June 1, 1910.		

Mr. Williams pointed out that South Framingham was not being discriminated against, but that for years every other community on the company's lines had been unjustly discriminated against by the low fares formerly in force to South Framingham. Milford had for years complained that its merchants and business were unjustly and injuriously affected by the fact that Holliston patrons were permitted to ride to South Framingham for 5 cents and charged 10 cents to Milford, practically the same distance. The effect of the increase on the workers was counteracted by the issue of so-called workingmen's tickets at the same rate and in the same manner as is done in the case of men working in Milford.

It had been suggested that in 1900, when a turnout was built at Holliston, it was agreed that the fare should be 5 cents between Holliston and South Framingham. Mr. Williams said that if the present management of street railways took the burden of living up to all agreements that the original promoters of the roads made, no country street railway in Massachusetts could be successfully operated. The fare had been charged for 10 years, but it was not within reason that under all possible changed conditions the fare should never under any circumstances be changed. Five cents does not purchase the same quantity of labor, materials and supplies that it did five years ago, and there was no reason why it should purchase as much for the passenger in the way of transportation. Mr. Williams said that the charge of the petitioners that the company had lost money in a park maintained on its line was incorrect, since the operation of a pleasure resort had always been profitable to the management. There had been very little increase in traffic on the Milford & Uxbridge Street Railway in the last 10 years. The total number of passengers handled between South Framingham and Holliston last year was 475,140. Mr. Williams urged that it was impossible to carry passengers on the rural lines at 1 cent per mile. The hearing was closed.

PREPARATION OF PLANS FOR CHICAGO SUBWAY

Under date of July 8 Bion J. Arnold, chief subway engineer of Chicago, has made a brief outline to the local transportation committee of the City Council relating to the work accomplished so far in the preparation of plans. Mr. Arnold was appointed by the mayor on Feb. 7, 1910, and he has perfected an organization which has devoted nearly half its time to the compilation of data relating to congestion on the Union Elevated Loop. The subway work consists of various surveys and records and the tentative development of the following designs, applicable to various streets of various widths:

TWO TRACKS

Two tracks for upper or lower level; side-station platforms; utilities below or on the side.

For medium level: island-station platforms; vestibule station entrance above; utilities below.

THREE TRACKS

Three tracks for upper or lower level; side station platforms; express track in center; utilities below or on side.

FOUR TRACKS

Two tracks on upper level for surface cars; two tracks on lower level for elevated trains; balance of space on upper level for pedestrians; utilities on lower level.

Alternate tracks on same level, alternately upper and lower; vestibule station entrance over depression; island station platforms.

Center pair of tracks on lower level; outer tracks on upper level at stations, depressed for entrance station vestibule; island station platforms.

Island station platforms for each pair of tracks at alternate stations; tracks swing between stations; vestibule station entrance above and utilities below; all tracks on same level.

Pair of tracks on one side on upper level with side and center station platforms; pair of tracks on other side depressed for vestibule station entrance; stations for each pair alternate; utilties below.

Center pair of tracks on lower level with side station platforms; outer tracks on upper level with island station platforms; stations for all trains at same point; utilities below.

Two outer tracks on upper level with side station platforms; inner pair of tracks on either upper or lower level, with island station platforms; station vestibule entrance above; utilities below.

Two tracks on upper level and two tracks on lower level; all side station platforms; stations for upper pair and lower pair of tracks alternate; moving sidewalks and escalators.

SIX TRACKS

Center pair of tracks on lower level with island station platforms; two tracks on one side on upper level with side station platforms, while the two tracks on other side are depressed for station entrance vestibule.

EIGHT TRACKS

Center pair of tracks on upper level over center pair of tracks on lower level; tracks on side rise and fall to give station entrance vestibules over depression; inner side track is on upper level when outer side track is at lower level; island station platforms.

Center pair of tracks on upper level over center pair of tracks on lower level; inner tracks on lower level; outer tracks depressed to give station entrance vestibule above; island station platforms.

Sufficient detail plans of these various designs are being made to demonstrate their efficiency and to estimate their cost.

Abutting buildings have been divided into three classes, as follows: Class "A," with continuous basement walls; Class "B," with steel frame and columns on spread foundations; Class "C," with steel frame and columns on caissons. Different methods for caring for the three different classes of buildings have been developed.

A method of construction for subways in streets 100 ft. in width, the structure occupying the full width of 100 ft., has

also been developed. This construction provides for all street traffic being continued during construction with free entrance to all business places. A thorough investigation has also been made of the cost of all material and labor that would enter into the construction and equipment of a subway located in any street in the city. This includes the labor and material involved in the different methods of construction, signals, lighting, power installation, stations, track, waterproofing, etc.

The location of initial subways has been given consideration. The report says that State Street is a desirable street in which to locate a north-and-south subway, by reason of its extensive width, the fact that there are fewer utilities under its surface than any other street in the downtown or subway district, except Michigan Avenue, and that there are no elevated lines, except where the loop crosses at Lake and Van Buren Streets.

Studies for the location of initial east-and-west subways are being made in the streets between the Chicago River and Twelfth Street, as well as east-and-west connections to the north and south subways on Division Street and Twenty-second Street, to accommodate the elevated trains.

In addition, studies and investigations are being made of all matters that concern subway traffic, including the traffic of both surface cars and elevated lines in and out of the downtown district during rush hours, with sufficient data to estimate the future traffic to be cared for. Unit cost figures have also been prepared to apply to any design of subway that may be found desirable and construction methods have been determined to care for abutting buildings, and to avoid disturbance of street traffic.

Mr. Arnold and his assistants are now engaged in a process of elimination with the intent of developing a final plan for recommendation, but are prepared to develop any design of subway that may be determined upon from those enumerated, giving cost and capacity in any street or streets that may be chosen.

MEETING OF JOINT COMMITTEE ON SHOP ACCOUNTING

The joint committee on shop accounting of the American Street & Interurban Railway Accountants' and Engineering Associations met on Tuesday, July 12, at the association headquarters in New York to prepare a report to submit to the two associations. There were present: P. S. Young, co-chairman; John Lindall, Charles Hewitt and N. E. Stubbs, of the committee; also H. H. Adams and M. R. Boylen, who have been assisting the committee in its work. Mr. Adams and Mr. Boylan presented a report on the cost system of shop accounting which after some discussion and a few changes was accepted by the committee. The committee will cover in its final report recommendations as to analytical sub-divisions of the standard accounts which are desirable for the use of the larger companies, and will outline a practical cost system for car repair shops, suggestions as to the handling of the sale of scrap material and a report on the method of procedure in obtaining mileage of car wheels, brake shoes, etc.

MEETING OF THE COMMITTEE ON BUILDINGS AND STRUCTURES

The committee on buildings and structures of the Engineering Association held a meeting at the office of the association, 29 West Thirty-ninth Street, New York City, on July 6. Those present were Martin Schreiber, engineer maintenance of way, Public Service Railway, Newark, N. J., chairman; F. F. Low, architect, Boston Elevated Railway, Boston, Mass.; George H. Pegram, chief engineer, Interborough Rapid Transit Company, New York City, and Charles H. Clark, engineer maintenance of way, Cleveland Railway. This committee was not appointed until last April and this was its first meeting. On account of the short time remaining for the preparation of a report, Mr. Schreiber suggested that the subject of economical maintenance of buildings and structures which was assigned to the committee should be passed over this year and taken up next year by the new committee. The report which will be presented at the Atlantic City convention will deal with the general principles involved in the design of terminals for urban and interurban railways. Some of the points which will be taken up include general arrangement of tracks; type of building and train sheds; spacing of tracks; toilet facilities; entrance and exit gates and ticket offices. The chairman will make a rough draft of the report and send it to each member of the committee with the request that the members enlarge upon the points brought out in the discussion of each of these features.

CHANGE IN EXHIBIT SPACE AT ATLANTIC CITY

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association announces that a radical change will be made in the exhibit space arrangement on the Million Dollar Pier for the 1910 convention of the American Street & Interurban Railway Association. This has been found necessary by the contractor because the G. A. R. convention will be held in Atlantic City the latter part of September and the pier will have to be used for entertainment purposes at that time. The Manufacturers' Association is now preparing a new diagram of the exhibit space at the pier. This diagram will be mailed as soon as possible to all exhibitors in case the changes necessary in the diagram alter the exhibitor's space, as indicated in his application blank.

There will be no change in Machinery Hall and in Building No. 3, but there will probably be a change in the general arrangement of Buildings No. 1 and No. 2, especially in the front spaces of Building No. 1. This change necessitates a postponement of the final assignment of exhibit space by the committee, but it is hoped that all space can be assigned by Aug. 1. The exhibit committee also says that the change mentioned makes it more necessary than ever that every exhibitor should give the weights and dimensions of the apparatus he expects to exhibit. The members of the exhibit committee held a conference in Atlantic City, last week, in regard to the situation.

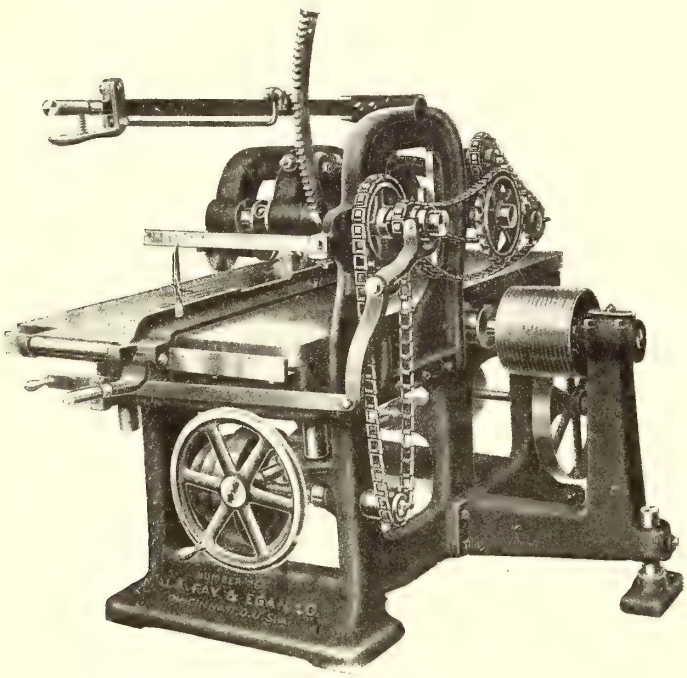
CONSTRUCTION PROGRESS OF THE ROCK ISLAND SOUTHERN

The Rock Island Southern Railroad Company is fast completing a high-speed freight and passenger road, the initial division of which will have 50 miles of track fed with 11,000-volt trolley. From Rock Island the road extends southward 21 miles over a steam railroad grade and thence 29 miles over a new grade to Monmouth, Ill. Later the road will extend from Monmouth to Burlington, on the Mississippi River, and a branch 7 miles long will be built from Gilchrist to Aledo. The new electric line has traffic arrangements with the Rock Island system and will undertake to handle heavy trains of coal with a.c. locomotives as well as a high-speed passenger business. In the north half of the line the maximum grade is 1.1 per cent and in the southern half 0.7 per cent. The maximum rate of curvature on any part of the line is 2 deg. The trolley wire will be carried on a line of heavy poles set 9 ft. from the track center, supporting Ohio Brass Company's brackets 10 ft. 6 in. long and using catenary material of the same manufacture. The trolley wire will be No. 0000 supported by a 7/16-in. Siemens-Martin high-strength steel cable. The pole line has been erected and work has just commenced on stringing the catenary.

The power plant is located at about the midpoint of the line and will include, at first, an installation of 12,000-kw capacity in Westinghouse turbines. Current will be generated at 2300 volts and stepped up to 11,000 volts for feeding directly to the trolley wire. No auxiliary feeders or transmission system will be required for the operation of the railway, but a 44,000-volt high-tension line will be constructed to carry current for commercial uses in Burlington, Iowa. No. 2 copper will be used for the transmission system.

A NEW SELF-FEED RIP SAW

J. A. Fay & Egan Company, Cincinnati, O., the well-known manufacturer of woodworking machinery, has just put on the market a new self-feed rip saw known as No. 264 and designed for general ripping in the car shop for both light and heavy work. The frame is a heavy structure, cast in one piece so as to be free from vibration. The machine is designed to rip a



Self-Feeding Rip Saw

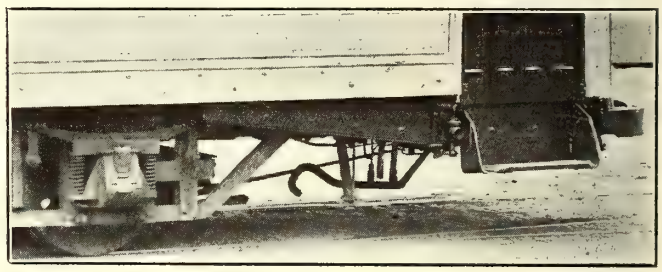
plank 4 in. thick with a 16-in. saw or 8 in. thick with a 24-in. blade. It takes 19 in. between the saw and the fence. By lowering the table and raising the feed out of the way, a timber as large as 12 in. can be ripped. The table is raised and lowered by worm segments and is 37¼ in. wide and 5 ft. 6 in. long. The fence is 2¼ in. high and 40 in. long and is instantly moved and clamped at any position.

The mandrel pulley has an outside bearing supported by a heavy arm bolted on the side of the frame. The feed consists of two large rolls above and one spur assisted by idler roller in the table. The driving mechanism consists of a train of sprocket gears and chain regulated by a three-step cone pulley. The machine is also made as a hand-feed rip saw, up to 14 in. thickness and with the fence beveling 45 deg.

NEW MECHANICAL SWITCH THROW AT DECATUR

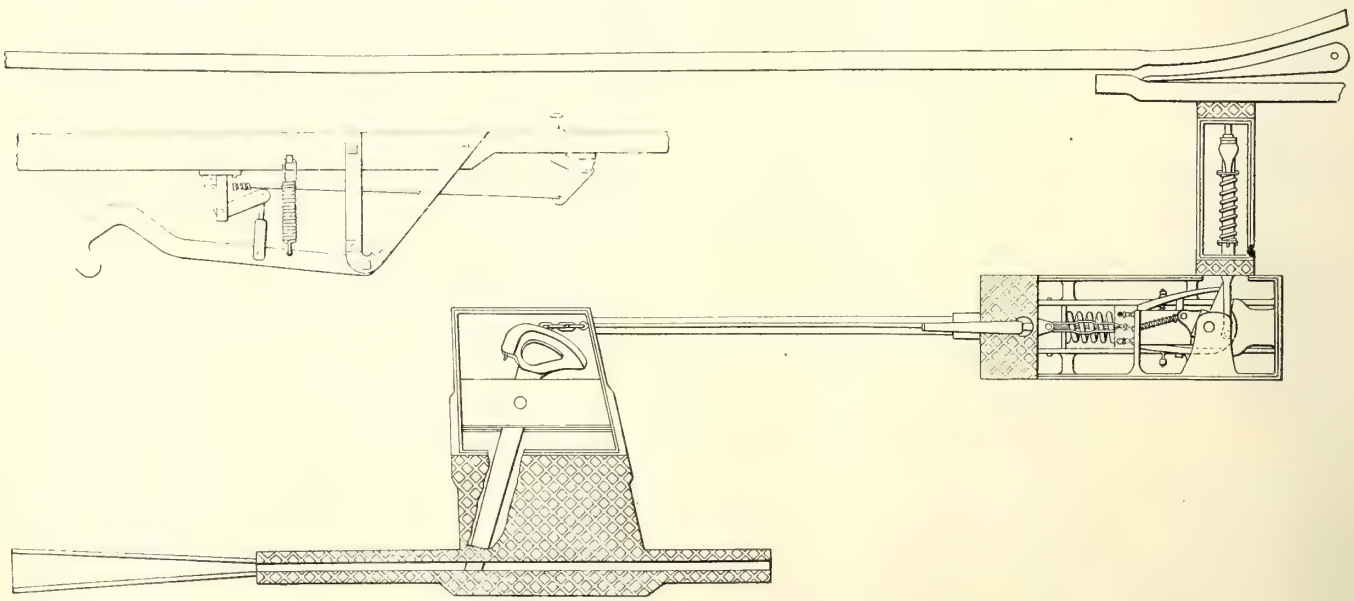
The Decatur (Ill.) Railway & Light Company has obtained good service from a mechanically-operated switch throw which has been installed on its city lines for 18 months and has operated at 10-minute intervals 18 hours per day during that time. The switch-throwing device consists essentially of three parts, all of which are mechanically operated and thus easily maintained without expert assistance. These are: a hook attachment supported from the car platform and normally held clear of the street by a spring, but which may be depressed by a foot pedal; a slot box with switch-throw lever located between the rails and provided with an opening into which the car hook may be depressed; and the switch-locking mechanism. The third part of the device is enclosed in another box also placed between the rails and below the street surface. In this box there is a spring connected at one end with the throwing lever which is tripped by the car hook and a system of dogs and eccentrics to transfer the proper motion to the switch tongue. An accompanying drawing shows the general arrangement of the parts of the mechanism.

To operate a switch with this switch-throwing device the motorman has only to depress the foot pedal as the throw box



Switch Hook Installed

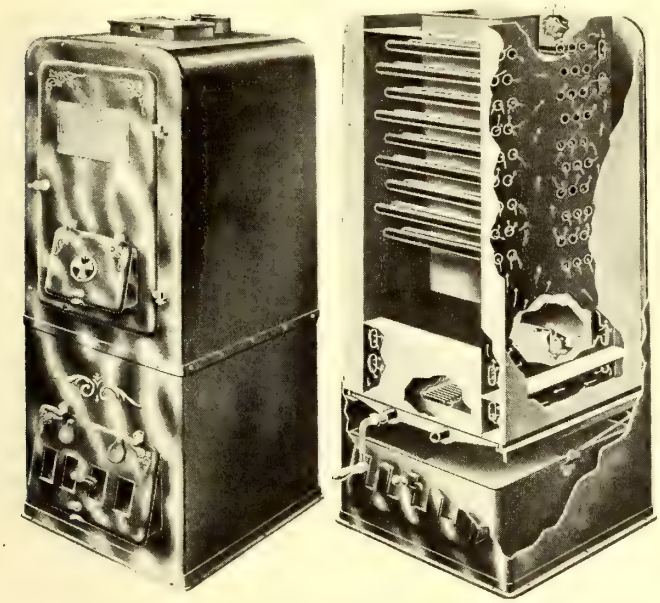
is approached; the hook beneath the car platform will then engage with the sunken lever and throw the tongue. The switch-throwing rod is operated by a mechanism so constructed as to keep the switch point held tightly against the rails by spring pressure, no matter which way it may be thrown. The device also is provided with a switch-throwing handle which normally lies in a depression in the paving. By using this handle the switch may be thrown into either position without interfering with the continued use of the car throw. Also, by means of an unlocking device, the quick-throw mechanism may be entirely disconnected except for the spring in the throw rod, and the switch then may be operated as an effective spring point using the old-style switch rod. This device is made by the Johnson-Bone Switch Throw Company, Decatur, Ill.



Plan of Mechanical Switch Throw Installation and Details of Hooking Device

A PRESSED STEEL HEATER

The Cooper Heater Company, Carlisle, Pa., has placed on the market a pressed steel car heater which is of remarkably light weight and small size. Thus the largest size required for a 65-ft. interurban car weighs only 220 lb., including the expansion tank. The height of any type heater is only 36 in., so that it does not interfere with the passengers' view whether it is in the



Outside and Inside Views of Pressed Steel Heater

vestibule or inside the car. This heater has four perpendicular water-legs pressed from ⅛-in. cold rolled steel and united by a series of nipples which are drawn outward from the front and back water-legs. These nipples are telescoped to corresponding nipples drawn inward from the two outer water-legs or tube sheets. A series of circulating tubes ⅞ in. in diameter connects the two side water-legs. The back and the two side water-legs are provided with a partition which obliges the water entering the back at the inlet to pass through the two lower series of nipples into the lower half of the side water-leg to the front; then out through the upper series of nipples in the front water-leg to the two side water-legs, then back and forth through the circulating tubes and out through the upper series of nipples to the discharge at the top of the heater. All tubes and joints are welded by the oxygen-acetylene welding process to make the heater absolutely seamless. After welding and testing, the heater is galvanized both inside and outside to prevent rusting.

The heater also has a removable coal magazine which furnishes and feeds the fire automatically for a period of 12 hours with one filling. This magazine is made absolutely gasproof, as the door to the same has a special catch which draws the lid down to a joint. All other doors on the heater are hinged from the top and have a spring catch at the bottom to prevent the doors from ever being left open. With this heater the maker also furnishes a pressed steel expansion tank which also is welded by the oxy-acetylene process employed for the heater.

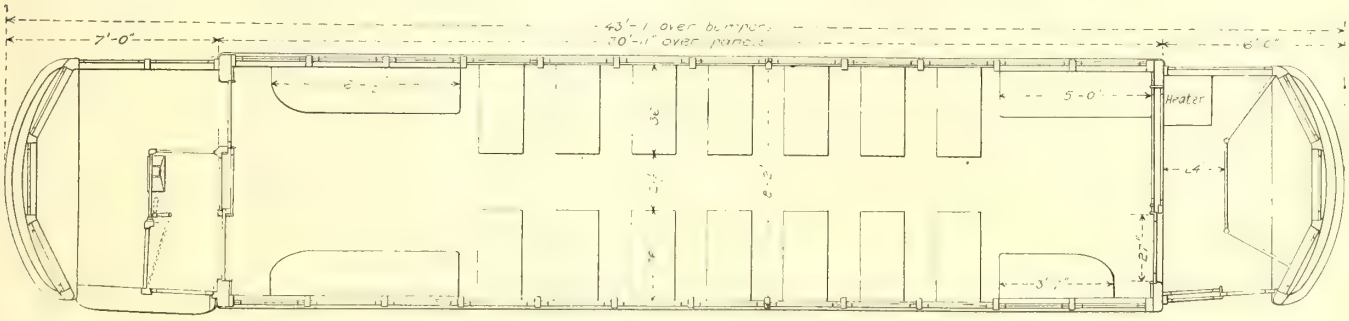
This heater is the invention of W. L. Blackwell, the general manager of the company.

PAY-AS-YOU-ENTER CARS FOR SYRACUSE

The Syracuse (N. Y.) Rapid Transit Railway Company has placed an order with the G. C. Kuhlman Car Company for 23 cars of the single-end, pay-as-you-enter type made under license of the Pay-as-You-Enter Car Corporation, New York. As shown in the accompanying plan these cars will be 43 ft. 11 in. over the vestibules and bumpers and 30 ft. 11 in. over the panels. The width over the belt rail will be 8 ft. 3 in. and the height from floor to underside of ceiling 8 ft. The front or exit platform will be 6 ft. long, with a railed section for the motorman and room for a heater in one corner as indicated. This end of the car will have a single sliding door controlled in unison with the step by the motorman. The rear platform will be divided into exit and entrance ways by a railing, but there will be a single swing door covering the exit, closed through the manipulation of a lever by the conductor. The object of this swing door principally will be to protect the conductor in inclement weather while he is standing at the cash box. The end body doors will all be of the sliding type, comprising a 27-in. front exit, and 25-in rear entrance and exit. The installation of curved longitudinal seats opposite all the body doors will insure freedom of passenger movement both in entering and leaving the car.

The bottom framing of the cars will consist of 4-in. x 7¾-in. long-leaf, yellow-pine side sills reinforced with ⅜-in. x 15-in. steel plate with the further reinforcement of a ⅜-in. x 8-in. plate riveted to the bottom edge of the steel plate, extending from the inside of the end sill at each corner of the car to 3 ft. past the bolsters toward the car center; 3½-in. x 5 1/16-in. center sills extending from end sill to end sills; 3½-in. x 4¼-in. white oak crossings; 4¾-in. x 6 13-16-in. white oak end sills. The flooring will be 13/16-in. yellow pine, with a double thickness under the seats. The aisle will have maple strips.

The body framing will embody white ash for all posts, sash rails, ribbing and deck plate. The side posts will be 3¼ in. thick. The side panels will be covered with sheet steel. The roof framing will be of monitor pattern with the upper and lower deck boards supported on ash rafters. The interior finish



Single-End Pay-as-You-Enter Car for the Syracuse Rapid Transit Company

will be cherry. The windows will be Brill semi-convertible.

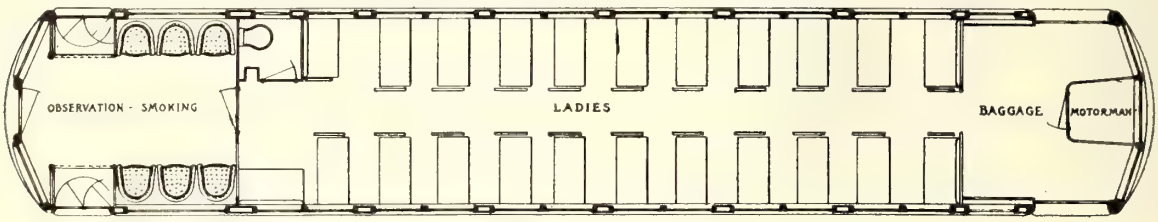
The platforms will be supported by outside knees made up of ¾-in. x 8-in. steel plates reinforced with 2½-in. x 8-in. oak timbers. The plates will be riveted to the sill plate and ⅜-in. x 8-in. reinforcing plates. The inside platform knees will be of white oak.

The bodies will be mounted on Brill No. 27-F-E-1 trucks of 4-ft. 6-in. wheel base having 35-in. diameter wheels. There will be four GE-216 motors per car. The air-brakes will be of the Westinghouse Traction Brake Company's type F.M.-3. Among the specialties to be installed are Curtain Supply Company's No. 89 protected groove fixtures with Pantasote curtains; Dedenda gong; Crouse-Hinds headlight; Ohio Brass Company's air sander; Peacock hand brake; Peter Smith forced air heaters; dry battery push-button system; Ohmer registers; Hovey draw-bars, and Brill track scrapers.

OKLAHOMA COMBINATION INTERURBAN CAR

The Niles Car & Manufacturing Company, Cleveland, Ohio, has recently built for the Oklahoma Railway Company the combination interurban car shown in the accompanying illustrations. It is called the "Oklahoma plan" car by the builder. The plan of this car provides a large main passenger compartment with a toilet room in the center of the car, baggage room with folding seats for smokers, separate motorman's cab at front end and an observation-smoking compartment with large windows at rear end. It includes practically all the accommodations of a steam railroad train of baggage, coach and observation cars, and is recommended for long runs and limited service. The general specifications and dimensions are as follows:

Length over buffers	54 ft.	7 in.
Length over vestibules	53 ft.	11 in.
Length of main compartment	34 ft.	5 in.
Length of observation compartment	10 ft	2 in.
Length of baggage room	8 ft.	3 in.
Width over sheathing at sills	9 ft.	6 in.
Width over all	9 ft.	8½ in.
Height, under sills to top of roof	9 ft.	6¾ in.
Height from track to top of roof	12 ft.	11½ in.
Distance between bolster centers	32 ft.	11 in.
Wheel base of trucks	6 ft.	4 in.
Seating capacity	52	
Length of seats		41 in.
Width of aisle		22 in.
Weight of trucks		19,000 lbs.



Seating Plan of Oklahoma Combination Interurban Car

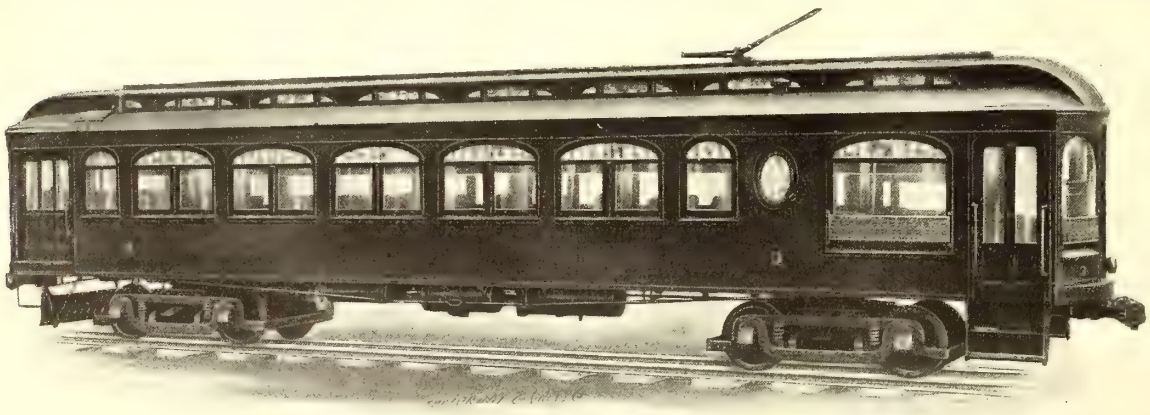
The bottom framing consists of two outside sills of 4½-in. x 7¾-in. and 1¾-in. x 6-in. yellow pine with ⅝-in. x 7¾-in. steel plate bolted between; four center and intermediate sills of 6-in. steel I-beams between yellow pine fillers extending from buffer to buffer, supported on and bolted to 10-in. plate bolsters; 6-in. needle I-beams and ¾-in. tie rods having turnbuckles in the center at each cross sill. There are also two 1⅝-in. under truss rods with 1¾-in. turnbuckles and two ⅜-in. x 2½-in. inside truss bars on pedestals over the bolsters for supporting overhanging ends. The floor consists of a double thickness of ⅞-in. x 3¼-in. yellow pine with waterproof building felt between and covered with corrugated rubber mat in rear vestibule.

The car body is designed according to the Pullman style, having twin Gothic windows with alternate single posts and panel piers, thoroughly braced, sheathed with ¾-in. x 2-in. poplar continuous from the sills to the letter panels and with a ½-in. vertical tie rod at each post. The roof is of the monitor deck style with steam coach hoods, concealed steel carline at each panel post. It is covered with No. 8 duck, painted and fitted with a trolley platform for the full length.

The motorman's cab is in the center at the front end and has a swinging door in the rear. It is glazed on all sides and fitted with curtains to exclude light. Heavy iron pipe railing, from floor to roof to protect motorman from baggage, may be used on this car instead of an enclosed cab. The baggage room at the front end has a 42-in. sliding door on each side. Smoking is permitted in this room when it is not filled with baggage. The observation vestibule is at the rear end. It has a 30-in. double folding door, triple steps with safety treads and Edward's self-raising steel trap door at each side. There is a 26-in. swing door in the center of the rear end and front bulkhead. In warm weather the large windows surrounding this vestibule are removed, making it practically open, but protected by bronze grills and drop guard rails at steps. In cold weather the observation feature is retained, but large plate glass windows are used. Smoking is permitted at the discretion of the management. The toilet room is in the near left-hand corner of the passenger compartment with dry hopper, white enamel finish, cement floor, roof ventilator. The water cooler is in an alcove outside.

The interior finish in the main compartment is of selected mahogany with large smooth panels having marquetry line borders. The window heads are of same curvature as on outside. Solid bronze trimmings, sectional rod bottom parcel racks and Empire ceiling are also installed. In the observation room the finish is dull and of dark Flemish oak. In the baggage room the finish is of glossy golden oak.

The seating consists of 19 Hale & Kilburn seats with stationary 25-in. backs, with bronze grab handle, spring edge cushions and upholstered with dark green leather; three cross bulkhead seats; one longitudinal corner seat in the main compartment and folding wooden seats in the baggage room. The loose parlor chairs and folding camp chairs for the observation vestibule were selected and furnished by the purchaser. The windows have the single lower sash fitted with Edward's locks with concealed racks to raise between double Gothic sashes. The deck sashes are in three sections, the center one hung on Hart's ratchet fixtures. Pantasote curtains are installed on spring rollers below the Gothic sashes.



Oklahoma Combination Baggage, Passenger and Observation Car

Among the miscellaneous fittings are automatic M. C. B. radial type draw bars and couplers; two Nichols-Lintern compressed air sanders on front end; one locomotive style pilot; one Knutson retriever, and a hot-water heater located in baggage room with pipes extending through main compartment and observation vestibule.

GASOLINE CAR FOR ROGUE RIVER VALLEY RAILWAY

The Rogue River Valley Railway, Jacksonville, Ore., now has in operation making regular trips the gasoline motor car illustrated. The body is of wood built on a steel channel underframe. It is divided into a smoking compartment seating six passengers and a general compartment seating 22 passengers. Leaf springs 5 ft. long reinforced with coil springs under the



Gasoline Motor Car

journal boxes support the underframe on the axles and make the car ride very easily. The wheel base is 10 ft.

The car is driven by a vertical, four-cylinder Brennan gasoline engine of 70 hp. The engine is mounted on a steel subframe below the floor line of the car body and is connected with a cone clutch on a longitudinal shaft to heavy reversible transmission gears, giving three speeds forward and three speeds reversed. Two sprocket chains are used to connect the transmission gears to the front axle. Control apparatus is mounted in each end of the car body, so that the car can be run in either direction. The car has a maximum speed of 35 m.p.h. and on regular trips has carried 48 passengers up a 1 per cent grade with ease. Acetylene gas is used for lighting. The car was designed by W. H. Barnum, vice-president and treasurer of the railway, and was built by the Ferry Garage Company, of San Francisco, Cal. It cost about $5,000.

ELECTRIC SWITCHING LOCOMOTIVE PERFORMANCE

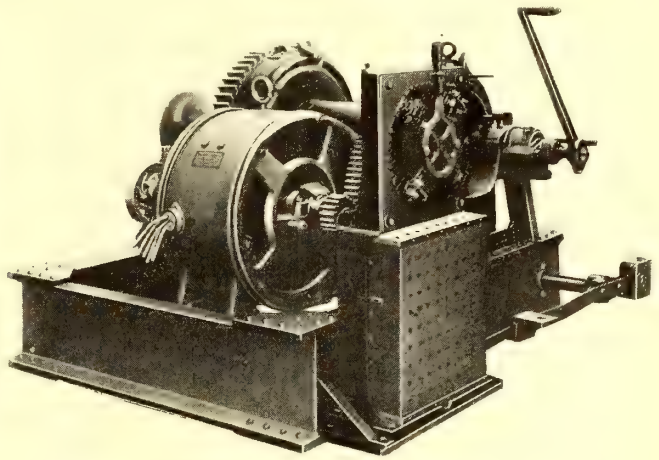
The Hoboken (N. J.) Railroad, Warehouse & Steamship Company has had in operation since May, 1906, a 60-ton electric switching locomotive which has shown a remarkably continuous performance under varying and severe load conditions. Since this locomotive was placed in operation four years ago there has not been replaced a single contact on the switch group or a contact on the master switches or reverser. On the control apparatus only two tips on the live switch have been replaced. The brushes that are in the motors at the present time have been operating 14 months, and the master mechanic believes they will operate at least six months longer without replacement. No trouble has been experienced with broken brushes. Only one pinion had to be replaced.

The cost of inspection and cleaning has been practically nothing. Every Saturday morning the man operating the locomotive makes an inspection of the equipment. The motor and the control apparatus are blown out with compressed air and any part that may need it is cleaned with a piece of cloth.

The locomotive has a running and a starting draw-bar pull of 14,500 lb. and 30,000 lb. respectively, and has a normal speed of 12 m.p.h. It has four 100-hp slow speed Westinghouse motors; a hand operated unit switch control, and air brakes with 4-D compressor. It averages 12 hours a day switching service.

PORTABLE ELECTRIC HOISTS FOR RENTAL

The accompanying cut shows a portable hoisting outfit designed by the Rochester (N. Y.) Railway & Light Company and equipped with a Westinghouse motor. In addition to those already sold, the company has retained two completely equipped hoists in stock for rental to contractors at a nominal charge of $2.00 to cover costs of delivering and installing the hoist. For local service d. c. motors are used. Several a. c. motors, which can be mounted interchangeably with the d. c. motors, are also held in stock and substituted when the hoists are to be used in outlying districts of the city. No extra charge is made for changing the motors. When equipped with an electric brake the hoist is absolutely automatic, a single lever giving both power and brake control. In case of interruption to service the electric brake is automatically set, while a mechanical brake actuated by a foot lever affords additional protection. A suitably arranged friction clutch allows the drum to rotate independently of the motor when lowering the load. The cost of a hoist complete as shown is $800 and without electric brake $700.



Portable Electric Hoist

Its capacity is 2000 lb. at 200 ft. per minute. The actual average cost of continuous operation at rated capacity on recent construction was 60 cents a day. The motor equipment consists of either of the following: 15-hp, d. c., type S, 1000 r.p.m., back-geared to a countershaft speed of approximately 230 r.p.m., R-28 controller and resistance; 15-hp, a. c., type MF, 1120 r.p.m., back-geared to give a countershaft speed of approximately 230 r.p.m. with type FA reversing controller.

ONE-PIECE STEEL END FOR BOX CAR

The W. T. Van Dorn Company, Chicago, had recently on exhibition in that city a standard steel underframe box car of the Southern Pacific Company, to which the one-piece steel end which the W. T. Van Dorn Company has developed has been applied. Subsequently, the car was exhibited at the Atlantic City convention of the Master Car Builders' Association, where it attracted considerable attention. The upper structure of the car originally was entirely of wood. One of the ends is fitted with two doors, arranged for wedge locking, the wedges being forced into place by toggle-joint handles. The ends are single pieces of sheet steel which has been formed under pressure so that it has a series of annular corrugations with the largest covering the full width of the car end. The edges of the corrugated end plates are formed for riveting to the steel underframe and for fitting over the wood siding so that tight joints are obtained. With this form of one-piece steel end construction the maximum interior length of the car is increased 18 in. The two ends not only are securely riveted to the underframing, but are tied together by through rods extending from end to end and are connected with the underframing by truss rods.

News of Electric Railways

The Detroit Situation

On July 5, 1910, Mayor Breitmeyer sent to the Council the final report of the committee of 50, acknowledging the failure of the board of arbitration plan and asking $20,000 to make an entirely new appraisal if further services from the committee are desired. The Mayor also sent in the bills of the two sessions of the board of arbitration held two months ago, aggregating $158.34. The Mayor made no recommendation beyond suggesting that the report and bills be referred to the committee on franchises. The bills transmitted to the Council are $43.74, expense of Judge Murfin; $25, expense of Judge Grant; $64.40, bills from the Pontchartrain Hotel incurred by the judges; $25.20, stenographer's fees. The Mayor says:

"I herewith transmit to your honorable body a report made by the executive committee of the committee of 50 appointed by me for the purpose of making investigations into the street railway question. I am also transmitting certain bills incurred in the attempt to arbitrate the differences between the valuation of Detroit United Railway properties as arrived at by the committee of 50, and as claimed by the company. I am transmitting these bills to your honorable body in pursuance of a resolution adopted at your session of April 19, 1910, touching on the question of the expense of such arbitration. I might say that more than $4,000 of expense incurred in preparing for the arbitration and in endeavoring to remove the obstacles placed in its way have been paid by members of the committee of 50 and myself. I would suggest that both the report and those bills be referred to your committee on franchises."

Despite the fact that Mayor Breitmeyer induced Frederick T. Barcroft, who appraised the property of the Detroit United Railway for the city, to outline the conditions under which he would explain the figures in his appraisal, there is a decided sentiment against the city retaining Mr. Barcroft further among the members of the franchise committee of the Council, before which the street railway matter is now up for consideration. It will be recalled that Mr. Barcroft has estimated that a further expenditure of $10,500 will be required by the city to carry out the work based on the suggestions made by him to the Mayor. Alderman Harpfer, in particular, has publicly expressed his disapproval of the attitude which Mr. Barcroft has assumed toward the negotiations.

The Detroit United Railway has brought suit to compel the city of Detroit to repair the foundations under the tracks of its 3-cent lines, and the court has issued an order to the Common Council to show cause why a writ of mandamus should not be issued. It is estimated that an expenditure of about $1,000,000 will be necessary to restore the foundations to good condition. The petition is made under a section of the company's franchise in which it is stated that the city shall be responsible for the upkeep of the pavement, both within and without the rails of the track. It is believed that this move by the company was made primarily to discount the erroneous impression that the company alone is responsible for the disrepair in which the 3-cent lines are at present.

New Subway Proposal in New York

Theodore P. Shonts, president of the Interborough Rapid Transit Company, has submitted an offer to the city of New York for the operation and equipment of new subways, and extensions to existing lines to be constructed on the city's credit at an aggregate cost of $70,000,000. The proposal involves:

The construction of a four-track line from Times Square through Seventh Avenue and West Broadway to Liberty Street, with a two-track extension to the Battery and a two-track branch from the intersection of Liberty Street and West Broadway under Liberty Street and the East River to Pineapple Street in Brooklyn; from Pineapple Street in Brooklyn to a junction with the existing Brooklyn subway on Fulton Street, and a four-track extension from the terminus of the Brooklyn subway at Atlantic and Flatbush Avenues, under the latter thoroughfare and Eastern Parkway as far as Nostrand Avenue.

An east side four-track line from about Thirty-fifth Street under Park Avenue and private property to Lexington Avenue, through Lexington Avenue across the Harlem River to some point below East 149th Street. A two-track extension from that point connecting with the existing West Farms branch of the subway. Another two-track extension running up Mott Avenue and 153d Street to River Avenue, with an elevated two-track line structure through that thoroughfare and Jerome Avenue as far as 194th Street.

The following basis is submitted for the equal division of profits between the company and the city after the fixed charges, the interest, and 1 per cent for the sinking fund have been provided for:

"1. The gross operating revenue of the new extensions to be ascertained from the number of tickets sold at stations along the new extensions, or, if deemed advisable by either the city or the company, from the number of tickets deposited in the chopping boxes on the new extensions, or by such other methods as upon full consideration may be agreed upon between the parties.

"2. The net profits of the company, to be arrived at as hereinafter provided, and to be disposed of as follows:

"(a) The city to take all net profits for the first five years from the time of beginning operations on any portion of the new subway extensions.

"(b) The net profits after five years to be equally divided between the city and the Interborough Rapid Transit Company.

"3. The net profits to be determined by making the following deductions from the gross revenues in the order named:

"(a) Maintenance of equipment. (It is proper to point out in this connection, however, that the maintenance of the equipment will be less if the new extensions are operated by the Interborough Rapid Transit Company, by reason of the fact that certain economies can be effected by extending over the new system the benefits of our present organization and our existing facilities, such as power stations, shops and terminals, which, with some enlargement, should be sufficient to take care of the old and new equipment.)

"(b) Maintenance of way and structure. (To be ascertained upon the basis of actual cost, plus a reasonable allowance for depreciation.)

"(c) Cost of conducting transportation. (To be ascertained on a car-mileage basis.)

"(d) General and administration expenses. (Likewise to be ascertained on a car-mileage basis.)

"(e) Taxes, if any.

"(f) The actual annual charges of the company for carrying the cost of equipment and providing a partial sinking fund of three-fourths of 1 per centum per annum to meet obsolescence. (This provision is intended to provide for the contingency that when at the expiration of the lease and equipment is taken over by the city its then market value, notwithstanding its full maintenance, may be less than its present cost.)

"(g) Interest on bonds issued by the city to defray cost of construction, plus 1 per centum per annum as a sinking fund.

"4. If the gross revenue should at any time be insufficient to meet the gross expenses, as provided for in Section 3 above, the annual deficit to be made good by the city."

The communication containing the latest proposal of the Interborough Rapid Transit Company for the construction of subways was also addressed to Mayor Gaynor. On this account Chairman Willcox of the Public Service Corporation has addressed a letter to the Mayor in which the proposal of the commission is discussed from the viewpoint of the commission. According to Mr. Willcox, the latest terms are less favorable than the terms virtually agreed upon be-

tween the company and the commission. In speaking of the routes proposed, Chairman Willcox says that the latest plan of the company would interfere with a broad comprehensive and logical scheme of rapid transit by attempting to secure permission to utilize Lexington Avenue from Fortieth Street to the Harlem River.

On July 12, 1910, the Public Service Commission unanimously voted to advertise for bids for the construction of the triborough subway on the route proposed by the commission itself. The commission gave out correspondence between Chairman Willcox and Mayor Gaynor regarding the recent offer of the Interborough Rapid Transit Company. The Mayor, in his letter, stated that he had not been aware that the Interborough Rapid Transit Company had previously offered to build the extensions with its own capital, adding that he should be disposed to take up that offer instantly. Mr. Willcox's reply included copies of the correspondence that passed between the commission and the Interborough Rapid Transit Company during the period the company's previous offer to build new lines was under discussion, Mr. Willcox calling particular attention to the advertisements of the company that appeared in the papers, in which it was stated that the extensions were to be built with the company's own money. The bids will be opened either on Sept. 13 or Sept. 20, on the former date if the invitations to bidders are advertised seven weeks, and on the latter date if they are published for eight weeks. Two forms of contract will be advertised, one calling for private construction and equipment, and the second for municipal construction, and private equipment and operation. The estimated cost of the entire system is about $125,000,000. The triborough system includes construction of a subway along Broadway and Lexington Avenue, with an elevated extension along Jerome Avenue in the Bronx; another Bronx line along Whitlock Avenue, Westchester Avenue and the Southern Boulevard; the Canal Street crosstown tunnel, the Broadway-Lafayette loop, Brooklyn, and extensions of the Fourth Avenue (Brooklyn) subway to Fort Hamilton and Coney Island. Chairman Willcox was to sail on July 13 for Europe. He will be back, however, a month before bids are opened.

On July 12, 1910, the Public Service Commission granted the application of the Manhattan Bridge Three-Cent Line for a certificate of "public convenience and a necessity" for an electric railway from a point near Atlantic Avenue and Flatbush Avenue, Brooklyn, to a point at or near Desbrosses Street ferry in Manhattan, by way of the Manhattan Bridge. It is specified, however, that the company must arrange in some way to cross Manhattan to the Hudson River front. The opinion of the commission granting the application was written by Commissioner Bassett. A summary of the testimony presented before the commission during the hearings on the application of the company, with particular reference to the cost of electric railway construction and operation, was published in the ELECTRIC RAILWAY JOURNAL of April 16, 1910, page 705.

Question Box of the Engineering Association

John W. Corning, secretary of the American Street & Interurban Railway Engineering Association, has sent to all member companies and associate members a list of the questions for the 1910 Question Box of the association. He says:

"The Question Box is a medium afforded the members of the association through which they may get replies to questions on subjects which are giving them more or less concern. The answers that are received are of more value to the questioner the wider apart are the points of view from which they come.

"You are, therefore, earnestly requested to give these questions your prompt and serious consideration, so that your answers may be received not later than July 20th. Considerable work is necessary on these answers before they can be collected in proper shape for printing."

ENGINEERING QUESTION BOX FOR THE 1910 CONVENTION

POWER STATIONS

1. What increase in fuel economy have you been able to accomplish under regular operating conditions? Upon what bonus or premium, if any, has this been based?
2. Is the use of boiler compound to be avoided if possible? Why?
3. What is the nature of tests commonly applied at the boiler rooms of member companies by insurance inspectors as a basis for certificates guaranteeing safe working pressure on boilers?
4. Have you ever used Lignite coal? If so, what is your opinion of it as a fuel?
5. How can the air space between the bridge wall and grate bars of a chain grate stoker be automatically stopped or reduced in area?
6. Can forced draft be used on a chain grate stoker? If so, how?
7. Is it good practice to operate large fly-wheel engines of a reputable make without fly-wheel insurance?
8. What should be the cost per 100 k.w. hours for lubricating the high and low pressure cylinders of a 1,650 k.w. vertical cross-compound condensing engine operating at full load, 75 r.p.m., saturated steam, 150 lb. pressure and 25 in. vacuum?
9. Do you use a damper regulator? If so, is there any way to prevent smoke when damper is closed?

TRACK

10. What kind of pavement has proved most satisfactory?
11. What is the most satisfactory practice in the construction of the foundation and sub-structure of a street railway track and loop?
12. Has any standard been decided upon as to what distance the third rail should be from running rail?
13. Is it necessary to use tie plates on yellow pine ties in street railway tracks?
14. Does it pay to use screw spikes? If so, why?
15. Taking maintenance of paving into consideration, is not the grooved rail as recommended by the association more economical than T-rail laid in paved streets?
16. Would it be economy to install solid manganese special work in paved streets where 20-ton cars are run on 2½ minute headway?
17. Would it be economy at the present price of manganese rails to install same on curves of 80 feet radius or less?
18. Does your experience prove that solid manganese steam railroad crossings are more economical than three-rail built-up crossings of latest designs? Give data.
19. Does greater economy and stability result from filling joints of stone paving with Portland cement grout, pitch, or hot quartz sand?
20. Are you obtaining more economical results from manganese center or solid manganese frogs under heavy urban traffic?
21. What type of bolted or keyed-in hard center gives best results?
22. What is recommended as standard rail to be used in permanent paving—brick, asphalt, bitulithic?
23. Has satisfactory service been obtained from patent joints designed for use on old rail, where the rail is considerably worn?

CAR HOUSES

24. What is the best system of fire protection for open railway yards?
25. Is there any automatic system for open yards?

LINES—OVERHEAD AND UNDERGROUND.

26. What should be the transmission loss on a d.c. 600-volt line, provided proper amount of copper is put up?
27. Have you used gasoline wagons for either emergency or regular city trolley repair work? If so, how long, how many, weight and horse-power of engines?
28. Do you recommend the use of gasoline trolley repair wagons in preference to animal wagons? What is the difference in cost of maintenance?

CAR BODIES

29. Has anyone had any experience with the use of wood preservatives on car bodies?
30. What is the most economical color for use on cars in a hot, sunny climate?
31. If a car body is down hard on the side bearing plates on one side, would this not interfere with the free movement of the trucks on sharp curves, and be liable to cause derailment?

CAR EQUIPMENT

32. What is your experience with, and your estimation of the value of, grooving commutators, to date?
33. How does the maintenance cost of interpole motors compare with that of the straight series motor?
34. What kind of oil has given most satisfaction in lubricating engineer's valve?
35. In elevated or subway service, what is the maximum difference allowable in the standing brake-cylinder piston travel and running brake-cylinder piston travel, before the wear in the pedestal boxes or other parts of truck should be taken care of?
36. What are the causes of broken brushes on 101-B motor, and remedy?
37. What variation from the correct distance may be allowed between axle and armature shaft and still obtain good results in gears, pinions and bearings?

WHEELS, AXLES AND TRUCKS

38. What is proper pressure for pressing cast-iron and rolled steel wheels and cast-steel gear wheels on the following sizes of axles: 4-in., 4½-in. and 5-in.? (Knees not to be used.)
39. Owing to the bad riding of cars, excessive wear of brake hangers and waste of power due to lost end motion of journal boxes on axles having M. C. B. journals, should this type of journal be modified by some device to check the end motion, and what would be the best device to use?
40. What are the causes of thick and thin wheel flanges, and remedy?
41. What wear should be obtained from cast-iron wheels under 11-ton cars, expressed in terms of (*a*) Car miles; (*b*) Reduction of diameter; (*c*) Percentage of weight?
42. What is the relative efficiency and maintenance cost of solid steel wheels as compared with steel-tired wheels?
43. What success has been attained towards correcting sharp flange wear of car wheels by reducing, by turning or grinding, the excessive diameter of the thick flange wheel on the same axle?
44. Is not the present 1-8 inch side clearance between standard journal-boxes and the brass and wedge more than is desirable? Would not a better condition be obtained by reducing this clearance to 1-16 inch, the journal-box being machined to a dimension of 1-16 inch in excess of width of standard brass and wedge?

MISCELLANEOUS

45. What is the most feasible and economical means of transmitting 400 amperes 8½ miles over a mountain interurban line, operating conditions being as follows:
    Headway, 20 minutes.
    Average speed first mile, 10 miles per hour.
    Average speed next four miles, 35 miles per hour.
    Average speed last three and one-half miles, 10 miles per hour.
    Average stops per mile for the above sections, 2.0, .20 and .86 respectively.
    Grades:
    First three miles, straight and level.
    Next two miles, straight, average grade 2½ per cent.
    Last three and one-half miles, 80 ft. radius curves every 200 feet, average grade 4 per cent.
    Equipment: Eight 25-ton cars, with four 160 h. p. motors per car.
46. Should not all city and interurban electric railroads adopt standardization as fast as possible?

Cleveland Traction Situation

The Cleveland Railway may have to face a deficit by the refusal of the City Council on July 5, 1910, to increase the operating expenses to an amount above that specified in the Tayler ordinance. This action had been recommended by Street Railway Commissioner Dahl, although he has so far indicated no other course to relieve the company from the increase in operating expenses resulting from the advance in wages made by the board of arbitration. Mr. Dahl states that the matter of wages is between the city, as the representative of the car riders, and the employees, and suggests that the company seek to have its demand for increased operating expenses arbitrated. It is difficult to understand the source of revenue to cover the increased wages. Mr. Dahl says that the $70,000 surplus accumulated under the Tayler ordinance must go to the interest fund.

It has been stated that Mr. Dahl favors a conference between officials of the company, representatives of the men and himself, with a view to reducing the advance granted the men. About 1¾ cents an hour could be added to the old scale under the present allowance. Mr. Stanley agrees with Mr. Dahl that the advance is excessive, but under the agreement between the company and its employees made in 1906, differences regarding wages on the expiration of the schedule adopted at that time were to be submitted to arbitration.

The debt claimed by the city is still unpaid by the Cleveland Railway, although July 7, 1910, was fixed as the date when an answer was to have been made to the claim that $117,000 is due the city.

New Indiana Road Opened.—The Valparaiso & Northern Railway has been opened for service between Valparaiso and Flint Lake.

New Road Opened in Maine.—The Aroostook Valley Railroad, which connects Washburn and Presque Isle, Maine, 12 miles distant, has been placed in operation.

Omaha Strike Declared Off.—The representatives of the employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., who went on strike in September, 1910, formally declared the strike off on July 8, 1910. As stated in the ELECTRIC RAILWAY JOURNAL at the time, the strike petered out within a week after it had been declared.

New Jersey Utility Commission.—The New Jersey Board of Railroad Commissioners was succeeded on July 4, 1910, by the Board of Public Utility Commissioners with the same personnel as the Board of Railroad Commissioners, but with increased powers. The full text of the New Jersey Public Utility Bill was published in the ELECTRIC RAILWAY JOURNAL of April 2, 1910.

Outing of New England Street Railway Club.—The summer outing of the New England Street Railway Club was held on July 1, 1910, on Narragansett Bay. About 170 persons were in attendance, one-third of whom were ladies. A special train carried the party from Boston to Providence in the morning, and the rest of the day was spent aboard the steamer *Warwick*, of the Providence & Fall River Steamboat Company. A clambake was enjoyed at noon. The itinerary included a visit to Newport waters. The party returned to Boston from Providence by train in the early evening.

Boston & Western Electric Railroad Receives Certificate.—The Massachusetts Railroad Commission has issued a certificate of exigency to the Boston & Western Electric Railroad, which has been before the commission under three separate petitions for about four years. The certificate authorizes the company to build a high-speed electric interurban railway between Waltham and Marlboro, with a branch to Maynard. Other municipalities to be traversed are Weston, Wayland and Sudbury. The cost of the proposed line will be about $1,552,000, and it is intended to utilize it as a part of a through route for cars running between Worcester and Boston via Marlboro and Waltham. At the Boston end of the line the company will probably turn its passengers over to the Boston Elevated Railway and utilize the new Cambridge subway in securing a fast route into the heart of the city.

Financial and Corporate

New York Stock and Money Market

July 12, 1910.

The temporary check to the decline and the partial recovery of prices in the stock market were due to the fact that the market was sold out. The heavy liquidation that caused the decline cleaned up the available supplies of stock and the covering by shorts, together with some investment buying, resulted in slight advances. The longs are having a hard time, however, holding prices. At every appearance of activity they slide downward and the close today was near the low point for the year.

Money conditions are favorable, and liberal gold imports are probable. Quotations today were: Call 2@3 per cent, 90 days 4@4¼ per cent.

Other Markets

While the Philadelphia market has been irregular and ragged during the entire week, there have not been any very definite price changes. Traction shares have held their ground fairly well and prices at the finish were about as good as at the beginning.

There has been very limited trading in tractions on the Chicago market during the past week. Metropolitan Elevated, which declined so sharply when the merger plans were checked two weeks ago, has recovered to some extent.

In the Boston market traction issues have been very dull during the week. Even Massachusetts Electric, which has recently been active, came into the market very slowly.

In the Baltimore market there were 2,270 shares of United Railways stock sold today. This is the most active trading that has yet occurred. The price was from 14⅜ to 14⅝, which is fully one point advance over last week. The air is still full of rumors that New York interests are endeavoring to acquire control.

Quotations of various traction securities as compared with last week follow:

	July 5.	July 12.
American Railway Company	a42½	a42½
Aurora, Elgin & Chicago Railroad (common)	a7 60	52
Aurora, Elgin & Chicago Railroad (preferred)	*91	86
Boston Elevated Railway	a126	a126
Boston & Suburban Electric Companies	*14	a15
Boston & Suburban Electric Companies (preferred)	*74	a74
Boston & Worcester Electric Companies (common)	a10½	a10½
Boston & Worcester Electric Companies (preferred)	a40	37
Brooklyn Rapid Transit Company	73⅛	76⅜
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82	82
Capital Traction Company, Washington	a130	a130
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a17	a17
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4s	a6½	a6½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a75	a74
Consolidated Traction of N. J. 5 per cent bonds	a103	a103
Detroit United Railway	*50½	45
General Electric Company	140	141
Georgia Railway & Electric Company (common)	a108	a107½
Georgia Railway & Electric Company (preferred)	a87	a87
Interborough-Metropolitan Company (common)	17	17⅝
Interborough-Metropolitan Company (preferred)	49	50½
Interborough-Metropolitan Company (4½s)	79½	79⅞
Kansas City Railway & Light Company (common)	a25½	a25½
Kansas City Railway & Light Company (preferred)	a73	a75
Manhattan Railway	125	128
Massachusetts Electric Companies (common)	*15⅞	14¾
Massachusetts Electric Companies (preferred)	*80	a78
Metropolitan West Side, Chicago (common)	a23½	*23½
Metropolitan West Side, Chicago (preferred)	a58½	*58½
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	65	66⅛
Northwestern Elevated Railroad (common)	a25	*25
Northwestern Elevated Railroad (preferred)	a63	a65
Philadelphia Company, Pittsburg (common)	a42½	a42½
Philadelphia Company, Pittsburg (preferred)	a43	a43
Philadelphia Rapid Transit Company	a18⅛	a18¾
Philadelphia Traction Company	84½	a84½
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs.	a100	a99
Seattle Electric Company (common)	*110	a109
Seattle Electric Company (preferred)	*100	a99½
South Side Elevated Railroad (Chicago)	*72¾	*72¾
Third Avenue Railroad, New York	7½	9¾
Toledo Railways & Light Company	6¾	7⅜
Twin City Rapid Transit, Minneapolis (common)	106¾	107
Union Traction Company, Philadelphia	a44¾	a44¾
United Rys. & Electric Company, Baltimore	a14½	a14½
United Rys. Inv. Co. (common)	*30	*30
United Rys. Inv. Co. (preferred)	50	*50
Washington Ry. & Electric Company (common)	a33½	a33½
Washington Ry. & Electric Company (preferred)	a87½	a88
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	a100	a100
Westinghouse Elec. & Mfg. Company	60	59
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

12624

Court Approves Settlement of Suit by New York City Railway Against Metropolitan Securities Company

On July 8, 1910, Judge Lacombe, of the United States Circuit Court, instructed William W. Ladd, receiver of the New York City Railway, to accept the settlement of $5,500,000 offered by the Interborough-Metropolitan Company, New York, and several former directors of the Metropolitan Securities Company, in settlement of all pending litigation in the Federal Courts between the New York City Railway and the Metropolitan Securities Company. As stated in the ELECTRIC RAILWAY JOURNAL of July 9, 1910, the $5,500,000 will be applied in the reorganization of the Metropolitan Street Railway toward the fund of $12,000,000 which it has been estimated will be required to meet the present needs of the company. Judge Lacombe, in his memorandum of July 8, 1910, said in part:

"Irrespective of other considerations, the cash offer of $5,500,000 is a large one. The total amount of receiver's claims, including interest, is $8,615,555.24, but to recover that sum it would be necessary for him to prevail on substantially every one of the questions in controversy between himself and the various defendants.

"Defeat on two or three points only might result in producing after some years a smaller sum of money than is now offered. What these controversies are may be seen by reference to the opinion of counsel. In the one case it is apparent that the question raised would have to be taken to the Supreme Court.

"Irrespective of the other serious questions referred to in the papers presented, it is to be remembered that the suit against the Metropolitan Securities Company impleaded with certain directors of the New York City Railway, is one for a diversion of capital of the last-named company to the treasury of the former. Whether or not under these circumstances interest could be recovered against any one other than the corporation defendant which received the diverted capital is problematical. That corporation is already bankrupt. The item of interest on this claim alone amounts to $1,200,000.

"In the other suit, called the stockholders' suit, the various defences are set forth in the opinion of counsel and it is manifest that there are difficulties in the way of recovery which indicate a protracted litigation with no certainty as to the ultimate result. Moreover, if such litigation were entirely successful in all respects, the result would be a large judgment against another corporation, and, as the experience of this receivership has indicated, it sometimes happens that when a particularly large judgment is obtained against such a corporation it turns out to be insolvent.

"In view of all these circumstances it seems wise for the receiver to accept the offer and he is instructed to do so. Even if the court entertained any doubt as to the wisdom of such a course the same instructions would be given in view of the substantially unanimous expression of approval by the representatives of the creditors and of all other interests who have appeared."

Wilmington Properties Absorbed by Wilmington & Philadelphia Traction Company.

O. T. Crosby, who has been elected president of the Wilmington & Philadelphia Traction Company, incorporated recently with a capital stock of $6,500,000, has issued a statement regarding the purpose of the company in part as follows:

"The Wilmington & Philadelphia Traction Company has assumed control of the Wilmington Street Railway and allied lines in Wilmington, Del.; of the Chester Traction Company and allied lines in and about Media, Darby and Lansdowne; of the Wilmington City Electric Company in Wilmington, Del.; of the Wilmington Light & Power Company, Wilmington, Del., and of the Wilmington Automatic Telephone Company. The last-named companies have heretofore been under one management, and all the others have been under another management.

"It will be impossible to accomplish immediately all that is prospected. The new management will be urgent for its own sake, as well as for the public good, to establish conditions approved by the majority as being fair to all. It would be past human power to obtain unanimous approval of any effort affecting many men.

"The properties in Pennsylvania will be operated by the Southern Pennsylvania Traction Company."

J. G. White & Company, Inc., New York, N. Y., are interested in the Wilmington & Philadelphia Traction Company, and at their office it was stated that an announcement would soon be issued giving the details of the merger. The statement by Mr. Crosby was addressed to the public of the territory in which the absorbed companies operate.

American Light & Traction Company, New York, N. Y.—The American Light & Traction Company has declared the usual quarterly dividend of 2½ per cent on its common stock, payable on Aug. 1, 1910, to holders of record on July 16, 1910, and an extra dividend of 2½ per cent, payable in common stock on Aug. 15, 1910, to holders of record on July 16, 1910.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—The Birmingham Railway, Light & Power Company, which paid an annual dividend of 2 per cent on the $3,500,000 of common stock of the company on Jan. 1, 1910, paid a dividend of 2½ per cent on the common stock on July 1, 1910. The dividend paid on the common stock in January was the first dividend on this stock which had been paid since Dec. 31, 1906.

Boston Suburban Electric Companies, Boston, Mass.—The Boston Suburban Electric Companies paid off the $500,000 of 5 per cent coupon notes due on July 1, 1910, at maturity with the proceeds of $450,000 of new notes bearing a lower rate of interest and with $50,000 from the surplus.

Brooklyn (N. Y.) Rapid Transit Company.—The directors of the Brooklyn City Railroad have declared a quarterly dividend of 2 per cent on the $12,000,000 of stock of the company, payable on July 15, 1910, to holders of record on July 5, 1910, out of the rental paid by the Brooklyn Heights Railroad, amounting to $1,200,000 (10 per cent) annually. It is explained that pending the appeal from the decision handed down in February, 1910, by which the Brooklyn Heights Railroad was held to be entitled to recover $3,356,938 from the Brooklyn City Railroad, ½ of 1 per cent of the rental paid by the Brooklyn Heights Railroad to the Brooklyn City Railroad will be retained quarterly, and be set aside in a special fund and returned to the stockholders in case it is not needed to settle the claim of the Brooklyn Heights Railroad.

Chicago (Ill.) Railways.—Representatives of different interests involved in the reorganization of the Chicago Railways met during the week ended July 9, 1910, and agreed on the form of foreclosure decree. Two plans had been submitted, one for a separate decree for each of the nine foreclosure suits, the other allowing one decree for all. The joint decree was selected.

Connecticut Valley Street Railway, Northampton, Mass.—The Railroad Commission of Massachusetts has authorized the Connecticut Valley Street Railway to issue $100,000 of 6 per cent cumulative preferred stock, to retire an equal amount of the first and refunding bonds.

Eastern Ohio Traction Company, Cleveland, Ohio.—Robert D. Beatty, as general manager of the Cleveland & Eastern Traction Company, has issued the following notice regarding the Eastern Ohio Traction Company, the Eastern division of which was sold under foreclosure recently to a representative of the holders of the first mortgage bonds of the company: "Announcement is hereby made that pursuant to the reorganization of the Eastern Ohio Traction Company properties, the Gates Mill, Chardon and Middlefield Division will be operated under the name of the Cleveland & Eastern Traction Company, general offices, 701 Electric Building, Cleveland; payments for accounts due, also accounts against the above-named division, should be made and rendered accordingly."

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The Fonda, Johnstown & Gloversville Railroad has declared an initial dividend of 2 per cent on its $2,500,000 of common stock, payable on July 20, 1910, to holders of record of July 11, 1910.

Illinois Valley Gas & Electric Company, Streator, Ill.—The Illinois Valley Gas & Electric Company has filed for

record its mortgage to the Illinois Trust & Savings Bank, Chicago, Ill., given to secure an issue of $10,000,000 of 5 per cent gold bonds dated May 1, 1910, and due May 1, 1940. The Illinois Valley Gas & Electric Company controls the Illinois Light & Traction Company.

Jacksonville (Fla.) Electric Company.—The Jacksonville Electric Company has declared a semi-annual dividend of 3½ per cent on the common stock of the company, payable on Aug. 1, 1910, to holders of record on July 12, 1910. This increases the dividend from 6 per cent to 7 per cent a year.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—An initial quarterly dividend of 1½ per cent has been declared on the preferred stock of the Lewiston, Augusta & Waterville Street Railway, payable on Aug. 1, 1910, to holders of record on July 15, 1910.

Lima & Honeoye Electric Light & Railroad Company, Lima, N. Y.—The Public Service Commission of the Second District of New York has received a petition from the Lima-Honeoye Electric Light & Railroad Company and the Lima-Honeoye Light Company for consent to transfer and lease property and franchises of the Lima-Honeoye Electric Light & Railroad Company; and a petition from the Lima-Honeoye Light Company for an order authorizing the issue of $5,000 par value of its capital stock for the improvement and maintenance of the electrical plant, distributing system and railroad leased to it by the Lima-Honeoye Electric Light & Railroad Company.

Northampton Traction Company, Easton, Pa.—A meeting of the stockholders of the Northampton Traction Company has been called for Aug. 27, 1910, to authorize an issue of $5,000,000 of bonds, the proceeds to be expended in connection with the plan to consolidate the Northampton Traction Company and the Easton & Washington Traction Company.

Oakland & Antioch Railway, Oakland, Cal.—The Oakland & Antioch Railway, which has an electric railway under construction between Oakland and Antioch, has filed a mortgage in favor of the Anglo-California Trust Company, San Francisco, Cal., to secure an issue of $2,000,000 of 30-year 5 per cent bonds.

Sedalia Light & Traction Company, Sedalia, Mo.—Herbert R. Hallett, president of the Atlantic National Bank, Boston, Mass., has been elected a member of the committee which has been selected to represent the holders of the first mortgage bonds of the company.

Third Avenue Railroad, New York, N. Y.—The hearings before the Public Service Commission of the First District of New York on the plan for the reorganization of the Third Avenue Railroad, submitted by the committee representing the bondholders, were closed on July 11, 1910.

Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio.—Control of the Electric Railway & Power Company of Tiffin has passed to Samuel B. Sneath, president and general manager of the Tiffin, Fostoria & Eastern Electric Railway, and others who are interested in that company. It is expected that the Electric Railway & Power Company of Tiffin will be merged with the Tiffin, Fostoria & Eastern Electric Railway.

Washington, Berwyn & Laurel Electric Railway, Washington, D. C.—Charles F. Gladfeller has been appointed receiver of the Washington, Berwyn & Laurel Electric Railway on application of the Guardian Savings & Trust Company, Cleveland, Ohio, trustee of a mortgage given to secure $220,000 of 5 per cent bonds, payable in 1921, the interest on which is in default.

Western Ohio Railway, Lima, Ohio.—The stockholders of the Western Ohio Railway have voted to lease the property to the Western Ohio Railroad, which was organized recently for this purpose, as announced in the Electric Railway Journal of June 11, 1910, page 1041. The personnel of the Western Ohio Railroad is the same as that of the Western Ohio Railway.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—The Wisconsin Traction, Light, Heat & Power Company has been authorized by the Wisconsin Railroad Commission to issue $500,000 of 5 per cent 30-year additional first mortgage gold bonds, maturing on July 1, 1931, for extensions and additions, the bonds to be sold for not less than 75 per cent of their par value.

Traffic and Transportation

Pennsylvania Railroad's New York Tunnels to Be Opened on Sept. 8

Ralph Peters, president of the Long Island Railroad, has stated, following an official inspection of all work in Manhattan and on Long Island that is being completed by the Pennsylvania Railroad and Long Island Railroad, that the East River tunnels will not be opened until Sept. 8, 1910, when the fall timetable goes into effect. The official announcement follows:

"Although the Pennsylvania Railroad's station, tunnels and yards were inspected by James McCrea, president of the Pennsylvania Railroad, and by Ralph Peters, president of the Long Island Railroad, in company with engineers and staff officers on July 6, 1910, to determine definitely upon a date for the Long Island Railroad to inaugurate its through service to New York, they found that the tracks and platforms will be ready for such service by Aug. 1, 1910, or even earlier, but the conditions of the station proper, on account of the large amount of cleaning up, installing fixtures and furnishings, breaking in and training station forces, and other proper operations of so large and important a terminal will not justify its being opened earlier than Sept. 8, 1910, when the fall timetable is put into effect.

"While it is true that traffic on the Long Island Railroad might be handled on certain platforms accessible without passing through the main station, it is thought best and wisest to wait until the entire station can be used. Therefore, this official notice is given by the Long Island Railroad that it will inaugurate service to the Pennsylvania Station on Sept. 8, 1910. Through electric service will be operated from Far Rockaway branch, from Long Beach, from the Hempstead branch and from Jamaica, connecting with all steam trains. A sufficient number of trains will stop at Winfield to make connections with all trains on the Port Washington and Whitestone branches. Ample equipment will be provided by Sept. 1, 1910, so that the business will be fully cared for."

Accidents in New York in May

The Public Service Commission of the First District of New York has issued the following comparative summary of accidents which occurred during May, 1908; May, 1909, and May, 1910, on the railways in the territory under its jurisdiction.

May.	1908.	1909.	1910.
Car collisions	195	144	84
Struck by cars	1,016	822	982
Boarding	627	647	683
Alighting	772	830	933
Contact electricity	43	21	35
Other accidents	2,499	2,048	2,082
Total	5,152	4,512	4,799
Injuries.			
Passengers	2,066	1,962	2,063
Not passengers	694	559	487
Employees	622	459	640
Total	3,382	2,980	3,190
Serious (Included in above).			
Killed	32	32	32
Fractured skulls	15	8	3
Amputated limbs	3	5	4
Broken limbs	41	26	32
Other serious	151	132	154
Total	242	203	225

New Route to Coney Island.—The Coney Island & Brooklyn Railroad is operating a new line to Coney Island from loop 3, Brooklyn Bridge, by way of De Kalb Avenue. Hitherto only the Smith Street cars started for Coney Island from this loop.

Toledo Trolley Trips.—The Toledo Railways & Light Company, Toledo, Ohio, has issued a publication entitled, "Toledo Trolley Trips," in which the attractive places within easy reach of Toledo by electric railway are described and illustrated.

Accident in Brooklyn.—One person was killed and more than a score of persons were injured on July 8, 1910, when

a car of the Brooklyn (N. Y.) Rapid Transit Company, bound for Canarsie, a pleasure resort, left the tracks and crashed into a trolley pole.

Change in Fare Between Portland and Vancouver.—The Portland Railway, Light & Power Company, Portland, Ore., has announced that the round-trip fare from Vancouver to Portland, or from Portland to Vancouver, will be reduced from 35 cents to 30 cents, to take effect on July 26, 1910.

Complaint Dismissed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of residents of Dunkirk and Fredonia against the Buffalo & Lake Erie Traction Company and the Chautauqua Traction Company as to the connection of these two lines at Westfield. The commission is advised by the attorney for the complainants that the matter has been adjusted to the satisfaction of the complainants.

Fares on Chautauqua Traction Company's Line.—On July 1, 1910, the Chautauqua Traction Company, Jamestown, N. Y., established 20-trip commutation ticket fares in either direction between Jamestown and Chautauqua, also intermediate points, at $4, and in either direction between Jamestown and Mayville, or intermediate points, at $5. This is a reduction from round-trip fare of 75 cents between Jamestown and Chautauqua, and 90 cents between Jamestown and Mayville.

Petition to Rescind Speed Ordinance.—Residents in Hollywood and the northwestern section of Los Angeles, Cal., have petitioned the Mayor to use his influence to have repealed the ordinance which went into effect recently limiting the speed of cars at crossings to 6 m.p.h., within the business district, to 12 m.p.h., and in the outlying sections to 20 m.p.h. The petitioners think that the motormen should be allowed to judge for themselves the speed at which it is safe to operate their cars.

Time-Table of Road Out of Philadelphia.—The Philadelphia & West Chester Traction Company, Philadelphia, Pa., has issued a very convenient time-table, effective on July 1, 1910, of trains over its line between Philadelphia and Newtown Square, West Chester, Llanerch and Ardmore, and Clifton and Collingdale. The publication contains a map of the Philadelphia & West Chester Traction Company's system, connecting lines and the electric railways in the vicinity of Philadelphia west to Harrisburg.

Central Electric Traffic Association Table.—The Central Electric Traffic Association has issued its new short-line distance table, compiled by the chairman of the association. It shows the absolute short-line distances between all the headline points shown in Joint Passenger Tariff No. 3, issued and compiled by the association. The table will be used to combat competition with the steam railroads. The table shows the distances between 34 important points in the Central Electric Traffic Association's territory.

Demands of New Orleans Employees Refused.—The directors of the New Orleans Railway & Light Company, on July 9, 1910, refused to grant the demand of motormen and conductors in its employ for a 3-year contract on a sliding scale that will reach 25 cents per hour the last year. The directors insist on a 6-year contract, with an increase of one-fourth of a cent per hour each year. A bonus is offered the 6th year, provided the Panama exposition is held in New Orleans. The men have declined the offer of the company, and have asked the company to arbitrate the differences.

Advertising an Electric Railway.—The Louisville & Northern Railway & Lighting Company, New Albany, Ind., is conducting an aggressive advertising campaign to encourage the use of the company's lines between Louisville and Indianapolis. Newspaper space and billboards have been used freely and the company has now erected an electric sign to overlook Lincoln Park, north of the postoffice in Louisville. "Go the Electric Way" is outlined in large letters on the sign, while the red car referred to in the company's advertisements in the newspapers is reproduced in outline in incandescent lamps in practically its full size.

Operation of Interurban Cars in Rochester.—The Public Service Commission of the Second District of New York has directed the New York State Railways to have the cars of the Rochester, Syracuse & Eastern Railroad operated over its tracks in Rochester as follows: All westbound cars to run through Franklin Street, Andrews Street, State Street, Allen Street and Plymouth Avenue, returning eastbound on Main Street from Plymouth Avenue to University Avenue, except train 76, due to leave Four Corners at 6 p. m. and train 42, due to leave Four Corners at 6:05 p. m., both of these trains to be operated as at present, crossing the Main Street tracks at State Street and running via Exchange Street, Court Street and Clinton Street to Main Street.

Employees' Magazine in Chicago.—There has just been published in Chicago the first issue of a magazine called *The Round Table*, which is to be distributed free among the employees of all the electric railways in Chicago, the revenue to the publishers to be derived exclusively from the advertising. *The Round Table* is designed along the lines of the Santa Fe employees' magazine, which has been very successful. The first issue contains 44 pages. Among the articles which appear are: "Public Utilities and the People," "Mr. Downs Accepts New Place," "Rehabilitation of Chicago's Traction Lines," "How the Speed of the Car is Controlled," "The Purchasing Power of a Nickel," and "New Cars for the Chicago & Oak Park Elevated Railroad."

Through Service in Indiana.—The proposed through interurban service between Indianapolis and South Bend will not be put into effect. Instead, service will be established between Indianapolis and Goshen, Ind., passengers between Indianapolis and South Bend being obliged to change cars at Goshen. The Indiana Union Traction Company and the Winona Interurban Railway have agreed to furnish service as far north as Goshen, the Indiana Union Traction Company's tracks to be used to Peru and the Winona Interurban Railway between Peru and Goshen. A number of new cars will be used in this service, and a limited schedule will be established. The original plans to establish through service between Indianapolis and South Bend were abandoned because an agreement could not be reached between the Indiana Union Traction Company, the Winona Interurban Railway and the Northern Indiana Railway in regard to continuing the service to Michigan City.

Complaint Against Service in Troy.—The Public Service Commission of the Second District of New York has received a complaint from Elias P. Mann, Mayor of Troy, N. Y., about the operation of the Oakwood Avenue Line of the United Traction Company in that city. A previous complaint was made to the commission asking that a 10-minute service from 6 A. M. to 9 A. M., and thereafter up to 12.30 at night a 15-minute service be required in accordance with an ordinance of the Common Council of Troy adopted Dec. 1, 1908. The commission made an order requiring a 15-minute service, but this was afterwards changed to the 20-minute service, which is now in effect at the request of the citizens. The complaint now made asks that the United Traction Company be compelled to run its cars every 10 minutes each way every day from 6 a. m. until 9 p. m. and thereafter every 15 minutes until 12.30 at night.

Experimental Night Service in Harrisburg.—Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to the efforts of certain interests in Harrisburg to compel the Central Pennsylvania Traction Company to operate an owl car service and to the argument which the company advanced to prove that such service was not needed. An informal discussion of the matter was held recently at the offices of the State Railroad Commission between the members of the commission and representatives of the company with reference to a night service, and it was decided that an experimental service for a short time would show whether or not there was a public demand for such service. F. B. Musser, president of the company, stated that if there was a demand for night cars sufficient to pay for the cost of their operation, the company desired to meet it, and would continue the service. It is not practicable to run the power plant of the company for a single night car; but, as soon as arrangements can be made for procuring power elsewhere, a half hourly service will be instituted between the Square and the upper end of the city. The commission will retain the papers in the case and will not make any recommendation or order until the test has been concluded.

Personal Mention

Mr. Robert Hollis has been appointed chief electrician of the Indianapolis, New Castle & Toledo Electric Railway.

Mr. George Ale has been appointed master mechanic of the Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.

Mr. H. B. McNulty has been appointed assistant manager of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.

Mr. W. R. Reynolds, formerly superintendent of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been appointed general manager of the American Light & Power Company, Kansas City, Mo.

Mr. A. G. Wishon, vice-president and general manager of the Fresno (Cal.) Traction Company, has resigned as general manager of the company to devote his entire attention to the interest of the San Joaquin Light & Power Company and the Fresno City Water Company.

Mr. L. C. Bradley, whose appointment as manager of the Galveston (Tex.) Electric Company was announced in the Electric Railway Journal of May 28, 1910, has also been appointed manager of the Galveston-Houston Interurban Railway, which is controlled by Stone & Webster, Boston, Mass.

Mr. A. H. Otis has been appointed general manager of the Ocean Shore Railway, San Francisco, Cal., to succeed Mr. J. Downey Harvey. Mr. Otis was formerly superintendent of the Boca & Loyalton Railroad, Loyalton, Cal., which operates a standard-gage steam railroad in California more than 50 miles long.

Mr. Robert D. Beatty, who was receiver of the Eastern Ohio Traction Company, Cleveland, Ohio, the eastern division of which was sold under foreclosure recently, has been appointed general manager of the Gates Mill, Chardon and Middlefield division of the company, which will hereafter be operated under the name of the Cleveland & Eastern Traction Company, Cleveland, Ohio.

Mr. Mortimer P. Reed has been appointed general superintendent of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., to succeed Mr. R. W. Reynolds, resigned. Mr. Reed was formerly secretary and treasurer of the Southern Michigan Railway, South Bend. He has recently been assistant superintendent of the Chicago, South Bend & Northern Indiana Railway.

Mr. James J. Gill, Albany, N. Y., has been appointed an assistant supervisor of equipment by the Public Service Commission of the Second District of New York. Mr. Gill was born in Kingston, N. Y., and was educated in the public schools of Kingston, St. Joseph's Academy and St. Vincent's College in Pennsylvania. He has been in the employ of the New York Central & Hudson River Railroad since 1879.

Mr. O. T. Crosby has been elected president of the Wilmington & Philadelphia Traction Company, and the Southern Pennsylvania Traction Company, Wilmington, Del., which have recently been incorporated to take over the Wilmington & Chester Traction Company, the Wilmington City Electric Company, the Wilmington Light & Power Company and the Wilmington Automatic Telephone Company.

Mr. F. W. Webster, general manager and superintendent of the Stockton (Cal.) Electric Railroad, has also been appointed general manager of the Fresno (Cal.) Traction Company, to succeed Mr. A. G. Wishon, vice-president and general manager of the company, who retires as general manager to devote all his time to the interest of the San Joaquin Light & Power Company and the Fresno City Water Company.

Mr. A. W. McLimont, formerly general manager of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., and now vice-president and general manager of the Michigan United Railway, Lansing, Mich., was tendered a banquet recently by the heads of the departments of the Chicago & Milwaukee Electric Railroad, including Mr. E. J. Bock, superintendent; Mr. C. E. Thompson, auditor and passenger agent; Mr. Walter Sylons, master mechanic; Mr. F. E. Low, division superintendent; Mr. C. R. Phenicie, electrical engineer; Mr. E. J. Morgan, purchasing agent; Mr. D. P. McCarthy, roadmaster, and Mr. E. H. Vivian, general traffic manager. Mr. McLimont was presented with a gold watch suitably inscribed and an engraved, copy of resolutions which were unanimously adopted by the Brotherhood of Interurban Trainmen at their meeting in June, 1910.

Mr. S. D. Wager has been appointed superintendent and traffic solicitor of the Toledo & Indiana Traction Company, Toledo, Ohio, which has succeeded to the property of the Toledo & Indiana Railway, which was sold recently under foreclosure. Mr. Wager was formerly general shop foreman of the Northern Ohio Traction & Light Company at Canton, Ohio. Mr. Wager began his railroad career in 1891, and since that time he has been connected with the Lake Shore & Michigan Southern Railroad; Chicago, Rock Island & Pacific Railroad; Missouri, Kansas & Texas Railroad; Toledo & Indiana Railway, and the Toledo, Port Clinton & Lake Side Railway, Genoa, Ohio. On June 15, 1906, Mr. Wager was appointed chief train dispatcher of the Toledo, Port Clinton & Lake Side Railway, and on Nov. 15, 1907, he was promoted to the position of general shop foreman of the company. In July, 1908, he was made master mechanic of the Toledo, Port Clinton & Lake Side Railway, and in April, 1909, he was appointed general shop foreman of the Northern Ohio Traction & Light Company. As superintendent and traffic solicitor of the Toledo & Indiana Traction Company, Mr. Wager will have his headquarters at Delta, Ohio. The Toledo & Indiana Traction Company operates more than 50 miles of line, over which about 35 cars are in regular service.

OBITUARY

W. A. Stadelman died on July 6 at his home in Rye, N. Y., at the age of 46 years. Mr. Stadelman was at one time a member of the firm of Chadbourne, Hazleton & Stadelman, of Philadelphia, which was quite active in the electric railway and electric motor field. For several years Mr. Stadelman was identified with the Brown Hoisting Machinery Company, of Cleveland, and the Wellman-Seaver-Morgan Company, of the same city, residing for a time in Cleveland, and later in New York. For the past two or three years Mr. Stadelman was at the head of the Darley Engineering Company, of New York. The funeral services were held in Rye on July 8, 1910, and the body was interred in Philadelphia.

Frederick H. Lincoln, vice-president and general manager of the Pay-Within Car Company, Philadelphia, Pa., was killed at West Philadelphia on the morning of July 11, 1910, while trying to board a moving train of the Pennsylvania Railroad. Mr. Lincoln had spent the week-end with his family at Atlantic City, and had made the trip from Atlantic City to West Philadelphia so as to change cars at that place for Washington, where he had a business engagement. Mr. Lincoln was formerly assistant general manager of the Philadelphia Rapid Transit Company, and was one of the co-inventors of the Pay-Within car. When he resigned from that company in December, 1909, to become connected with the Pay-Within Car Company, which is affiliated with the Electric Service Supplies Company, a biographical sketch was published in the Electric Railway Journal in which his work with the Philadelphia Rapid Transit Company in particular was reviewed. Mr. Lincoln was born in Boston, Mass., on May 28, 1867 After serving seven years with the Thompson-Houston Electric Company he entered street railway work in 1891 with the Toledo (Ohio) Consolidated Street Railway. In 1893 he entered the employ of the People's Traction Company, Philadelphia, Pa., and continued with that company and its successors in various capacities for 16 years. Mr. Lincoln was elected president of the American Street & Interurban Railway Engineering Association at the convention in Denver in 1909, but resigned that position when he retired from railway work to become connected with the Pay-Within Car Company. He was also a member of the American Institute of Electrical Engineers.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

American Falls, Rockland & Southeastern Railway, Boise, Idaho.—Application for a charter has been made in Idaho by this company to build electric and steam railways in Idaho. Capital stock, $1,500,000.

***Hampden Railway, Springfield, Mass.**—Chartered in Massachusetts to construct a railway to be operated by steam or electric power between Springfield and Bondville, with a spur to Holyoke. Capital stock, $1,000,000. Directors: Ralph D. Gillett, H. W. Ely, Archie D. Robinson, Westfield; Arthur W. Eaton, Pittsfield; Joseph A. Skinner, Holyoke; H. H. Bowman and E. T. Ley, Springfield.

***Western Indiana Construction Company, Madison, Wis.**—Incorporated in Wisconsin to build an interurban electric railway to connect Madison and Stevens Point. Capital stock, $100,000. Headquarters, Madison, Wis. Officers: Allen T. Russell, Indianapolis, president, and J. E. Jones, Portage, manager.

FRANCHISES

Point Grey, B. C.—The British Columbia Electric Railway, Ltd., Vancouver, has been granted a 99-year franchise to build an electric railway through the district south and west of Vancouver. It has a 40-year franchise to build a railway in Point Grey. The company agrees to build five initial lines of railway, two of which are to be in operation within one year and two more in two years.

***Sebastopol, Cal.**—John E. Bennet has been granted a franchise by the Council to build an electric railway from the power house in Sebastopol to the town limits.

Carbondale, Ill.—The Murphysboro Electric Railway, Heat & Power Company, Murphysboro, has been granted a 50-year franchise by the City Council to build a railway in Carbondale and extend it to Murphysboro.

St. Charles, Ill.—The Chicago, Wheaton & Western Railway, Chicago, has been granted a franchise by the City Council to operate a single or double-track railway in St. Charles.

New Albany, Ind.—The Louisville & Southern Indiana Traction Company, New Albany, has been granted a franchise by the City Council to extend its tracks to the proposed new fair grounds near New Albany. It is probable that a line will be built from New Albany to French Lick Springs.

Iowa City, Ia.—The Iowa City, Ottumwa & Southwestern Electric Railway, Iowa City, has been granted a franchise by the City Council to build a railway in Iowa City. This is part of a plan to build a 74-mile electric railway to connect Iowa City and Ottumwa via Sharon Center, Trytown, Amish, Wellman, Keota and Ollie. Frank Tanner, Iowa City, general manager. [E. R. J., May 7, '10.]

Wichita, Kan.—The Arkansas Valley Interurban Railway, Wichita, has asked the Council for a franchise to build an electric railway over certain streets in Wichita.

New Orleans, La.—The New Orleans Railway & Light Company has bought the franchise of the Spanish Fort extension of the West End Railroad, and the line will be built, including a bridge over Bayou St. John.

Marlboro, Mass.—The Boston & Western Electric Railway has been granted a certificate of exigency by the Railroad Commissioners for the construction of an electric railroad beginning in Waltham and extending through Weston, Wayland and Sudbury to Marlboro. There is a branch from South Sudbury to Maynard. [E. R. J., May 28, '10.]

Kansas City, Mo.—The Metropolitan Street Railway, Kansas City, has accepted the franchise requiring it to extend the present terminus of the Quindaro Boulevard line west to Twenty-second Street and thence north to Brown Avenue.

Fremont, Neb.—The Nebraska Traction & Power Company, Omaha, has been granted a franchise by the City Council to build an electric railway within the limits of Fremont. This railway is to connect Fremont and Omaha. Under the terms of the franchise it is to be completed by Jan. 1, 1912.

Wahoo, Neb.—The Omaha, Western & Lincoln Railway has asked the Council for a franchise to build a railway in Wahoo. This proposed 219-mile electric railway will connect Omaha, Hastings and Lincoln. Frank F. Schaaf, president. [E. R. J., June 25, '10.]

Amsterdam, N. Y.—The Fonda, Johnstown & Gloversville Railroad, Gloversville, has been granted a franchise by the Common Council to double track Main Street in Amsterdam and to construct a belt line.

New York, N. Y.—The Public Service Commission on July 12 granted the application of the Manhattan Bridge Three-Cent Line for a certificate of public convenience and necessity for an electric railway from a point near Atlantic Avenue and Flatbush Avenue, Brooklyn, to a point at or near Desbrosses Street ferry in Manhattan, by way of the Manhattan Bridge. [E. R. J., Mar. 12, '10.]

New York, N. Y.—Frederick W. Whitridge, receiver of the Union Railway and Third Avenue Railroad has been granted a certificate of public convenience and necessity by the Public Service Commission of the First District, which at the same time approved the terms of a franchise recently granted by the Board of Estimate for the construction of an extension through Fordham Road from Sedgwick Avenue to the 207th Street station of the Broadway subway.

Beaumont, Tex.—The Beaumont Traction Company has asked the City Council for a franchise which, when adopted, will repeal the three existing franchises under which the company is operating. Among the many improvements provided for in the new franchise will be the double tracking of several lines.

***Sweetwater, Tex.**—C. M. McLain, G. E. Romsey and W. E. Barrow, all of Sweetwater, have been granted a franchise by the Council to build a street railway in Sweetwater.

TRACK AND ROADWAY

Rogers-Bentonville-Decatur Interurban Railroad, Rogers, Ark.—This company has started surveys at Cave Springs for a route for the proposed railway which is to connect Rogers, Cave Springs, Bentonville and Decatur. Construction is expected to begin next month. J. D. Houseman and G. G. Southerland, St. Louis, are promoting this railway. [E. R. J., June 14, '10.]

British Columbia Electric Railway, Victoria, B. C.—It is stated that this company is surveying for a line to Saanich.

Hanford & Summit Lake Railway, Hanford, Cal.—This company, which was recently incorporated to build a 15-mile electric railway through Grangeville and Hardwick into the Summit Lake region and return through Lemoore and Armona, has effected its organization by the election of the following officers: Chas. King, Hardwick, president; Ralph W. Heins, vice-president; J. O. Hickman, Hanford, treasurer; John B. Rogers, San Francisco, general manager and chief engineer. The directors of the company have authorized an issue of $500,000 of 5 per cent, 30-year gold coupon bonds, interest payable semi-annually, of which $300,000 will be offered for general subscription to the public. The company will begin immediately the acquisition of the rights of way and will begin construction shortly. [E. R. J., July 9, '10.]

Denver (Col.) City Tramway.—It is officially stated that company has secured permits for a portion of Fourteenth Street, and has made another application for permit which will enable it to double the track on Fourteenth Street, from Moffat Road on the north to the junction of Colfax Avenue and Broadway.

Atlanta & Carolina Railway, Atlanta, Ga.—It is reported that within 60 days this company will resume construction of its proposed railway to connect Atlanta, Augusta and Athens with a branch line to College Park. J. W. English, Atlanta, president.

Decatur Southern Traction Railway, Decatur, Ill.—This company is said to have completed preliminary arrangements and contracts will be let about Aug. 1 to build the

proposed 30-mile railway from Decatur, Ill., south through Macon and Assumption to Pana. There will be a bridge over the Sangamon River. R. McCalman, 318 Citizens, T. & T. Building, Decatur, chief engineer. [E. R. J., Feb. 19, '10.]

*Mendota, Ill.—L. J. Kendall, La Moille, and A. R. Unholz, Princeton, are said to be interested in a plan to build an interurban railway to connect Princeton and Mendota, via Dover and La Moille.

*Connersville, Ind.—It is stated that all preliminaries have been completed for building an interurban railway to connect Connersville and Hamilton. C. L. Henry is interested.

Southern Indiana Traction Company, Hanover, Ind.—It is stated that this company will soon construct an interurban railway to connect Madison and Scottsburg.

Red Oak & Northeastern Railway, Red Oak, Ia.—This company is securing subscriptions for building its proposed 110-mile interurban railway to connect Red Oak, Winterset, Greenfield and Des Moines. W. L. Sonntag and D. M. Dowd, Des Moines, are interested. [E. R. J., Oct. 23, '09.]

Oklahoma-Kansas Railway, Baxter Springs, Kan.—This company has completed surveys and engineers are now preparing maps and estimates for its projected 23-mile electric railway to connect Columbus, Galena and Baxter Springs, Kan., and Sunny Side, Lincolnville, Hattanville and Miami, Okla. C. F. Lambert, Kansas City, Mo., chief engineer. [E. R. J., June 18, '10.]

Motor Grand Traction Company, Belleville, Kan.—This company has completed surveys on 65 miles and contracts will soon be awarded for building its proposed 165-mile railway to connect Chester, Neb., and Wichita, Kan., via Concordia, Salina, Canton and Newton, Kan. E. S. Alnutt, Canton, Kan., president. [E. R. J., April 30, '10.]

Conway Springs, Kan.—J. M. Frantz, who is interested in promoting a proposed interurban railway to connect Hutchinson, Haven, Mt. Hope, Andale, Goddard, Wichita, Viola, Conway Springs, Anson, Wellington, Caldwell, Kan., and Medford, Enid, Guthrie and Oklahoma City, Okla., reports that matters are in a preliminary stage and financial backing has not yet been secured. [E. R. J., June 25, '10.]

Horse Cave & Eastern Railway, Horse Cave, Ky.—This company advises that it will start construction on its projected railway as soon as engineering preliminaries have been completed. The line will be 25 miles in length and will connect Horse Cave, Hiseville, Knob Lick and Edmonton. It will also connect with the main line of the Louisville & Nashville Railroad, and will cross the Louisville, Lincoln Farm & Mammoth Cave Traction Company. Repair shops will be located at Horse Cave. Either gasoline or gasoline electric cars will be operated for passenger service, and steam for hauling freight. Capital stock, $25,000, to be increased before construction begins. Bonds will be issued to the amount of $300,000. Louis Edwards, 1463 Arlington Avenue, St. Louis, Mo., general manager. [E. R. J., June 18, '10.]

Louisville (Ky.) Railway.—This company is said to be making preliminary arrangements for building an extension in Louisville to give East and South Louisville a direct railway service with West Louisville and Parkland.

*Murray (Ky.) Traction Company.—Press reports state that this company will let contracts about Sept. 1 for building its proposed 16-mile railway to connect Murray and Calloway. Surveys are said to have been completed and most of the rights of way secured. Nath. Ryan, Murray, president.

Lansing, Mich.—W. H. Zimmerman Company, Chicago, Ill., have closed contracts for the engineering and construction work in connection with 12½ miles of third-rail interurban railway to be constructed from Lansing to Grand Ledge. Arrangements will be made to enter Lansing over the tracks of the Michigan United Railways. The new line will carry freight as well as passengers, and will ultimately be extended from Grand Ledge to Grand Rapids. The legal organization of the company has not yet been completed. Right of way has been purchased and arrangements have been made by the W. H. Zimmerman Company to turn over the grading, culverts, bridges and fencing to George H. Kneal, Lansing, Mich., who started construction a few weeks ago. [E. R. J., July 2, '10.]

Michigan United Railways, Lansing, Mich.—This company expects to make extensive improvements for the Jackson city lines. The improvements comprise the construction of several new switches to expedite service, an extension of a spur line at Michigan Center and the construction of about 3000 additional ft. of roadway to Grass Lakes.

Missoula (Mont.) Street Railway.—This company is said to be considering plans for extending its line to Fort Missoula.

North Jersey Rapid Transit Company, Paterson, N. J.—This company formally opened its new line between Hohokus and Suffern on June 22. Cars are now in regular operation.

Citizens' Traction & Power Company, Albuquerque, N. Mex.—This company has started construction on its new street railway in Albuquerque. A. W. Hayden, 412 West Copper Avenue, Albuquerque, president. [E. R. J., April 16, '10.]

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company, it is said, will build an extension of its railway in Fredonia.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has started construction at Minetto on its 11-mile railway to connect Fulton and Oswego. Work is being done by the Ontario Construction Company.

Westchester Street Railway, White Plains, N. Y.—It is reported that this company is considering plans for building an extension of the Pelham Manor line down Pelhamdale Avenue from the present terminus of the line near the passenger station to Travers Island. Work will soon be started.

Oklahoma (Okla.) Railway.—This company is said to have completed a 7-mile extension to Moore and a 16-mile extension to Yukon.

Beaver Valley Traction Company, New Brighton, Pa.—This company states that during the next few weeks it will rebuild 4100 ft. of track.

New Castle, New Wilmington & Sharon Railway, New Castle, Pa.—This company is considering plans for starting work on its 15-mile railway to connect New Castle, New Wilmington and West Middlesex. James Campbell is interested. [E. R. J., March 26, '10.]

San Angelo (Tex.) Street Railway.—Press reports state that this company will soon build extensions to its lines in the southern and western sections of San Angelo.

Washington-Virginia Railway, Falls Church, Va.—This company advises that construction will soon start on its proposed railway to connect Washington, D. C., and Falls Church, Va. Capital stock authorized, $1,000,000; issued, $50,000. Officers: M. E. Church, president and general manager; G. B. Fadsley, vice-president; F. B. Parker, secretary, and L. L. Northrop, treasurer, all of Falls Church, Va. [E. R. J., July 2, '10.]

*Husum, Wash.—C. M. Wolford, R. Lauterbach, White Salmon, and associates are said to be interested in promoting a 60-mile electric railway to connect Binzen, White Salmon, Bristol, Pine Flat, Snowden, Gilmer, Camas Prairie, Fulda and Glenwood, thence west to the Trout Lake region. From Trout Lake the line will extend down the White Salmon River to Husum and around Bald Mountain to White Salmon, forming a complete loop.

Seattle-Everett Interurban Railway, Seattle, Wash.—The Stone-Webster Engineering Corporation, Boston, is now building 26 miles of railway in Washington. This company was organized to build a railway to connect Seattle, Ballard, Edmonds and Everett. There are about 17.5 miles now in operation.

Fairmont & Pittsburgh Railway, Fairmont, W. Va.—Press reports state that this company will soon let the contract for the construction of the section of its line between Waynesburg and Blacksville. This is part of a plan to connect Fairmont, Blacksville, Waynesburg and Pittsburgh. J. F. Seatty, general manager. [E. R. J., June 18, '10.]

Wheeling & Western Traction Company, Wheeling, W. Va.—Interest is said to have been again revived in this company, which proposes to build a railway to connect Wheeling, W. Va., and Uhrichsville, Cadiz and New Athens, Ohio. Subscriptions have been received from the citizens of Cadiz

and New Athens to build the eight-mile section between Cadiz and New Athens. It is stated that the construction of this section will be started at once by the J. J. Burns Construction Company, Chicago, Ill.; A. E. Townsend, Cadiz, Ohio, general manager. [E. R. J., June 27, '08.]

SHOPS AND BUILDINGS

Michigan United Railways, Lansing, Mich.—This company expects to improve its freight terminal facilities and build a new passenger station for the Jackson City lines.

Springfield (Ohio) Railway.—This company is said to be preparing plans for a new office and car house in Springfield. The estimated cost will be about $100,000.

Oregon Electric Railway, Portland, Ore.—This company is said to be engaged in securing a site in M'Minnville to be used for terminal yards and depot grounds.

Portland (Ore.) Railway, Light & Power Company.—This company has started work on the construction of its new car houses near Killingsworth Avenue, in Portland. The structure will be of brick and will cost about $20,000.

El Paso (Tex.) Electric Company.—The Stone & Webster Engineering Corporation, Boston, Mass., is building a car house for this company which will have a storage capacity of 25 cars.

Utah Light & Railway, Salt Lake City, Utah.—This company has begun the construction of its new machine shop and car house as an addition to its shops in Salt Lake City.

Richmond Railway & Power Company, Richmond, Va.—This company is planning to build two new car houses between Cary Street, Taylor Street, Elm Street and Strawberry Street. The structures will be built of brick, steel and concrete.

Washington Water Power Company, Spokane, Wash.—It is stated that this company will start work within the next month on the construction of its new car houses on the entire block bounded by Boone Street, Cedar Street, Walnut Street and Sharp Street, in Spokane. The structure will be 300 ft. by 300 ft., of brick and concrete construction. It will have a storage capacity for 180 cars.

POWER HOUSES AND SUBSTATIONS

Southern Indiana Traction Company, Hanover, Ind.—This company expects to build a power house at Madison. J. E. Greeley, vice-president.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company has let the contract to James Maine & Sons for the erection of its new power house, 154 ft. x 132 ft., at Waterloo adjoining the present station. The structure will be built of concrete, steel and brick and will be absolutely fireproof. Estimated cost is $300,000.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has awarded the contract to McGowan & Jacobberger for building its new power house at Fifth Street and Jackson Street, Omaha. The Wisconsin Bridge & Iron Company, Milwaukee, has the contract for structural steel. The structure will be 140 ft. x 245 ft. The site, building and equipment will cost, it is estimated, $600,000. [E. R. J., June 11, '10.]

Northern Ohio Traction & Light Company, Akron, Ohio.—This company, it is said, will soon start the erection of a new power house at Akron. Plans are being prepared and bids will be asked in a few weeks. The cost is estimated to be about $2,000,000. [E. R. J., April 16, '10.]

Knoxville Railway & Light Company, Knoxville, Tenn.—This company states that during the next two weeks it will build an extension to its power house in Knoxville, to cost about $8,000. A 3000-kw turbine will be installed.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—John I. Beggs, president, announces that this company will expend $1,000,000 within the next two or three years developing the water power of the Wolf River. The necessary land has been secured near Gardner's dam, about 70 miles from Appleton. The power that will be developed there will be used by the interurban system operated in the Fox River Valley by the Wisconsin Traction, Light, Heat & Power Company. The dam at Gardner's dam will be 35 ft. high. Water will be carried from there through two flumes 1½ miles to the site of the power plant. The river drops 60 ft. in that 1½ miles.

Manufactures & Supplies

ROLLING STOCK

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., is considering the purchase or construction of a heavy freight locomotive.

North Jersey Rapid Transit Company, Paterson, N. J., will probably place an order for some additional cars, including a work car, early in the fall.

Galveston-Houston Electric Interurban Railway, Houston, Tex., is said to be considering the purchase of 10 cars for high-speed service and an electric locomotive.

Michigan United Railways, Jackson, Mich., contemplates purchasing 30 cars, a snow sweeper and a sprinkler at this time. Mention of the fact that the company was in the market for part of this equipment was made in the ELECTRIC RAILWAY JOURNAL of March 5, 1910.

Third Avenue Railroad, New York, N. Y., has placed an order with the Gould Storage Battery Company for batteries for 30 cars. The motors, control, etc., for these cars will be furnished by the General Electric Company. The car bodies will be built at the company's own shops.

Illinois Traction System, Peoria, Ill., which was noted in the ELECTRIC RAILWAY JOURNAL of May 14, 1910, as preparing specifications for six heavy electric locomotives, is now building these locomotives at its shops in Decatur, Ill. They will be equipped with four G E, 600-hp motors with Sprague-General Electric, multiple unit type M control. The trucks will be furnished by the American Locomotive Company and the air-brakes will be Westinghouse E-1. The locomotives will resemble in general outline the steel turtle-back cars in use on this line, and will be 34 ft. long, 9 ft. 3 in. wide. They are to be equipped with M. C. B. couplers and steel pilots.

Syracuse (N. Y.) Rapid Transit Railway, which was noted in the ELECTRIC RAILWAY JOURNAL of June 25, 1910, to have ordered 25 cars from the G. C. Kuhlman Car Company, has ordered 23 cars from this company instead of 25 cars. They will be built for pay-as-you-enter operation and will be of the semi-convertible, single-end type. The following details have been specified for these cars:

Length of body...30 ft. 11 in.	Curtain fixtures..Cur. S. Co.
Over vestibule.....44 ft. 7 in.	Curtain material ...pantasote
Width over sills....8 ft. 1 in.	Gongs .....Dedenda
Over posts at belt..8 ft. 3 in.	Hand brakes.....Peacock
Body .....wood	Heaters.....Peter Smith
Interior trim.....cherry	Headlights ....Crouse-Hinds
Underframe, wood with plated sills	Motors.....GE No. 216
	Registers .....Ohmer
Air brakes. West. Trac. Brake	Sanders .....Ohio Brass
Bumpers, Hedley Anti-Climber	Track scrapers.....Brill
	Trucks .....Brill No. 27
Couplers .....Hovey	

TRADE NOTES

Detroit Seamless Steel Tubes Company, Detroit, Mich., has appointed H. L. White as sales manager.

Electric Equipment Company, Philadelphia, Pa., has sold three 11-bench single-truck cars to the Blue Hill Street Railway, Canton, Mass.

H. Thomas, Ferrocarril de Arica a la Paz., Arica, Chile, desires to receive catalogs and samples of material which can be adapted for railway shop work.

Whipple Supply Company, New York, N. Y., has moved its office from Room 1171 to Room 2066 in the Hudson Terminal Building, 50 Church Street.

Phœnix Bridge Company, Philadelphia, Pa., has appointed N. R. McLure, recently assistant engineer, to the position of resident engineer at St. Louis, Mo., in charge of the western interests of the company. Mr. McLure succeeds O. J. West, resigned.

Carver Tracklaying Machine Company, Urbana, Ill., has been incorporated to engage in general contracting work for steam and electric railroads. Capital stock, $30,000. Incorporators are: Taylor M. Carver, Oliver W. Lamb and Harvey M. Grant.

Peter Smith Heater Company, Detroit, Mich., has appointed H. S. Williams chief engineer with headquarters in

Detroit. Mr. Williams has been connected with the Utica & Mohawk Valley Railway, Utica, N. Y., for the last eight years, and at the time of his resignation from that company he was electrical engineer of the company.

C. W. Hunt Company, New York, N. Y., builders of coal-handling, conveying and hoisting machinery, has appointed the San Francisco Bridge Company selling agents for the Pacific Coast with offices at 865 Monadnock Building, San Francisco. The C. W. Hunt Company has just completed a naval coaling station in San Francisco Bay for the Government.

C. A. Tupper has resigned as manager of the publicity department of the Allis-Chalmers Company, Milwaukee, Wis., to become associated with the Reliance Engineering & Equipment Company, with headquarters for the present at Milwaukee. Mr. Tupper will be succeeded by W. M. S. Miller, who has been connected with the Allis-Chalmers for some time.

Hensley Trolley & Manufacturing Company, Detroit, Mich., has been formed by the consolidation of the Hensley Trolley Company, formerly of Huntington, Ind., and the Acme Brass Foundry Company, Detroit. The principal office and factory of the new company will be on Holden Avenue, Detroit. The company reports that its business for the first half of 1910 has far surpassed that of the same period in previous years.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has arranged with Kuhn, Loeb & Company to renew for three years from Aug. 1 at 6 per cent a year $4,000,000 of the company's outstanding $6,000,000 of secured notes. The remaining $2,000,000 will be paid off from the company's surplus treasury funds. The new issue of $4,000,000 will be secured by all the bonds and shares now pledged as security for the $6,000,000 issue.

Crawford Locomotive & Car Company, Streator, Ill., has recently elected George E. Pratt, formerly connected with the Star Brass Works, Kalamazoo, Mich., manufacturers of the Kalamazoo trolley wheel, vice-president of the company. Mr. Pratt has long been connected with electric railway work, both as a manufacturer of air-brake equipment and of cars. The Crawford Locomotive & Car Company as yet has devoted itself entirely to steam railroad work and is located at Streator, about 90 miles from Chicago.

Ohmer Fare Register Company, Dayton, Ohio, recently had an interesting experience, showing the durability of its registers. One of its No. 30 type indicating, recording and printing registers was recovered from a car house which had been destroyed by fire. The case of the register was melted off, the dials, tablets and other interior parts were burned and partly melted, and the register was further damaged by heavy timbers falling upon it. After being unlocked by an identification key, and fed with a small roll of paper, an impression was taken before any repairs were made, but the figures showed clearly on the record sheet. The register was practically destroyed, yet the mechanism in it was of such good material that it performed its functions and printed test registrations from the battered and partly melted wheels.

J. Frank Lanning & Company, Pittsburgh, Pa., manufacturers of journal brasses, etc., are meeting with success in the introduction of their products among railway companies. The Reading Transit Company was among the first to adopt these brasses after giving them a preliminary trial. J. Frank Lanning & Company report that this company has purchased all its brasses from them during the past eight months. The Utica & Mohawk Valley Railway Company has placed two duplicate orders for brasses with J. Frank Lanning & Company since the initial test of these bearings, as have also the Richmond Light & Railroad Company, the Allegheny Valley Street Railway Company, the Otsego & Herkimer Railroad Company, the Lehigh Valley Traction Company, the Dennison & Sherman Railway Company and the Chester Traction Company.

J. G. White & Company, Inc., New York, N. Y., have appointed L. R. Pomeroy chief engineer of the railway and industrial division of the company. Mr. Pomeroy has for a long time been considered an authority on railway shop equipment, operation and construction. From 1886 to 1890 he was a special representative of the Carnegie Steel Company, introducing basic boiler steel for locomotive and special forgings for railways. For nine years he was engaged in the same work with the Cambria Steel Company and the Latrobe Steel Company, jointly; this assignment involved metallurgical engineering and experimental research to adapt special steels for railway axles, crank pins and piston rods. From 1899 to 1902 he was assistant general manager of the Schenectady Locomotive Works. For six years following this he was a special representative in the railway field for the General Electric Company, this work covering the electrification of steam roads, railway shops, and the general application of electricity for all railway purposes. For the past two years he has been assistant to the president of the Safety Car Heating & Lighting Company. In these lines of work he has devoted a large portion of his time to consulting work in the special field of railway shops, machine tool operation and the adaption of tools to the work, with special reference to sequence of operation and general efficiency, and his special attainments and experience form a valuable addition to the J. G. White & Co. organization.

ADVERTISING LITERATURE

Handy Manufacturing Company, Bridgeport, Conn., has issued a folder in which the various sizes of Handy die stocks are listed and illustrated.

L. J. Wing Manufacturing Company, New York, N. Y., has issued Bulletin No. 7, in which the Typhoon turbine blower is described and illustrated.

Buda Company, Chicago, Ill., has issued Bulletin No. 143, which describes and illustrates exclusively its No. 100 car which it manufactures for inspection work. A set of specifications is also contained in the publication.

Bristol Company, Waterbury, Conn., is mailing a 64-page illustrated index of Bristol's recording instruments for pressure, temperature and electricity. It contains illustrations of the most important Bristol instruments, with partial explanation of the instruments and their applications.

Ransome Concrete Machinery Company, Dunellen, N. J., has printed a 96-page catalog descriptive of the Ransome concrete mixers for 1910. It contains an outline of the development of Ransome mixers, and illustrates in detail the various types of concrete mixers and other products which the company manufactures.

NEW PUBLICATIONS

The Polytechnic Engineer.—Published by the Polytechnic Institute, Brooklyn, N. Y., 1910. Cloth; 144 pages, illustrated. This is the annual publication of the Polytechnic Institute which contains the results of researches made by the professors and students. The principal features of electric railway interest in this number comprise a brief mathematical treatment of "Negative Track Feeders," by Samuel Sheldon, professor of physics and electrical engineering; and a study of "Train Resistance Formulas and Speed-Time Relations," by William D. Ennis, professor of mechanical engineering.

The 1910 Moody Manual.—This book is now ready for distribution. Every section of the Manual has been extended, but the most marked increase will be found in the public utilities section, which includes electric tractions, gas and electric properties of all descriptions. As a specimen of the enlargement effected in the statements of the larger public service corporations, it may be said that the resumé of the Public Service Corporation of New Jersey, and its subsidiaries, covers 18 pages in the 1910 issue, as compared with 10 pages in the 1909 issue. Much valuable information has been added to the descriptions of properties and bonded indebtedness of this and many other corporations, and the entire section has been gone over carefully, with the view to securing uniform phraseology treatment. The style and type used in this, as in the other sections, have been especially designed to facilitate quick reference and to show clearly the intercorporate relationship of the large systems. The industrial section, which has always been one of the striking features of the Manual, has received special attention, and is now most complete. This section includes nearly 150 industrials, with capitalization approximating $500,000,000, not to be found in any other publication.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, JULY 23, 1910 No. 4

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 23, 1910.

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A Pamphlet on Norfolk Franchises

A good example of the straightforward method of presenting the case of a proposed electric railway franchise ordinance to the people is shown in a pamphlet recently published by the Norfolk & Portsmouth Traction Company, and signed by its president, John Blair MacAfee. The changed conditions in the distribution of population in Norfolk, due to the growth of the city, called for a modification of the existing routes and the extension of certain lines, which were obviously as much for the benefit of the community as of the railway. The subject could have been argued out in the Council, but the company believed that every citizen was also entitled to a presentation of the case so that he could understand the situation. So it published a pamphlet which showed the proposed routes in detail, described the benefits which would accrue from them and prefixed an introduction discussing electric railway conditions in general and those of the Norfolk & Portsmouth Traction Company in particular. A great deal is being said at the present day in regard to direct primaries and the referendum. The opinion of good citizens is divided as to the advisability of their adoption, but there is no doubt that people as a whole are taking a great deal more interest in political matters than ever before. It may not be wise to extend the policy of referendum to such municipal questions as ordinances affecting the manner of extending electric railway franchises, but the development of an intelligent public sentiment in regard to the real conditions of electric railway operation cannot but be of material value, both to the community and to electric railway companies. Such a knowledge will inevitably have a powerful, if not controlling, influence upon the decisions reached by the regularly constituted authorities, and the pamphlet issued by Colonel MacAfee and others of a similar character are steps in the right direction.

Sunday Excursions at Reduced Rates

The practice of offering reduced excursion rates on Sundays, holidays and at the time of such special events as circuses, fairs and large conventions is common on steam railways and has been followed by several electric interurban roads in an effort to increase gross earnings. A study of the timetables of steam roads shows at a glance the reason why special excursions are profitable on days when commercial business is generally suspended. Usually one-half or more of the local trains run "daily except Sunday" and it pays the steam railroad to utilize for excursions the cars and locomotives which would be idle otherwise. Most interurban roads on the other hand do their largest business on Saturdays and Sundays. Their equipment is usually barely sufficient to handle the traffic which come on these days without offering special inducements and if extra cars are provided for the excursion business they only stand idle during the week. At the best there is only a

small margin of profit in reduced excursion rates and it easily is possible actually to lose money in the end if the practice is overdone. Even if a company has a few extra cars it can do its regular business untold harm by offering low rates and attempting to handle more people than can be comfortably accommodated. The recollection of bad service remains with the public a long time. In the case of a new road the conditions may be somewhat different. Reduced rate excursions will serve to attract the bargain hunting traveling public and to acquaint them with the road and its facilities. If the service is given as advertised they will ride again at the regular rates. Long distance travel also can often be stimulated by reduced rates offered on the days when people have the time to travel. But the principle should be borne always in mind that unless the business so attracted tends to equalize the week's load curve it is apt to be done at a loss.

Roadway Signs

Although the question of roadway overhead signs to indicate school and fire-engine crossings, section breaks, automatic switches, slow-down sections, and curves where cars which pass in opposite directions will not clear, is of minor importances compared with some other problems which a city railway management must solve, it constitutes one of the many details which go to make up success in operation. No great advantage perhaps would follow the adoption by all railway companies of uniformity in the shape or the wording of the signs, but some improvements could often be effected by individual companies at little extra cost. The worst faults at present are the insufficient number of signs and their tendency to become illegible because of cheap construction. The most desirable location for these signs is on the span wires or suspended from the nearest pole. Either plan is better than that of painting the sign on the rounded surface of the pole itself. It is true that signs or no signs the experienced motorman knows as a matter of course all the special running conditions on his route. But as a matter of precaution, it is advisable to have all points distinctly marked as a reminder to the old motorman and as a notice to the employee of less experience. Signs of this kind may be considered as a form of advertising which impresses the public with the fact that the railway management wants the exercise of the utmost care in the operation of its cars. It was said long ago that a wicked and perverse generation seeketh after a sign and the principle holds good to-day that a liberal use of signs is a great convenience to the traveling public. It is often advisable to indicate even the stopping points of cars for the benefit of strangers as well as of local residents who are apt to forget what stop rule is in vogue at certain localities. Another important point in connection with signs of this kind is their construction. Whatever the material used, it should be such as to withstand the weather or otherwise the signs will soon become unsightly, illegible and even dangerous. A cheap looking sign is quite likely to convey an undesirable impression of the management. Perhaps as good a sign material as any is enamelled iron, hung to the span wire by copper or brass clips. This material is such a common article of manufacture that it can be purchased almost anywhere for but little more than cast or sheet iron, which has to be kept painted.

SOME PRECAUTIONS IN THE USE OF HIGH VOLTAGES

The increasing use of high transmission voltages in electric railway service brings up considerations with respect to safety which are hardly of the same importance with the ordinary transmission work. Transmissions for railway purposes differ from the usual industrial lines in their relation to accessibility to an extent that makes caution particularly important. The ordinary power transmission line runs across country perhaps for many miles commonly and preferably over its own right-of-way, particularly if of very high voltage. It is in a sense accessible to anybody who wants to climb the poles or towers, and trespassers have sometimes met a lamentable end, but, on the whole, the public knows pretty well the danger of such lines, the very insulating features of which are enough to suggest the likelihood of danger, and are rather inclined to give them a wide berth.

In railway systems, on the other hand, there is a strong probability that the transmission lines wholly, or to a large extent, follow the railroad right-of-way and while they are not usually in the class which to-day is called high voltage, say, 30,000 volts or over, they are still quite high enough to be dangerous and run much nearer to the ground than is the case with transmission lines. High-voltage feeders are frequently carried rather low and must be guarded accordingly. Further, these high-voltage feeders and some accompanying transmission lines carrying pressures of 20,000 volts to 30,000 volts do not suggest from their structure any particular element of danger, the insulators being of moderate size and mounted on pins of about the ordinary dimensions in about the usual way. Beside this similarity to lines of more moderate possibilities it is becoming rather common to run such circuits with all the wires on the same level, the old triangle arrangement of the three-phase circuits, which instantly marked them as transmission lines, being abandoned. It would seem to be a wise policy to mark all lines carrying high-voltage alternating circuits distinctly and definitely with a danger sign, as is very often done abroad. A conventionalized lightning bolt or some similar broad hint placed conspicuously on the pole perhaps in the immediate vicinity of the high-voltage wires would soon become familiar as a sufficiently conspicuous danger warning to keep linemen or casual trespassers away from wires which in themselves convey no particular suggestion of danger.

The public should be made thoroughly familiar with the risk of fooling with high-voltage circuits. To the ordinary petty risks of 500-volt railway current they have become thoroughly hardened, but the high-tension feeders, and in the case of alternating-current roads, the high-voltage trolley wires are a very different matter. Where the former run along the railway line there is also always some risk of getting crosses upon guard and even trolley wires to which particular attention ought to be called. There are several effective plans for grounding or otherwise putting out of mischief broken wires even in the cases where they do not ground themselves, and the precaution is worthy of consideration.

Finally the possible dangers with very high-voltage circuits ought to be better understood than they are. With pressures of 40,000 volts or 50,000 volts and above, now in occasional use for railway transmission, it is not sufficient that the linemen

understand sufficiently that they must not touch the wires even with rubber gloves on. It is also vital that they should understand that such wires are not safe to work around unless with the exercise of extraordinary caution. There are several instances in which men have been killed or so shocked as to fall from the poles with fatal results when the appearance and indication showed that there was no actual contact with the wire at all, but only an approach within striking distance of the high voltage. It is not altogether safe, in other words, to point out a high-voltage wire by approaching the finger within a few inches of it, particularly if one does not know the actual pressure of the circuit. With proper precautions the more moderate voltages can be handled with perfect safety, and lines can even be subjected to minor repairs while carrying current. It is, however, preferable in circuits of which the continuity is as important as it is in railway work to provide duplicate circuits, or at least duplicate wires which can be cut in at switch stations on very short notice, and it is worth remembering that even a dead wire on a high-tension line should be hard grounded before work begins on it. The shocks received from an ungrounded wire are presumably not perilous, but the only "good" high-voltage wire is one made thoroughly dead by effective grounding.

ELECTRIC RAILWAYS AND THE NEWSPAPERS

Occasionally, an electric railway official, tired of being misquoted or misrepresented in the daily press, will include all newspapers and their attachés, editors, reporters and proprietors in a general, sweeping and forceful denunciation. Now, we are very far from approving all of the actions and policies pursued by our fellow journalists of the daily press. Every business and profession has its rascals and the newspaper business is not free from them. We do not propose to defend the venal or excuse the misguided journalist's efforts or to palliate the publication of erroneous statements of any kind. But we do believe that in a great many cases, more cordial relations than now exist could be cultivated between the press and the public service corporations to the benefit of both and without the expenditure of any money for advertising space. The newspapers fulfill a necessary function in the business and social life of the community and they are here to stay. The public service corporation also has an important function to perform in the community and its affairs are naturally of public interest. We believe that most railway companies are realizing that the public is not only entitled to the knowledge of all important action taken by the company, but that the simplest and most direct method of making this action public is through the newspapers.

The primary foundation of good relations between the papers and the companies is means by which the former can secure prompt, accurate and authoritative "news" in regard to the company's affairs which is of public interest. Ordinarily the official to give out this news is the chief executive officer of the company. On the small roads, he is the one to whom newspapers naturally turn for information of this kind. On larger systems, the intermediary can just as well be a special publicity officer or manager who is even more efficient for this purpose than the president or general manager because he has more time to devote to it. It is essential, however, that such a person should have a good sense of news values so that he will know just what the newspapers want. A man who is familiar with the ins and outs of the publishing business is much more desirable for this service than a man with railroad training only. The advantages of having for this work an individual who combines newspaper experience with tact and courtesy is illustrated in the case of one large railway which has succeeded in overcoming the unfriendly attitude of the home newspapers to such an extent that it rarely fails to receive fair treatment whenever articles concerning its affairs are published.

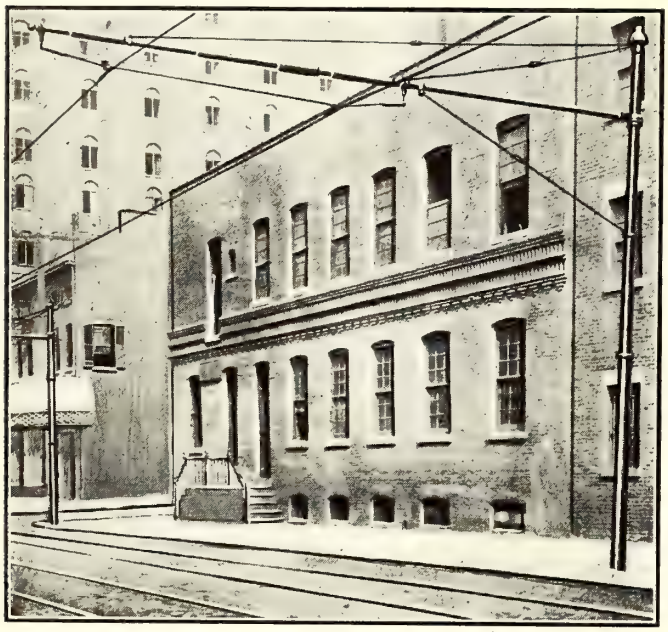
The publicity manager of this railway was for a long time a reporter and editor on one of these papers and so was personally acquainted with nearly all the journalists in the towns served by his company. His first move was to inform these men that he would be at their disposal by telephone both day and night for confirmation and amplification of any story which they might secure about his company. In addition to correcting articles obtained directly by the reporters, this publicity manager also arranged to write a great many items himself, but instead of preparing them as cut and dried stories for distribution to all the papers at the same time, he makes it a point to bring out most strongly the features sure to be of local interest. Thus, when the company appropriates a certain sum of money to cover improvements in towns A, B, C and D, the items prepared for the newspapers in town A emphasize what is to be done for that particular locality, while the improvements for the other cities are mentioned but vaguely. In short, the publicity manager puts himself in the place of a reporter who wants to secure a story that will interest his particular class of readers. Consequently, when the item is written and submitted, it can enter the paper as news without any puffs or other evidences of "inspiration." From time to time, long stories are prepared, as on the handling and the counting of fares, improvements in shops and cars, etc., but in no case is such an article written until some editor has been apprised of the subject and has signified his desire to accept a story of the character suggested. As the result of this policy a great many notices are printed to show how the company endeavors to satisfy the public requirements. At the same time the only advertising placed in any of the papers is that actually needed for legitimate announcements. All advertising is paid for in cash on a monthly basis.

One feature which has particularly contributed to securing the friendship of the newspapers is the frankness of the company in regard to accidents. All that the newspapers need do is to telephone the publicity manager for information and the latter immediately furnishes all details, except such names and addresses as would be of material assistance to ambulance chasers.

It should be mentioned in conclusion that the success of this publicity manager has been due, not only to his special training, but because he has been given a free hand in securing whatever information he wants. The department heads are not held responsible for any statement published about their divisions, as it is left to the judgment of the publicity manager to decide what ought to be printed. This policy avoids all friction and misunderstandings as to authority. The publicity manager is an attaché of the president and is responsible solely to him.

BROOKLYN LINE DEPARTMENT—EFFICIENCY FEATURES OF CONSTRUCTION AND MAINTENANCE

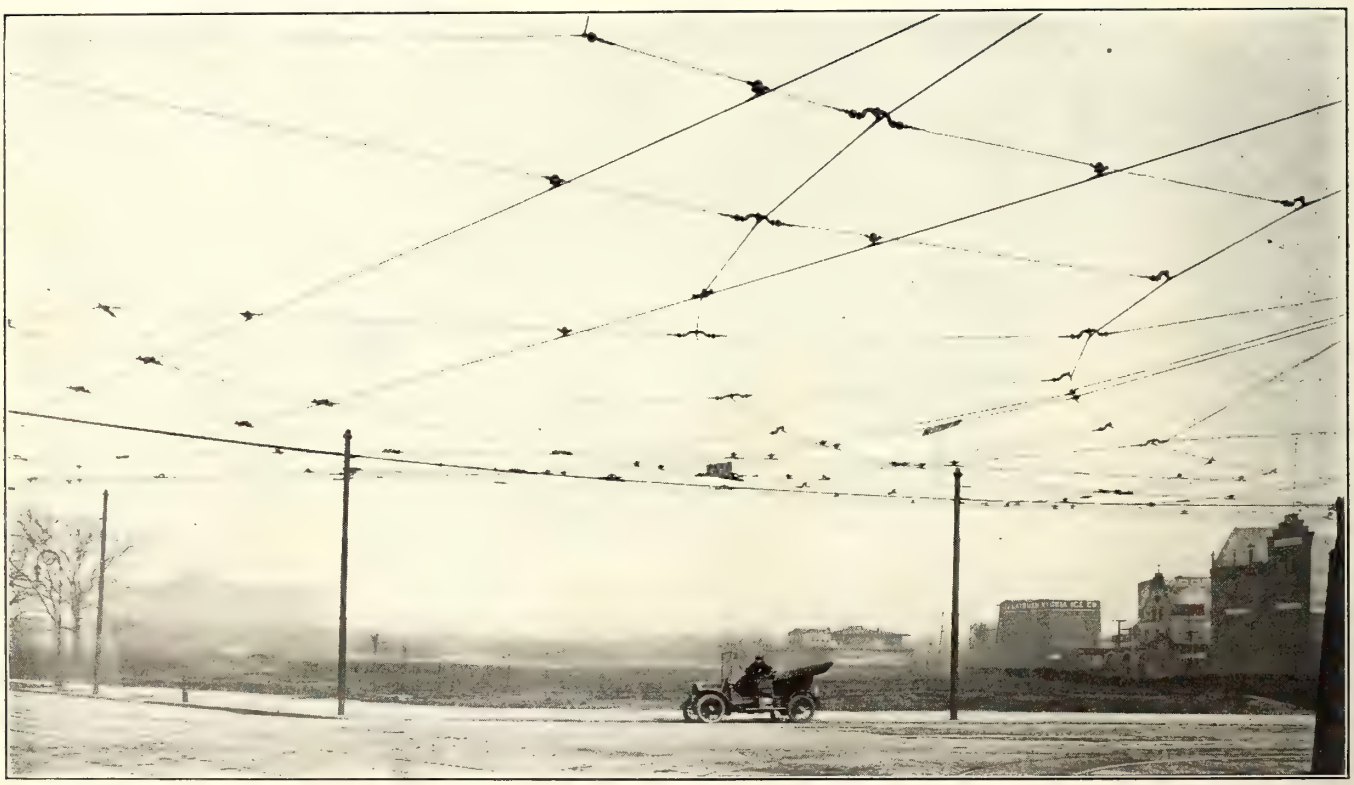
The scope of the line department of the Brooklyn Rapid Transit System is so large that a full description of the constructional and maintenance features of the overhead trolley alone cannot be presented in one article of reasonable length. The history of the iron-bar overhead construction devised by this company and its overhead work at bridges have already been described in the articles published in the June 11 and June 18 issues of the Electric Railway Journal. The present article will deal with the construction used for the ordinary type of overhead trolley lines, together with an explanation of the system of records for keeping account of the material used and the line work done by the department. Other articles will take up the work, equipments, and reports of the regular construction and emergency crews; specifications for material; experimental installations; manufacturing and testing methods; third-rail construction; lighting; signals; telephones; etc.



Brooklyn Line Construction—Bracket Over Double Track Near Sugar Refinery



Brooklyn Line Department—Long Bracket Construction at Prospect Park Circle



Brooklyn Line Department—Overhead Work at Flatbush Avenue and Malbone Street at Crossing with Coney Island & Brooklyn Railroad

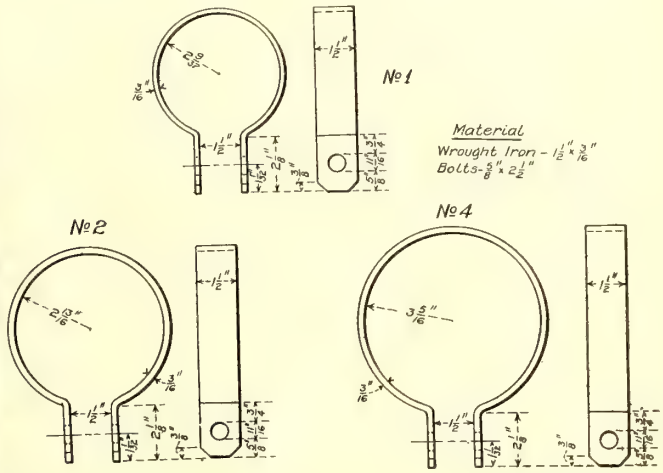
LINE AND POLE CONSTRUCTION

Of course, by far the greater part of the overhead construction in Brooklyn, is of the span type as in all large cities. There

are many special situations, however, where brackets must be used. One example on page 136 shows some long bracket construction near the Havemeyer & Elder sugar refinery. This construction was installed on account of the heavy trucking as it avoids setting a second series of poles. Another example of long bracket construction is offered by the installation at Prospect Park Circle on Flatbush Avenue. An illustration in this column shows the bracket construction adopted for right of way operation in high-class suburban territory. The poles are of octagonal form, 30 ft. long and are painted green. The bracket pipe projects through the wood and is stopped by a pin set cross-wise in the pipe. The clearance over the rails is about 17 ft. Another view on this page illustrates the combination span and bracket construction with steel poles as used at the Sheepshead Bay station of the Brighton Beach line where the change from third-rail to overhead construction is made. The same poles carry the spans over the inside express tracks and the brackets over the outside local tracks of this division.



Brooklyn Line Department—Double Trolley Wire on Brooklyn Bridge Incline



Brooklyn Line Department—Standard Wrought-Iron Bands for Trolley Poles

The general pole construction in Brooklyn consists of No. 2 iron or steel poles 30 ft. high and made up generally of 5-in., 6-in. and 7-in. sections with occasional poles of 6-in., 7-in. and 8-in. sections for junction points, etc. The 30-ft. pole is high enough to carry feeders so that length was made standard in preference to 28 ft. Corroded poles are reinforced with concrete and steel rods internally according to a method invented by C. E. Roehl, electrical engineer, and H. H. Hilborn, line superintendent, Brooklyn Rapid Transit Company. This method and its results have been described in two earlier articles—one in the ELECTRIC RAILWAY JOURNAL of Oct. 10, 1908, and the other in the issue dated April 3, 1909. The Brooklyn company has reinforced about 2000 poles in this manner since August, 1908. When a pole is overhauled it is carefully scraped and painted and then protected with a cement jacket to a height of about 2½ in. above the surface of the ground. This practice is considered particularly valuable because it prevents further corrosion at a place which cannot be properly protected in any other manner. It has been noted that some poles which were reinforced with external sleeving require attention after some time owing to the fact that the disintegration of the sulphur packing permits a pocket to be formed for the collection of water. Rusting, therefore, begins anew in the space between the outer sleeve and the pole. A drawing on this page presents details of the standard wrought-iron pole bands. They are made for several diameters, are carefully finished to be free from sharp edges and are well painted with one coat of red lead and oil before installation.

Rehabilitated and other poles are coated with Smith's durable metallic dark green paint. It has been found that paints cheaper than this are practically worthless and that it is more economical to use a high-grade paint than attempt to effect a small initial saving. Once the poles are properly painted, they will remain presentable for 10 years except in the vicinity of chemical works. The company has approximately 20,000 poles on the system and at present a special pole-painting gang of men under a foreman is kept busy whenever the weather permits. It has been found advisable to set a standard for the number of poles to be painted daily after making allowance for variations in pole fittings and the distances the men have to go to start their work. The men use a special form of low vehicle known as a jigger wagon and a ladder which has a wide base and a special top fitting to permit the ladder to rest securely against the pole. Other ladders would tip and throw the men to the sidewalk if they were inclined to reach around the poles. A tower wagon with one or two tables would not be



Brooklyn Line Department—Overhead Work on Right-of-Way in Suburban Territory



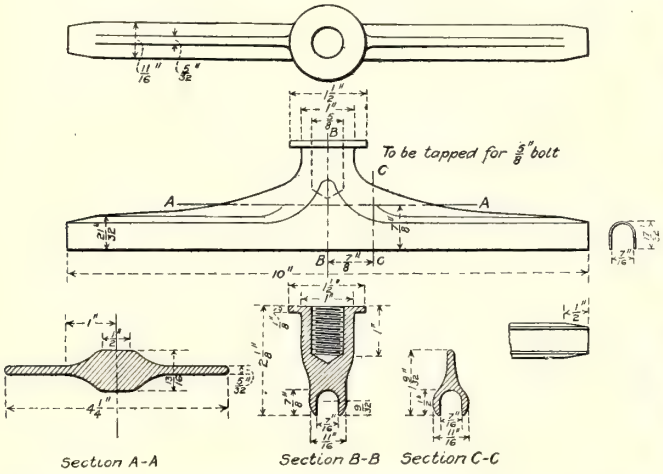
Brooklyn Line Department—Combined Span and Bracket Work at End of Brighton Beach Third-Rail Division

practicable for painting poles in many Brooklyn locations partly on account of the narrow space between the rails and the curb and partly on account of trees.

EARS, FROGS AND OTHER DETAILS

Below is a drawing of this company's standard ear. The special feature of this ear is the generous amount of metal used in the sides of the groove as is shown by section C-C. This ear is only 10 in. long, or about 5 in. shorter than the ear used by many other railways. The Brooklyn ear, however, has the same amount of metal as usual in the 15-in. type, but it is distributed to better advantage for securing a longer life. No trouble has been experienced from the wire crystallizing or breaking off at the ends. The drawing mentioned gives the data for a No. 000 wire. The other standard wire sizes, of course, have grooves of different dimensions.

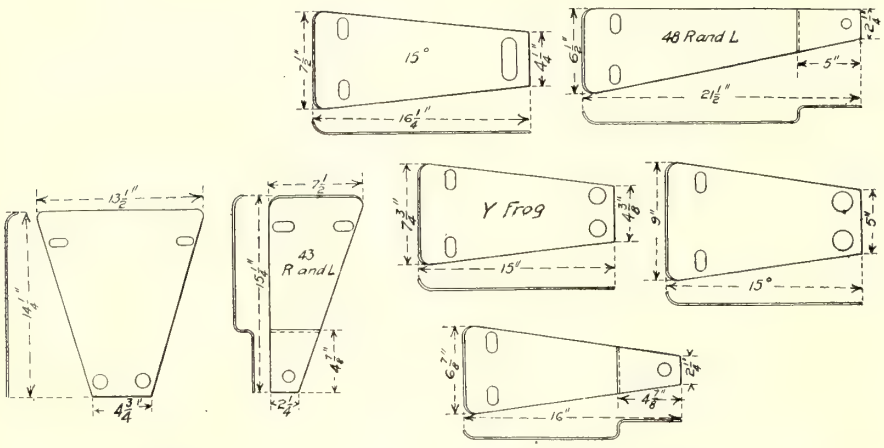
On page 139 is a detail drawing of the standard splicing ear used for No. 0 wire. The most interesting point about this ear is the free under-run secured by making the splicing with this casting.



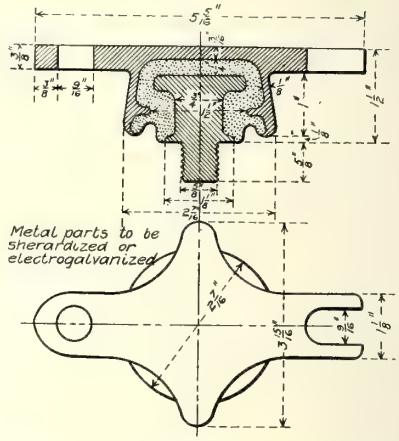
Brooklyn Line Department—Standard 10 in. Ear for No. 000 Wire



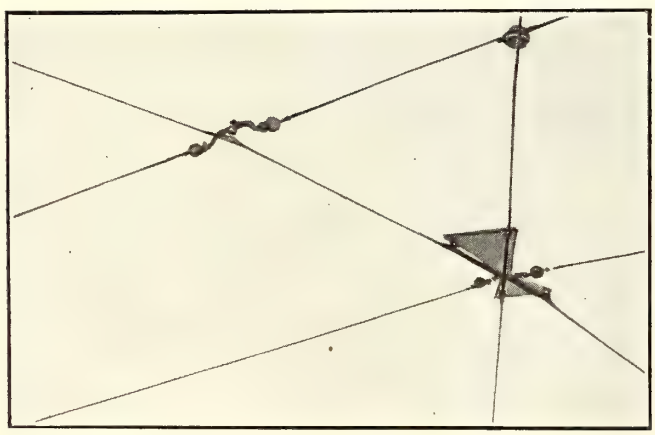
Brooklyn Line Department—Overhead Construction for Combined Switch and Cross-over at Coney Island



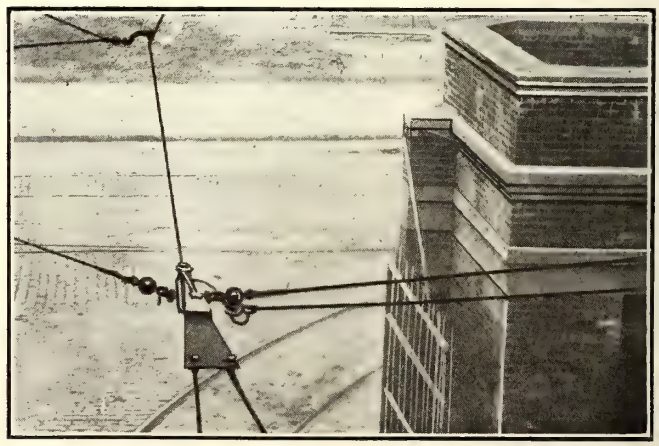
Brooklyn Line Department—Types of Frog Guards



Brooklyn Line Department—Trough Trolley Hanger



Brooklyn Line Department—Diagonal with Frog Pan



Brooklyn Line Department—Pan Guard for Left-Hand Frog

The wire is inserted through a hole as shown, is bent over and secured by means of a wedge and nut. The bottom of the ear is slightly arched so that when the stress is placed on it the under-run becomes practically a straight line. These ears have proved very satisfactory and while they cost almost twice as much as some other types, their life is considerably longer and they do not cause the wire to break at the ends of the ear. In the ordinary types if the wire is not soldered it will usually pull out and if it is soldered the heat required to solder the wire effectively may be so great because of the large amount of metal in the ear that the wires will become brittle at the end of the casting and eventually break at that point. These ears have been in use since April, 1909, without a single failure. Their life is further increased by installing a short piece of U-shaped copper tubing so as to cover the ear and a short section of wire on each side.

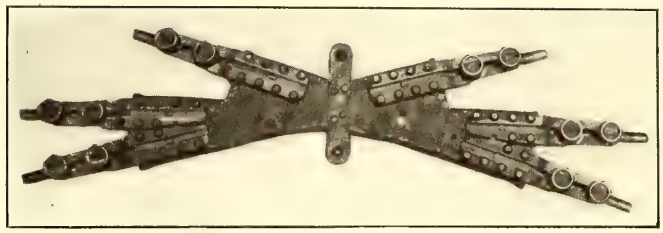
The standard trolley hanger shown in detail on page 138 is designed to bring the trolley wire as close as possible to the trough to prevent the trolley wheel getting between the trough and the wire. The company uses less insulation than is customary in mine hangers because the trough is drier so that it is not necessary to have so much leakage surface.

A 20 deg. diagonal for No. 0000 wire also is presented on this page. This diagonal is used with two pull-off rings which have been found sufficient, although the general practice appears to demand four pull-off rings. Two half-tones on this page also show the top and bottom of a three-way diagonal, which is made of wrought iron to which are riveted brass end castings with which the wire is held in place.

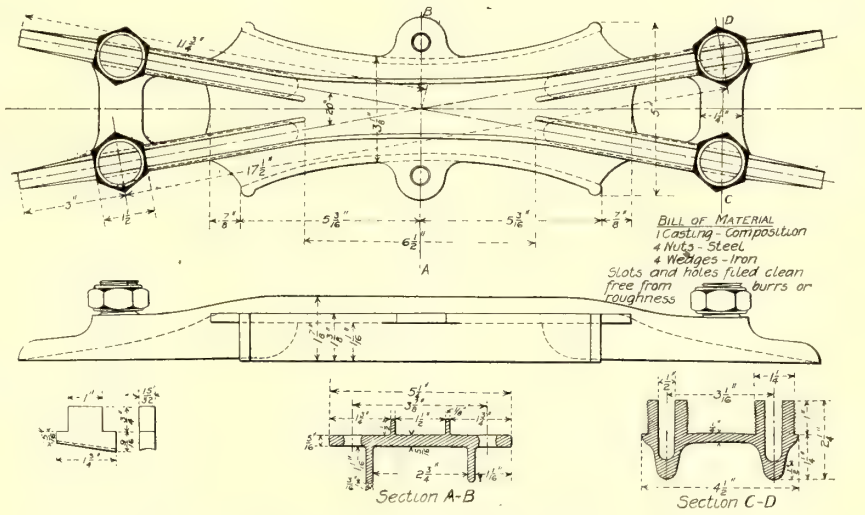
The overhead construction over a combined slip switch and crossing in the Coney Island terminal yard is illustrated on page 138. Two standard Y-frogs about 3 ft. apart are employed for the purpose and both trolley wires are in use between the frogs.



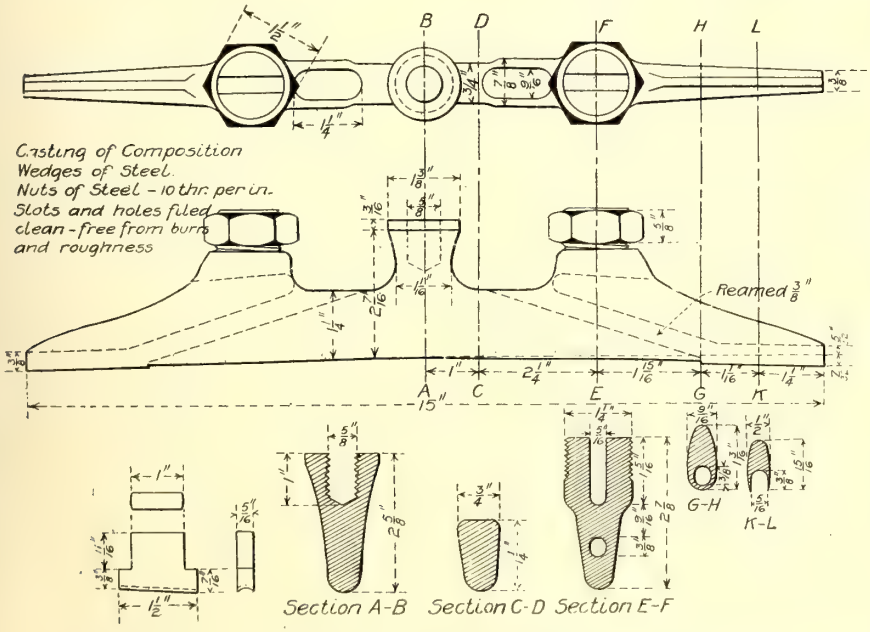
Brooklyn Line Department — Bottom of Three-Way Diagonal



Brooklyn Line Department—Top of Three-Way Diagonal



Brooklyn Line Department—20 deg. Diagonal for No. 0000 Wire



Brooklyn Line Department—Splicing Casting for No. 0 Wire

This particular installation gave entire satisfaction all of last summer, whereas there was much trouble before the present method was installed.

A cut on page 138 shows the pan-guard for a left-hand frog as installed in the yard of the track department headquarters on Nostrand Avenue. This pan-frog is made out of wrought iron and is held in place by three attachments. Two of these are ears clipped on each of the wires and attached to them with small stud bolts. The third connection is by means of a bolt in the frog. This construction has proved very successful in preventing trolley poles from becoming wedged in the crotch formed by the two trolley wires. It also helps to maintain the alignment of the trolley wires at the frog. Diagonals are protected in the same manner with pan-guards of the proper length to fill the space between the two wires as illustrated on page 138.

MAINTENANCE RECORDS

Micrometer measurements to determine the wear of trolley wire are made at stated intervals according to the length of service of the installation. At places of heavy traffic, as at the Brooklyn Bridge, such measurements are made as often as every 3 months. Span wires are tested for grounds every 6 months. A car is used in testing spans but instead of attaching a wiper contact to the trolley pole, it has been found more satisfactory to have a man sit on the top of the car and hold the wiper in his hand. This insures that perfect contact will be

made with the span at whatever maximum speeds are allowable on the line under test. There is connected to this wiper contact a voltmeter which is read by a second man who carries a blueprint of the route. The location of the defective spans is indicated according to this print together with a statement as to the leakage. The locations of faulty spans are telephoned to the line department operator from the first convenient station so that repairs can be made immediately. By

LINE DEP'T TROLLEY WIRE INSPECTION ..... 19.....

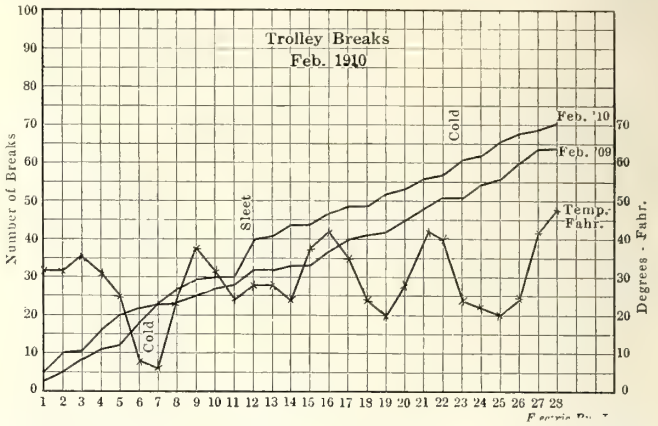
LINE, FROM ..... TO .....

LOCATION	WIRE		CONDITION							
	Size	Diam.	Splices	Ears	Spans	Curves	Trough	Breakers	Poles	REMARKS

SPECIFY WIRE AS COPPER OR PHONO

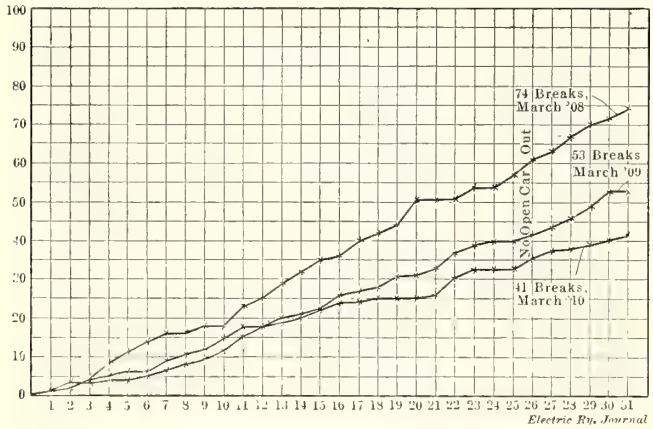
INSPECTOR

Brooklyn Line Department—Trolley Wire and Apparatus Inspection Blank



Brooklyn Line Department—Daily Record of the Breaks for February of 1909 and 1910, and Temperature for 1910

this method of testing over 60 miles of street are covered in a working day. The ears are also taken off at stated intervals as wire wears faster under the ears than at other points on



Brooklyn Line Department—Three-Year Record of Wire Breakage

straight line. The blank used in connection with this work is reproduced together with the general reports on the condition of troughs, spans, ears, breakers, poles, etc.

Every month there is made up a report covering the breaks in trolley wire, their causes, the amount of material required for replacement and the length of the delay caused in each instance. This form is assembled from the daily reports of each line crew.

Every break is recorded and analyzed to determine if the breakage is due to defective workmanship, defective material, method of operation or poor inspection. It has been found that the breaks are most frequent at the beginning and close of the summer season for at these times a large number of stored cars are suddenly placed upon the line. Naturally it

takes a few days before the stiffness of the trolley bases works itself out. The effect of contraction in cold weather is usually considered the principal cause for the increased number of wire breakages in winter over those of the summer months. It is probable, however, that on lines where no trolley catchers are employed, as is the case in Brooklyn, part of the increase in trouble is due to the conductors' neglect of the trolley pole in cold weather.

..... DEPARTMENT

DAILY REPORT OF FORCE ACCOUNT

..... 191.....

..... COMPANY

Auth. No. .....

Location ..... ORIGINAL

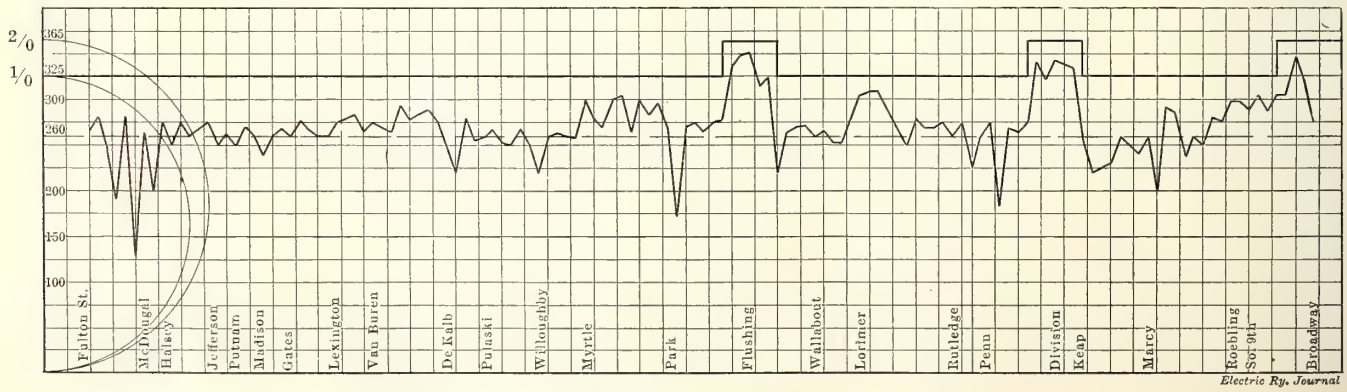
NO. OF MEN	CLASSIFICATION	HOURS

Timekeeper

CORRECT FOR LABOR .....

Brooklyn Line Department—Report Blank to Cover Work for Outside Parties

A cut on this page shows graphically the wire breakages for three successive years on over 500 miles of line measured as single track. It may be added that the breakage totals include breaks in car-house and yard wires. Of course, wire troubles should be extremely rare in such situations as the crews or shopmen are in position to give their undivided attention to the handling of the pole. Nevertheless, breaks do take place there and it is deemed proper to record them. Another cut on this page presents the graphic method of showing the extent of wire wear throughout a given length of route, one measurement being taken for each span. It will be observed that semicircles



Brooklyn Line Department—Graphic Record of Wire Wear

representing the full diameters of No. 0 and No. 00 trolley wire are placed at the left of the drawing. By projecting the various thicknesses from the proper semicircle as a scale, there is obtained for a series of measurements a curve which betrays at a glance the exact condition of affairs throughout the line. It has been noted from the curves that the greatest wear occurs at the compulsory stops such as "School" and "Fire" instead of occurring at the corners where stops are made only to take on or discharge passengers. On the whole, these micrometer measurements are found to be of the utmost value not only in determining the condition of the wire but also the condition of the track in cases where abnormal wire use is discovered where least expected.

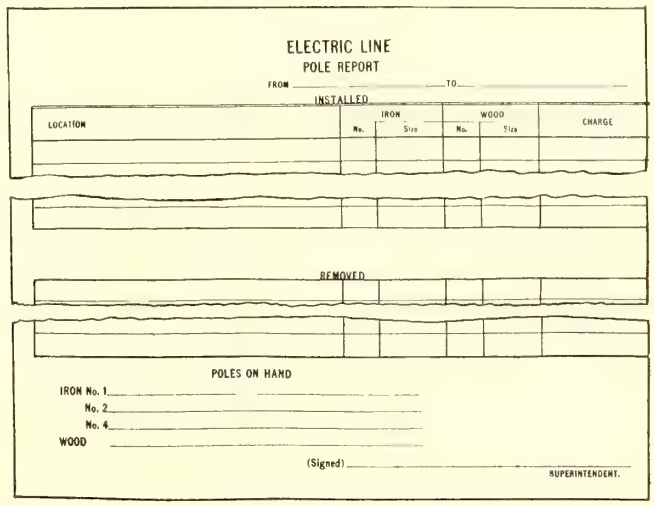
Owing partly to grade changes in certain outlying districts, the line department has to cut its trolley wire on an average of once a week to permit the moving of houses across the tracks. The labor and depreciation of the wire due to this cutting are charged against the house owners, a suitable deposit being secured in advance before the work is done.

ELECTRIC LINE.

Standard monthly maintenance	Horses on hand
Payroll maintenance	Purchased
Request maintenance	Sick
Add. and bett.	Died
Construction	Sold
Trolley poles, installed	Cost per horse, per day
Removed	Electric lights, installed
Reconcreted	Removed
Painted	Repaired
Span wires, installed, ft.	Telephones in use, N.Y. & N.J. office
Taken down	Resident
Trolley wire, installed, ft.	Automatic
Removed	Pony
Torn down, accidents	Installed, N. Y. & N. J. office
Overhead feeders, installed, ft.	Resident
Taken down	Automatic
Underground feeder, installed, ft.	Pony
Repaired, ft.	Repaired, N. Y. & N. J. office
Blow-outs, No.	Resident
Third rail, installed, ft.	Automatic
Repaired	Pony
Torn down	Cost, N. Y. & N. J. office
Stable, standard monthly maintenance	Resident
Payroll, maintenance	Foreign calls, cost
Add. and bett.	Received from employees
Construction	

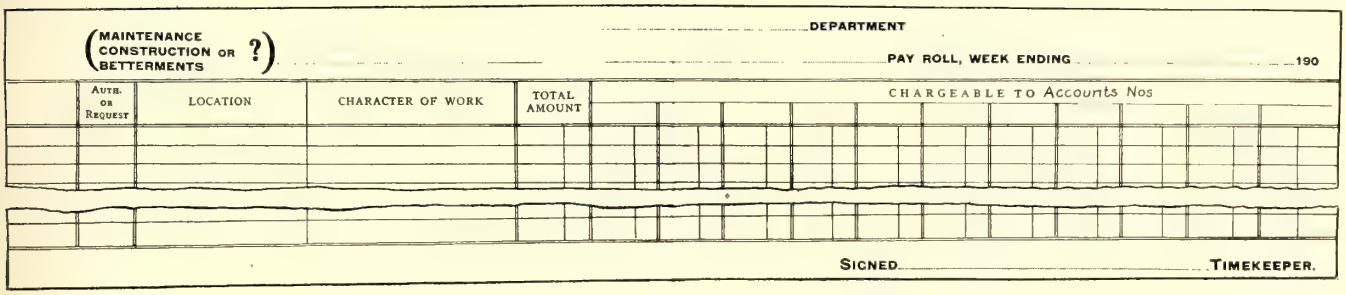
Brooklyn Line Department—Items Detailed in Monthly Report to the General Manager

When work is done for an outside party as, for example, where certain wires and cables are shifted for some contractor, the blank, "Daily Report of Force Account," shown on page 140, is used. This form is rendered in triplicate, one copy going to the comptroller, one copy to the customer and one to the files of the line department.

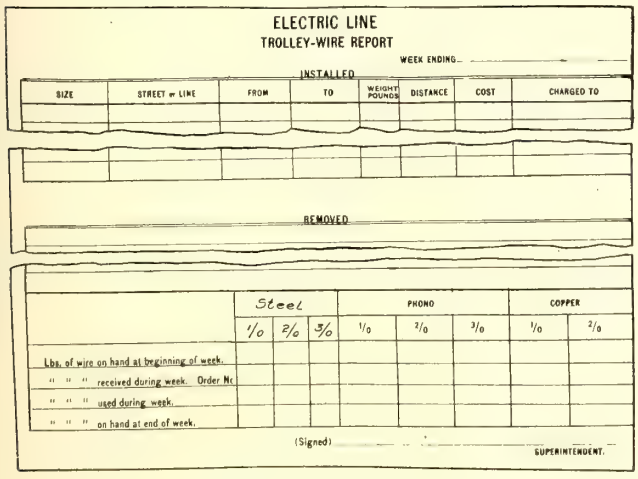


Brooklyn Line Department—Report on the Installation and Removal of Poles

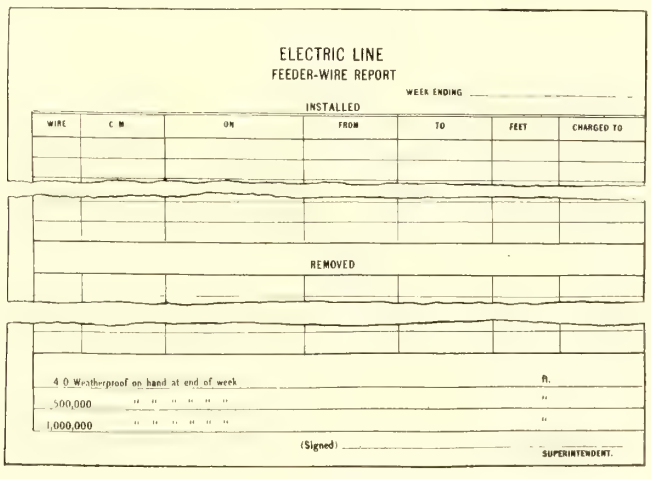
The form covering the monthly report to the general manager is itemized as in the reproduction except that the original is ruled vertically to separate the figures for the surface and bridge-elevated lines. It will be observed that the activities of the line department embrace also the care of underground feeders, the third-rail systems, electric lights and telephones. The style of weekly report made out by the timekeeper of the line department for the auditor is shown above. This form is made out for maintenance construction or betterments. The several columns give the general manager's authorization number for the work, the location and character and the standard account numbers to which the different items of each job



Brooklyn Line Department—Weekly Report to the Comptroller



Brooklyn Line Department—Stock Report on Trolley Wire



Brooklyn Line Department—Stock Report on Feeders

are chargeable. All trolley wire run during the week is summarized from the line crews' report reproduced, which also gives details covering the amount of wire removed. The bottom of the report shows the quantity of different sizes and types of wires on hand at the beginning and end of the week.

The weekly pole report shown gives the type and size of pole installed, together with the location and the account or authorization number to which the work is charged. The table at the bottom of the sheet shows the number of poles on hand. The feeder-wire report names the streets on which feeder jobs have been carried out during the week, giving the lengths and sizes used and the proper charge account number. As in the wire report, reference is made to amounts removed and to the stock conditions.

The three stock reports just described have been found of considerable value, as complete information is at hand always to permit work to be planned with the greatest economy.

REPORT OF THE COMMITTEE OF FIFTY IN DETROIT

An abstract was given last week of the first portion of the report of the committee of fifty appointed to investigate the street railway situation in Detroit. An abstract of the concluding portion of the report follows:

COST OF SERVICE

The committee was met by the statement of officials of the company that no information was available as to the cost of construction of roads built by underlying companies that were merged into the Detroit United Railway on Dec. 31, 1900, as the books containing this information were destroyed when the Jefferson avenue car house was burned, Dec. 30, 1901.

The operating expenses, as shown by the Detroit United Railway's books, apply to the entire system, that is, the city lines, and the Wyandotte, Orchard Lake, Pontiac and Flint divisions together. In order to determine the city's portion of the operating expenses, the unit of car-mileage was used. After deducting the subsidiary earnings from chartered cars, express, mail, advertising and rents from the operating expenses, the remainder was pro-rated on the car-mileage basis between the city and interurban lines. The city portion was then divided by the number of revenue passengers carried, and in a separate column by the total passengers carried.

In the final figures the committee added 6 per cent on the appraised value of the physical and franchise property as a reasonable and fair return on the capital invested.

The committee left out of consideration the matter of depreciation, stating that it could not determine whether since Dec. 31, 1900, there had been a depreciation, or an appreciation, of the property. The matter of depreciation had not, until during the last three years, been taken into account on the books of the company. The committee adds that the company is now "apparently not treating it on a scientific basis. We do not feel that we can state with any degree of accuracy what percentage of depreciation, if any, should be considered in dealing with the cost. It is our opinion that the failure of the company to make any provision for depreciation, up to within the last three years, and the fact that street railway companies generally have not charged off for depreciation, is evidence that they consider the depreciation to be fully covered by charges to operating expenses."

Applying the interest on the investment as determined by the appraisals, to the net cost as shown by the report of the accountant for the committee, W. D. Gridley, and the result is as shown in Table VI on this page.

The report of Mr. Gridley, the accountant, as made to the committee, says in part:

"As there is no separation on the books of the Detroit United Railway of the expenses of operation of the city lines from the interurban divisions of the Detroit United Railway, it is necessary for the purposes of this inquiry—to ascertain the cost of carrying a passenger for the years 1906, 1907 and 1908—to prorate these operating expenses. The unit used in arriving at the percentage on which to prorate the expense is that of car-mileage.

"I have treated the items of subsidiary earnings or income, aside from passenger fares, as deductions from expenses, on the theory that the company's business is that of carrying passengers. It was for that purpose that the rights and privileges granted by the city were given, and furthermore, the expenses incurred in earning income from sources other than from carrying passengers, are included in the operating expenses. It follows then, that to arrive at the cost of carrying a passenger these outside earnings should be deducted from the total operating expenses.

"The next step is the prorating of the operating expenses on the basis of the car-mileage.

"The total car-mileage for 1906 was 22,274,234, of this 19,330,555 was city, and 2,943,679 interurban. The city percentage was then .867843. Prorating the operating expenses, less the subsidiary earnings, on this basis and the amount apportioned to the city lines would be 2,451,716.82.

TABLE VI.—COST OF CARRYING A PASSENGER FOR YEAR 1908, AS COMPILED BY COMMITTEE ON COST OF SERVICE, DETROIT.

			City percentage on car Mileage basis .878707	Cost Per revenue Passenger 108,393,502	Per Passenger 148,840,835
Operating expenses and deductions from income.					
Operating expenses		$3,482,002.23			
Chartered cars	$23,850.70				
Express	187,827.58				
Mail	4,557.48				
Advertising	20,498.14				
Rents	6,418.89	243,152.79			
		$3,238,849.44	$2,845,999.67	.026256	.019121
Investment as determined by appraisals					
Physical Property		$11,284,536.88			
Franchise property		2,810,615.24			
6 per cent per annum			845,709.12	.007802	.005682
Total		$14,095,152.12	$3,691,708.79	.034058	.024803

"The number of revenue passengers carried in the city during 1906 was 99,266,118. The cost per revenue passenger was then .024698.

"The total passengers carried was 135,682,957, the cost per passenger being .018069.

"There are, however, other deductions from income to be considered, such as interest on floating debt, interest on funded debt, and depreciation, for which provision must be made, so that in the schedules I show:

"First. Cost per revenue passenger on basis of operating expenses less subsidiary earnings.

"Second. Cost per revenue passenger, same basis and including pro rata proportion of interest on floating debt.

"Third. Cost per revenue passenger, including foregoing, and pro rata proportion of interest on funded debt.

"Fourth. Cost per revenue passenger, including foregoing, and pro rata proportion of amount set aside by the company for depreciation.

"In parallel column are shown costs per passenger, on basis of total passengers, that is including with revenue passengers those carried on transfers and employees' tickets and passes.

"No provision is made in this calculation for dividends on capital stock.

"In the matter of depreciation, there being no basis of cost to proceed upon, we are obliged to adopt the figures used by the company, which we have done."

The computation showing the cost of carrying a passenger in 1908, as made by Mr. Gridley, is published herewith in Table VII.

TABLE VII.—COST OF CARRYING PASSENGER, 1908, AS COMPUTED BY W. D. GRIDLEY, FOR COMMITTEE ON COST OF SERVICE, DETROIT.

Operating expenses and deductions from income.			Cost. City percentage car mileage basis .878707	Per revenue passenger 108,303,502	Per passenger 148,840,835
Operating expenses		$3,482,002.23			
Chart'd cars	$23,850.70				
Express	187,827.58				
Mail	4,557.48				
Advertising	20,498.14				
Rents	6,418.89	243,152.79			
Total		$3,238,849.44	$2,845,999.67	$0.026256	$0.019121
Including with above interest on floating debt.		182,408.91			
		$3,421,258.35	3,006,283.66	0.027734	0.020198
Including with above interest on funded debt.		956,390.00			
		$4,337,648.35	3,846,670.24	0.035487	0.025844
Including with above depreciation		300,000.00			
		$4,677,648.35	$4,110,283.34	$0.037920	$0.027615

Car Mileage.	
City	21,067,368
Interurban	2,908,043
Total	23,975,411

Percentage.	
City	.878707
Interurban	.121293

City Passengers.	
Revenue	108,393,502
Employees and pass	4,729,045
Transfer	35,718,288
Total	148,840,835

Mr. Gridley also made a preliminary report regarding bonds, stocks and general matters to the committee on cost of service. This report shows the journal entries at the time of organization of the Detroit United Railway, and the entires that followed the later acquisition of various properties. Concerning other matters this report says in part:

"The American Street & Interurban Railway Accountants' Association classification of accounts provides that interest incurred in financing construction as well as discount on bonds sold shall be considered items of construction cost. Since the organization of the Detroit United Railway the following amounts have been capitalized from discount on bonds: 1905, $1,308,922.84; 1906, $2,000; total, $1,310,922.84.

"Taxes and insurance are handled by pro-rating monthly the estimated yearly charges.

"The matter of the liability of the company for injuries and damages is handled by charging to operating expenses a percentage of the passenger receipts each month and crediting to injuries and damages sinking fund; the claims as settled being charged to this fund. During 1901, 1902 and 1903 the percentage used was 2 per cent; during 1904 and the first three months of 1905, 2½ per cent; for the remaining nine months of 1905, 3 per cent; and for 1906, 1907 and 1908, 3½ per cent. The balance to the credit of the fund on Jan. 1, 1909, was $11,494.18.

"'Depreciation' is the term used to cover loss through wear and tear, and obsolescence, and to properly provide for it, the probable life, for the purposes of the enterprise of the property in use, must be determined. Thus in order to provide for depreciation on the amount of the original investment as shown by the books on Dec. 1, 1900, of $23,000,000, it would be necessary to know the physical valuation of the property, and the probable life of it, and the franchise valuation, and the time it has to run, and then set aside yearly an amount sufficient to cover the declining value. But we do not know, and have found no way as yet of determining what the values placed upon these items were.

"The street car companies appear not to have definitely settled as to how the matter of depreciation should be handled, and no provision is made for it in the standardization of accounts as adopted by the Street Railway Accountants' Association.

"Until 1906, the Detroit United Railway had created no reserve for depreciation, but during that year $250,000 was transferred from profit and loss to depreciation reserve, and in 1907 $276,000 was transferred from income account to depreciation reserve, and in 1908 $300,000 was similarly transferred. During 1908, $137,385.47 of the cost of renewals of tracks and foundations was charged to depreciation reserve, leaving the balance to the credit of the fund on Dec. 31, 1908, at $688,614.53.

"During 1906, the Detroit United Railway carried on all its city lines 99,266,118 revenue passengers, for which it received in fares $4,271,593.93, an average per passenger of $.04303. That year there was paid in dividends $625,000, for interest on funded debt $954,855.63, set aside or deducted from investment account $250,000 for depreciation, and the surplus was increased $148,635.09.

"During 1907 the city lines carried 108,715,417 revenue passengers, for which was received in fares, $4,707,803.66, an average of $.0433. That year $343,750 was paid in dividends, $954,990 interest on funded debt, set aside $276,000 more to depreciation reserve and increase the surplus $450,090.80.

"During 1908 the city lines carried 108,393,502 revenue passengers for $4,692,548.08, an average of $.04329, paid no dividends, paid interest on funded debt of $956,390 (Schedule 6), set aside $300,000 to depreciation reserve, $200,000 to contingent liability reserve, and increased the surplus $494,801.96.

"This brings the examination of the question of cost up to the point where it is necessary to agree upon some basis for the division between city and interurban lines of the operating expenses, interest on bond, depreciation, and earnings from other than passenger fares.

"It would seem that a fair unit for the division of operating expenses, and earnings outside of passenger revenue, which can be strictly separated, is that of car-mileage."

The committee on cost of service was: Henry Ford, Richard P. Joy, Joseph Boyer, John D. Wiley, John D. Cochell, Philip H. Gray and A. G. Studer.

SCHEDULES

The report of this committee says in part:

"We believe the Detroit United Railway is desirous of having a schedule that is as convenient as possible to fully meet the requirements of the people.

"The committee believes the time for workingmen's tickets, morning and night, should be extended at least 15 minutes.

"The speed of the cars, as well as the noise resulting therefrom, in some sections of the city, has been criticized. Realizing that the schedule must govern the speed of the cars, and believing that a lower rate of speed would not be satisfactory, we suggest that more care be given the cars, especially the trucks and wheels, to insure their good condition, which would result in less noise, and which would certainly be greatly appreciated by the public.

"The committee suggests that the schedule be arranged to best take care of the congested traffic at certain times of the day, especially in those sections where there are vast numbers of laboring people going to and from work. We realize there are times, however, when it is impossible to furnish sufficient cars to take care of immense crowds of people as satisfactorily as might be wished, but due consideration should be given to such conditions.

"Your committee recommends the consideration of an extension on the Jefferson avenue line, of a straight 5-cent fare to the city limits. This part of the city is developing into a very important manufacturing district, employing many workmen who object to paying a 10-cent fare each way. Many homes are also being erected in this section, and we believe the granting of a 5-cent fare to the city limits would not only be very acceptable to those living and working in that vicinity, but

that it would also aid very materially in building up that part of our city."

The names of the committee on schedules follow: George H. Barbour, E. A. Burch, James W. Thompson, C. V. Pasternacki, Gabriel Chiera and Edward D. Brown.

EXTENSIONS AND REARRANGEMENT.

An abstract of the report of this committee was published in the issue of the Electric Railway Journal for May 22, 1909, page 949. The members of this committee were Dr. J. H. Carstens, W. W. Hannan, T. H. Simpson, Thomas E. Reeder, Thomas Neal, William C. Pasha, Charles P. Russell, Theodore L Smith and Alfred A. Trites.

EXTENSIONS AND REARRANGEMENT

A majority and a minority report were presented on this subject. The majority report was signed by D. M. Ireland, Charles A. Dean, M. J. Murphy, Frank Kennedy and William Pasha. The report was adverse to municipal ownership, and said:

"Before any municipal undertaking may be classed as successful, two facts must be established to the satisfaction of the taxpayers.

"(1) Would a rigid system of accounting, with every legitimate expense charged to the utility operated rather than to some general fund, with proper allowance for interest on the investment, depreciation, obsolescence and sinking fund leave a balance upon the right side of the municipal ledger?

"(2) Is the standard of operation, service, wages and general up-keep such that it would be satisfactory to the people of an American city?

"Comparison of existing municipal street railway undertakings in foreign cities being found of little value for the purpose of our investigation, your committee has considered the subject under the following heads:

"(1) What will municipal ownership of the street railways of Detroit cost?

"(2) Can Detroit afford to make the investment

"(3) Is it desirable to assume the burden; to assume the responsibility of a costly experiment with no definite assurance that cheaper fare could be provided without affecting the quality of service?

"As the franchises of the Detroit United Railway, which expired on Nov. 14, 1909, covered only a part of the city system, unless an advantageous purchase of the remaining lines can be made by the city, municipal ownership can be only partial for at least 14 years, at least not unless the city shall engage in a costly work of paralleling such lines. Two systems would mean two fares in many cases now covered by transfer.

"In Detroit the amount which the municipalization of the street railway system would require would, when added to the present bonded debt, so largely increase the percentage of bonded debt to taxable property as to exclude the bonds from savings banks' investment.

"Immediate municipal ownership of Detroit's street railways would involve: The amount of the appraisal of the committee of fifty plus several million dollars for betterments and extensions, including the 57 miles of new track recommended by the committee on extensions and rearrangement, which are imperative if the city is to have proper service and which the Detroit United Railway or any other company would be required to assure the city in order to secure further operating privileges. In the matter of cost must be included the heavy demand which must be met in the not distant future for the construction of a subway as outlined by the committee on extensions and rearrangement, also interest on the bonds issued to effect the purchase, a loss of taxable property to the assessed value of the system, which paid taxes in 1908 amounting to $134,842.63. The enlarged field for damage claims against the city would be found no inconsiderable item of expense.

"As a municipality we are seemingly pushed to the limit of our resources to perform such primary, non-contentious municipal undertakings as, having no element of profit in them, cannot be left to private enterprise. Do taxpayers desire to assume the responsibility in the hope of securing cheaper transportation?

"By placing the street railway system under municipal control a large body of municipal employes is created, each member having a vote. The management is made to reside in a body politic, subject to change at least every two years. Do these conditions indicate a fair probability that such efficiency and economy in administration and operation will prevail as will serve to reduce fares in a sufficiently large degree to warrant and render advisable pledging the faith and credit of the city; increasing the bonded debt and tax rate?

"No one will claim that an intricate business like the operation of a great railway system should be left to the decisions of bodies of men inexperienced in the particular problems involved. Men competent to make profits cannot afford to give their services to secure profits for a city. Nor is the management of a street railway calculated to draw men into the service for the sake of honor, since the occupation is beset with difficulties and anxieties. Responsibility for life and property is in the highest degree burdensome, and the dealings with an army of employees on the one hand and with the public on the other require tact and experience, which command a high price in the labor market.

"With profit to the individual as an incentive to economy in administration eliminated; with our municipalities as at present organized, tenure of office brief and with politics entering so largely into municipal elections, it is a matter of grave doubt in the minds of your committee as to whether the conduct of an undertaking requiring experience for efficient management, could be operated by the municipality to the profit either of the taxpayer or the car patron.

"Summing up the situation as it exists in Detroit to-day, your committee believes that the municipal ownership of street railways at the present time would:

"(1) Largely increase the city's bonded debt.

"(2) Increase the tax rate.

"(3) Diminish the amount of taxable property.

"(4) Increase the city's liability for damage claims.

"(5) Benefit neither taxpayer, employee nor patron.

"(6) So increase the tax rate as to react to the detriment of the city's industrial expansion.

"(7) Promote increased political manipulation.

"We believe that for Detroit to engage in street railway operation would be to enter a field better adapted to private than public undertaking. To enter upon an experiment certain to be costly and not certain to be successful, a course most unwise, from a business standpoint and which, in the opinion of your committee, should not be undertaken."

MUNICIPAL OWNERSHIP—MINORITY REPORT

The minority of the committee, W. D. Mahon and J. D. Cochell, presented a report signed by the former favoring municipal ownership. The minority report says that there is no hope for relief in the grant of a new franchise to the present company and recommends that the City Council "grant no more franchises for the purpose of operating privately owned street railways to any person, corporation or company and make arrangements to at once inaugurate and establish a thorough system of municipally owned street railways covering the entire city."

TAXATION AND PAVING

An abstract of the report of this committee was published in the issue of the Electric Railway Journal for May 22, 1909, page 949. The members of this committee were Melvin Henry, Howard C. Beck, Theo. H. Eaton, Fred C. Hees and George H. Lyons.

A proposal has been adopted by the Swedish Government for the electrification of the State Frontier Railway in the north of Sweden, the power to be derived from the Porjus waterfall, near Gellivare, which is stated to be capable of yielding 50,000 hp—about 16,000 hp in excess of the requirements when the railway is working in normal conditions. A power station is to be erected at Porjus, and a railway is to be constructed from that point to Mount Gellivare.

MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The meeting of the Central Electric Traffic Association which was held at Dayton, Ohio, on July 19, 1910, was well attended. The committee appointed at the last meeting of the association to consider the advisability of the association issuing a map reported progress. The committee appointed at the last meeting of the association to consider the publication of an interurban railway guide by the association also reported progress and submitted an outline of several propositions looking to the publication of such a guide. Those in attendance also discussed at length the best methods of complying with the terms of the new Federal law creating a court of commerce. It was decided to hold the next meeting at the Hotel Anthony, Ft. Wayne, Ind., on Aug. 16, 1910.

ACCIDENT ON NEW YORK MONORAIL LINE

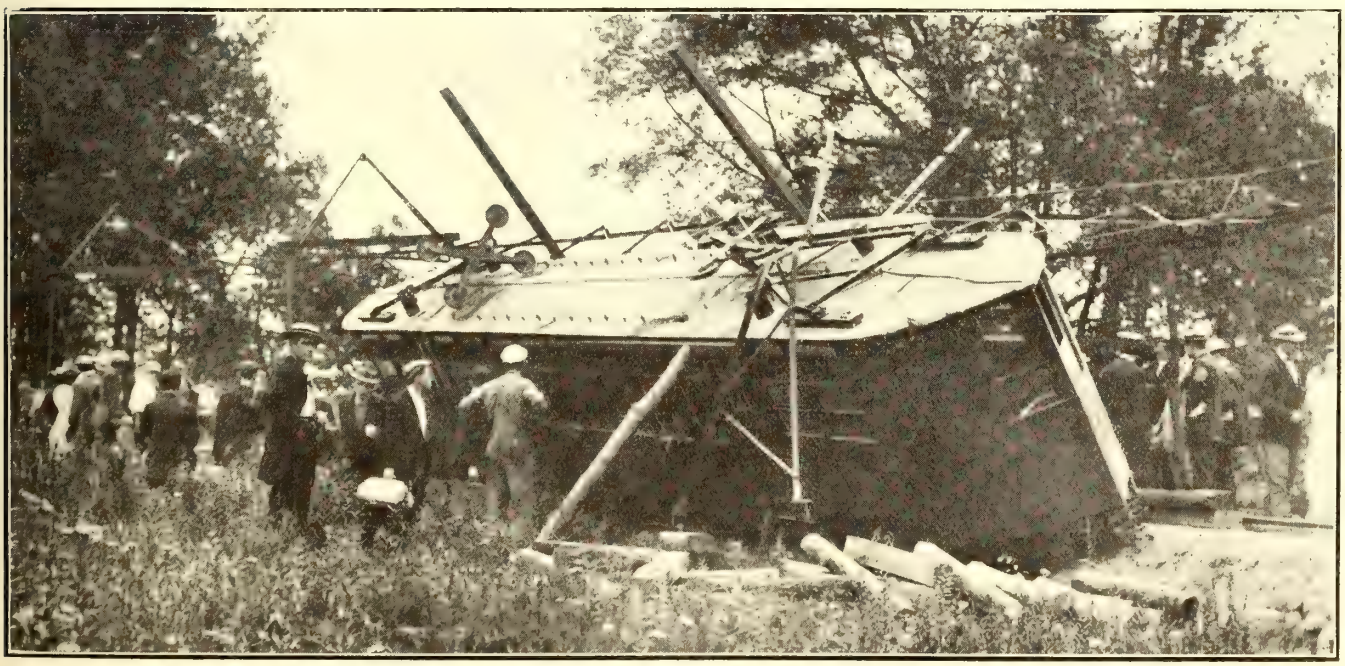
On Sunday afternoon, July 17, a car of the Pelham Park & City Island Railroad monorail line was derailed while going around a curve at a speed of about 30 m.p.h. There were about 100 passengers in the car at the time although its seating capacity was only 50. Fortunately, the car was not running along an embankment so that while the passengers were thrown one on top of the other on the floor of the car as it toppled over against a bent, only five or six were badly injured.

The line on which this accident occurred is a single rail line extending 3 miles from the Bartow (N. Y.) station of the New York, New Haven & Hartford Railroad's Harlem River branch through Pelham Bay Park to City Island. The route was formerly operated by horses. The franchise for the monorail electrification was obtained a couple of years ago, but owing to various delays in securing the construction material, no work of consequence had been done up to within a few months of the time the construction permit was to expire. As a result, the line was rather hastily built in certain places. It was intended, for instance, not to run the car until the T-section single running rail had been spiked to ties set in concrete, but instead of carrying out this construction the car was run over ties laid in plain soil. The result was that when the car went around the curve, the ties tipped up on one side and so contributed to the derailment. However, the principal reason for the derailment appears to have been the lightness of the overhead construction. For some reason, all of the bents intended for this installation did not arrive in time to complete the work according to the engineering plans, so the constructors made use of some much lighter bents which were used in 1907 by the monorail company on a line at the Jamestown Exposition. This overhead construction consisted of a pair of current-carrying latticed guide rails suspended from wooden bridges. The latter were carried on steel bents bolted to wooden beams instead of being set in concrete as intended. Apparently this construction was not heavy enough to bear the strain imposed upon it by the two trolley trucks each of which carried four combination guide and current wheels bearing horizontally against the guide rails. As shown in the illustrations, the overhead construction at the scene of the accident was considerably distorted by the tipping of the car and the ties on the left side of the rail were forced upward.



View of Car as it Fell Over Against One of the Bents

The car dropped against one of the bents, which fortunately did not break or pull away from the bottom beam to which it was bolted. The damage to the car itself was very slight. It is expected that the damage will be repaired within a few days but to avoid future accidents, experimental runs will be made for about a month. The car was built and equipped in accordance with the Tunis monorail system which was described on page 75 of the ELECTRIC RAILWAY JOURNAL for Jan. 9, 1909.



Side View of the Monorail Car, Showing Damage to the Overhead Structure

MEETING OF THE COMMITTEE ON CITY RULES

The committee on city rules of the American Street & Interurban Railway Transportation & Traffic Association held a meeting at the office of the association, 29 West Thirty-ninth Street, New York, on July 16. Those present were: R. E. Danforth, Public Service Railway, Newark, N. J., chairman; H. H. Hunt, Stone & Webster, Boston, Mass.; L. H. Palmer, Metropolitan Street Railway, New York; D. A. Hegarty, Little Rock Railway & Electric Company, Little Rock, Ark., and F. R. Fuller, Portland Railway, Light & Power Company, Portland, Ore.

The meeting was called to take action on replies to data sheet No. 55, which had been received from about 60 member companies. This data sheet, which was sent out on May 18, requested a discussion on proposed changes in six of the rules adopted at the Denver convention, these being the only rules in the code as adopted which had been subject to criticism.

Rule No. 2 relating to the responsibility of motormen and conductors was first considered. The rule as submitted by the committee reads: "The motorman is held responsible (a) for the safe running of the car; (b) For the proper operation of the machinery of the car; (c) For running car according to schedule. The conductor is in charge of the passengers on the car and is held responsible (d) for the safety and convenience of the passengers; (e) For the collection and proper accounting of fares."

The rule as amended at the Denver convention reads: "The conductor is in charge of the car and is responsible (a) for the stopping and starting signals; (b) for the safety and convenience of passengers; (c) for the collection and proper accounting of fares. The motorman is held responsible (d) for the safe running of the car; (e) for the proper operation of the car and its machinery; (f) for running the car according to schedule."

The committee favored the rule which it submitted, but the replies from member companies showed that there was about an equal division of opinion in favor of the rule as submitted and in favor of the rule as amended. The committee recognized that this question is largely a matter of local conditions. It was decided, therefore, to submit both rules to the convention this year for final action. In preparing the report, the chairman was instructed to include in the discussion two or three typical replies from larger companies in favor of both rules.

The next rule considered was No. 21 which relates to standing on steps. The committee recommended the following wording for this rule in place of that adopted at the Denver convention: "Permit no person to stand or ride on the steps, buffers, dashers, fenders or roof. Passengers should be fully inside the car or safely landed on the platform before the signal is given to start." As there were only nine companies opposed to this wording of the rule, the committee decided to recommend it for adoption this year.

Rule No. 101 relating to the position of the conductor on the car was amended at the Denver convention by the insertion of the words "or at main entrance" after the words "remain on rear platform." Inasmuch as this code of rules is intended for universal use and there are very few companies using center entrance cars the committee was in favor of eliminating from the rule the words "or at main entrance." Only three companies replying to the data sheet were in favor of retaining this phrase in the rule and, therefore, the committee decided to recommend that it be eliminated.

Rule No. 116 regarding the amount of change which the conductor will make for passengers offering coins or bills of large denomination was amended at the Denver convention by striking out the sentence "conductors will make change for passengers to the amount of $2 and in place of this sentence there was substituted the following, "Previous to taking charge of the car, conductors will provide themselves with $.... for the purpose of making change."

There was considerable discussion among the members of the committee on this point and the final decision was to recommend that the rule be amended by striking out the sentence stating the amount of change with which the conductors must provide themselves before taking charge of the car and substituting therefor the sentence "Conductors will make change for passengers to the amount of $....."

The committee will also recommend that the sentence "Previous to taking charge of the car conductors will provide themselves with $..... for the purpose of making change" be included under Car House Rules, No. 33.

The committee submitted in the data sheet an amended rule No. 213 which reads as follows: "Power Off Line—When the power leaves the line cars must be stopped clear of all crossings or danger points. The overhead switch must then be thrown off and the light switch thrown on and the car started only when the lights burn brightly." This wording of the rule eliminates all reference to coasting and is favored on this account. As it was almost unanimously approved in the replies to the data sheet, the committee will recommend the change.

A member company suggested the addition of a new paragraph to Rule 10, as follows: "When it becomes necessary to reverse a car for a greater distance than 10 feet, motorman must take handles to the opposite end of car and operate it from that end. The conductor, under these circumstances, will change his position, that is to say, he will go to the opposite platform in order to give proper signal to motorman." As there were only four replies which were not in favor of this proposed addition to Rule 10, the committee decided to recommend to the convention that it be incorporated in the rules.

The chairman of the committee is not satisfied with the number of replies received to the data sheet sent out and intends to use every effort to obtain some expression of opinion from all member companies on the code of city rules prior to the convention. As this subject is very important all member companies who have been addressed are strongly urged to reply to the communications of the chairman of this committee immediately.

THE ADVANTAGES OF OPERATING AT HEAVY LOADS

Conservative operators of power plant machinery are constantly striving to secure good efficiencies by running each prime mover within its economical range. The best results in steam engines of recent design and in turbines are generally obtained between 75 per cent of normal load and 125 per cent overload. In spite of the best efforts of station men to cut out prime movers from service as soon as their loads fall to the less efficient ranges, it is difficult in the great majority of installations to secure full or overload economy for protracted periods if the demands upon the plant are fluctuating. In some classes of industrial service, however, the conditions of steadiness of output are decidedly favorable, and in the central station field managers are accomplishing much toward securing the benefits of heavy load operation by adding power business in the daytime hours.

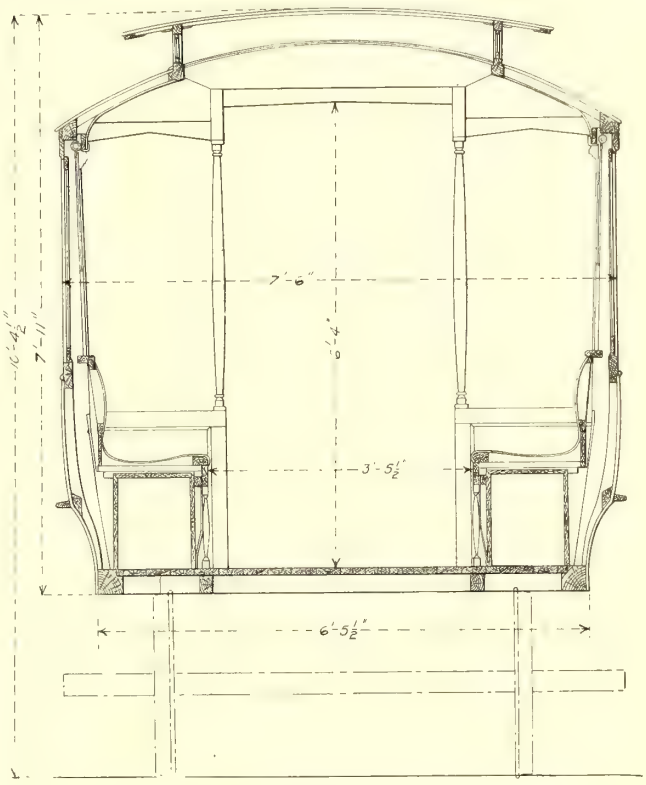
A recent test by the engineering firm of D. C. & W. B. Jackson, Boston and Chicago, furnishes an unusual illustration of the benefits of a well-sustained load upon station economy. The plant was driven by a 1500-hp compound condensing engine, and in a continuous test of two weeks, the average load upon this machine was 2117 hp. The maximum load handled was 2367 hp, and the minimum, 1827 hp. The coal consumption was 1.695 lb. per hp-hour, Reynoldsville bituminous variety being used with a calorific power of 14,033 B.t.u. per pound, dry. The fuel cost was $2.45 per ton, and the net operating expense per hp-hour, including labor, fuel, supplies and repairs, was 0.31 cts. The figures are drawn from an industrial plant running 24 hours per day with a remarkably steady load. They are not readily duplicated in plants where the demands upon the equipment vary rapidly and through wide ranges, but are interesting as indices of what may be expected in mere running cost when the full capacity and more of a good sized prime mover is required for a protracted period.

STORAGE BATTERY CARS FOR THE THIRD AVENUE RAILROAD, NEW YORK

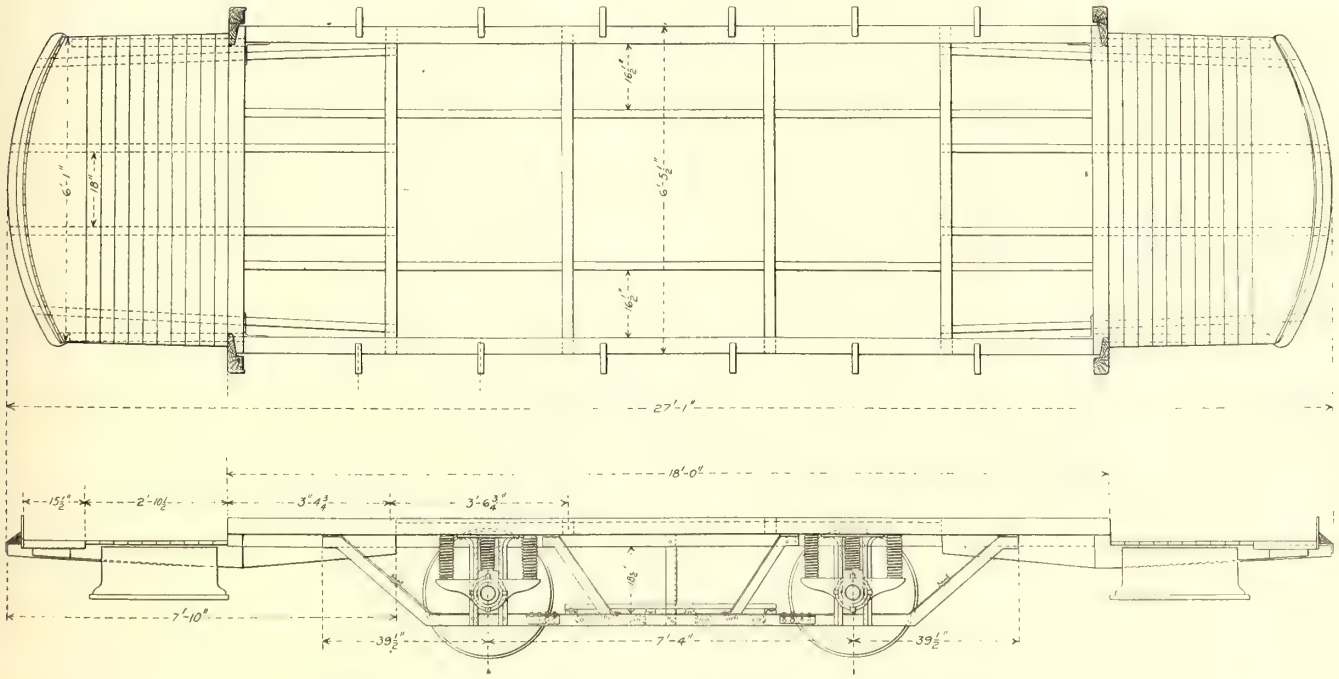
The latter part of March, of this year, the Third Avenue Railroad, New York, N. Y., placed in service a storage battery equipment on a converted horse-car. A description and some operating results of this car were published in the ELECTRIC RAILWAY JOURNAL, of April 23, 1910. This pioneer car has been so successful that F. W. Whitridge, receiver of the company, has now placed an order for 30 similar equipments. Twenty-five new car bodies, are to be built and five old horse-car bodies are to be rebuilt for this purpose in the shops of the Third Avenue Railroad Company. The motor equipments and control will be furnished by the General Electric Company and the storage batteries will be supplied by the Gould Storage Battery Company. A remarkable feature of the contract with the battery company is an agreement to maintain the accumulators for five years at a fixed price per car-mile. The battery company has agreed to do all necessary cleaning, furnish all renewals of chemicals and water, make repairs, and generally maintain the efficiency of the cells in good operating condition. This contract is said to be the first of the kind ever made.

As shown in the accompanying plan and elevation, the cars will be 26 ft. 5 in. long over all and 6 ft. 5½ in. wide. The platforms will be about 4½ ft. long and designed for prepayment operation like the other cars of this company. The car body proper is 18 ft. long and will have longitudinal seats for 24 to 26 passengers. Under the seats on each side, a space 17 ft. long by 12 in. wide by 15 in. deep will be provided for the batteries. By reference to the cross-section of the car, it will be seen that room has been left in front of the battery casings under the seats for piping in case it is decided to use hot-water heaters in these cars. These pipes would be covered by perforated iron sheets. In general, the car bodies will be constructed of wood throughout and the interior finished in yellow ash. They will be mounted on single tracks, built up of riveted commercial shapes to the design shown in the drawing. Each of the truck pedestals will be furnished with three vertical springs.

The storage battery equipment will consist of 58 cells of the Gould 29-T-H type, having a capacity of 420 ampere-hours when discharged at a 70-amp rate and at a temperature of not less than 80 deg. Fahr. The total number of sets ordered is 36, a half dozen being reserved as spare. It is defined in the contract that "battery operating condition" means maintaining the efficiency of the batteries to at least 75 per cent of their rated capacity. The motor equipment per car consists of two G. E. No. 1022 automobile type motors rated 30 amp capacity at 125 volts. The motors and the trucks will be furnished with ball bearings. The type of silent chain drive has not yet been selected. With this electrical equipment it will be possible to maintain a regular schedule speed of 7 m.p.h., figuring on eight stops per mile. The total weight of the car body, truck and equipment will be approximately 6 tons. The cars will be operated on practically level streets now served by horse-cars. It is believed that the use of self-propelled cars will greatly stimulate the traffic on these old horse routes.



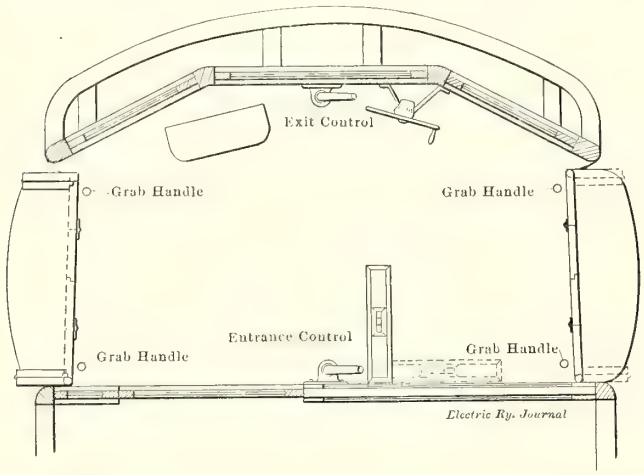
Cross-Section of Storage Battery Car, Showing Space Under Seats for the Accumulators



Plan of Storage Battery Car and Side Elevation of Truck

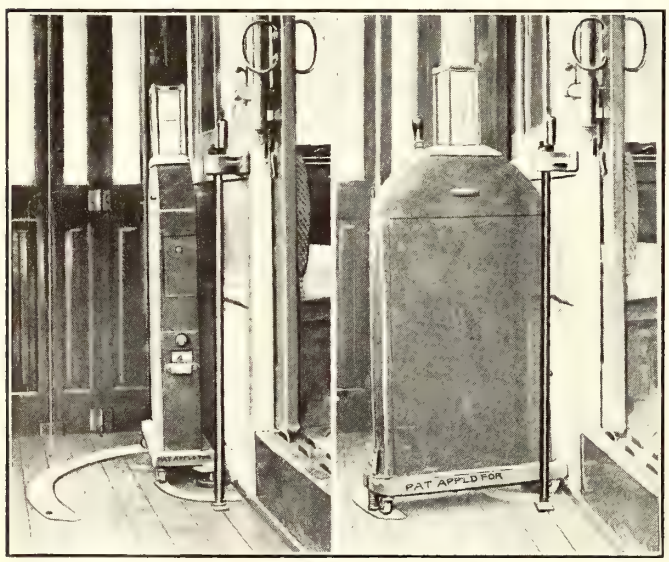
ARRANGEMENT OF SMALL CARS FOR PREPAYMENT SERVICE

The Decatur Railway & Light Company, one of the Illinois Traction System properties in Illinois, has just equipped a large, single-truck, short-platform car with folding platform doors and swinging fareboxes, which will provide for the collection of fares on the platforms and the positive closing of the entrances while cars are in motion. The car first equipped in this manner, illustrations of which are presented herewith, is



Floor Plan of Platform Showing Location of Swinging Fare Box and Folding Doors

one of 20 which immediately will be equipped similarly. Charles Woods, master mechanic of the Decatur Railway & Light Company, planned and is carrying out the work of adding the new features to these cars. This work is of particular interest because the Decatur cars are typical of the single-truck equipments operated by a large number of small city systems which heretofore have felt that the short platforms would not per-



Views of Platform Showing Fare Box in Two Positions and Folding Doors

mit of satisfactory operation according to the prepayment plan.

The two principal objects desired in the re-equipment of the Decatur car were (1) to provide for collection of fares on the platforms, and (2) to install doors which would prevent boarding and alighting accidents. These objects were attained by the use of a narrow form of four-till Brill fare box and the addition of four sets of folding doors operated and controlled by hand mechanisms, supplied by the Pay-Within Car Company through its sales agent the Electric Service Supplies Company.

The fare boxes are about 6 in. thick by 2 ft. wide and 4 ft. high provided with a glass coin-receiving and dropping section mounted on the top of a sheet-steel case, containing four safety boxes for the collections of four different conductors. Each fare box is mounted on a heavy base supported by roller castors. The base is securely fastened to the platform floor by a through bolt so fitted into a floor casting that the fare box may be revolved through 90 deg. A spring lock is provided so that the box can be securely fastened in either position. The fare box when not in use on the forward platform is swung out of the way against the end bulkhead; when in use on the rear platform the box is revolved into a position at right angles to the left-hand side of the entrance into the car body where it forms a partition behind which the conductor can stand.

Protection against boarding and alighting accidents has been provided by installing at each entrance a set of four-leaf wooden doors controlled by the pay-within hand-operated mechanism. As the cars being equipped are operated from either end provision had to be made for conveniently operating the doors from the conductor's station on the rear platform and the motorman's station on the forward platform. The operating handle used by the motorman for opening and closing the forward door, when used as an exit, is installed just at the right of the controller. On the rear platform the handle used by the conductor for operating the rear entrance and exit door is close to the left-hand side of the door leading from the platform into the car body. Only one removable handle for each platform is provided for the door-operating mechanisms, and thus with one handle in charge of each member of the car crew there is no chance for a passenger to operate the doors on the blind side of the cars and the entrance and exit doors are under complete control at all times. The new folding doors when open cover the location of the old grab-handles; therefore, a pipe stanchion has been installed at either side of each platform entrance. These stanchions take the place of the older grab-handles and are enclosed by the doors when the cars are in motion.

The design of the door-operating mechanism applied to these cars is such that friction has been greatly reduced by means of ball bearings and therefore the doors can be moved very easily. The post which carries the door-operating handle is supported by ball bearings at the top and bottom and also the 1-in. shafts on which the doors hang have similar bearings, thus providing ease of operation with the 6-in. control handles. The use of ball bearings also serves to prevent pinching of any of the moving parts when the platforms are overloaded. The door-carrying mechanism is so designed that the door sections are locked positively in the open and closed positions.

Some of the advantages of this new plan of car equipment are that it requires no alteration of the car body or platforms, thus greatly reducing the initial expense, the present full-seating capacity of the car remains and the desired objects of pre-collection of fares and complete platform enclosure are attained.

The Government of Turkey, through its consul-general, Reouf Bey, has invited bids for the construction of an extensive electric railway system in Constantinople and vicinity. Franchises of five city lines are offered to the successful bidders.

The directors of the Rhätisch Railway, Switzerland, have approved a proposition to electrify a portion of that line for 15-cycle single-phase operation. The section to be electrified comprises the routes between Bevers, St. Moritz and Samaden, Pontresina and from Bevers to Schuls. Electrical operation is to begin in the summer of 1913. A contract has been made with a power plant at Brusio for a period of 10 years to 20 years covering the delivery of energy at 10,000 volts, 15 cycles. The lines to be electrified comprise a comparatively small proportion of the total system, but will serve to demonstrate the practicability of changing over additional sections.

DISCUSSION ON PARKED STREETS

The question of the construction and use of electric railway tracks in parked streets came up recently before the Supreme Court of Kings County, New York, in connection with the application of the Coney Island & Brooklyn Railroad to construct a parkway 23 ft. wide in Coney Island Avenue. This application was made to the Board of Estimate and Apportionment of the City of New York, and Spencer C. Cary, an abutting property owner, brought action to enjoin the board from permitting this change. Mr. Cary stated that he was an owner of the fee to the middle of the street, and alleged that he gave the easement for street purposes only, and that the proposed action of the city in turning the street into a park was a violation of this easement.

Among the expert witnesses at the hearing was Frank R. Ford, of Ford, Bacon & Davis, who testified that electric tracks had been installed in parked street on St. Charles Avenue in New Orleans, as well as in other cities, and that such construction was desirable from the standpoint of the public, of the company and of the passengers carried. In the first place, Mr. Ford said, the tracks in the parkway eliminated very largely the noise, which is always present to a greater or less extent in tracks in paved streets, especially if the paving is laid on concrete foundation, which acts as a sounding board. In parked streets the noise is very much deadened, and the cars seem to slip along very quietly. A second advantage is the elimination of dust, and a third is the reduction of accidents both to pedestrians and vehicles. The witness said that the number of accidents caused by electric car operation with tracks in the parkway are less than one-fourth the accidents on similar tracks in paved streets.

Another advantage is the fact that the tracks can be readily repaired without tearing up paving and interfering with the use of the street as a driveway. Another advantage, and this might be considered partly in connection with the reduction of accidents, is that the parkway acts as a traffic regulator, because it divides the vehicular traffic going in opposite directions, one class passing on one side of the street and one class on the other side. Another advantage is that the parks and the parkway, if properly maintained, are very pleasing to the sight of residents on the streets, pedestrians and passengers on the cars, and the construction is better from a hygienic and sanitary standpoint than when the street is paved.

One benefit which the railway company derives from such construction is the ability to operate with somewhat higher speed than on a paved street because of the non-interference with vehicular traffic, and this, of course, is also a benefit to the riding public. The track construction is also cheaper to maintain, and as the rail is cleaner, less current is required and the cars can be stopped more easily than on rails in paved streets.

ACCIDENT INSTRUCTION FOR BALTIMORE SCHOOL CHILDREN

The school board of Baltimore, Md., has just approved the plan of the United Railway & Electric Company, of Baltimore, for the distribution in the public schools of cards showing the proper method of getting off a car and also giving a few words of caution. It is hoped that by this means the children will learn to exercise the degree of care necessary to avoid accidents. The publication issued by the company consists of two 9¼-in. x 11-in. cards bound together by a strip of linen. Three of the sides show the illustrations reproduced on this page. The fourth side contains the following statement, headed as follows:

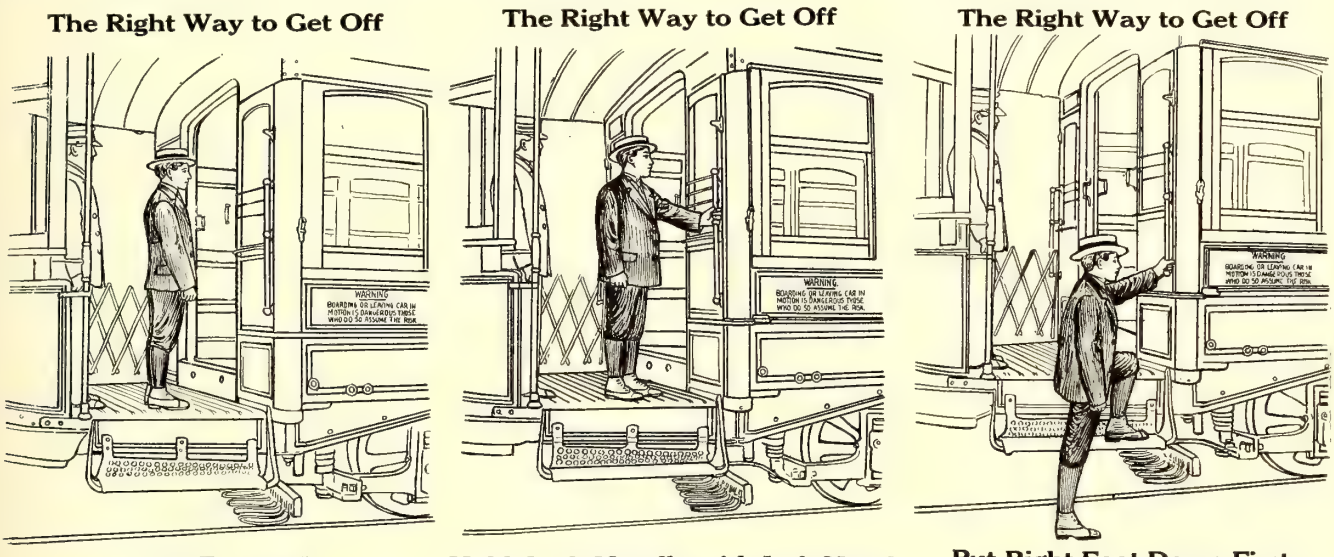
A FEW WORDS OF CAUTION

You sometimes read about a school boy or girl being run over by a street car or an automobile or a wagon, and being badly hurt or even killed. You sometimes see a reckless or thoughtless child just escape by a hair's breadth accidents of this kind. That is my reason for warning you to be very careful of wagons, cars and automobiles when on the streets.

Before crossing a street always look in both directions so that you may be sure there is no danger from an approaching car or other vehicle. Never rush across the street, for in your hurry you may stumble and fall and you may be run over by a wagon or car that you did not see or that you thought was too far off to be of danger to you. Never cross behind a car or wagon unless you are sure no car or wagon coming the other way is on the other track.

Some of you use the street cars to come to school and to go home from school. Indeed, a great many of you ride on wet days. Bear these things in mind. Don't try to get on the car until it has come to a *full stop*. Never get off a car until it has come to a *full stop*. There is but one right way to get off a car, so that you will be sure not to trip yourself and fall. The right way is: *Face forward; Take Hold of Grab-Handle with Your Left Hand; Put Your Right Foot to the Ground First.*

If you are careful in these things, your parents will have no reason to worry about your safety on your way to and from school.



Baltimore School Cards Illustrating the Proper Way of Boarding and Leaving Cars.

The Bradford (England) City Tramways, since August, 1909, have been carrying the blind people of the city free of charge, a numbered pass being issued to each blind person.

REPORT ON PITTSBURGH CONDITIONS

As stated in the ELECTRIC RAILWAY JOURNAL for Feb. 19, 1910, B. J. Arnold was engaged by the Mayor of Pittsburgh in February to make a report upon the transportation situation of the city of Pittsburgh. Mr. Arnold's report to the Mayor upon the proposed construction of a subway was printed in the issue of this paper for July 9. The first portion of his report upon the surface transportation situation has just been made public and is devoted to re-routing. In this report Mr. Arnold says:

"Fully as important as the development of a comprehensive plan for the rehabilitation and improvement of the physical plant of the system is the question as to how, when and where to run the cars. This is a problem of such far-reaching importance that it should not, in fact, cannot be satisfactorily settled by any one man. The president of the railways company or his officials cannot alone make the decisions without exposing themselves to criticism; and the service cannot be successfully regulated by any representative of the city without the co-operation of the railways company. The problem, therefore, is one that should be worked out by means of an official conference; and until the fundamental principles of re-routing have been determined and an equitable balance between the various interests has been established in such a way that the balance can be maintained, there can be little real progress made toward securing adequate service by means of re-routing.

PRESENT SERVICE

"The present routing is far from satisfactory. Some sections of the city are getting better service than other sections. Many routes which should be served with double-truck cars are still being operated with the small single-truck cars, and excessive overcrowding at certain times of the day exists on some lines, while, on the other hand, there are empty seats which are unnecessarily being run at other times and places. The whole system of routing is the result of more or less haphazard development rather than the outcome of a careful design. The growth has been influenced to a certain extent by special interests, which have been favored, not so much on account of influence as through insistence, until the entire routing system may be said to be out of balance.

"To improve the routing on a permanent basis, the following steps are suggested:

"1. Determine the relation that should exist between income and service by agreeing that a certain percentage of the gross earnings from operation shall be used in giving service; the balance to be retained by the company for fixed charges and profits. A discussion of what this ratio should be under Pittsburgh conditions has been prepared and will follow in a later report.

"2. Study the requirements of each section of the city and district and the physical difficulties to be contended with.

"3. Establish the principles of routing that will result in the most economical distribution of the car-miles available with a given income.

"4. Provide a system for the recording and the checking of schedules, delays and accidents. These records should be constantly used for improving the service and should be public.

"5. Make provision for extending and altering the tracks and routes to take care of constantly growing and shifting demands.

"It will be decidedly ineffective work to approach the re-routing part of the transportation problem without an equipment for securing the information needed as well as a definite understanding that a comprehensive plan is to be developed, which will be acceptable to and accepted by the majority of interests affected.

DATA REQUIRED FOR ROUTING PROBLEM

"Any rearrangement of routes, to be of permanent benefit, must be based on facts and not on assumptions. Among the records which should be available to those charged with the responsibility of working out an improved schedule are the following:

"1. Monthly records of the number of passengers, number of car-miles and earnings per car-mile on each route operated by the company for several years past.

"2. Continuous daily records showing the earnings of each car on each route, the total number of passengers carried by each car and the actual time of each trip as compared to the scheduled time.

"3. The physical limitations of each route showing length of line, curves, width of streets, obstructions at corners, distance between tracks, overhead obstructions, grades, terminal facilities and connections with other routes.

"4. The present schedule showing the number of cars scheduled at different times of the day for summer and winter service, and the time required for each run during rush hours and non-rush hours.

"5. The location of car houses and storage tracks and a statement of the dead mileage which the present arrangement entails in running empty cars to and from the ends of their routes when placed in or taken out of service.

"6. Records of counts on passengers and seats which have been made from time to time by the city and by the company at various checking stations.

"7. Records of individual car trips which have been made and which ought to be made to ascertain when the passengers board the car, how far they travel and when they alight, and the ratio between the maximum number of passengers using the car on a given one-way trip and the maximum number on the car at any one time.

"8. A study of transfers showing the total number and the character and size of the transfer load at the transfer point.

"9. Record of franchise requirements and agreements between underlying companies which affect the number and location of the cars on the various lines.

"10. Copies of working agreements with operating men as to hours of work, tripper or swing-back runs, etc.

"11. Full list of car equipment, available, ordered and contemplated, with data as to possible changes which will allow for double-ended operation.

PRINCIPLES OF ROUTING

"Before much progress can be made in re-routing the cars, an agreement will be desirable covering the fundamental principles involved, some of which may be outlined tentatively as follows:

"1. The measure of service on any route should take into account the ratio between the total number of passengers in the car for the entire one-way trip and the maximum number on the car at any one time. This 'loading factor' is different for different routes, and if the continuous records for individual car loading is to be an indication of the relative demands for seats, this factor should be determined for each route and used intelligently.

"2. To determine whether any part of the system should be on a through line or on a transfer route, the demand for seats during the rush hour on that line should be sufficient to call for say, six large cars per hour; otherwise it will probably be found that better service may be supplied by a small car operating more frequently in a shuttle service.

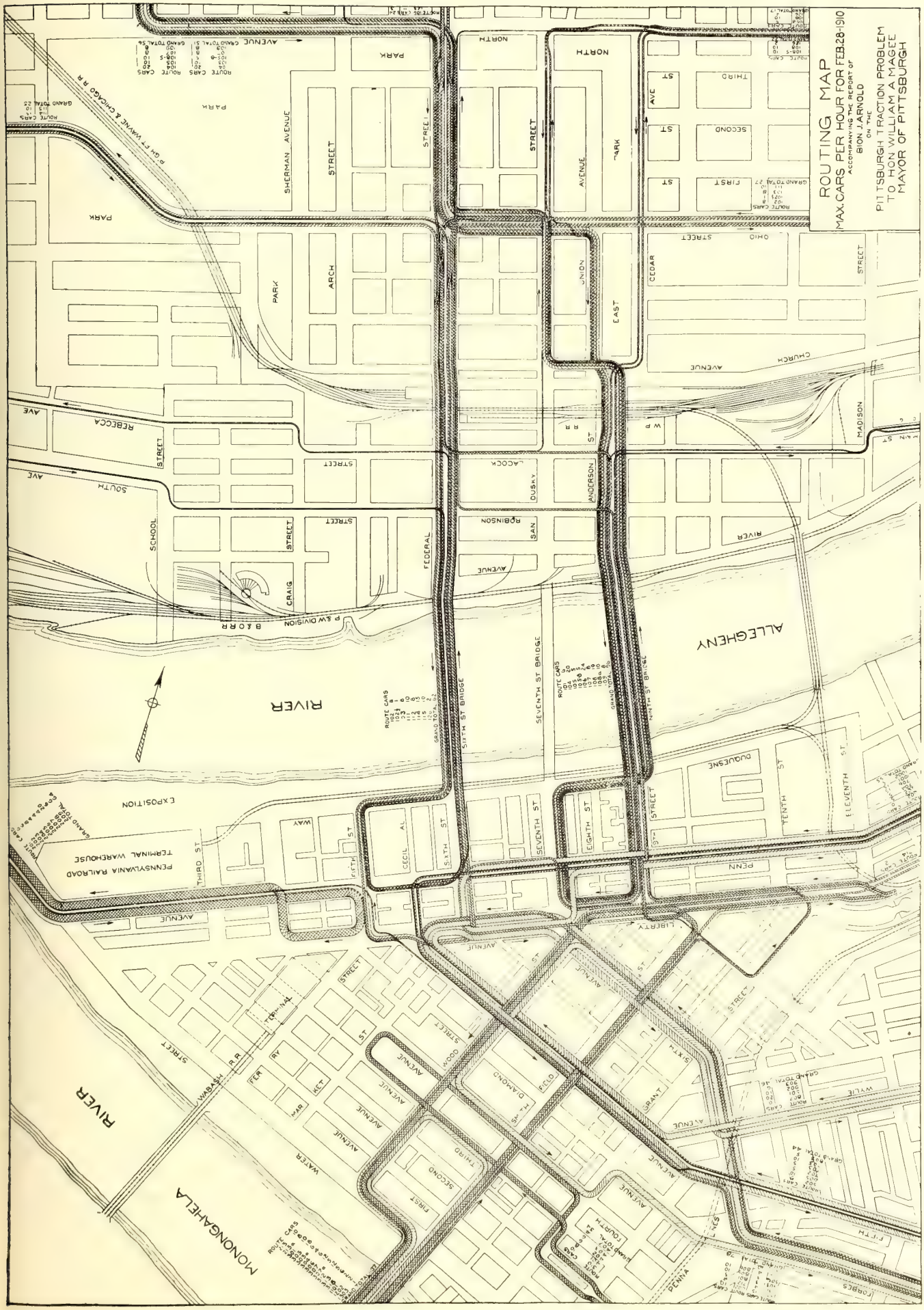
"3. There may be routes or lines upon which shuttle service might be provided to the best advantage at all times except during rush hours, when 'through' cars can be provided.

"4. Transfers are not a hardship if the passengers get something in return to compensate them for the inconvenience of transfer—for instance, more frequent service in large, comfortable cross-seat cars for at least part of the ride.

"5. The small single-truck cars should be operated on the hills and on cross-town transfer lines, but should be kept out of the terminal district and off the main throughfares.

"6. In the downtown district, the long-haul routes should make use of the short loops and the short-haul routes should use the long loops, as the long-haul passengers will walk further to get a seat than the short-haul passengers.

"7. Through routing can be established gradually, by first connecting the short-haul routes on different sides of the city in such a way as to form through routes, and as these first routes prove successful, more through routes may be added.



Pittsburgh Rush Hour Movement, Showing Present Routing and Winter Schedule in Downtown Terminal District

"8. Transfers should be given in an effort to cut out useless car-miles and by concentrating traffic on through routes secure the efficiency that comes with the most efficient traffic density.

"9. If it can be agreed that the service to be supplied is measured by the income, then the one-city, one-fare principle and a very liberal transfer policy can be adopted, and there will be no question as to whether or not the patrons of the system will get back in service their share of the fare.

"The working out of the whole problem of routing, therefore, starts with determining definitely how much of the income is available for service, then how many car-miles this appropriation will supply, and finally what disposition of this service will best supply the demands for seats.

"This program presupposes that the records of the present routing and service will be available, that the results of a complete system of checking future operations will be made public, and that there will be a continuous and effective co-operation between the company and the city in considering and carrying out the proposed changes and eventual improvements.

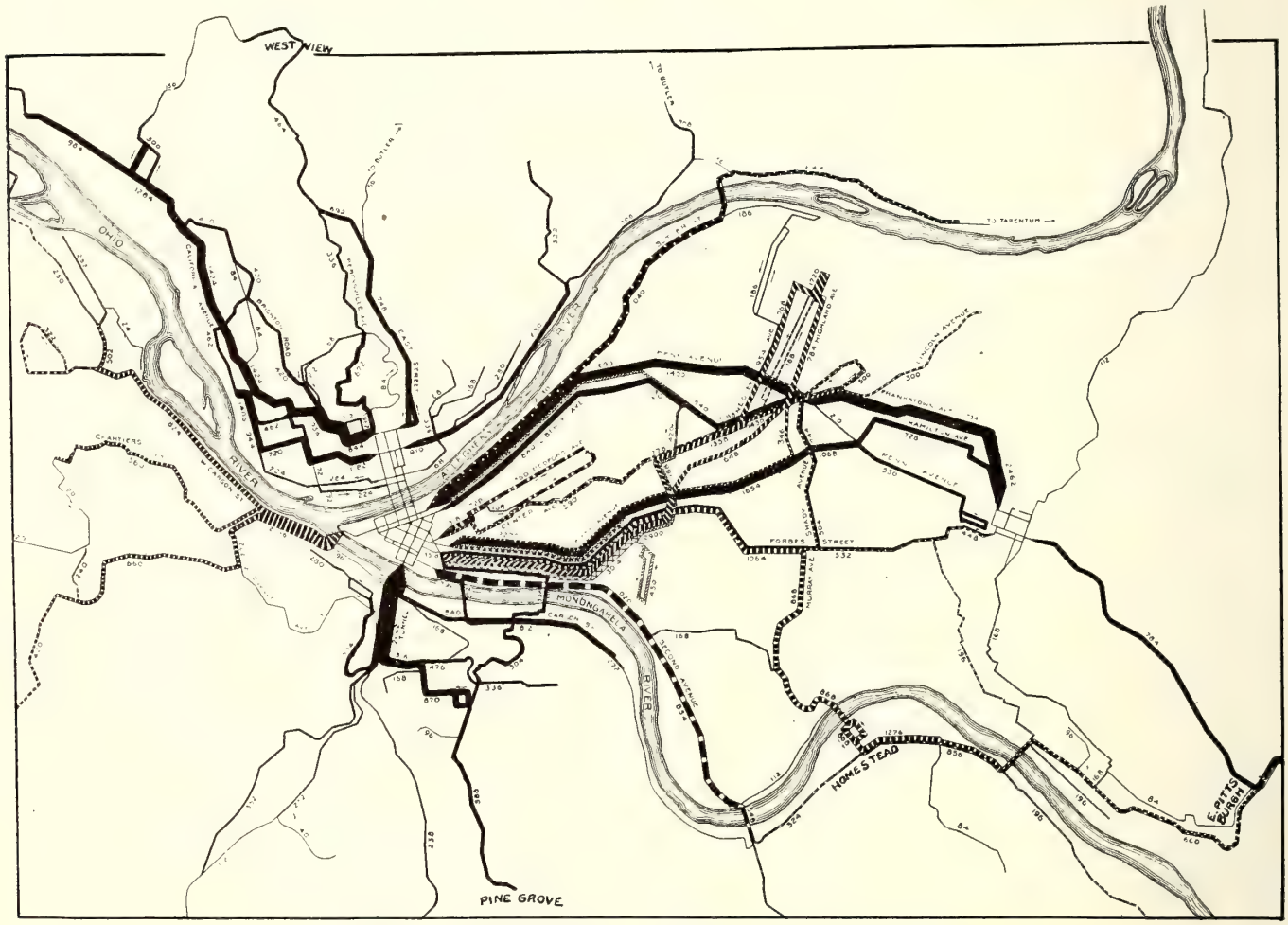
DIAGRAMS

The first portion of the report is accompanied by two diagrams, reproduced herewith. The large diagram on page 151 shows the rush-hour movement on Feb. 28, 1910, a typical winter day. Each route is indicated by a different kind of a shaded line and the width of the lines varies with the number of cars operated during one rush hour. As will be seen, the system of routing in Pittsburgh consists of looping the cars on the various routes in the downtown district. There are no stub-end terminals except at the Union Depot. This loop routing results in many conflicting crossings at street intersections on account of the converging layout which was brought about by the two systems of streets developed parallel to the rivers. The maximum number of cars scheduled to leave the downtown section of Pittsburgh is 598 per hour.

The diagram on this page shows the rush-hour seating capacity of the surface railways of Pittsburgh taken on the same day tabulated in the larger diagram. In this diagram, the width of the lines indicates the number of seats which are scheduled to be operated one way on each route during the rush hour. The total number of seats due to leave the central business district at "The Point" and on the North Side is 23,942 during the peak hour of the evening rush. This diagram shows where these seats go and how the system is routed on the "direct" principle, with most of the cars running from the center of the city to the outlying districts with very few cross-town lines.

OTHER SECTIONS

Other sections of the report will relate to the financial and operating records of the Pittsburgh Railways Company, and will give comparisons with traction districts in other cities, future developments for rapid transit in Pittsburgh, etc.



Rush-Hour Seating Capacity of Pittsburgh Street Railways

INTERNATIONAL EXHIBITION OF ELECTRICITY AS APPLIED TO RAILWAYS

Under the auspices of the Imperial Russian Technical Society, the International Exhibition of Electricity as Applied to Railways will be held in St. Petersburg this year from the middle of August to the middle of November. It will be divided into three sections. The first section will be devoted to the applications of electricity to trunk lines. Drawings, descriptions and views of apparatus and installations will be exhibited in a section covering the following: Signaling, blocking, telegraph and telephone systems used on trunk lines, and experimental installations of these systems in working order which have not yet been in use in Russia, electric lighting and power transmission systems in railway stations

and shops, also train-lighting systems. The exhibits under the second section, which will be devoted to street and interurban railways, will include cars, car equipment and car parts, track and overhead material and data bearing on their installation and maintenance, drawings, photos and descriptions of central stations and separate parts of their equipment, also apparatus for insuring their continuous operation. Plans, drawings and views of car houses and repair shops and their different departments will also be shown under this division. The third section will be devoted entirely to hydroelectric plants. This exhibit will contain drawings and photos of projected and constructed hydroelectric plants in Russia and foreign countries, and apparatus for hydroelectric installation.

A standard gage track, 2 miles in length, will be constructed by the society for testing purposes. The expenses of the exhibition will be defrayed by the receipt of entrance fees, payment for spaces from exhibitors, sale of catalogs, etc. The exhibition will be in charge of a special organization committee of the society. The objects exhibited will be judged by an expert's jury which consists of members elected by the eighth section (railways) of the Imperial Russian Technical Society and approved by the council of the society. The president of the jury of experts will be sanctioned by the Minister of Commerce and Industry. On the report of the expert's jury the committee will award gold, silver and bronze medals, diplomas, as well as honorary prizes and honorable mentions. To exhibitors will be awarded prizes given by the Government and by societies, whose right to confer prizes is established by their duly registered rules. The number and quality of the prizes awarded by the committee will conform with the determination of the Government and institutions establishing the prizes

PREPAYMENT CARS AT RAILROAD CROSSINGS

At the annual convention of the Iowa Street & Interurban Railway Association this year, in the discussion which followed the reading of a paper on "Prepayment Cars," questions were raised as to the best method for protecting the rear end of a pay-as-you-enter car while the conductor was flagging a crossing. Various methods were suggested and a member of the association called attention to a law in Iowa which prohibits locking the doors or otherwise hampering the free entrance and exit of passengers. Inasmuch as the practice with regard to this matter varies, the opinions of several railway operators who have communicated with this paper on this subject are presented in abstract.

T. Fitzgerald, assistant general manager Cincinnati (O.) Traction Company—"With reference to preventing the ingress and egress of passengers at railway crossings, this is something that I would not consider a sensible proposition, as in case of the trolley leaving the wire, or if for any other cause the car should become stalled on the track, the safety of a number of passengers might depend upon their ability to leave the car promptly. In the operation of our prepayment cars such points have practically given us no trouble, as the conductor can keep his eyes open and can usually get the fares of all passengers boarding at these points. Most of our crossings are in outlying districts where the traffic is light, and we have flagmen stationed at the crossings in the congested districts during the hours of heavy traffic. I do not believe that this is a matter of any serious importance to us. If the conductor is compelled to leave his car he calls the motorman to the rear end for the purpose of seeing that fares are deposited in the fare box."

Operating Official, Ft. Dodge, Des Moines & Southern Railroad, Boone, Iowa—"On prepayment cars passengers must leave and enter from one side, the other side remaining closed. Our conductors, when they go ahead to flag a crossing, keep on that side of the car and watch passengers. It seems to me that the conductor is in a position to give a quick signal to the motorman should passengers attempt to alight or a person attempt to board the car. I do not believe it would be a good plan for the conductor to put a bar or any other hindrance across the openings of the car, as even with the conductor flagging a crossing an accident might take place and the passengers would be in greater peril because of the obstruction placed by the conductor."

Charles E. Taylor, superintendent Edmonton (Alta.) Radial Railway—"Our pay-as-you-enter cars are fitted with a sliding step controlled by the conductor from the rear platform. On leaving the car at any time that the conductor is requested to flag the car across the railway crossings or other point, the conductor operates this step by means of a handle in the vestibule, which allows it to be drawn underneath the car and has the effect of keeping passengers from boarding the car while the conductor is absent from the platform. We have found this very satisfactory, as we have yet to experience any boarding or alighting accident whatever in the operation of our pay-as-you-enter cars."

J. B. Rannie, traffic superintendent British Columbia Electric Railway, Ltd., Vancouver, B. C.—"Our company has only recently commenced using the pay-as-you-enter type of car and up to the present time we have not been using a gate or bar to lock the entrance while the conductor leaves the car for the purpose of getting change or for any other reason."

Thomas H. McCauley, superintendent Calgary (Canada) Electric Railway—"We have only an occasional case of a conductor leaving his post, not having any level crossings except over a spur rarely used and then protected by the steam railway company by signal when the conductor goes forward to signal only. Under such circumstances the conductor leaves his car after the passengers are all off and on and signals from a point where he has a view of the rear platform. We are training our passengers to pay voluntarily, by notices at the rear reading, 'Passengers are required to voluntarily place fare in box. Neglect to pay is a criminal offence subject to fine or imprisonment.' This is a municipal system and therefore passengers are stockholders to a great extent."

L. D. Mathes, manager Union Electric Company, Dubuque, Iowa—"In operating the cars of the pay-as-you-enter type we adopt no special ruling or measure for controlling movement of passengers to and from the car at steam railroad crossings. Local conditions are such that few passengers board or leave the cars at these points. The conductor goes ahead in the usual manner and reaching the center of the steam crossing he observes whether passengers are entering or alighting from his car before signaling the motorman to come ahead. In event the passengers board the car they find the inside doors open. The conductor enters the body of the car and collects the fares in the same manner as he would if the car was of the standard box type. It was suggested that the conductor could pull the double sliding doors together and throw a latch or lock, thereby restraining passengers from leaving the car at the crossing and holding those who might board it on the rear platform. We consider this an unsafe method, as in the event that the electric car was threatened with a collision in crossing the steam railroad tracks, passengers would have no chance to escape by the rear doors. This entire question impresses us as being one so entirely governable by local conditions that no universal rule of practice can be adopted. We feel that it would be a grave error to lock the car doors while the conductor is flagging the crossing."

H. T. Edgar, manager Northern Texas Traction Company, Ft. Worth, Tex.—"We only have two crossings operated over by pay-as-you-enter cars, and as passengers are not accustomed to boarding or leaving the cars at these crossings, we have had no trouble whatever on this account, which would make our condition in this respect very much easier than would be found on some other companies. When passengers board cars at crossings the conductor always waits to collect fares before he goes ahead to flag the crossing and, of course, passengers leaving the car would be protected in the same way on pay-as-you-enter cars as on the old style."

Harry Bullen, general superintendent Detroit (Mich.) United Railway—"We have but one of our lines (Woodward Avenue) fully equipped with pay-as-you-enter cars. There is no railroad crossing on this line and there is no occasion therefore

for the conductor to be absent from the car while the latter is in regular operation."

REASONS FOR ATTENDING THE ATLANTIC CITY CONVENTION

H. C. Donecker, secretary of the American Street and Interurban Railway Association, is sending out this week to all member companies and associate members a series of five mailing cards on which are printed reasons why officers of each department should attend the Atlantic City convention. The text of the cards is reprinted below:

AMERICAN ASSOCIATION

"The advantages of becoming a factor in a registration of between 3000 and 4000 individuals.

"The privilege of attending 21 meetings of five affiliated associations.

"Participation in the discussions of more than 60 committee reports and papers.

"The broader viewpoint afforded by the consideration of the practice of other companies.

"An opportunity to hit upon the solution of problems which may have been met and overcome in other localities.

"The advancement of the work of standardization generally, which can best be accomplished through co-operative effort. Standardization means economy and is of increasing importance because of advances in unit costs.

"The benefits resulting from the inspection of the exhibits of more than 200 manufacturing companies, which exhibits cover over 70,000 sq. ft. of space.

"The ideas of others may help you; why not let your own ideas help others?"

TRANSPORTATION AND TRAFFIC ASSOCIATION

"The attendance will be drawn from the leading officials of more than 350 electric railway companies.

"The subjects treated are live and up-to-date and relate to both city and interurban operation. Among them are 'City Rules, 'Interurban Rules,' 'Training of Transportation Employees,' 'Transfers,' 'Creation of Passenger Traffic,' 'Express and Freight,' and 'Construction of Time Tables and Schedules.'

"The association was organized for mutual benefit; therefore it needs your ideas as well as those of the other fellow.

"The problems discussed cover a wide variety of conditions, some of them undoubtedly similar to your own.

"The educational advantages in the inspection of a manufacturers' exhibit covering upward of 70,000 sq. ft. of space.

"New thoughts are created, the means of overcoming difficulties developed and a broader viewpoint afforded through the consideration of the operating methods of others."

ENGINEERING ASSOCIATION

"It will broaden the point of view.

"It will stimulate the imaginative faculty, which is behind creative force.

"It brings one into touch with thinking men of the profession from widely different points, representing a wide range of conditions.

"The convention discussions offer opportunities (for interchange of ideas) that do not occur at other times during the year.

"You have good ideas and the association wants them.

"The manufacturers' exhibits as usual will be a great attraction, and an education in themselves."

ACCOUNTANTS' ASSOCIATION

"Because the discussions will reveal to you the weak points in your system.

"Because you can get the benefit of the diversified experience of those who attend.

"Because you owe it to the association to give the members the benefit of your experience.

"Because you cannot afford to miss meeting the fellows who go.

"Because you will be benefited by the trip. It will take the place of the vacation which it is so hard to find time to take."

CLAIM AGENTS' ASSOCIATION

"Seven 'live-wire' subjects, full of interest to you, are on the program.

"The best kind of tact is contact. Get in touch with fellows who do something.

"The broadening of your acquaintance among progressive men will alone be worth more than the cost of the trip.

"If you are a man of ideas and willing to express them the convention wants you to bring your ideas and help the other fellow as well as yourself.

"Another reason why we want you is because we know that you are not one of those who are ready to be superannuated and feel that they know everything about every phase of claim work, and have reached a point where an exchange of ideas will not benefit them."

DEATH OF MR. LINCOLN

The funeral of Frederick H. Lincoln, vice-president and general manager of the Pay-Within Car Company, occurred on the afternoon of Thursday, July 14, at his late residence in Philadelphia. The interment was made at the West Laurel Hill Cemetery, Philadelphia. The American Street & Interurban Railway Engineering Association, of which Mr. Lincoln was elected president last October, was represented by a committee appointed by Acting-president Harvie and consisting of Messrs. Adams, Winsor and Gove. There was also a large attendance of Mr. Lincoln's recent associates and other friends in the Philadelphia Rapid Transit Company and other companies.

The result of the coroner's inquest on the death of Mr. Lincoln, held July 18, developed the fact that when Mr. Lincoln boarded the Washington train on which he met his death, it had just started to move from the West Philadelphia station. Mr. Lincoln had both feet firmly on the step and his left hand was on the grab rail. But as the train moved on, his grip, which he held in his right hand, caught between the side of the car and the open door of a signal tower which is at the end of the platform, and he was pulled off the step. The signal tower is approximately 20 ft. from the point at which Mr. Lincoln boarded the car and stands about 20 in. from the side of a passing car. The coroner's jury recommended that the Pennsylvania Railroad Company remove the tower to a safer distance from the track.

RESULTS OF THROUGH TICKETING IN ENGLAND

The annual report of the tramways department of the county borough of Croydon, England, gives some interesting figures on the result of the through ticketing arrangement with the London County Council Tramways, as mentioned in the Electric Railway Journal for May 7, on page 824. As the result of an agreement "That the amounts to be apportioned between the authorities shall be in accordance with the fare stages traversed in the area of each authority," there were sold by the joint systems no less than 757,761 through tickets between July 31, 1909, and March 31, 1910. The proportion due to the London County Council was practically £6,317 and to Croydon £3,039. The building of a short extension between Norbury and Streatham and the inauguration of the through tickets increased the travel over the joint route by about £9,983. An interesting feature in connection with this service is that it resulted in the discontinuance by Sept. 15, 1909, of a motor omnibus service which had been started July 26, 1908. Between April and September, 1909, 203 motor omnibus breakdowns delayed the Croydon car service for a total of 163 hours, 7 minutes. From April 1, 1909, to March 31, 1910, the Croydon Tramways operated 7,585,900 car-miles; carried 64,764,415 passengers and had receipts of £288,385, or 9.1 pence per car-mile. This municipal tramway system is managed by T. B. Goodyer, who kindly furnished the foregoing figures.

STEP HOLDER FOR OPEN CARS

The Brooklyn Rapid Transit System and the Third Avenue Railroad, New York, recently have equipped 919 and 232 open cars respectively with a running board step-holder invented by Joseph Edwards, a shop foreman of the first-named company. The application of this device is shown in the accompanying views as follows: the side elevation, Fig. 1; the cross-section, Fig. 2, taken through the points 2—2 of Fig. 1; the perspective view, Fig. 3; and the front view of the upper portion of the bracket, Fig. 4. In this device the keeper is always out of the way when not in use and so cannot catch the clothing of the passenger; neither does it have to be raised and held up while the step is made upright.

The sides of a car using this step-holder are provided with iron hangers, each of which has a rearwardly-projecting foot

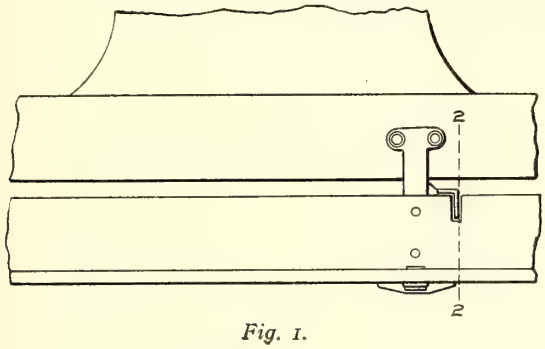


Fig. 1.

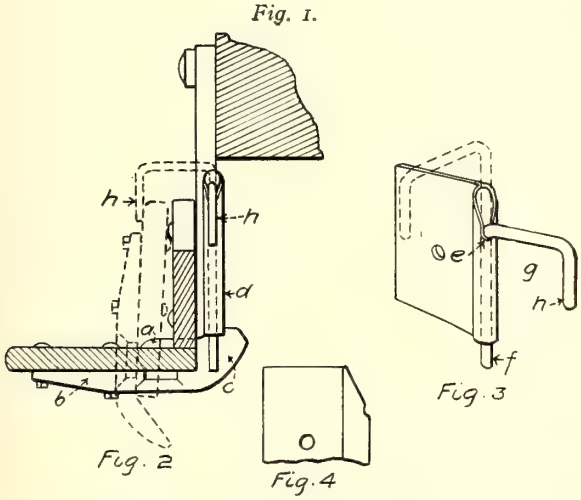


Fig. 2 Fig. 3 Fig. 4

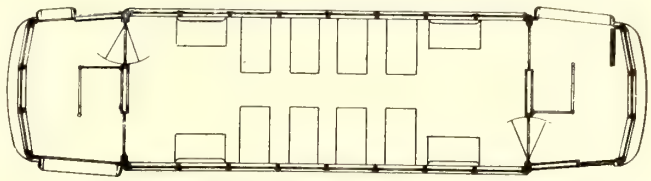
Details of Step Holder for Open Cars

with an inclined face. This foot has front ears "a" to which a hinged arm "b" is attached. The arm "b" has a toe "c" which is adapted to come against the foot when the arm is forced downward, thereby supporting the arm in a horizontal position. The running board is attached to the upper side of these arms and the riser to the outer face of the hangers. On the rear of the hangers there is attached a bracket "d" which consists of a plate with a vertical sleeve at its edge. The upper end of the sleeve has inclined side lips which lie in a plane substantially at right angles to the plane of the riser. The side of the sleeve opposite the bracket plate is formed with a notch "e." It will be observed that the step is made to receive the shank "f" of a bent keeper "g." The shank is not secured to the sleeve, but simply is received loosely therein.

The action of the keeper in holding the running board upright is shown in Fig. 2. The step is folded upward and the keeper is raised, rotated forward and dropped so that its finger "h" engages the outer or under side of the step. It is necessary only to raise the keeper to permit the step to assume the horizontal position. When the keeper is released it descends by gravity so that its horizontal portion rests upon the upper inclined edges. The keeper cannot stay in equilibrium in this position, as the effect of the inclined edges is to rotate the arm backward so that it moves in substantially the same plane as the bracket plate. The upper edge of the riser has a slot to enable the finger "h" to clear the riser when the keeper swings backward.

SINGLE-TRUCK, DOUBLE-END, PAY-AS-YOU-ENTER CAR

The Niles Car & Manufacturing Company, Cleveland, Ohio, has recently furnished some pay-as-you-enter cars to the Aurora, Elgin & Chicago Railroad under license of the Pay-as-You-Enter Car Corporation. As shown in the plan and half-tones,



Plan of Single-Truck, Double-End, Prepayment Car

these cars are of the single-truck, double-end type. The general specifications are as follows:

Length of car body over end plates	20 ft.	8 in.
Length over buffers	32 ft.	2 in.
Length of vestibules	5 ft.	1½ in.
Width over all	8 ft.	5¼ in.
Height, under sills to top of roof	9 ft	
Seating capacity		24
Length of cross seats		33 in.
Width of aisle		21½ in.
Wheel base of truck	7 ft.	6 in.



Single-Truck, Double-End, Prepayment Car

The bottom framing consists of side sills of 4¾-in. x 8-in. yellow pine; end sills of 5½-in. x 8-in. oak; truck frame sills, 3¼ in. x 6 in. The floor is of ⅞-in. x 3¼-in. yellow pine laid lengthwise of car, with maple floor strips in aisle. All body



Interior of Aurora, Elgin & Chicago Car

posts are of ash or oak. The vertical outside sheathing is of ¾-in. x 2-in. poplar. The double-sash windows have the upper sash stationary, the lower ones being arranged to drop with hinged covers over sash pockets. The end bulkheads have a panel in the center and a door at each side.. The vestibules at each end of the car have double folding exit and entrance doors at the rear and a sliding exit door at the front. An iron pipe railing, as shown in the drawing, separates the entrance from the exit on the rear platform. The interior finish is in quartered oak. The seating is of rattan.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Georgia.—Commerce—Interstate Commerce—Taxation.

Where a city grants permission to an electric railway company, exclusively engaged in the transportation of interstate freight and passengers, to use certain of its streets by running its cars over the tracks of a local street railway company, under the terms, conditions, and limitations specified in the contract between the two companies, it cannot impose a specific annual tax on the business of such railway company for running its cars in the city's streets. Such a tax is laid on the business of carrying on interstate commerce, and amounts to a regulation of it, which under the Federal Constitution belongs solely to Congress.—(City Council of Augusta et al. v. Augusta & A. Ry. Co., 61 S. E. Rep., 992.)

New York.—Carriers—Carriage of Passengers—Refusal to Give Transfers—Penalties.

Where it is shown that one became a passenger merely to see whether or not the company was giving transfers as provided, and that he had no business beyond the point of transfer, he is not aggrieved, within the meaning of the statute, by the company's refusal to issue him a transfer.—(Bull v. New York City Ry. Co., 106 N. Y. Sup., 378.)

New York.—Street Railroads—Mortgages—Construction—After-Acquired Property—Foreclosure of Mortgages—Sale of Property—Reservation of Right to Impose Liens.

A clause in a general mortgage executed by a street railroad company on all of its property, which specified as included therein all after-acquired engines, machinery, tools and equipment of every description used in operating the mortgagor's lines, covers machinery subsequently acquired and installed in buildings on real estate afterwards acquired and not subject to the mortgage, which is used in operating such lines, or in any manner in connection therewith, where it is not attached to the realty and can be removed without injury thereto.

A street railroad mortgage covering all of the property of the mortgagor specifically enumerated a number of lines of road either owned or leased by it, and provided, inter alia, that it should include all "equipment of every description now used or which may hereafter be used or employed upon said several lines or routes, whether now owned by the railroad company or hereafter to be acquired for use upon or in connection with the same." Held, that such provision included rolling stock and all other personal property subsequently acquired by the mortgagor and devoted to use generally on its system, which included, not only the lines enumerated and covered by the mortgage, but other after-acquired lines, which were, however, operated in connection therewith, and all of which, by the law of the State requiring the exchange of transfers between them were made a single unitary system.

New York.—Foreclosure of Mortgages—Sale of Property—Reservation of Right to Impose Liens.

A decree foreclosing a mortgage given by a street railroad company operating an extensive system, including leased lines, which system has been operated for several months by receivers, must necessarily reserve to the court the right to impose liens on the property after its sale, in case it shall be necessary for payment of the expenses and obligations incurred by the receivers, including personal injury claims, and balances which may be found due to lessors whose lines have been returned to them for personal property wrongfully withheld.—(Guaranty Trust Co. of New York v. Metropolitan St. Ry. Co. et al., 166 Federal Rep., 569.)

Texas.—Statutes—Implied Repeal—Licenses—Occupation Tax—All Other Taxes.

A statute may impliedly repeal an earlier one by entirely superseding it, though there is nothing in the provisions of the two which might not stand together if all were inserted in one act.

Where a statute imposes an occupation tax it will be ordinarily presumed that that is to be the only tax on such occupation, unless a different intent plainly appears.

Sayles' Ann. Civ. St. 1897, Art. 5049, Subd. 54, imposes an annual occupation tax on street railway companies, based on mileage. Acts 30th Leg. (Gen. Laws 1907, p. 479) c. 18, levies a gross earnings annual occupation tax on street railways in cities of over 100,000 population; section 22 declaring that the taxes so levied shall be in addition to "all other taxes," with the exceptions defined by the act, while section 25, prescribing the taxes from which corporations taxed under the act shall be exempt, includes occupation taxes imposed by Act 1905 (Laws 1905, p. 217, c. 111) Held, that the words "all other taxes," in section 22, included all taxes except those specified in section 25, and hence the act of 1907 did not impliedly repeal so much of article 5049, Subd. 54, as imposed occupation taxes on street railway companies, but that the taxes imposed by that act were in addition to the gross earnings tax imposed under act 1907.—(Dallas Consol. Electric St. Ry. Co. v. State et al., 120 S. W. Rep., 997.)

Texas.—Licenses—Occupation Tax—Repeal of Statute—Street Railroads—Double Taxation.

Sayles' Ann. Civ. St. 1897, Art. 5049, Subd. 54, provides for the levy of an annual occupation tax on street railway companies on a track mileage basis. Acts 30th Leg. (Gen. Laws 1907, c. 18) pp. 479-489, levies an annual occupation tax upon street car companies in cities over 10,000 population, on a basis of gross receipts, and provides that, except as herein stated, all taxes levied by this act shall be in addition to all other taxes now levied by law. The Thirtieth Legislature voted down an amendment to this act, expressly repealing article 5049, Subd. 54. Held, that the latter act did not repeal the former.

Held, also, that the exaction of both taxes was not double taxation, since it was the intention to equalize the burden of taxation, on the theory that the franchises of companies in populous cities were more valuable than in smaller ones.—(Dallas Consol. Electric St. Ry. Co. v. State et al., 118 S. W. Rep., 879.)

Washington.—Street Railroads—Franchises—Statutes—Expression in Title of Subject of Act—Municipal Corporations—Act of City Legislative Authority—Franchises—Injunction.

Laws 1903, p. 364, c. 175, as amended by Laws 1907, p 192, c. 99, empowers the legislative authority of a city having control of any public street to grant street railway franchises and to prescribe the terms and conditions on which such railways shall be constructed, maintained and operated. Seattle Freehold Charter, Art. 4, Sec. 23, provides that, on application being made for a street railway franchise, the City Council shall by resolution determine whether such franchise shall be granted, and shall cause notice of the application to be published, etc., and offer to grant the franchise to the person or corporation who will pay the highest percentage annually of gross receipts, etc. Held, that in view of the constitutional provision reserving to cities power to frame and adopt charters, but also providing that such charter shall be subject to and controlled by general laws, and of the construction placed thereon, viz., that a general law is superior to and supersedes all freehold charter provisions inconsistent therewith, the legislative authority of the city was not required to follow the charter method in determining to whom it would grant a franchise, but could exercise its own judgment on the question, and the fact that bids were invited and received in the manner provided by the charter did not lessen the right of the legislative authority to determine the question as it saw fit, and to grant the franchise to one other than the highest bidder.

Laws 1903, p. 364, c. 175, is entitled, "An act relating to electric railroads * * * the use of streets and roads thereby," etc. This title is repeated in Laws 1907, p. 192, c. 99, amending the former act. Held, that the title is sufficiently broad to bring the provisions of the acts relating to the granting of franchises for such railways by the legislative authority of cities within the subject-matter expressed in the title.

Under Laws 1903, p. 364, c. 175, as amended by Laws 1907, p. 192, c. 99, empowering the legislative authority of a city to grant street railway franchises and to prescribe the terms and conditions on which such railways shall be con-

structed, maintained, and operated, the acts of the legislative authority in granting a franchise are purely legislative, and will not be enjoined.—(Ewing v. City of Seattle, Seattle Electric Co., Intervener; 104 Pac. Rep., 259.)

Wisconsin.—Exchange of Property—Title—Sufficiency—Rescission—Grounds—Failure to Perform—Cancellation of Instruments—Relief—Occupation of Land by Railroad Tracks—Removal of Cloud on Title.

A railroad company in exchange for a right of way and certain other land, agreed to convey a tract of land "by good warranty deed." The railroad company tendered a warranty deed from an agent, who held under a deed expressed to be in trust for the railroad company. The property of the company was covered by a mortgage securing the payment of a large amount of outstanding bonds. Held, that the title tendered was not one which the grantee was bound to accept, since it was doubtful whether the trust was not passive, so that title would vest at once in the company, making the land subject to mortgage; and, on the other hand, if the trust were active, the proposed conveyance might be in breach of it, and in case there was no express trust, the agent's title might be clouded by the possibility of a resulting trust in favor of the creditors of the company, under St. 1898, Sec. 2078, providing that, where title is taken in the name of one person, and the consideration paid for another, such a conveyance shall be presumed fraudulent as against the creditors of the parties paying the consideration.

Plaintiffs agreed with a railroad company to give it a right of way and certain other land in exchange for a specified tract of land and $800. The company paid the cash consideration, and went into possession of its tract, and graded its road and laid its tracks, but the title which it offered to convey to plaintiff was not marketable, and was rejected. Held, that there was a failure of performance on the part of the company, justifying a cancellation of the contract in equity.

Held, also, under St. 1898, Sec. 1852, giving a railroad time to acquire or perfect title to land on which they have laid their tracks, and forbidding an injunction pending proceedings to assess compensation, etc., that the cancellation of the contract should not affect its operation as a consent to the occupation of the right of way, and that the company should be permitted to remain in possession pending the determination of the compensation to which plaintiff was entitled.

Where a contract between plaintiffs and a railroad company, by which plaintiffs were to transfer a right of way through their property, and all their land lying to the east of the right of way, in consideration of the transfer of a like amount of land by the railroad company, is declared rescinded by the court, if the contract, after such rescission, constitutes a cloud upon the title of plaintiff's land, the removal of such cloud is not only inherently a function of equity, but is specially enjoined by St. 1898, Sec. 1836.—(Mahn et al. v. Chicago & M. Electric Ry. Co. et al., 121 N. W. Rep., 645.)

LIABILITY FOR NEGLIGENCE

Alabama.—Street Railroads—Action for Injury from Car—Proof of Operation by Defendant—"Railroad"—"Railway."

Plaintiff, suing for the killing of his mule through the alleged negligent operation by defendant's agents and servants of one of its cars on its street railroad, has the burden of supporting the allegation that it operated the car. In the absence of evidence of another corporation of a similar name, the jury may infer that defendant, named in the caption of the complaint as "Mobile Light & Railroad Company, a corporation," was, as alleged, operating the street car in the city of M. that killed plaintiff's mule, from his testimony that he had a mule killed on a certain street in such city, that the railroad track runs on such street, that it was the track of the "Mobile Light & Railway," and that "they" operated cars down that street; the words "railroad" and "railway" being practically synonymous. (Mobile Light & R. Co. v. Mackay, 48 S. Rep., 509.)

Louisiana.—Municipal Corporations—Negligence—Leaving Horse Unhitched—Carriers—Negligence of Motorman—Evidence.

Where a horse attached to a wagon was left standing unhitched in a public street and ran away and collided with a street car, whereby plaintiff was injured the owner of the horse was liable for damage caused, under Civ. Code, sec. 2321.

A motorman held not negligent for failing to bring his car to a full stop on seeing a wagon on the side of the street without a driver, where the horse takes fright and collides with the street car, and a person, an employee, thereon is injured. (Trenchard v. New Orleans Ry. & L. Co. et al., 48 S. Rep., 575.)

Massachusetts. — Injuries — Negligence — Contributory Negligence.

Where a street car was running along a country road outside of the roadway, the motorman was not bound to anticipate that a traveler would needlessly drive upon the track, and need not stop until there was some danger of collision.

In an action against a street car company for injuries caused by plaintiff's vehicle being struck from behind, plaintiff could not recover if he unnecessarily, and without exercising due care, drove out of the highway near to the track, and thereby contributed to his injury.—(Ducharme v. Holyoke St. Ry. Co., 89 N. E. Rep., 561.)

Massachusetts.—Carriers—Street Railways—Injury to Person Boarding Car—Instructions—Negligence.

In an action for injuries while boarding a street car, a charge that where a person goes toward a street car after it has stopped at a regular stopping place and takes hold of it in the process of entering it, he is a passenger, is deficient, in not stating that if the person undertook to take hold of the car after it had started, and without having been seen either by the motorman or conductor, he was not a passenger.

If a street car was just starting and barely moving, the attempt of a woman incumbered with bundles to board it would not constitute negligence.—(Payne v. Springfield St. Ry. Co., 89 N. E. Rep., 536.)

Michigan.—Master and Servant—Injuries to Third Persons—Negligence—Willfulness — Damages — Personal Injuries—Future Consequences—Impairment of Nervous System.

Where, in an action for injuries to plaintiff by his horse becoming frightened by the blowing of a whistle attached to an electric car, there was evidence to prove a negligent use of the whistle as opposed to a malicious and wanton use of it, and the court charged in accordance with defendant's contention that plaintiff could not recover if the whistle was blown intentionally, willfully, and maliciously by the motorman to frighten the plaintiff's horses, if the motorman's act was not within the scope of his employment, it would be assumed that a verdict for plaintiff rested on a finding that the blowing of the whistle was negligent, and not malicious and wanton.

Apprehended future consequences of an injury cannot be considered in determining plaintiff's damages, unless there is such a degree of probability that such consequences will follow as to amount to a reasonable certainty.

Where one of the consequences of injury is a permanent impairment of the nervous system, it should be considered in estimating damages.—(Brininstool v. Michigan United Rys. Co., 121 N. W. Rep., 728.)

Missouri.—Negligence—Issues—Contributory Negligence—Street Railroads—Collision—Negligence of Motorman.

Where plaintiff's want of care appeared in making out his own case, contributory negligence was in issue, though it was not set up in defendant's answer.

In an action for damage to plaintiff's team by colliding with defendant's car, it appeared that plaintiff's driver was driving between defendant's tracks, and that the car and wagon were in plain view of each other for several blocks; that plaintiff's driver actually saw the car coming for a block or two, and attempted to get off the track within sufficient time to have done so, but for the unexpected sliding of the wheel along the track. Held, that the motorman's conduct should only be judged by the standard of an ordinarily prudent man, and he was not required to foresee that the wheel would slide on the rail, and he was therefore not guilty of negligence. (Hebeler vs. Metropolitan St. Ry. Co., 112 S. W. Rep., 34.)

New Jersey.—Street Railroads—Accident to Pedestrian—Negligence.

A pedestrian, struck by a street car which left the track, is not guilty of contributory negligence because he was standing in the roadway, when it appears that he was sufficiently distant from the track for the car to have passed him in safety if it had remained upon the track.—(Najarian v. Jersey City, H. & P. St. R. Co., 73 Atl. Rep., 527.)

New Jersey.—Street Railroads—Injuries to Person on Track—Evidence.

Under the circumstances of this case, where it appeared by a preponderance of testimony that plaintiff had been seen intoxicated shortly before the accident, and the negligence attributed to the defendant rested substantially upon the plaintiff's uncorroborated story, which appears inconsistent with the situation in which he was found after the accident, and which, even if true, discloses negligence on his part, a verdict for the plaintiff is set aside.—(Anderson v. Public Service Corporation of New Jersey, 73 Atl. Rep., 840.)

New York.—Negligence—Personal Injuries—Proximate Cause.

Defendant is liable for any personal injury negligently inflicted, though the injury would have been less disastrous if plaintiff had been in perfect health at the time of the accident.—Miehlke v. Nassau Electric R. Co. et al., 114 N. Y. Sup., 90.)

New York—Master and Servant—Contributory Negligence—Sudden Peril.

The fact that an employee working in a sitting position between the tracks on a trestle, stood up on seeing a train 15 feet away, and was struck by the step of the car, does not render him guilty of contributory negligence, though he might have escaped injury if he had remained passive where he was.—(Gorman v. Brooklyn Heights R. Co., 115 N. Y. Sup., 662.)

New York.—Street Railroads—Injury to Person Crossing Track—Contributory Negligence—Infants—Care Required.

Plaintiff, an infant, before attempting to cross the street, which was 32.7 feet from curb to curb, saw defendant street railroad's car some 215 feet away, and ran to cross the track, but miscalculated the speed of the car, and was struck and injured. Held, that it could not be said that, because he made the mistake of assuming that he could cross the street in safety, he was guilty of contributory negligence as a matter of law.

The law does not require of children the same degree of prudence that is required of adults.—(Quinlan v. Richmond Light & R. Co., 117 N. Y. Sup., 641.)

New York.—Master and Servant—Personal Injuries—Questions for Jury.

Where a motorman claimed that because of lack of proper hangers between his vestibule and the car proper the light prevented him from seeing, and he ran the car into a wagon and was injured, the question of whether he was negligent in not leaving the window ahead of him open wider than 2½ inches, so he could better look ahead, was for the jury.—(Forton v. Crosstown St. Ry. Co., 116 N. Y. Sup., 746.)

New York.—Carriers—Failure to Stop on Signal—Contributory Negligence—Duty to Stop at Customary Place on Signal—Absence of Headlight.

A street car track was built within 5½ ft. of a wire fence on one side of the street, so that when a car passed there was a clear space between the car and fence of about 4 ft. There was no sidewalk there, but pedestrians were accustomed to walk there, and the street cars were accustomed to stop anywhere along there to discharge passengers, or on signal to receive them. Rough ice and snow had formed on the clear space, making an incline towards the tracks. Decedent walked along on such space, and attempted to signal a car, which, however, ran by without slackening speed, and inflicted injuries resulting in his death. Held, that he was not negligent as matter of law in being where he was when injured.

If street railroad cars were in the habit of stopping on signal at a certain place, the failure to do so, resulting in injury to the person signaling, would constitute negligence.

Running a street car after dark without a headlight would be negligent.—(Trieber v. New York & Q. C. Ry. Co., 119 N. Y. Sup., 439.)

New York.—Master and Servant—Appliances and Places for Work—Street Cars—"Bumpers"—Master's Liability for Injuries to Servant—Tools, Machinery—Buffers.

The extensions of the floors of street cars at either end which constitute the platforms are not "bumpers" in the sense in which that term is applied to freight and passenger cars operated in trains on steam railroad lines.

A street surface railroad company operating its cars not in trains, but singly, does not owe its employees the duty of using only cars with platforms at either end so constructed as to be at the same height above the track, or with buffers to guard motormen against injury from collisions. (Durkee vs. Hudson Valley Ry. Co., 86 N. E. Rep., 537.)

New York.—Street Railroads—Rights in Street—Injuries—Actions—Jury Question—Contributory Negligence.

While a street car company has a paramount right to use its tracks in a street, and the driver of a vehicle must leave the track promptly on hearing the signal, he can drive on the street car tracks and assume that a car will not collide with him from the rear without giving him warning of its approach and an opportunity to leave the track, and that the car will not approach in excess of the speed limit.

In an action against a street railroad company to recover damages to plaintiff's horse and wagon, etc., caused by defendant's negligence in striking the rear end of the wagon, whether plaintiff was guilty of contributory negligence held for the jury.—(Normand v. Hudson Valley Ry. Co., 117 N. Y. Sup., 1076.)

New York.—Highways—Repair—Personal Injuries—Obstructing Passage of Trolley Car—Contributory Negligence—Matter of Law—Injury Caused by Negligence of Third Person and Fellow Employee.

Plaintiff, an inspector, was knocked from the running board of a car by a projecting part of a concrete mixer, used by defendant in repairing the highway. Held that, admitting he could have seen it when boarding the car and that it was plainly visible from that time until he was thrown off, he was not guilty of negligence as a matter of law, because he was not legally obliged to look for such obstructions, and his duties required his attention elsewhere, and he had a right to rely on other users of the highway not dangerously obstructing the passage of cars.

Where plaintiff, an inspector in the employ of a trolley road, was knocked from a car by a projecting part of a concrete mixer used by defendant in repairing the highway, if the accident was caused by the negligence of both defendant and the motorman, a fellow employee of plaintiff, defendant would still be liable.—(Swanton v. Hastings Pavement Co., 114 N. Y. Sup., 443.)

Texas.—Carriers—Injury to Passenger—Contributory Negligence.

Where a passenger on a street car, instead of waiting for the car to stop at the usual place before alighting, got off while the car was in motion, and immediately passed around its rear end and practically upon the adjoining track, upon which he knew cars passed at frequent intervals coming from the opposite direction, and neither stopped, looked nor listened to discover if a car was approaching, he was negligent as matter of law, and could not recover for an injury from being struck by a car on that track.—(Austin Electric Ry. Co. v. Lane, 120 S. W. Rep., 1011.)

Virginia.—Street Railroads—Injuries to Person on Track—Contributory Negligence.

Where plaintiff had lived near the point at which he was injured by a street car for a number of years, and the point at which his friends were to take the car was not a regular stopping place, and he knew that the car would not stop except on signal, and they knew that it might be momentarily expected, and he saw it a short distance from the crossing, and, that he might give the signal, stooped to strike a match on the rail, and in so doing projected his head over the track so that it was struck, he was guilty of contributory negligence.—(Norfolk & P. Traction Co. v. White, 63 S. C. Rep., 418.)

News of Electric Railways

The Detroit Situation

The City Council of Detroit has approved the action of the committee on franchises of that body in reporting in favor of employing an engineer to make a new appraisal of the property of the Detroit United Railway at the expense of the company, and it is likely that Frederick W. Walker, who succeeded Fred T. Barcroft as engineer of the committee of fifty, will be retained to make the appraisal, if the company will agree to defray the expenses which a new appraisal will involve. Mr. Walker will be authorized to employ three other engineers of standing as assistants. He is of the opinion that with proper co-operation the appraisal can be accomplished within a very short time. The differences between the values fixed by him and those fixed by the company could then be arbitrated as was proposed originally.

There has naturally been a great deal of speculation regarding the tenor of the special message regarding transit affairs in Detroit which it was announced recently that Mayor Breitmeyer would address to the Council. It is reported that the Mayor will insist as the principal provision of a new grant upon the payment to the city by the company of a rental for the privilege of operating after a fair return has been made to the stockholders based on the investment of the company as determined by a board of arbitration which will consider the disputed points in the appraisals of the company and the city. It is said to be the Mayor's idea to have this rental set aside as a special fund with the end in mind of eventually taking over the property of the company. The Mayor is also said to favor the appointment of a municipal street railway commission with power to deal with all questions which come up between the company and the city. Among other things he is said to favor the following: Universal transfers during rush hours. The extension of rush hours both night and morning in accordance with the provisions of the Webster settlement ordinance. Fares during other times of the day and night to remain as now. The franchise of the lines on which a 3-cent fare is now in force to remain unchanged until after its expiration in 1924.

The franchise committee of the Council which met with F. W. Brooks, general manager of the Detroit United Railway, has submitted its report to the Council, and without objection a resolution offered by Chairman Harpfer asking the company if it will agree to pay the expenses incurred in employing an engineer to reappraise the property of the company was passed. Only Alderman Gutman refused to sign the report. Following a statement of the fact that the Mayor has recommended the employment of Mr. Barcroft to explain the details of his appraisal, the committee report says:

"This committee agrees that it is imperative that a valuation of the company's property, which cannot be impugned, be reached by the city, whether it is to be used in an ordinance proposed for settlement of the question or in the purchase of the property of the company, but we regret to say that we disagree with him (the Mayor) upon the policy of retaining Frederick T. Barcroft, under whose direction the appraisal of the Detroit United Railway property was taken. Your committee is firmly convinced that the Council should appoint an engineer to make an appraisal of the property of the Detroit United Railway at the expense of said company, and we therefore recommend that the city clerk be directed to submit a copy of this report to the president of the Detroit United Railway with the request that he inform the Common Council in writing, at its next session, whether or not said company would, at its expense, pay the cost of having an appraisal of its property made by a competent engineer appointed by the Common Council."

In answer to the mandamus proceedings of the Detroit United Railway to compel the city to spend $1,000,000 in repairing pavements along the lines of the company which are operated at a 3-cent fare, Corporation Counsel Hally, of Detroit, has declared that the company has been so lax in performing requirements of the contract that the city is relieved of its contractural obligations in the case. By mutual consent the Circuit Court has postponed the case until September.

The application of the Michigan United Railway for permission to enter Detroit has not yet been acted upon, but it has been decided that the Michigan United Railway could come into Detroit over the 3-cent lines of the Detroit United Railway and that an interchange of transfers on these lines could be made compulsory.

Consideration of the resolution introduced into the Council by Alderman Glinnan to submit municipal ownership to a vote on Aug. 15, 1910, has been postponed. The measure, besides instructing the city clerk and election commissioners to make all necessary arrangements for holding the election, instructs Controller Heineman to draw warrants on the general fund for the expense of the election, not to exceed $10,000.

Progress of Toledo Inquiry

At the request of Brand Whitlock, Mayor of Toledo, Albion E. Lang, president of the Toledo Railways & Light Company, has furnished the City Council with a copy of the inventory prepared for the committee of bondholders. Mr. Lang transmitted a reply to the last communication of Mayor Whitlock on July 6, 1910, and afterward conferred with J. B. Merrill, chairman of the committee of the council on railroads. Subsequently Mr. Lang sent a communication to the newspapers in which he stated that he desires only a guarantee of a sufficient return on the investment in the company to attract capital to rehabilitate the property. He suggests that an engineer be appointed by the city to cooperate with the engineer of the company in preparing data for the city. Mr. Lang's letter to Mayor Whitlock follows:

"In your letter to Messrs. Nau, Tanner and Rusk of June 10, as to a board of engineers, it was not our intention to make it a condition precedent to an investigation by such a board of engineers, that the city or the company should be bound by their findings, as we quite agree with you as to the probable inability of the municipal authorities to delegate their authority in that respect.

"Our thought was that such an investigation would promptly inform the municipal authorities, among other things, as to the actual value of the properties of the company, the character of service best suited to the requirements of the people of Toledo, the actual cost of operation and the requirements for future extensions, betterments and improvements, which information would seem to be necessary for use in any negotiations looking to a settlement of the franchise question and avoiding, if possible, the complications, delays and expenses which have attended the adjustment of franchise questions in the cities of Chicago, Detroit, Cleveland and Kansas City.

"We were pleased that the accountants selected for an examination of our books and accounts so promptly entered upon their examination, and as we have endeavored in every way to assist and facilitate them, we trust that their early report will fully inform the municipal authorities with regard to facts possible to be obtained through accountants.

"Appreciating that accountants, as such, cannot be expected, without the assistance of engineers, to analyze the accounts as to actual cost of operation, as well as the valuation of property and other matters dealing with engineering problems, we have supposed that at the proper time the city authorities would select engineers to act independently or in conjunction with the accountants in determining such engineering problems, and we think that the appointment of such an engineer at the present time, to act in conjunction with the company's engineer, will result in material saving of expense to both the city and the company, and will facilitate the promptness with which such information will be available to the city authorities.

"In accordance with your request, however, we are instructing our engineer to complete promptly such inventories and schedules as the company now has, and when completed, they will be furnished to the city authorities."

On July 14, 1910, Mayor Whitlock met with the council committee on railroads. The accountants have completed their work so far as the books of the company show the business which is being done and they are waiting for the additional information which Mr. Lang has promised to supply. In a letter to Mr. Lang, dated July 13, the Mayor has suggested that such schedules as may be completed should be furnished Nau, Tanner & Rusk, and that the remainder be turned over to them as soon as they are finished, in order that Nau, Tanner & Rusk may proceed with the preparation of their report without loss of time.

Cleveland Traction Situation

The statment of the Cleveland Railway for June, 1910, under the Tayler plan, shows a deficit of $8,221.26, but on the basis of actual expenditure the deficit is $48,927.85. This makes the actual deficit for the four months of operation $78,828.83. J. J. Stanley, president of the company, stated to the directors, in session on July 16, 1910, that the deficit for June was due principally to expenditures for the maintenance account, as the increased allowance of six cents per car-mile for June, July, August and September had proved inadequate to meet requirements. While the allowance was $133,713.06, the expenditures were considerably in excess of this amount, due to the conversion of old cars to cars of the prepayment type and minor improvements in the power houses. The surplus in the operating account cared for the increase in the wages of the platform men and the deficit was not due to this. Only $2,633.75 remains in this account and it will not cover the increase for the present month. During June the car miles operated totaled 2,228,551, as compared with 2,034,393 for the same period last year. The total number of passengers carried for the month was 14,495,333, as against 12,443,486, an increase of 2,051,847. The increase in car miles was less than 10 per cent, while the increase in the number of passengers carried was more than 16 per cent. The report for June, figured under the Tayler ordinance, follows:

Gross receipts from operation		$515,503.66
Operating expenses:		
Maintenance	$133,713.06	
Operation	256,283.36	
		389,996.42
Net from operation		$125,507.24
Miscellaneous income		4,999.44
Gross income less operating expenses		$130,506.68
Taxes		26,816.93
Income less operating expenses and taxes		$103,689.75
Interest		111,911.01
Deficit		$8,221.26

The directors have authorized the company to make a loan of $200,000 to meet immediate requirements.

Transit Affairs in New York

Theodore P. Shonts, president of the Interborough Rapid Transit, New York, N. Y., sent another letter to Mayor Gaynor on July 15, 1910, on the proposed extensions of the present subway, in which he shows a willingness to compromise on the objections the Mayor raised to the original plan. The most important of the points in dispute were the using of Lexington Avenue for the northeast leg of the so-called "Letter H" route, thereby completely blocking the Broadway-Lexington Avenue subway, and the provision that if the earnings of the company should not suffice to pay the interest on the city's corporate stock issued for construction and an additional 1 per cent, to constitute a sinking fund, the city should take up such deficiency and not be reimbursed by subsequent earnings when they should grow to be sufficient. Mr. Shonts abandons this latter proposition, and says that he will incorporate a clause in his final communication to the Public Service Commission providing that "the making good of any temporary deficit by the city will be limited to the payment of any interest on its own bonds not met by the net earnings of the road and all interest so paid, together with a sinking fund of 1 per cent per annum, from the commencement of operation of the extensions, to be a preferred and cumulative charge against the net earnings of the road, to be paid in full before any division of the profits is made." Mr. Shonts points out several reasons why he believes Lexington Avenue is the best route for the northeasterly extension, but declares that he is willing to consider any other suggestion that the city or the commission may make.

New Oregon Road Opened—The Portland, Eugene & Eastern Railway, Eugene, Ore., has been placed in partial operation.

Railway to Furnish Power Along Its Lines—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has announced that it will furnish electricity for light, heat and power to consumers along its line.

Car License Suit in Milwaukee—The hearings in the suit brought by Emil Seidel, Mayor of Milwaukee, against the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to recover $77,000 in car license fees which he claims is due the city were postponed on July 11, 1910, to Aug. 1, 1910, after both sides had agreed on a stipulation of facts.

Spokane Transportation Club.—It has been decided to postpone from July 20, 1910, to August 11, 1910, the annual outing of the Spokane Transportation Club, Spokane, Wash., on the St. Joe River. At the meeting of the club on June 17, 1910, it was voted to accept the invitation extended by Waldo G. Payne, second vice-president and traffic manager of the Spokane & Inland Empire Railroad, and J. C. White, of the Red Collar Steam Boat Line, to hold the annual outing of the club on the St. Joe River, taking the cars of the Spokane & Inland Empire Railroad as far as Cœur d'Alene. The party will then journey by boat up Cœur d'Alene Lake to the mouth of the St. Joe River.

Steam Road in Southwestern New York Seeks Permission to Electrify Line—The Jamestown, Chautauqua & Lake Erie Railroad, Buffalo, N. Y., which is controlled by the same interests that control the Buffalo & Lake Erie Traction Company, has applied to the Public Service Commission of the Second District of New York for permission to electrify its line, which extends between Jamestown and Westfield, N. Y., a distance of 42 miles. This railroad has been operated by steam and undoubtedly the freight traffic will be continue to be handled in this manner. The Jamestown, Chautauqua & Lake Erie Railroad connects with the lines of the Buffalo & Lake Erie Traction Company at Westfield.

Advertising a New Franchise in Norfolk—The Norfolk & Portsmouth Traction Company, Norfolk, Va., has published in pamphlet form for distribution in Norfolk the series of bulletins about the new franchise introduced in the Council of Norfolk on May 3, 1910, which it has just finished running as advertisements in the newspapers of Norfolk. These bulletins numbered 17 in all, and by publishing five each week in the newspapers they were brought to the attention of the readers for more than three weeks just before the meetings were begun before the committee of the council having the new ordinance in charge. Maps have been used to considerable advantage in the pamphlet to illustrate changes in routes, etc., which the company desires. The company concluded its first advertisement in part as follows: "The draft submitted is a mere block or pattern; a suggestion from which a new copartnership agreement may perhaps be drawn. In some cities public utility companies would have prepared a completed ordinance on lines in every way agreeable to the management of the company, which ordinance would have been submitted to a few important and influential parties, whose consent obtained, it would have then been introduced to councils and passed. We have adopted the 'new' method; have gone directly to the people through their chosen representatives. Nothing has been prearranged. No one has been pledged. Our object in seeking to have the ordinance introduced as it was, was that full discussion might take place. There is nothing hidden. We are out in the open. As the argument of the company is unfolded to you, facts, figures and statistics furnished you, it is our hope that you will come to look upon us as a good partner, a good citizen, and as such entitled to your support."

Financial and Corporate

New York Stock and Money Market.

JULY 19, 1910.

In the stock market to-day there was no pressure to sell and consequently there was very little trading. Without the selling eagerness prices held firm, and the day recorded slight recoveries from the low points of yesterday. The buying element is almost entirely absent, and unless the sellers become anxious and force liquidation trading almost stops. Traction stocks continue to hold their full share of what little trading exists. Interborough is still traded in liberally at about former prices, while Third Avenue is considerably more active at advanced figures.

Money is very easy. Quotations to-day were: Call, 1½ to 2½ per cent; 90 days, 4½ per cent.

Other Markets

Tractions have been dull in the Philadelphia market during the past week. Very few shares of Rapid Transit have been offered and trading in Union Traction, the most active of the lot, has been spasmodic. Prices are practically unchanged.

In Boston, Massachusetts Electric and Boston Elevated are still traded in to a limited degree, but there has been no change in price. Other tractions are out of the market.

There has been little trading in tractions in Chicago. The market is dead, waiting for more definite information concerning the various mergers and deals that are now pending. A feeling of uncertainty checks all trading.

In the Baltimore market during the week there has continued to be quite liberal trading in the certificates of the United Railways Company. Up to the present time, however, nothing has developed to indicate that an attempt was being made to purchase control.

Quotations of various traction securities as compared with last week follow:

	July 12.	July 19.
American Railways Company	a42½	a42½
Aurora, Elgin & Chicago Railroad (common)	52	*52
Aurora, Elgin & Chicago Railroad (preferred)	86	*86
Boston Elevated Railway	a126	126
Boston & Suburban Electric Companies	a15	a15
Boston & Suburban Electric Companies (preferred)	a74	a74
Boston & Worcester Electric Companies (common)	a10½	*10½
Boston & Worcester Electric Companies (preferred)	37	37
Brooklyn Rapid Transit Company	76⅝	77¼
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82	82½
Capital Traction Company, Washington	a130	a130
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a80
Chicago Railways ptcptg., ctf. 2	a17	a17
Chicago Railways, ptcptg., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4s	a6½	a6¼
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a74	a74
Consolidated Traction of N. J. 5 per cent bonds	a103	a103
Detroit United Railway	45	*45
General Electric Company	141	144
Georgia Railway & Electric Company (common)	a107½	a107½
Georgia Railway & Electric Company (preferred)	a87	a87
Interborough-Metropolitan Company (common)	17⅝	17¾
Interborough-Metropolitan Company (preferred)	50½	50¾
Interborough-Metropolitan Company (4½s)	79⅞	80
Kansas City Railway & Light Company (common)	a25½	a25
Kansas City Railway & Light Company (preferred)	a75	a79½
Manhattan Railway	128	128
Massachusetts Electric Companies (common)	14¾	*15
Massachusetts Electric Companies (preferred)	a78	a80
Metropolitan West Side, Chicago (common)	*23½	*23½
Metropolitan West Side, Chicago (preferred)	*58½	*58½
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	66⅛	68½
Northwestern Elevated Railroad (common)	*25	18
Northwestern Elevated Railroad (preferred)	a65	a65
Philadelphia Company, Pittsburg (common)	a42½	a44
Philadelphia Company, Pittsburg (preferred)	a43	a43½
Philadelphia Rapid Transit Company	a18¾	a19
Philadelphia Traction Company	a84½	*84½
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs	a99	a99
Seattle Electric Company (common)	a109	a109⅛
Seattle Electric Company (preferred)	a99½	a100
South Side Elevated Railroad (Chicago)	*72¾	*72¾
Third Avenue Railroad, New York	9¾	10⅜
Toledo Railways & Light Company	7⅝	*7⅝
Twin City Rapid Transit, Minneapolis (common)	107	107½
Union Traction Company, Philadelphia	a44¾	a45
United Rys. & Electric Company, Baltimore	a14½	a14½
United Rys. Inv. Co. (common)	*30	*30
United Rys. Inv. Co. (preferred)	*50	60¾
Washington Ry. & Electric Company (common)	a33½	a32½
Washington Ry. & Electric Company (preferred)	a88	a88
West End Street Railway, Boston (common)	a88	a87
West End Street Railway, Boston (preferred)	a100	a100½
Westinghouse Elec. & Mfg. Company	59	*59
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Brief Submitted in Third Avenue Reorganization

Counsel for the reorganization committee of the bondholders of the Third Avenue Railroad, New York, N. Y., has filed with the Public Service Commission of the First District of New York a brief setting forth the proposed changes in the capitalization of the company, in which answer is made to the analogy used by Mr. Maltbie, of the commission, in the closing hearing before the commission on July 11, 1910, at which it was suggested that the capitalization of the company should be scaled down. Mr. Maltbie used a suppositious case of a company with a capitalization of $100,000,000. He then assumed that the property depreciated and was worth $60,000,000 when the line was reorganized. The question then arose whether it would not be better to reduce the capitalization to the present value of the property, or $60,000,000. William D. Guthrie for the bondholders says:

"There were, of course, two aspects to this suggestion: The one from the point of view of bondholders, the other from that of stockholders. First, it was asked why it would not be just to cut the bondholders down 40 per cent to present value. The answer is that this would wipe out 40 per cent of their actual investment and to that extent savor of confiscation, for, of course, once reduced, the bondholders could not collect more than the reduced face of their obligations.

"Would such a compulsory reduction of an honest and legal debt be permissible? Or, stated conversely, could the commission say to the corporation that a reissue of bonded debt at face would not be a 'lawful refunding of its obligations?'

"Then, secondly, it was asked whether there was any practical difference to stockholders if the par value of their stock were reduced to actual value of the equity. Of course, shares of capital stock only represent undivided parts of the whole equity after deducting debts and obligations. In that sense it could make no difference what the par value was—whether one dollar, ten dollars or one hundred dollars.

"The idiosyncracies and prejudices of investors must be reckoned with. Few are logical. They are accustomed to a par value of $100 per share, and if we now argue to them that a share of stock of the par value of $50 or $10 will be inherently as valuable in respect of the equity it actually symbolizes or represents as a share of $100 par value, they will not believe us. * * *

"Practically, the reduction of the par value of the stock of the Third Avenue Railroad to 50 or 10 would be the compulsory writing or wiping off pro tanto of the actual investment it now represents. * * *"

The plan of reorganization submitted by the bondholders involves a reduction in fixed charges of more than $800,000, the investment of $7,000,000 of new money and a reduction in capital liabilities of about $5,000,000. As against the old securities, which include $15,995,800 of stock, $37,560,000 of bonds and $5,540,172 of accrued interest, totaling $59,095,972, there would be under the reorganization plan $16,590,000 of stock, $15,790,000 of refunding 4 per cent bonds and $22,536,000 of adjustment income bonds, totaling $54,916,000.

Consolidation of Chicago Elevated Railways

Henry A. Blair, who has recently been conducting negotiations on behalf of a syndicate headed by the First National Bank, New York, N. Y., for the consolidation of the elevated railways in Chicago, recently issued a statement regarding the progress of the negotiations, in part as follows:

"Mr. Blair has spent a busy two weeks in going over the details of the plan for the consolidation of the elevated railways with his bankers and attorneys and a great many of the necessary details have been satisfactorily passed upon. All essential points have been considered by the attorneys and bankers, and no hitch of any sort in the successful working out of Mr. Blair's proposition has been found that may interfere with the ultimate consummation of that deal.

"Conditions in the financial market during the last week have caused Mr. Blair to delay negotiations for a short time, as he considers that in a deal of this size more favor-

able money conditions should be at hand in order that he may be able to realize better prices and less expensive rates in financing the proposition. Accordingly he has arranged to return to New York on July 7, 1910, by which time it is hoped banking conditions will have become more settled and will permit of a more favorable consummation of the plan."

No statement has since been issued in regard to the progress of the negotiations.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—Control of the Augusta-Aiken Railway & Electric Company, which holds the stock of the Augusta Railway & Electric Company, North Augusta Electric & Improvement Company, Augusta & Aiken Railway, North Augusta Hotel Company and the North Augusta Land Company, is said to have passed to Redmond & Company, New York, N. Y., through the purchase of the holdings of the E. H. Harriman estate in the company.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—The Charleston Consolidated Railway, Gas & Electric Company has increased its capital stock from $1,500,000 to $2,000,000 by creating an issue of $500,000 of 6 per cent preferred stock in $50 shares, which has been taken by the Charleston Consolidated Railway & Lighting Company.

Chicago (Ill.) Consolidated Traction Company—Judge Grosscup heard argument on July 12, 1910, on the claims of the holders of the securities of the Cicero & Proviso Street Railway that the plan for the reorganization of the Chicago Consolidated Traction Company does not offer them a fair settlement. C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., and G. G. Moore, receiver of the Chicago & Milwaukee Electric Railroad, have been retained by Judge Grosscup to assist him in passing on the claims of the holders of the securities of the Cicero & Proviso Street Railway.

Cincinnati (Ohio) Traction Company—The bond department of the Fifty-third National Bank of Cincinnati recently offered at par and interest $180,000 of the issue of $360,000 of 5 per cent equipment notes issued by the Fidelity Trust Company, Philadelphia, Pa., trustee, and guaranteed as to principal and interest by the Cincinnati Traction Company. They are dated July 1, 1910; are of a par value of $1,000 and the principal is due $36,000 yearly on Jan. 1 from 1911 to 1920, inclusive. Besides being guaranteed by the Cincinnati Traction Company these notes are a first mortgage on 50 new prepayment cars and 50 new summer cars, the title to which rests with the trustee until the final payments of these notes. Twenty-five per cent of the total cost of this equipment is paid in cash.

Hornell & Bath Interurban Railway, Hornell, N. Y.—The Public Service Commission of the Second District of New York has authorized the Hornell & Bath Interurban Railway to issue $195,000 par value of its bonds, the proceeds to be used in connection with the construction of the company's line from Hornell to Bath, Steuben County. This amount is in addition to $450,000 of bonds previously allowed.

Los Angeles (Cal.) Railway—A meeting of the stockholders of the Los Angeles Railway will be held on Sept. 8, 1910, to consider increasing the capital stock of the company from $5,000,000 to $15,000,000 to be divided into 150,000 shares of the par value of $100 each.

Memphis (Tenn.) Street Railway—The suit brought in the interest of certain minority holders of the securities of the Memphis Street Railway to set aside the sale of the property of the company to the American Cities Railway & Light Company has been decided adversely to those who brought the suit by the Supreme Court of Tennessee.

Western Ohio Railway, Lima, Ohio—Depositors of stock of the Western Ohio Railway under the agreement of Dec. 9, 1904, have been notified to present their certificates of deposit at the office of the Cleveland Trust Company, Cleveland, Ohio, for exchange for stock of the Western Ohio Railroad on the basis of one share of stock of the Western Ohio Railroad for three shares of stock of the Western Ohio Railway. Fractional shares which may result will be adjusted by purchase or sale at $27 per share.

Traffic and Transportation

Arbitration of Wages in Connecticut

The first hearing before the board of arbitration consisting of Clarence Deming, David E. Fitzgerald and Judge W. S. Case, to consider the terms of service of the employees of the Connecticut Company, was held at New Haven on July 9, 1910. The company was represented by Edward G. Buckland, Calvert Townley, vice-president of the Connecticut Company, and John K. Punderford, general manager of the company. A representative of the men asked the board to adjourn the hearing for a week, but the arbitrators ruled that the preliminaries should proceed and that the case should then be adjourned until July 13. The principal evidence submitted on July 9 on behalf of the men related to the increase in the cost of living in the last few years and to the wages of those working at trades and the increases in wages to employees in trades. Mr. Buckland, for the company, objected to evidence being admitted regarding the wages of skilled mechanics, but Judge Case admitted the exhibit after the representative of the men who had offered it explained that it had been submitted principally to show how the earnings of men engaged in other pursuits had been advanced. According to the representative of the men there are 1680 motormen and conductors in the employ of the company. They work on an average of 9 hours and 15 minutes a day and receive an average of 23 cents an hour, or $2.12 a day.

On July 13 data were submitted by the representatives of the company concerning the rates of pay on the various lines of the company before they came into the possession of the Connecticut Company in June, 1904. The increase in wages since that time ranges from 9 per cent in Bridgeport to 32 per cent in Middletown. The advance in New Haven has been 16.32 per cent. The average increase for all the lines since 1904 is about 22 per cent. Mr. Townley reviewed the meetings which had been held between him and a committee of the employees to consider the subject of terms of service. The first meeting was held in March, 1910. Mr. Townley explained the condition of the finances of the company to the representatives of the men, and later sent them a notice of an increase in wages which provided a sliding scale from 21½ cents an hour to 26 cents an hour to extend over eight years of service. On March 23 another conference was held. The chairman of the committee suggested that the rates should remain the same, with the maximum to be reached in six years and expressed the opinion that such a schedule would be accepted. This schedule was posted on April 6 to go into effect on April 9, 1910. Subsequently the members of the committee requested Mr. Townley to give the wage question further consideration, as the men on the New Haven and the Norwich divisions objected to the proposed scale. They asked for a scale of wages to range from 22½ cents an hour to 27½ cents an hour. This Mr. Townley would not entertain. On May 3 Mr. Townley was informed that the men were voting whether they would accept the scale or ask a higher one. Later he was advised that the representatives of the men had arranged a conference with President Mellen. Mr. Mellen declined to discuss the subject of wages with the men.

The evidence submitted by the representatives of the men on July 14, 1910, related largely to the finances of the company and to its ability to meet the increase which the men had asked. Mr. Buckland, for the company, offered as evidence the rates of wages paid to employees of electric railways east of Buffalo, the conditions on which are approximately the same as those on the lines of the Connecticut Company. Frederick M. Ward, a real estate dealer, testified that rents of apartments such as electric railway employees in New Haven occupy had decreased lately.

At the hearing before the board on July 15, 1910, Charles S. Mellen, president of the company, said that the representatives of the men had broken faith with the management of the company by not making a really serious effort to bring about the acceptance by the men of the scale of 21½ cents to 26 cents an hour. Both sides closed their cases on the morning of July 15. Mr. Punderford said that he had considered the advisability of increasing fares. At

one time the fare from New Haven to Savin Rock, a distance of 4½ miles, was 20 cents. The lines in New Haven were then controlled by several companies and there were no transfer privileges. Not long ago the fare from New Haven to Lighthouse, a distance of 10 miles, was 10 cents. Now it is only 5 cents.

Subway Traffic Order Suspended Temporarily

At the request of the Interborough Rapid Transit Company the Public Service Commission of the First District of New York has suspended for 30 days its order of April, 1909, which required the company to maintain a headway of 2½ minutes in the subway in the daytime and will allow the company to establish a headway such as it deems that traffic requires on the promise of the company to provide a seat for every passenger. Traffic both in the subway and on the elevated lines decreases greatly in the summer on account of the hot weather and the number of people who are out of town. The difference in the number of passengers carried in the subway during the months of heavy traffic as compared with the months of light traffic is forcibly illustrated by the record of the company for April 13, 14 and 15, 1909; June 28, 29 and 30, 1910, and July 5, 6 and 7, 1910, on which the request of the company was based. The record for April 13, 14 and 15, 1909, shows that 628,698 passengers, 631,069 passengers and 603,459 passengers were carried, respectively. The record for June 28, 29 and 30, 1910, shows that 628,698 passengers, 631,069 passengers and 603,459 passengers were carried, respectively. The record for July 5, 6 and 7, 1910, shows that 694,325 passengers, 625,845 passengers and 616,170 passengers were carried, respectively. The request of the company for the suspension of the order as made by Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, under date of July 11, 1910, follows:

"On April 5, 1910, the Public Service Commission issued an order after rehearing case No. 1211 that the Interborough Rapid Transit Company operate on the local and express tracks of the subway division enough trains in each half hourly period, beginning at the even hour and half hour, to provide a number of seats at least equal to the number of passengers or the maximum number of cars and trains that can be operated with subway cars now and hereafter owned and equipped, and further stipulates that not more than a 2½-minute interval shall be operated between 6:46 a. m. and 6:41 p. m. and not more than a 3-minute interval between 6:41 p. m. and 11:59 p. m.

"Heretofore during the summer months when the riding on the elevated and subway is greatly decreased on account of the hot weather and the large number of people out of town for the summer, your commission has consented to a suspension of any service orders that were based on the heavy winter travel.

"As a comparison between the heavy winter travel and the summer travel you will note that in March, 1910, on the subway we averaged about 830,000 people per day, while during June our average was only 677,000, and July and August will run considerably less than that of June.

"We therefore would respectfully request that service orders against this company be suspended during the summer months, especially that part defining the intervals, it to be understood that this company will continue to observe that part of the order which calls for a seat per passenger or the operation of a maximum number of trains during the period where a seat per passenger is impossible."

Rehearing Asked in West Chester Fare Case.

The West Chester Road Improvement Association has filed an application with the Railroad Commission of Pennsylvania for a rehearing in the matter of the complaint of the association against the Philadelphia & West Chester Traction Company, Philadelphia, Pa., for establishing six 5-cent fare zones between Sixty-third and Market Streets, Philadelphia, and West Chester, Pa., instead of five. The substance of the decision of the commission denying the complaint was published in the ELECTRIC RAILWAY JOURNAL of July 2, 1910, page 55. The following reasons are given by the association for a rehearing:

"1. The commission erred in dismissing the complaint.

"2. The commission erred in holding that the most equitable arrangement of the fare zones is that which makes them practically equal in distance, without considering the arrangement of the termini of the zones so as to fix them at the settlements or villages along the line when practical.

"3. The commission erred in not recommending the system of zones on the main line to conform to the density of the travel in the different sections on that line.

"4. The commission erred in not recommending that the defendant should discontinue issuing free passes to all the public officers along the main line.

"5. The commission erred in holding that complainants found no fault with the through rate of fare from Philadelphia to West Chester.

"6. The commission erred in holding that the zones recommended by complainants would be considerably shorter than they now are.

"7. The commission erred in holding that if the recommended zones were adopted it would occasion more or less dissatisfaction and complaint on the part of the residents all along the line between Newtown Square and West Chester, the result of which would be that the dissatisfaction would probably be greater than it is at present.

"8. The undersigned further apply for rehearing to prove to the commission that if the recommended zones are adopted no dissatisfaction will be occasioned between Newtown Square and West Chester or anywhere else on the line.

"9. The commission erred in not recommending that the defendant should reduce the fare for the school children."

Progress of Arbitration in Massachusetts

Three hearings have been held by the arbitration board appointed to consider the problem of wages on the Springfield Street Railway, the Worcester Consolidated Street Railway, the Worcester & Southbridge Street Railway, the Worcester & Blackstone Valley Street Railway, the Worcester & Holden Street Railway, and the Marlboro & Westboro Street Railway, all controlled by the New England Investment & Security Company. As previously announced in the ELECTRIC RAILWAY JOURNAL, the arbitration board consists of C. S. Hamlin, chairman, E. C. Foster and W. P. Hayes. The companies were represented at the hearings on July 11, 12 and 19 by Charles W. Bosworth, Springfield, Mass., and the employees were represented by William B. Fitzgerald. The three hearings thus far held have been devoted mainly to testimony by employees' representatives as to the increased cost of living during the past three years. Counsel for the companies objected to much of the testimony on the grounds that they were prepared by interested parties, that they were not susceptible of being readily checked and that they did not indicate percentage increases. The companies showed that maximum wage increases of 23 to 25 per cent had been made in 1903 and 1908. The hearings were continued to July 25 to enable further testimony to be submitted by the companies.

Owl Car Service in Harrisburg—The Central Pennsylvania Traction Company, Harrisburg, Pa., inaugurated a half-hourly all-night service on its Third Street belt line between 1 a. m. and 5 a. m. on July 18, 1910. Should the patronage justify it the service will be made permanent.

Reduction in Fare Ordered on Rochester & Suburban Railway—The Public Service Commission of the Second District of New York has decided that the fare of 10 cents charged on the Rochester & Suburban Railway between Rochester and Sea Breeze, on Lake Ontario, in Irondequoit, or between any points intermediate thereto should be 5 cents. The company has been ordered to put into effect a new tariff on or before August 1, 1910.

Employees in New Orleans Accept Company's Offer—On July 16, 1910, the motormen and conductors in the employ of the New Orleans Railway & Light Company, New Orleans, La., voted to accept the offer of the company of a 3-year contract at 22¾ cents an hour for the first year, 23 cents an hour the second year and 23¼ cents an hour the third year. The original request of the men was for a sliding scale of wages for three years, the maximum wage to be 25 cents an hour.

Indianapolis Trade Association Makes Second Successful Trip—Four cars filled with representatives of the Indianapolis Trade Association were operated successfully on July 15, 1910, over the lines of the Indianapolis & Cincinnati Traction Company and the Cleveland, Cincinnati, Chicago & St. Louis Railroad, to more than 20 towns and cities. Frequent concerts were given by the two bands which accompanied the members of the association. This was the second trip of the kind that the members of the association have made, and it was so successful that the officers of the association have announced that another trip will be arranged.

Arbitration of Wages in Toronto—The Toronto (Ont.) Railway and its employees having failed to agree on the question of wages a board of conciliation has been formed to consider the question. Either or both parties have the right to reject the decision of the board of conciliation; but under the act passed by the Dominion Government, it is provided that such a board shall consider such disputes if both parties fail to come to any agreement. The employees have appointed John G. O'Donoghue to represent them, while the company has selected J. P. Mullarkey as its representative. These two members have selected Judge John A. Barron, Stratford, Ont., as the third member of the board.

Holiday Record of the Chicago & Milwaukee Electric Railroad—The record of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., for July 2, 3 and 4, 1910, is very interesting compared with the same three days in 1909. The gross receipts of the company for July 2, 3 and 4, 1910, were $23,001, as compared with $21,026 for the same period of 1909. The car miles for July 2, 3 and 4, 1910, were 46,005, as compared with 43,422 for the same period of 1909. The earnings per car mile for July 2, 3 and 4, 1910, were $.50, as compared with $.484 for the same period of 1909. The passengers carried for July 2, 3 and 4, 1910, were 118,657, as compared with 105,644 for the same period of 1909. On July 2, 3 and 4, 1910, all trains were operated on schedule time and no cars were turned in on account of being out of repair.

Increase of Commutation Rates in New Jersey.—The Interstate Commerce Commission on July 14, 1910, announced its intention to permit the proposed increased commutation rates between New York and New Jersey points to go into effect July 20, 1910, and then to determine the justice of the new rates while they are in operation. The announcement followed the hearing before the commission on July 12, 1910, when representatives of the Board of Public Utility Commissioners of New Jersey and of the commuters appeared and argued for the suspension of the rates on the ground that they were unreasonable. The rates were originally intended to go into effect on June 29, 1910. At the request of the commission, however, the date was postponed until July 20. These rates make up part of general increases in commuters' rates in all directions out of New York City, but they are the only ones that come under the classification of interstate commerce.

Fare Complaint Against Schenectady Company Dismissed—The Public Service Commission of the Second District of New York has dismissed the complaint of residents of Niskayuna, Schenectady County, and Colonie, Albany County, against the Schenectady Railway, regarding the 10-cent fare to stop 8. The commission holds that it has not been shown to its satisfaction that the fare from Schenectady to stop 8 is unreasonable. Hearing was had upon the complaint and it was shown that since 1902 the Schenectady Railway has divided its line between Schenectady and Albany into five zones; that the first zone extends from Schenectady to stop 6, a distance of 4.26 miles, and the commission was asked to extend the 5-cent fare to stop 8, a distance of 5.2 miles. A number of persons in the locality were opposed to the change as it would result in increasing the fare from Albany to stop 6, and a petition signed by 27 persons was filed in opposition to the change asked for in the complaint.

A Little Trip Through History—The Lehigh Valley Transit Company, Allentown, Pa., has issued an illustrated souvenir hand book setting forth the beauties of a trip over its celebrated "Liberty Belt Route" between Philadelphia and Delaware Water Gap via Allentown and Bethlehem. It is entitled "A Little Trip Through History," and gives a concise sketch of the towns along the route and a history of incidents of the revolutionary period which are connected with various points on the system. A map in colors shows the territory traversed by the company's lines, by connecting electric railways and by the steam railroad between Philadelphia, Bethlehem, Mauch Chunk, Pottsville and the Delaware Water Gap. The publication is designed solely to bring to the attention of the public the historic associations of the territory and its picturesque scenery and it contains no schedules or display advertising. The company says that "A Little Trip Through History" has brought better results than any other of its various methods of advertising.

Fare Complaint Dismissed—The Public Service Commission of the Second District of New York has dismissed the complaint of various residents along the lines of the Western New York & Pennsylvania Traction Company about the passenger fare charged between Allegany and Olean. The complaint alleged that the company charged 10 cents as a single trip passenger fare between Allegany and Olean, an alleged distance of four miles, which it was claimed was unreasonable and excessive. The complaint also alleged that the service between these points was inadequate. A hearing was given upon the complaint but no testimony was submitted to show that the service was insufficient. Evidence was submitted by the company which showed that it was running 24 cars each way per day between Olean and Allegany on six days of the week and 26 cars on Saturday and it also appeared at the hearing that the company ws selling for 15 cents and using on its line a round trip ticket between these points, which is sold at several public places in Olean and in Allegany, unlimited as to time or persons using the same, and was also selling and using upon its line school ticket books at half rate for children attending school, each of which tickets entitled passengers riding thereon to transfer privileges in Olean and enabled the passengers to ride from the corporation line in Olean on the east or south to the Back Five Mile Road west of the corporation limits in Allegany, a maximum distance of about six miles with the privilege of a transfer.

Service During Meeting of Elks in Detroit—The Elks met in Detroit during the week which commenced July 10, 1910, and the Detroit United Railway readjusted its service so as to afford the delegates at the meeting the greatest facilities possible on its lines during their stay in the city. Under a special interurban schedule the 11 p. m. cars on the Flint division ran all the way to Flint, instead of to Oxford only, as usual; on the Rapid Railway the 11 p. m. cars ran to Port Huron instead of to Mt. Clemens only; on the Toledo line cars ran through to Toledo, instead of to Monroe only. In addition 11 p. m. service was provided to Ann Arbor, Pontiac, Farmington and Northville. During the Elks' parade on the morning of July 14, and the automobile parade on the afternoon of July 15, the streets in the heart of the city were in full possession of the Elks, so that the service of the company had to be changed considerably. Woodward cars were not able to come all the way to the city hall, nor was any car able to cross Woodward Avenue. During the automobile parade, however, the Jefferson-Grand River cars were run without interruption, in order to take the people to Belle Isle. F. W. Brooks, general manager of the company, addressed the following communication to the employees of the company previous to the meeting: "Particular attention is called to the fact that the convention and public gatherings which are continually being held in Detroit are largely attended by persons who are strangers in the city, and therefore must depend to a great extent upon the information given them by the citizens to enable them to reach different points in the city. As a general rule convention visitors wear badges and can be distinguished in that way. All conductors will pay special attention to these people and give them all information possible in regard to proper cars to take at any point, transferring, etc., though unnecessary conversation must not be held. In that way they will be made to feel welcome and will leave with a favorable impression of the city."

Personal Mention

Mr. C. D. Phillipp has been appointed trainmaster of the Oregon Electric Railway, Portland, Ore.

Mr. C. A. Coolidge has been appointed general manager of the Oregon Electric Railway, Portland, Ore., to succeed Mr. Guy W. Talbot, who resigned to become president of the Portland Gas & Coke Company, Portland, Ore.

Mr. Walter L. Fisher has accepted the appointment as special traction counsel for the local transportation committee at Chicago, and has begun work with Mr. Howard Hayes, assistant corporation counsel of Chicago, upon the ordinance designed to extend the franchise of the Chicago Railways over the lines of the Chicago Consolidated Traction Company.

Mr. C. N. Ryan has been appointed auditor of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, which have recently taken over railway, electric light and telephone interests in Wilmington, Del., and vicinity. Mr. Ryan's electric railway work dates from March, 1905, when he gave up the practice of public accounting to accept the position of auditor of the Michigan United Railways, Lansing, Mich. In October, 1906, he entered the employ of J. G. White & Company, Inc., New York, N. Y., as traveling auditor in the operating department of the company, and continued in this capacity until October, 1907, when he was transferred to the Eastern Pennsylvania Railways, Pottsville, Pa., as assistant secretary and assistant treasurer. In February, 1910, Mr. Ryan was transferred to the Albany Southern Railroad, Hudson, N. Y., as auditor. The Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company are properties with which J. G. White & Company, Inc., are identified.

Mr. Mortimer P. Reed, who has been appointed general superintendent of the electric railway properties controlled by the Murdock syndicate, including the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., has been connected with the Murdock interests for 10 years. Mr. Reed is 38 years old, and has resided in South Bend for 18 years. For eight years before entering railway work he was connected with the Birdsell Manufacturing Company. He entered the employ of the Indiana Railway as purchasing agent in 1900. In 1903 he was also elected secretary of the company. In 1905 he was made secretary and purchasing agent of the Northern Indiana Railway and continued in that capacity until 1907. From 1901 to 1906 Mr. Reed also acted as president of the South Bend & Southern Michigan Railway. Mr. Reed was secretary of the Southern Michigan Railway from 1906 to 1908, and from 1908 until March, 1910, he was secretary, treasurer and general superintendent of the Southern Michigan Railway. When the Southern Michigan Railway was sold to the Murdock syndicate in March, 1910, Mr. Reed represented the stockholders in the sale and made the final clearance. He then became assistant general superintendent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway.



M. P. Reed.

OBITUARY

John D. E. Duncan, for the past six years managing engineer for Sanderson & Porter, New York, died at the home of his mother in Ann Arbor, Mich., on July 13. He was graduated from Michigan University, in the School of Engineering, with the class of 1893, and later took a post-graduate course at Cornell University, from which he received the Master's Degree in Mechanical Engineering. The six and one-half years following were spent in engineering work with various companies, and in 1901 he joined the engineering forces of Sanderson & Porter.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Elgin (Ill.) Traction Company.**—Incorporated in Illinois to build an electric railway in Elgin. Capital stock, $100,000. Incorporators: George S. Webb, William T. Angell and W. D. Ball.

***Columbus, Mt. Vernon & Mansfield Railway, Columbus, Ohio.**—Incorporated in Ohio to build an electric railway to connect Columbus and Mansfield, via Mt. Vernon. Capital stock, $10,000. Directors: J. W. Lehman, J. M. Adams, David Lehman, Thomas W. Varley and George W. Rhodes.

Pittsburgh, Steubenville & Wheeling Street Railway, Pittsburgh, Pa.—Chartered in Pennsylvania to build an electric railway to connect Pittsburgh, Steubenville and Wheeling. A 4-mile line will be built between Dormont and Bridgeville. Capital stock, $40,000. Incorporators: W. E. Hildebrand, Oliver Building, Pittsburgh, president; John F. Klein, Carnegie, and C. W. Behney, Cecil. [E. R. J., Feb. 27, '09.]

***Cincinnati & Pittsburgh Electric Railway, Huntington, W. Va.**—Incorporated in Delaware to build electric and steam railways in Ohio. It is said to be the intention to construct a line from Cincinnati, Ohio, to Pittsburgh, Pa. Capital stock, $1,000,000. Incorporators: A. E. Cox, F. S. Kanode, A. W. Werninger, C. P. Sanborn and C. R. Wyatt, all of Huntington.

FRANCHISES

Yuma, Ariz.—Hiram W. Blaisdell, president of the Yuma Light & Power Company, has asked the Council for a franchise to build an electric railway through certain streets in Yuma.

Oakland, Cal.—The Southern Pacific Company, San Francisco, has asked the Council for a franchise to extend its tracks along the bay shore in North Oakland to the right of way obtained by franchise in Berkeley. If this franchise is granted it will supply the connecting link to complete the loop system of electric service which the company expects to establish in Berkeley.

Portersville, Cal.—F. W. Nofziger and associates have been granted a 50-year franchise by the Council to build a railway in Portersville. [E. R. J., June 4, '10.]

De Kalb, Ill.—The Chicago & Milwaukee Railroad, Chicago, has asked the Council for a franchise to build its railway over certain streets in De Kalb.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has been granted a franchise by the Council to operate its cars around the Third Street loop.

East St. Louis, Ill.—The East St. Louis Railway has been granted a franchise by the Council to extend its line from the former city limits to the present city limits at Eighty-ninth Street, Edgemont.

Pana, Ill.—The Decatur Southern Traction Railway, Decatur, has been granted a franchise by the Council to build an electric railway in Pana. It will connect Decatur, Macon, Assumption and Pana. R. McCalman, Decatur, chief engineer. [E. R. J., July 16, '10.]

Peoria, Ill.—The Peoria & Galesburg Railway has been granted a 40-year franchise to build a railway in Peoria. S. F. Atwood, Peoria, secretary. [E. R. J., June 4, '10.]

Marlboro, Mass.—The Boston & Western Electric Railway, Boston, is making arrangements to file applications for franchises in the cities and towns through which its line will pass, namely, Marlboro, Sudbury, Wayland, Maynard and Waltham. [E. R. J., July 16, '10.]

Springfield, Mass.—The Springfield Street Railway will ask the Railroad Commission for the approval of a franchise to extend its tracks along St. James Avenue, Springfield, as far as the Boston & Albany Railroad bridge.

Lincoln, Neb.—The Omaha, Western & Lincoln Railway has asked the Council for a 99-year franchise to build an electric railway in Lincoln. This is part of a plan to build a 219-mile railway to connect Omaha, Hastings and Lin-

coln. Frank F. Schaaf, general manager. [E. R. J., July 16, '10.]

Bolivar, N. Y.—The Southwestern New York Traction Company has applied to the Public Service Commission for permission to exercise franchises and privileges and for a certificate of public convenience and necessity. This proposed 18-mile railway will connect Bolivar, Scio, Allentown and Wellsville. B. F. Patterson, Bolivar, general manager. [E. R. J., June 25, '10.]

St. John, Ore.—The Portland Railway, Light & Power Company, Portland, has been granted a franchise by the Council to build a railway over certain streets in St. Johns.

Scranton, Pa.—The Scranton & Lake Ariel Railway, Scranton, recently incorporated, has asked the Council for a franchise to build a railway over certain streets in South Scranton. John J. Brown, president. [E. R. J., June 11, '10.]

Sharon, Pa.—The New Castle, New Wilmington & Sharon Railway, New Castle, will ask the City Council for a franchise to build a railway in Sharon. The proposed railway will connect New Castle, New Wilmington and West Middlesex, a distance of 15 miles. James Campbell is interested. [E. R. J., Mar. 26, '10.]

***Flemington, W. Va.**—W. J. Davidson and W. C. Wyckoff have been granted a franchise by the County Court to build an electric railway in Flemington.

TRACK AND ROADWAY

***Birmingham, Ala.**—F. A. Burr, Thos. O. Smith, Frank Nelson, Jr., and S. E. Thompson are reported to be considering plans for building an electric railway to connect Birmingham, Owenton, Shadyside and Ensley.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract to McAlpine, Roberts & Company, Vancouver, for grading the extensions of its North Vancouver lines in the Capilio district.

Northern Electric Railway, Chico, Cal.—This company has been granted by the War Department, in conjunction with the Vallejo & Northern Railway, the privilege of constructing a swing draw railway vehicle and foot passenger bridge across the Sacramento River at the foot of M Street in Sacramento. The bridge will be a steel and concrete structure, and will cost, it is estimated, $400,000.

Los Angeles (Cal.) Railway.—This company has begun work on a 1-mile double-track extension on Thirty-ninth Street, from Western Avenue to Vermont Avenue.

Porterville, Cal.—H. H. Holley, promoter of the proposed 87-mile electric railway to connect Porterville, Tulare, Poplar, Woodville, Springville and Globe, states that grading has been started on the line. The section between Tulare and Springfield will be completed first. [E. R. J., Feb. 5, '10.]

Tri-City & Northeastern Interurban Railway, Port Bryon, Ill.—This company has completed the permanent survey of its line between Albany and Morrison. The surveys for the entire route are completed and construction will soon be started on this projected electric railway, which is to connect Watertown, Hampton, Rapids City, Port Bryon, Cordova and Albany. J. W. Simonson, Port Bryon, president. [E. R. J., April 30, '10.]

Galesburg & Rock Island Traction Company, Rock Island, Ill.—Press reports state that this company has completed the preliminary arrangements and succeeded in financing the project. The proposed line will connect Galesburg and Rock Island, and will be 41 miles long. Warren C. McWhinney, president. [E. R. J., July 17, '09.]

Mason City & Clear Lake Railway, Mason City, Ia.—Press reports state that this company will spend nearly $100,000 this fall in improving its line between Mason City and Clear Lake, a summer resort 10 miles west.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company, it is said, will build a 21-mile extension through Dike to Trundy Center.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has graded 15 miles of its proposed 30-mile line between Wichita and Newton, Kan. Later it is planned to extend to Hutchinson, Kan., 55 miles from Wichita. The track is being laid with 70-lb. standard rails, bonded with American Steel & Wire twin-terminal bonds. Four interurban cars are now on order with the Jewett Car Company and the St. Louis Car Company. Power will be purchased from the Kansas Gas & Electric Company at 33,000 volts. Ohio Brass Company overhead material will be used to distribute the 600-volt current to the cars. The offices of the company are at 145 North Emporia Street, Wichita, Kan. The personnel includes W. O. Van Arsdale, president; O. A. Boyle, vice-president and general manager, and Charles D. Bell, chief engineer. The cars of the new line will reach a terminal site at the business center of Wichita over the tracks of the Wichita Railroad & Light Company, which is one of the properties of the McKinley Syndicate, Champaign, Ill.

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—It is stated that H. H. Snyder, representing Eastern capitalists, will soon begin surveys for this line. Arrangements have been made to finance this proposed 60-mile railway, which is to connect Louisville and Mammoth Cave via Glasgow, Bear Wallow, Uno, Goodnight, Hardyville, Cannier, Magnolia, Buffalo and Hogenville. J. M. Richardson, Glasgow, president, and J. Wood, secretary. [E. R. J., May 7, '10.]

***Southwestern Traction & Power Company, New Orleans, La.**—This company, it is said, has been formed to construct an electric railway to connect New Iberia, New Orleans and other points. F. W. Crosby, New Orleans, is said to be interested.

***McKanna Interurban Company, St. Louis, Mo.**—This company has been organized to build an interurban electric railway between St. Louis, Mo., and Oklahoma City, Okla., via Ada, Roff and Stonewall. Surveying will soon be started. Capital stock, $500,000. The power plant is to be established 16 miles north of Ada, Okla. J. J. McKanna, Oklahoma City, president. The plan is to use part of the trackage of railroads extending out of St. Louis.

Catskill (N. Y.) Traction Company.—This company proposes to extend its line 12 miles from the Greene County Agricultural Society's Fair Grounds, at Cairo, westerly along the Susquehanna Turnpike to Oak Hill. W. C. Wood, president. [E. R. J., Feb. 5, '10.]

Cincinnati, Portsmouth, Pomeroy & Pittsburgh Electric Railway, Cincinnati, Ohio.—It is reported that this company has practically completed the preliminary arrangements and proposes to begin construction within 60 days on its proposed railway from Cincinnati to Pittsburgh along the Ohio River Valley. A. E. Cox, 1502 Third Avenue, Huntington, W. Va., president. [E. R. J., April 23, '10.]

West Tulsa Belt Line Railway, Tulsa, Okla.—This company is said to have finished grading and started track laying on its proposed 8-mile railway to connect Lefebre and Lost City. W. E. Hawley is interested. [E. R. J., Sept. 18, '10.]

United Railways, Portland, Ore.—This company has awarded the contract for construction of the first 24 miles of its extension to Tillamook to Porter Brothers. This includes the long tunnel at Cornelius Gap. Surveying and securing the right of way between the 24-milepost and Tillamook is practically completed and bids for the work have already been opened. The located line will be extended from Tillamook to Bay City, thus giving this company an 80-mile route between Portland and the coast.

Chester (Pa.) Traction Company.—This company is reported to be considering plans for improving its lines in Chester and throughout the county. The work is to include the double-tracking of its railway between Wilmington and Darby.

Ogden (Utah) Rapid Transit Company.—This company is rapidly completing work on its extension from Hot Springs to Brigham City. Plans are under consideration for the extension of the Ogden canyon line through the Huntsville valley and Eden valley.

***Utah & Salt Lake Electric Railway, Salt Lake City, Utah.**—This company has been organized to build the proposed 70-mile electric railway to connect Salt Lake City and Payson via Sandy, Draper, Murray, Lehi, American Fork, Pleasant Grove, Provo, Springville and Spanish Fork. The capitalization will be $1,500,000. Among those interested are: Simon Bamberger, Stephen Chipman, James

Clark, A. J. Evans, D. R. Beebe, George W. Craig, W. T. Reynolds and George C. Whitmore.

Richmond & Chesapeake Bay Railway, Richmond, Va.—This company has completed surveying routes between Ashland and Fredericksburg, where connection is made with the line from Ashland to Richmond and from Fredericksburg to Washington.

Ontario & Northern Railway, Ontario, Wis.—V. A. Stoddard, secretary, advises that this company will build a steam railroad and not an electric line, as reported in a recent issue. [E. R. J., July 2, '10.]

SHOPS AND BUILDINGS

Wichita Railroad & Light Company, Wichita, Kan.—This company is planning the construction of a new central repair shop and car house to furnish accommodations for the storage and repair work on the 75 cars now operated.

Blue Grass Traction Company, Lexington, Ky.—This company is planning the erection of a terminal station at Nicholasville. The company recently completed a line from Lexington to Nicholasville and contemplates further extensions into the Blue Grass country.

Kansas City Railway & Light Company, Kansas City, Mo.—This company is completing an addition to its main office building at Fifteenth Street and Grand Avenue, Kansas City, Mo. The new part is five stories high and has ground dimensions of 84 ft. x 110 ft. It is a brick structure. The first floor has a high ceiling and encloses a large railway and lighting substation. The railway equipment includes one 2000 kw, one 1500 kw and three 1000-kw rotary converters. The electric lighting equipment includes one 1500-kw rotary converter, one 750-kw Edison three-wire booster set, a 500-kw motor-generator set and a 3000 amp-hr. storage battery. The claim department, which now has other quarters, will be housed in the new structure.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company has prepared plans for an addition and alterations to its car house in Buffalo. The addition will be built of brick, 65 ft. x 140 ft., and 18 ft. high. The estimated cost is $18,000. The contractors are Constable Brothers.

Susquehanna Railway, Light & Power Company, Lancaster, Pa.—This company has moved into its new three-story fireproof building in Lancaster. The first floor will be used for office and machinery purposes, the second floor for general offices and the third floor by the receiving and accounting department.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company's new power plant at Covina Junction, Los Angeles, will be placed in operation on Aug. 1. The structure is of reinforced concrete and is being equipped with two 1000-kw generators. Power is obtained from the Kern River substation. Work of wrecking the company's old power house near the Indian Village has begun.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company will build two substations, each to contain one 200-kw Allis-Chalmers motor-generator set with the necessary control equipment. Ohio Brass Company overhead material will be used to distribute the 600-volt current to the cars. Power will be purchased from the Kansas Gas & Electric Company, 33,000 volts.

Boston & Western Electric Railway, Boston, Mass.—It is reported that this company will build a power house at South Sudbury.

Frederick (Md.) Railway.—This company has decided to build a new power plant in Frederick. W. S. Taylor, general manager.

Monterey Railway, Light & Power Company, Monterey, Mex.—This company, which has a concession from the Mexican Government for supplying Monterey with water and light, has placed an order with Allis-Chalmers Company for a 100-hp, 220-volt, three-phase, 60-cycle, squirrel cage induction motor and three 50-kw transformers.

Sunbury & Selinsgrove Street Railway, Sunbury, Pa.—This company's new power plant at Sunbury has been completed and was put in operation July 13. The structure is 40 ft. x 84 ft. [E. R. J., April 9, '10.]

Manufactures & Supplies

ROLLING STOCK

West Penn Railways, Connellsville, Pa., is building 11 cars in its own shops.

Springfield (Mass.) Street Railway has purchased 12 cars from the Standard Steel Car Company and eight cars from the Wason Manufacturing Company.

Oil Belt Railroad, Oblong, Ill., which is constructing a 12-mile railway between Charleston and Mount Carmel, contemplates the purchase of 8 or 10 cars.

Citizens' Traction & Power Company, Albuquerque, N. Mex., which is building a line in Albuquerque, is considering the purchase of two gasoline motor cars.

Shawnee (Okla.) Electric Railway expects to purchase nine cars. It is building a 41-mile electric railway to connect Shawnee and Oklahoma City. About 10 miles of the route has been graded.

Jacksonville (Fla.) Electric Company, reported in the ELECTRIC RAILWAY JOURNAL of April 23, 1910, as contemplating the purchase of five cars, has ordered 10 cars from the Cincinnati Car Company.

El Paso (Tex.) Electric Company, mentioned in the ELECTRIC RAILWAY JOURNAL of June 25, 1910, as preparing specifications for several cars, has placed an order with the Cincinnati Car Company for six cars.

Pittsburgh (Pa.) Railways, which was noted in the ELECTRIC RAILWAY JOURNAL of March 12, 1910, as receiving bids for 150 double-truck city cars, has ordered 50 steel cars from the Standard Steel Car Company.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., has placed an order with the Cincinnati Car Company for 25 single-end, closed cars. The cars will be equipped with two Westinghouse motors each and standard trucks.

Hudson & Manhattan Railroad, New York, N. Y., in conjunction with the Pennsylvania Railroad, has ordered 80 double-end, 200-hp, type M control and motor equipments from the General Electric Company for joint use on the main line of the Pennsylvania Railroad, which is to be electrified between Harrison and Jersey City. Mention of the contemplated purchase of this equipment was made in the ELECTRIC RAILWAY JOURNAL of June 18, 1910.

Cincinnati (Ohio) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of March 5, 1910, as having placed an order with the Cincinnati Car Company for 50 single-truck, open, 10-bench cars, has drawn the following specifications for these cars:

Seating capacity.....50	Couplers..Combination Hedley anti-climber and drawbar
Weight (car body only), approx.....10,000 lb.	Curtain fixtures...Cur. S. Co.
Length of body...30 ft. 3 in.	Curtain material, printed duck
Width over sills.. 7 ft. 1¾ in.	Fenders .....Hunter
Over posts at belt. 7 ft. 6½ in.	Hand brakes.....Peacock
Sill to trolley base 8 ft. 9½ in.	Headlights .....Dayton
Body.....wood and metal	Motors.....2-West. 101-B-2
Interior trim, white ash throughout	Registers.....Int. double
Underframe .....composite	Roofs.....turtle back
Bumpers, ⅜ in. x 7 in. steel plate	Step treads.....Mason
Car trimmings, polished bronze	Trolley base.....two U. S.
Control system, single-end K-11 controller	Trucks, type.....Brill 21-E
	Wheels.....33-in. cast iron
	All power wiring in conduit

TRADE NOTES

Spencer Air Purifying Company, New York, N. Y., reports that the Spencer air purifier is now being used by the following electric railways: Lehigh Valley Traction Company, Hazleton, Pa.; Camden & Trenton, Camden, N. J., and the Pennsylvania Railroad, electric division.

C. A. Wood Preserver Company, Austin, Tex., has opened a sales office in Indianapolis for the State of Indiana, in charge of F. D. Rusling. The company reports that the increase in its business necessitated adding Chicago as a distributing point, which will facilitate making quick shipments for the Middle West.

National Railway Equipment Company, Chicago, Ill., announces that it has just completed an arrangement with one of the standard trunk line steam railroads whereby it is offering for sale a large number of freight cars in good repair. These equipments include 1000 box cars, 800 flat cars, 600 gondolas and a number of ballast and other types of cars.

Cutter Electrical & Manufacturing Company, Philadelphia, Pa., has closed a contract for the circuit breakers for the Chicago & Northwestern Railway's terminal power house in Chicago. The equipment consists of I-T-E motor-operated remote control circuit breakers and switches for the protection of the engine, turbine and motor-driven generators.

Western Electric Company, New York, N. Y., reports the receipt of an order from the Atchison, Topeka & Santa Fé Railroad for 600 of the new railway telephone selectors which it has recently developed. Following successful experimental installations, the New York Central & Hudson River Railroad and the Pennsylvania Railroad have also placed second orders for the new selector.

Kellogg Switchboard & Supply Company, Chicago, Ill., announces that J. C. Murray, sales engineer, has left on a six months' business extension trip through South America. Mr. Murray expects to visit customers, agents and friends of the Kellogg Switchboard & Supply Company in all the important cities, stopping at Bahia, Rio de Janeiro, Sao Paulo, Montevideo, Buenos Ayres, Santiago, Lima, Colon and other cities.

E. F. Wheaton has resigned as vice-president and general manager of the General Traction Development Company, Cleveland, Ohio, and has opened offices in the Engineers' Building. W. A. Hume, formerly assistant to the vice-president of the General Traction Development Company, has become associated with Mr. Wheaton. George H. Carpenter succeeds Mr. Wheaton as vice-president and general manager of the company.

Ackley Brake Company, New York, N. Y., has appointed the Chinese General Engineering Company of Shanghai as its selling agent for Ackley brakes in China. G. S. Ackley, proprietor of the company, who is making a trip around the world in the interests of the company, was greatly impressed with the opportunities for developing trade in China. Mr. Ackley believes manufacturers should visit the country and exhibit their wares. The Ackley Brake Company is now considering a plan to establish a factory in Japan.

Pay-Within Car Company, Philadelphia, Pa., announces that the Cleveland (Ohio) Railway has recently placed an order for 100 additional equipments of Pay-Within apparatus with the Chicago office of the Electric Service Supplies Company, general sales agents for the Pay-Within Car Company. These equipments include the necessary folding-door apparatus, control stands, etc., for converting four-door standard cars to pay-within operation, and are furnished under license of the Pay-Within Car Company. When this apparatus is installed the Cleveland Railway Company will have 200 pay-within cars in operation.

General Electric Company, Schenectady, N. Y.—Employees of the New York office on July 9 held their fifth annual outing and games at Langes' New Dorp Beach Hotel, New Dorp, S. I. The program included a dinner, served at 2 p. m., which was followed by a comedy ball game. This was one of the features of the outing, and was played between teams of the New York office, composed of the "Old Boys" and "Young Men." A number of other athletic events were held, prizes being awarded to the winners. Two corporation league baseball games were also played with the New Jersey Zinc Company, in which the General Electric Company lost the first game and won the second game.

Wagner Electric Manufacturing Company, St. Louis, Mo., has removed its office in Charlotte, N. C., to the Woodward Building, Birmingham, Ala., which will be in charge of J. F. Jones. Mr. Jones was born in Gainesville, Ala., and was graduated in 1901 from the Alabama Polytechnic Institute with the degrees of E. E. and M. E. He entered the employ of the General Electric Company, and in 1905 resigned to become connected with the Fort Wayne Electrical Works as transformer sales engineer. In February, 1909, he resigned from the Fort Wayne Electrical Works and joined the home office force of the Wagner Electric Manufacturing Company at St. Louis, Mo. The Birmingham office will cover that part of Tennessee east of the Tennessee River, and all of the States of Mississippi, Alabama, Georgia and Florida. North and South Carolina, which have heretofore been handled from the Charlotte office, will now be handled from the Philadelphia office, which is located in the Real Estate Trust Building, in charge of John Mustard.

ADVERTISING LITERATURE

York Rolling Process Company, New York, N. Y., has issued a pamphlet describing and illustrating the York steel tie.

Maryland Steel Company, Sparrow's Point, Md., has issued a 30-page booklet describing Cunningham coal tar paint.

Q & C Company, New York, N. Y., has issued a bulletin describing and illustrating its rail-laying machine for renewing rails.

Railway Appliances Company, Chicago, Ill., has issued a leaflet describing the uses of the R. A. skid shoe which it manufactures.

Eclipse Railway Supply Company, Cleveland, Ohio, is mailing a folder describing the style "C" Eclipse life guard which it manufactures.

C. W. Hunt Company, New York, N. Y., has issued general catalog No. 102, in which are briefly described the various types of coal handling and hoisting machinery, conveyors, industrial railways, etc., which it builds.

Heywood Brothers & Wakefield Company, Wakefield, Mass., has printed a folder describing the Universal car seats which it manufactures. In connection with the folder the company is mailing a set of illustrations of its various types of car seats.

Cooper Heater Company, Carlisle, Pa., has issued an illustrated 20-page catalog, in which it gives a brief history of the growth and progress of car heating devices. The catalog also contains a detailed description of the new Cooper pressed steel heater which the company has just placed upon the market.

Wonham, Sanger & Bates, New York, N. Y., have issued a pamphlet entitled "The 'H-B' Life Guard in the American Continent," in which the merits of this device are described. The pamphlet also contains a list of the successful pick-ups made by "H-B" life guards in some of the larger cities where it is being used.

Highway Metal Culvert Department of the Penn Metal Ceiling & Roofing Company, Ltd., Boston, Mass., is distributing a time book for the use of foremen of highway departments engaged in laying highway metal culverts. The book also contains practical information of value to highway foremen relative to the highway metal culvert which the company manufacturers.

The Public Service Commission has received a letter from Frederick W. Rowe of the Manhattan Bridge Three-Cent Line, M. E. Harmon, William C. Demarest, and Henry Roth, urging that a subway along Flatbush Avenue, from Atlantic Avenue to Eastern Parkway, and Livonia Avenue to New Lots Road, and also branch southerly on Utica Avenue and Nostrand Avenue be constructed at once. These four men agree that in such case they will take a lease to operate this subway, paying interest on the sinking fund of 1 per cent on the cost of the Flatbush Avenue portion, and a nominal rental for the balance. Should the proposition be favorably considered, they will organize a company in a form or in such form as will be satisfactory to the commission and the Board of Estimate, and take the necessary formal applications for the obtaining of this lease. The Public Service Commission of the First District of New York has placed on the city map the Utica Avenue subway route in the Borough of Brooklyn, extending south from Eastern Parkway to Jamaica Bay, some four miles. This is a route asked for by property owners, who have expressed their willingness to have such a line built by assessment.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, JULY 30, 1910 No. 5

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 30, 1910.

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Systematizing Car Overhauling

The importance of planning for systematic shop overhauling of cars when a group of any given type is to be passed through the maintenance department cannot easily be exaggerated. At this time of year in northern latitudes many companies are actively engaged in overhauling their box car equipment in anticipation of the coming winter, and unless this work is carefully laid out its cost tends to rise to extreme limits. It is essential for the shop force to know in considerable detail what work is required before it is begun and not to take the first car in the shed, jack it up, look over the trucks and wiring, and then repair it before going over the next one. A general survey of all the cars to be gone over at any one period is worth all that it costs in time and effort, since by this means an estimate of all the material required can be prepared and orders placed with the stockroom or purchasing department in time and in sufficient number to enable the company to secure the most advantageous prices and deliveries and reduce to the minimum the number of surplus parts that are carried in stock. Economies in the planning of labor also accompany a systematic study of an overhauling problem before actual tool work begins.

Pittsburgh Transportation Problem

Pittsburgh is the latest city whose surface transportation system is being given careful analysis by the municipal authorities. Three examinations have been made during the past two years, the first by Stone & Webster for the State Railroad Commission, the second by Mr. Swensson for the same body and the third by Mr. Arnold for the Mayor. Of the two reports by Mr. Arnold published this week one is of a general character and to the broad outline of the electric railway situation as there presented we believe there will be few who will dissent. The object of the report was to educate public opinion in Pittsburgh in transportation matters so that it could take up the detailed analysis to be presented later with a better understanding. To Mr. Arnold's suggested remedies of relief for overburdened traction companies, however, we would add another, that of charging for all transfers issued, which we do not understand that he includes in his analysis. The amount at which transfers should be sold, whether 1, 2, 3 or 4 cents, is a matter to be determined in each particular case. But if the "receipts per passenger" must be increased we believe that this method would often be the simplest and would also be perfectly logical because it actually costs a railway company more to carry a passenger who transfers than one who travels the same distance on a single car. The conclusions of Mr. Arnold's second report, or that on Pittsburgh's immediate needs, are that radical changes should be made in the routing of the cars and important improvements added to the physical property. The method by which the latter are to be provided in the pres-

ent adverse financial condition of the company will be taken up in subsequent reports.

Coal Analyses in Power Plant Tests

Much stress has been laid of late upon the importance of chemical analyses of fuel in connection with power plant operation. It is unnecessary at this time to refer again to the advantages of studying coal from the point of view of its constituents and contained heat units per pound, or of drawing fuel contracts on a chemical basis. In view of the objections sometimes urged against the adoption of laboratory methods in dealing with large quantities of fuel, however, it is interesting to note the accuracy which can be obtained in getting a fair average sample of coal for the chemist's determinations. On a recent test of a steam plant, which lasted about two weeks, samples of coal were taken from every barrow load which was fired; these were mixed daily and subdivided into air-tight jars, and a daily analysis made. At the end of the test an analysis was also made of a specially prepared sample of the coal from the bins as a whole and the two determinations were compared as follows: Moisture, 1.83 per cent and 1.83 per cent; volatile matter, 30.86 per cent and 31.12 per cent; fixed carbon, 57.38 per cent and 57.22 per cent, and ash, 9.93 per cent and 9.83 per cent. The close agreement between the average of the separate analyses made during the test and the final analysis of the representative sample from the bins showed that the fuel ran very uniformly and that conscientious work in taking daily samples may be thoroughly relied upon to give a fair index of the average conditions present in the fuel.

Railway Equipment Problems

In spite of the advance which has been made in recent years in methods of investigating electric railway problems it is significant that the field for research is always attractive and seems always to be broadening. It may fairly be said that electrical phenomena lend themselves more easily to analysis than mechanical questions, on account of the accurate and effective measuring apparatus which can be pressed into service in the former class of inquiry. In the sphere of car design it is impressive how little, relatively, one can determine as to the fitness of minor members of the framing, truck parts, and brake rigging for a given service, from the quantitative point of view. A car at a standstill is in large measure subject to the distribution of stresses common to a bridge, but a car in motion on a rough track presents an entirely different problem to the designer. Extreme difficulty surrounds the effort to determine numerically the forces in action on a piece of rapidly moving rolling stock. Although the "cut and try" method of designing must be practised to a large extent in this class of problems, there is no reason for discouragement on the part of the man who has a bent toward theoretical determinations. It may be hard to isolate the factors entering into the problem and to bring about conditions tending to vary one element so that the effect on others can be observed. Nevertheless this is the proper line of attack, combined with improved observation of operating conditions and results. Every master mechanic realizes the tendency of the smallest investigations to carry him into the most intricate relations of equipment parts and service. In the multiplicity of these factors lies the challenge for ingenuity to isolate phenomena and deduce conclusions of real value to the industry.

SENIORITY AND BONUS SYSTEMS

In the United States Navy, the policy has been adopted of involuntarily retiring on part pay a certain number of the older officers each year to provide vacancies for the younger men and so increase the number of promotions. The same plan cannot well be adopted in the electric railway business but the management there is faced with the same problem of maintaining the interest of all members of the force in their work and of keeping their loyalty and zeal in their work at the highest pitch. This is especially true with regard to the platform employees who realize that they greatly outnumber the officers so that promotion can come only to a small percentage of them. Besides, many men who do excellent work on the platform are temperamentally unfitted for positions of command. Of course, one obvious method of rewarding good service is the seniority system in which the wages gradually increase according to a regular scale. The system is a logical one because it is fair to assume that the men who are oldest in the service have been retained by the company because they have continued to perform their duty satisfactorily and, being more experienced, their labor is actually more valuable. Most companies follow this plan although various modifications are possible. Thus in Brooklyn a man for especially creditable service may be advanced in his seniority record more rapidly than his actual time on the road would require.

Still another method is the cash bonus system, used either in connection with or without the seniority system. A striking example of this method is that employed by the Capital Traction Company, Washington, D. C., and in use there exactly two years on July 1, 1910. On that date the Capital Traction Company distributed among 311 employees the sum of $18,825, in amounts ranging from $25 to $100 each as a reward for the faithful performance of their duties. The men are divided into four classes: *A* those who have given two years satisfactory service; *B* those who have given five years satisfactory service; *C* those who have given 10 years satisfactory service; *X* those who have given one year's satisfactory service. In general the principle of the scheme is to give the greatest annual reward to the men who have been longest in the service of the company. Details of the conditions under which the bonuses are given and the amounts for each class are presented in an article published elsewhere in this issue, but a point which is especially noteworthy is the extraordinary number of employees who met successfully the onerous conditions laid down in regard to compliance with the rules. For example, of the 382 men who were on the regular classified list July 1, 1909, fully 311 received a bonus one year later. This record appears even more extraordinary in view of the fact that only 315 men were eligible for the bonuses in any event as 67 men had left the classified service during the year. These figures speak most convincingly of the appeal made to the men by this bonus system. The fact that 79 first-year men were in the premium class despite the condition that six reprimands in 12 months would have disqualified them is another convincing proof of how this method of extra payment encouraged the men to do their best.

Of course, the object of both the seniority and bonus plan, and others which have been used, is partly to encourage good men to engage and remain in the service and partly to secure from them the best work of which they are capable. Opinions will probably always differ as to which in practice is the more

desirable; that of special rewards for good service or that of the payment of regular wages, assuming that the aggregate amount is practically the same in each case. One plan would probably appeal to some men, the other to other men, and the best way to judge is by the results. We believe, however, that to most employees, the former plan would be more satisfactory than the payment of a bonus, even at a slight difference in monetary return to the average employee in favor of the bonus. It is conceivable also that the latter plan might tend more to the suppression of complete reports on accidents.

NEW CLASSIFICATION USED BY TWIN CITY COMPANY

In its annual report for 1909 the Twin City Rapid Transit Company continues its creditable practice of furnishing the details of operating expenses. Owing, however, to the fact that the Interstate Commerce Commission classification of accounts, adopted in 1909, is different from that formerly in use the company does not compare the details of earnings and expenses in the report. In the previous annual statement, covering the operations during the year 1908, the receipts were composed of passenger earnings and miscellaneous earnings, which amounted, respectively, to $6,333,297 and $66,213. The report for 1909 divides the total operating revenue between $6,924,656 revenue from transportation and $45,120 revenue from operation other than transportation. Although these figures are not comparable, owing to the differences in classification, they are of interest as showing how very small an amount of gross revenue is derived from operation other than transportation, as defined in the uniform classification. The revenue from transportation probably includes some minor revenues from other than passenger transportation, but the large increase over the gross earnings of the preceding year is due to the development of the business.

The five general expense accounts used in 1909 were as follows: Maintenance of way and structure, maintenance of equipment, traffic expenses, conducting transportation, and, lastly, general and miscellaneous expense. The 1908 report showed seven general accounts, comprising in addition to the two maintenance accounts, the following: Operation of power plants, car service, general expenses, injuries and damages, and insurance. Maintenance charges in both accounts were larger in 1909 than in 1908, but no figures are available to show whether this was due partly to the variations in classification or altogether to more liberal expenditures. The maintenance of way and structure expenditures were $256,990 in 1909 and $205,624 in 1908. The maintenance of equipment expenditures were $345,753 in 1909 and $291,051 in 1908. These totals represent less than one-half of the appropriation in each year for upkeep of the property. In addition to the expenditures for maintenance charged in operating expense the company appropriated for renewals $703,000 in 1909 and $544,000 in 1908.

The $2,038,577 expended in 1909 for conducting transportation is more nearly comparable with the total of $1,996,913 expended in 1908 for operation of power plants and car service. The traffic expense, which aggregated $41,835 in 1909 was, of course, not shown separately in the previous year.

The fair comparison of operations accounted for under the same classifications that will be possible when the details of the 1910 results are made public will permit an analysis that will be of much value.

BOILER ROOM EXPANSION

The demand for increased steam generating capacity in a plant which is somewhat restricted as to available land imposes upon the management the choice of two methods of boiler room expansion. First, the enlargement of the plant by the installation of parallel batteries under the original or extended roof, and second, the erection of a new boiler house on a site close by the first installation, but with provision for interconnection of high pressure mains. The plan to be followed depends largely upon the shape of the company's land, the design of the existing station and the prospects of its further expansion, taking into account the steam-using requirements of the prime movers and the relative cost of fuel handling in each instance.

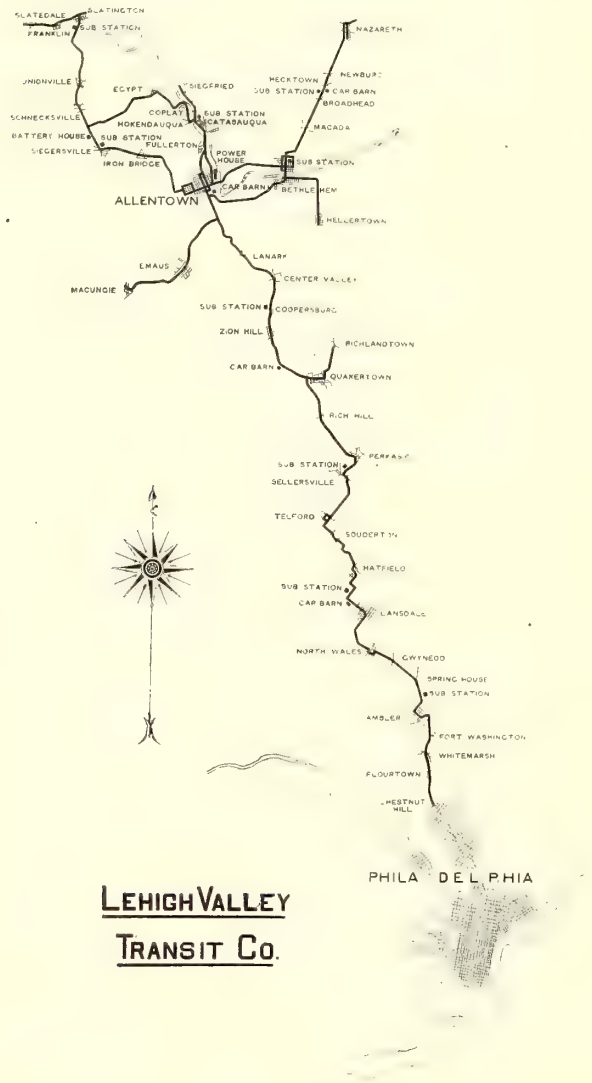
Where the space will permit extension of the existing boiler room without involving the tearing down of other structures or the moving of heavy equipment, it generally follows that this is the least expensive course. It is relatively easy to carry a header forward to meet new lines of batteries, and reliability and flexibility of service are readily secured by proper valving and in some cases by cross-connections on the engine room side of the plant. Usually it is less costly to extend the coal-handling system under a single roof than to build a separate plant. Modern telpher equipment disarms the question of fuel movement of its difficulties. In operation, it is of the highest advantage to maintain all the boilers in one or two lines which can be swept by the eye from a single point. The cost of firing labor tends to run lower, with the combined boiler room plan.

The separated installation scheme works out well in cases where the new electric generating units are practically independent of the old apparatus and where short runs of piping are essential for their steam supply. The old and new boiler installations can still be tied together for peak or emergency operation by a well-insulated header. With a coal supply from a field between the two rooms the cost of fuel handling will rise very little. An accident in one plant will rarely be able to affect the other. If necessary, gage lines can be run to a central point so that the boiler room foreman will be in touch with the steam conditions in every battery. This does not give him the same oversight as is characteristic of the single equipment, but it has the advantage of increasing the responsibility of an understudy who may be placed in charge of the second division of batteries. In some cases the necessity of building an additional chimney will dictate the establishment of an independent though thermally connected boiler room. It is generally more important to have short runs of steam supply lines between the batteries and prime movers of any given station group than it is to maintain close connections with short runs between old and new groups of batteries. Pressure drops will be tolerated in emergency service over fairly long tie lines, which would be out of the question in efficient daily operation.

While the plan of providing a separate boiler room installation is not a logical one under normal conditions, and would not be adopted in the construction of a new plant, it has been found to work out extremely well in exceptional cases where the company's land facilities were cramped in the direction which would naturally be followed in enlarging the steam generating plant.

POWER DEVELOPMENTS OF THE LEHIGH VALLEY TRANSIT COMPANY

The Lehigh Valley Transit Company was formed in Nov., 1905, by the consolidation of four railway systems in the Lehigh Valley region of Pennsylvania. These were the Lehigh Valley Traction Company, the Philadelphia & Lehigh Valley, the Allentown, Slatington & Coplay, and the Egypt & Ironton companies. By this merger the system was made to include about 140 miles of track, centering at Allentown, with the several branches terminating at Chestnut Hill (Philadelphia), Slatington, Nazareth, Macungie and Hellertown. These branches in turn connect at several points with other trolley systems so that the whole network covers a large district. One of these connections extends to Easton and thence to the Delaware Water Gap region. At the same time an arrangement



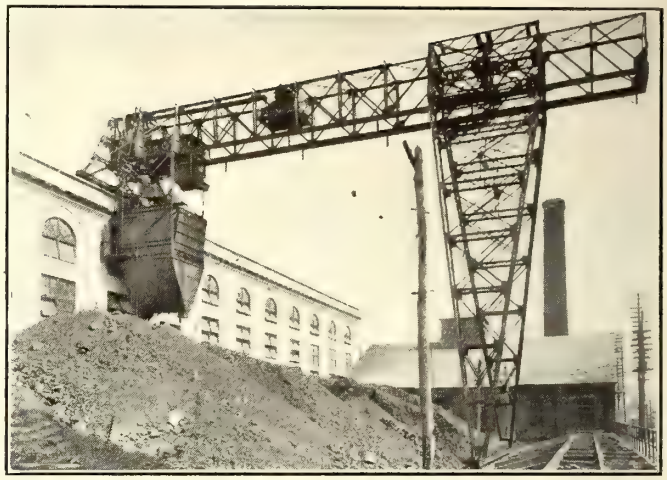
Lehigh Valley Transit—Route, Power Plant, Substations and Car House

was effected whereby the Lehigh Valley Transit Company undertook the management of the Allentown Electric Light & Power Company, which leases the Bethlehem Electric Light Company and the South Bethlehem Electric Light Company; also the Slatington Power Company which leases the Citizens Electric Light, Heating & Power Company of Slatington and Walnutport. The company also leases the Quakertown Traction Company, the Allentown & Coopersburg Turnpike Company and the Bethlehem & Nazareth Passenger Railway Co. The authorized and outstanding stock is $3,000,000 common and $5,000,000 preferred.

ORIGINAL POWER ARRANGEMENTS

As a result of the successive growths of these different lines, the generating stations were widely scattered and the equipment of various types.

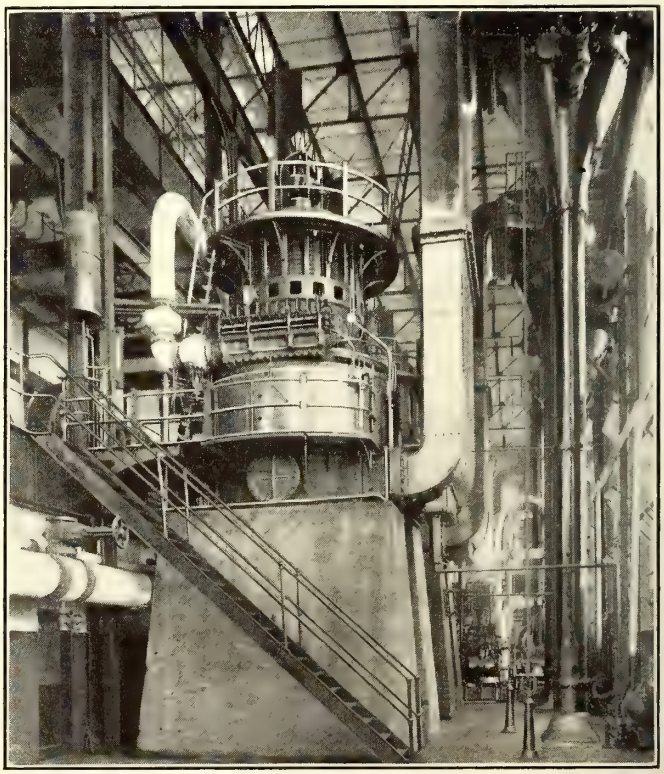
The railway generating stations were at the following points: Allentown, 2500 kw; Quakertown, 350 kw; Souderton, 350 kw; Ambler 350 kw; Broadheads 400 kw; Slatington 600 kw.



Lehigh Valley Transit—Boiler Room Side of Power Plant, Showing Coal Pits and Gantry

The lighting stations were located at: Slatington, 100 kw; Allentown 1000 kw; Bethlehem 500 kw.

In addition to these generating stations a 200-amp. storage battery station was located at Rocky Ridge, and a 300-amp storage battery station at Allentown. The existing incandescent lighting systems were operated at 133 cycles and the street lighting was composed mainly of open arc lamps, supplied by 9.6 amp Brush machines, the stations at Allentown and Bethlehem being so equipped. The railway feeder systems were better adapted to the requirements of the original sections of their roads with their very light equipment, than to the heavier equipment and increased schedules of the combined network.

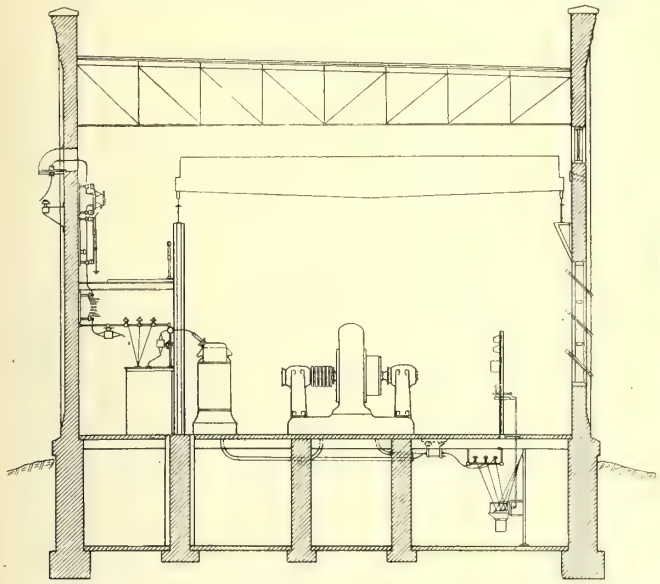


Lehigh Valley Transit—One of the 2000-Kw, 13,200-Volt, 25-Cycle Turbines

CHOICE OF SYSTEMS

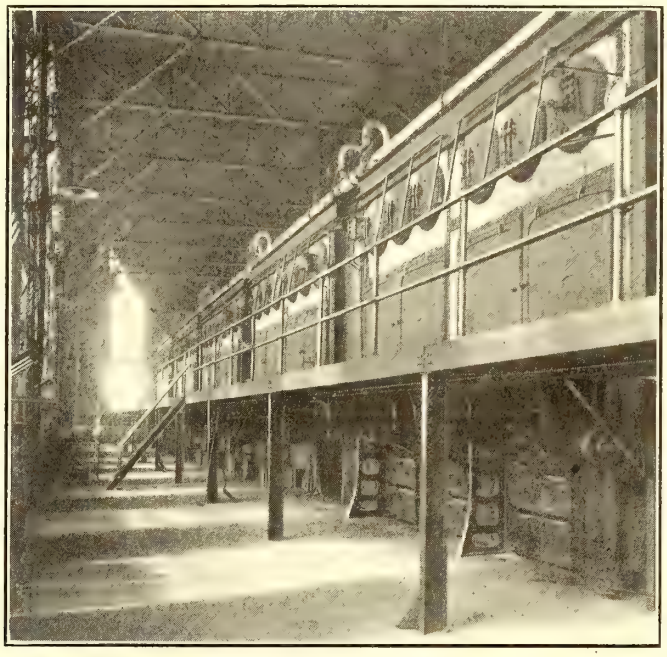
In the choice of distributing and operating systems and fre-

quency for the generating plant, certain considerations largely determined the choice for the respective services. On the service lighting system for instance, most of the transformers installed were suitable for operation at 60-cycles, although then used at 133 cycles. To discard these in favor of any other frequency, which might be indicated by other considerations, would have entailed a considerable loss, and furthermore would have resulted in great inconvenience when changing over from the old system to the new. The necessity of maintaining the existing service and of bettering it as rapidly as possible was more than ordinarily important. The arc lighting situation was somewhat complicated by reason of existing contracts which definitely specified the type and form of lamp. These were of such a nature as to make it desirable to retain the existing system for that service even at the expense of having a certain amount of complication in the station equipment.

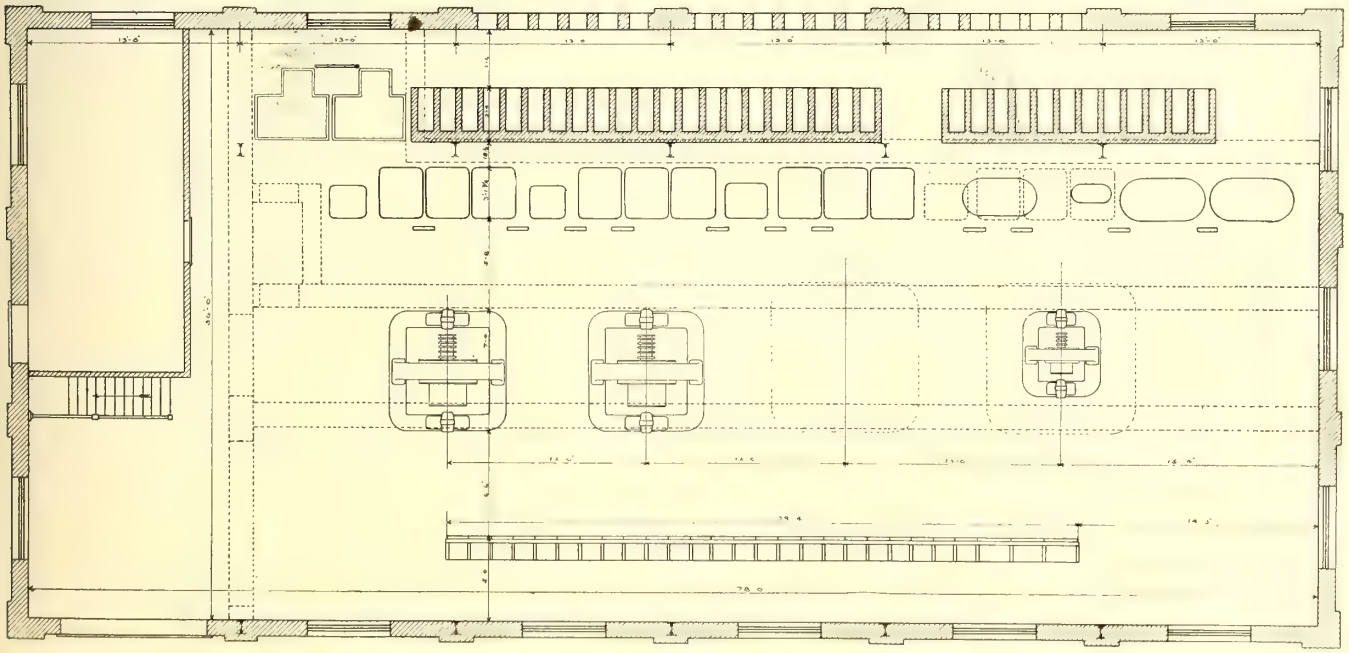


Lehigh Valley Transit—Cross-Section of Four-Unit Substation

On the railway system all of the existing lines were operating at 600 volts d.c., and the character of the service and the existing construction determined the retention of this system for the operation of the railways. Some of the local power users in Allentown were equipped with 600-volt d.c. drives, which required the provision of a 600-volt metallic circuit, the intention being gradually to reduce this service to a point where it could be discontinued and the apparatus provided for that service be subsequently converted to the use of the railway system. The unfavorable location of the stations outside of Allentown, both as regarded their fuel and water supply (which in most cases had resulted in their operation non-condensing) determined the choice of a single centrally located station at Allentown on the south bank of the Lehigh River, with railroad connection from the Lehigh Valley Railroad providing an ideal situation as regards both coal and water.



Lehigh Valley Transit—Boiler Room, with Stokers, and Charging Platform



Lehigh Valley Transit—Plan of Typical Four-Unit Substation

The three-phase 25-cycle, 13,200-volt transmission to the railway substations was settled upon because of the contemplated connection with the transmission of adjacent systems operating at this frequency. The importance of this over-balanced the desirability of having a single frequency in the generating station. The accompanying map of the system shows

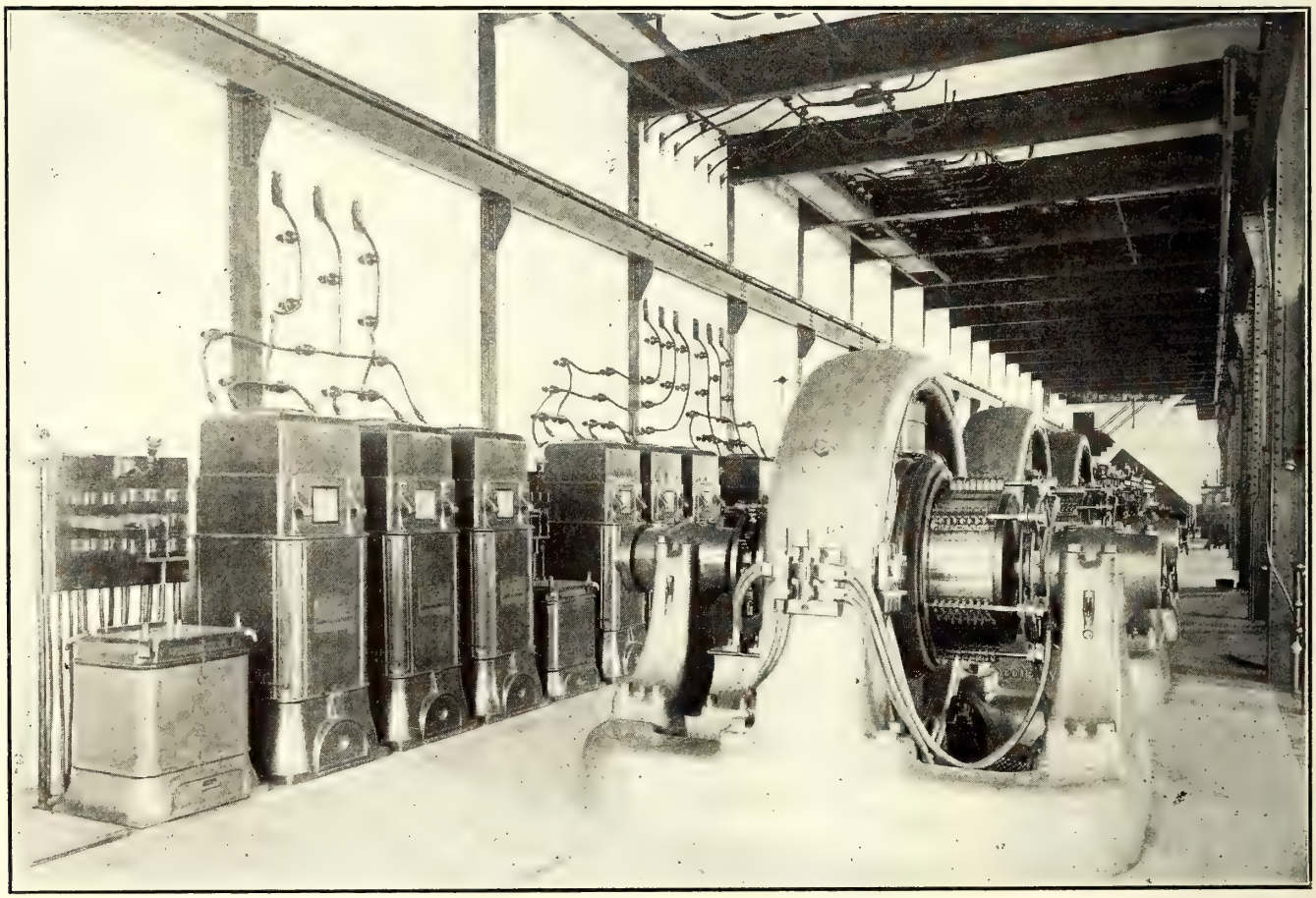
the location of the present generating plant and of the respective substations. For all of the branches, with the exception of the Philadelphia division, single transmission lines are used, the construction employing 40 ft. average wooden poles, carried for the greater part of the distance along public roads. On the Philadelphia division a single pole line, with duplicate transmission lines, is installed, both lines entering and leaving all substations so that they can be interchanged at any point.

For the lighting systems of Bethlehem and Slatington independent three-phase, 60-cycle 13,200-volt transmission lines are carried to the respective substations, a single copper line being installed for Slatington and a double line for Bethlehem. In the construction of the various lines bare copper wire, ranging from No. 2 to No. 00 is employed, the insulators being triple petticoat porcelain, 70,000-volt test, with locust pins. For the majority of crossings the standard strain insulator construction is employed, the belief being that the simplest possible arrangement would give the greatest security from trouble.

switches. The control panels for the a.c. lines are located opposite the respective switches on that side of the station, while the railway machine and feeder panels, together with the lighting distribution, are located on the opposite side of the building.

The incoming duplicate high-tension lighting lines are handled in a manner similar to that just described for the railway lines, as they are carried through three-phase step-down transformers to a 2300-volt lighting bus, the local power being distributed at three-phase and the lighting at single phase. The transformers in all the substations are of the air blast type, duplicate blowers, as indicated, being provided in all cases. The arrangement of the straight railway substations is similar to that shown, excepting only for the omission of the lighting equipment.

The system of connections employed in the main station at Allentown is shown diagrammatically on page 176, but only one connection of each kind is indicated. There are two



Lehigh Valley Transit—Railway Substation Apparatus on the Lower Gallery of the Turbine Room

RAILWAY SUBSTATIONS

The railway substations are all built on a uniform plan, differing only in the number of units provided and in the provision for the lighting distribution in the special cases where this is required. The plan and elevation show the general arrangement of the Bethlehem substation, which has provision for four railway converters. Those at present installed there are of 300 kw capacity. The layout, however, is such as to provide ample room for 500 kw units should future load requirements demand increased capacity. It will be noted that this station has provision for lighting equipment, the small rotary converter shown being a three-wire machine to meet the requirements of the local metallic circuit d.c. service, which, as above noted, will be sooner or later eliminated. The incoming duplicate high-tension railway lines are carried through remote manually-operated oil switches in independent cells to the sectionalized high-tension bus, from which the respective step-down banks of transformers for the rotaries are supplied through corresponding oil

2000 kw. 25-cycle Curtis turbo-generators supplying the railway system, with provision for the future installation of two additional units of capacity up to 5000 kw. These are Y-connected with ungrounded neutral and are each connected through a single remote-control motor operated oil switch to the 25-cycle high-tension busses, which are sectionalized at the center. The various 25-cycle transmission lines are supplied from this high-tension bus, the duplicate lines on the corresponding divisions being taken from the respective halves of the bus. The 60-cycle, 2300-volt turbo-generators for the lighting system, of which there are one 2250 kw, one 1000 kw, and one 500 kw, are similarly connected to the 2300-volt main bus. The single-phase Allentown lighting and three-phase local power are supplied directly from this bus through remote-control, solenoid-operated oil switches in independent brick compartments. The lighting transmission lines for Bethlehem and Slatington are supplied through 2300-13,200-volt three-phase step-up transformers, delta-connected with induction regulators in the more

important lines. All of the electrical equipment is of the General Electric Company make.

The arc lighting is supplied by 125 light, 9.6 amp Brush arc machines connected in pairs to three-phase, 60-cycle synchronous motors operated from the 2300-volt, 60-cycle bus. The 600-volt metallic motor circuit in Allentown is supplied from a rotary converter, operating from the same bus through step-down transformers, a tie connection being provided between the d.c. bus and the railway busses in the local substation, which is situated in the same building, as shown in one of the illustrations, provision being made for starting this rotary from either the a.c. or d.c. ends. The substations are all operated at 13,200 volts with delta-connected transformers. The railway system is operated on a 20-hour schedule, the metallic circuit rotary which operates from the 60-cycle system, being cut on to the railway feeders during the four-hour shutdown of the 25-cycle system, thus providing for emergency operation and specials. This permits repairs throughout the system without interruption in any of the services, duplicate lighting lines being provided wherever the continuous lighting service is required.

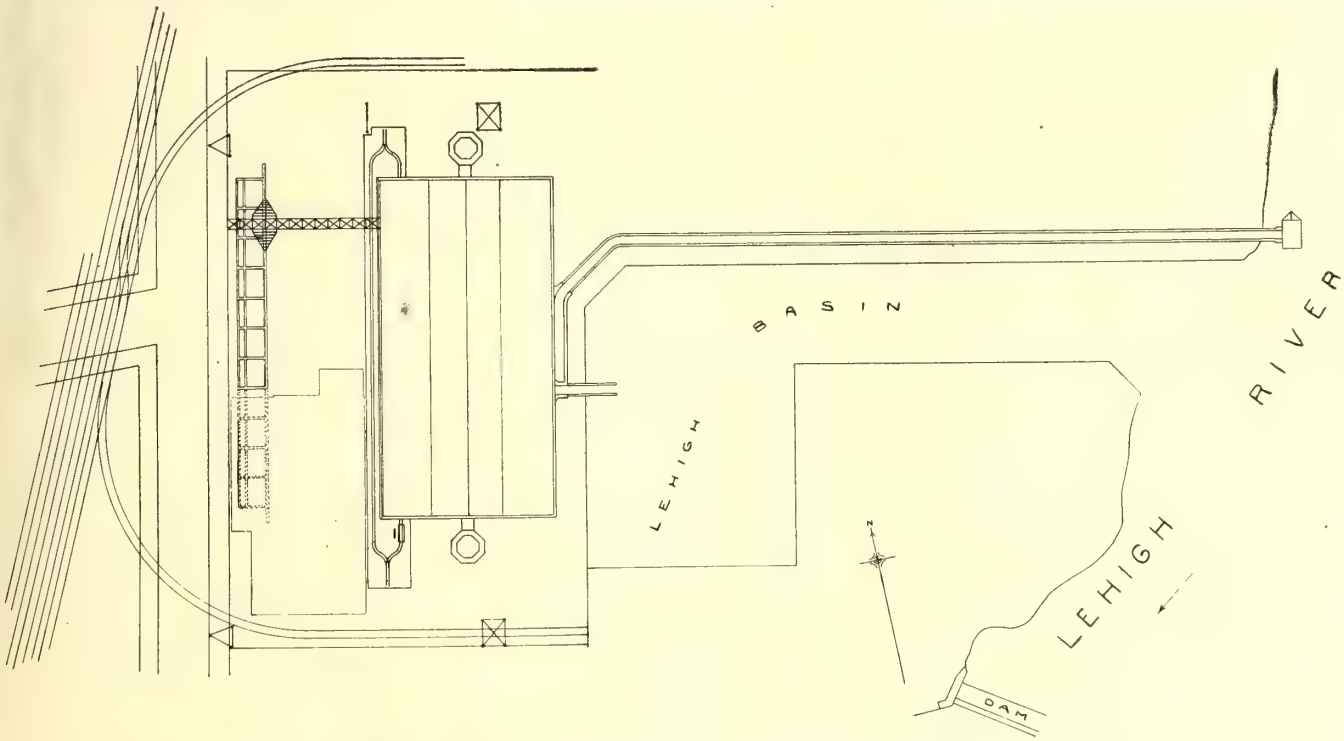
POWER STATION

The accompanying plan of the Allentown power plant property will give a good idea of the situation as effecting the location and construction of the generating station. Particular attention should be called to some of the features governing the design and of the results accomplished by the design adopted. The necessity of supplementing the existing station by the use of such new equipment as could be quickly put into service, determined on a location as close to the existing railway station as conditions would permit, while the character of the site necessitated over-lapping the new and old stations. In brief this condition consisted in the presence of about 20 ft. of loosely filled ground occupying what was previously a part of the old Lehigh basin. The great quantities of coal dust, saw dust, mud, etc., brought down at times of high water by the Lehigh river, and deposited in these basins, was a factor of no small importance in considering the water supply. The final arrangement decided upon by the constructing engineers included a crib with four sets of steel screens located out in the main channel of the river, the discharge from the condensers being made into the basin.

Another consideration which was given weight by reason of the numerous coal strikes at the time, was the provision of a large reserve coal storage, capable of insuring against an interruption from any trouble of this nature. As the railroad connection crossed one of the city streets, some system of receiving coal whereby frequent shifts would not be required, was necessitated. The extended system of coal pits, capable of receiving a train of cars, was therefore determined upon and there was installed an electrically operated Browning gantry crane, with one end traveling on the coping of the building wall for handling the coal from the pits to storage or stokers.



Lehigh Valley Transit—Steel and Concrete Boiler Supports and Reinforced Concrete Ash Hoppers



Lehigh Valley Transit—Plan of Power Station Property

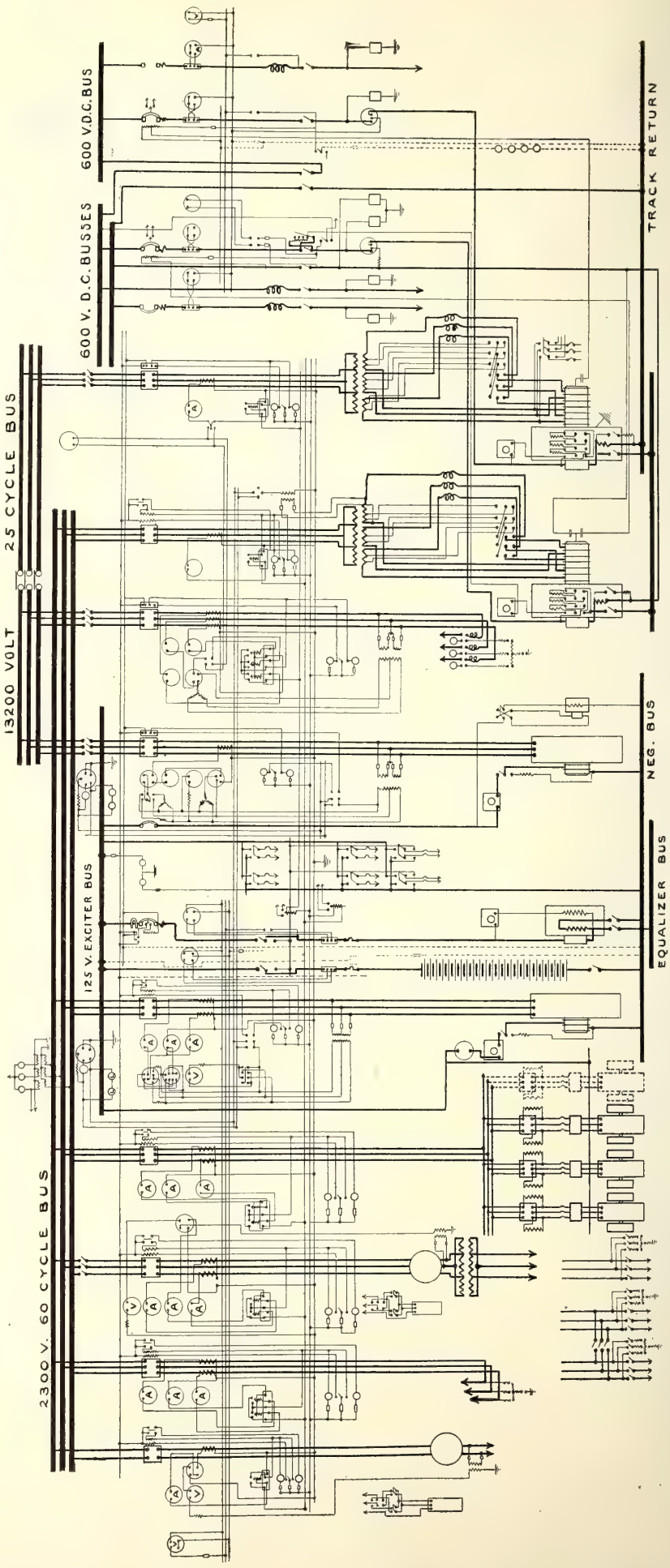
As shown in one of the illustrations on page 172, this crane carries at the building end, a suspended hopper into which the clam shell bucket discharges. Immediately beneath this hopper, and entirely enclosed from the weather, are duplicate electric-driven coal crackers. The crushed coal is discharged into the lower hopper with cut-off valves, one of which is located for

loading into a charging larry traveling on a bracket runway at the side of the building, while the other valve discharges into an emergency storage pile of crushed coal. The bulk of the coal is, of course, stored uncrushed, the area provided being sufficient to accommodate a three-month supply. One man ordinarily attends the coal handling. The sectional elevation and the two plan views of the station will make clear the general arrangement of the same.

On account of the character of the soil, it was necessary to carry the entire building and the machine foundations on piles. The latter were cut off below minimum water level. At the same time the great variation in the river level necessitated very deep foundations in order to raise the lower floor of the station to a point which is secure against floods. The building is of skeleton steel construction, with monolithic concrete walls, roof and floors. It is absolutely fireproof in every regard, as the doors and windows are of metal glazed with ribbed wire glass. The efficient lighting and ventilation of all portions were carefully considered and it will be noted from an examination of the typical cross-section, that practically every portion of the building, including the switch galleries and the boiler room, is open to the full lighting of the main windows. Monitors are provided for the full length of the building for both the boiler room and turbine room to insure efficient ventilation.

As shown in the view of the boiler room, an auxiliary coal skip hoist is provided in one corner. This is arranged to receive coal from the crushed coal storage previously referred to and to discharge the same into a small hopper at one end of the boiler room; this is so arranged as to discharge into the same larry car as the discharge hopper on the gantry crane. The charging larry passes along the front of the boilers at the level of the stoker hoppers. This car is a Hunt storage battery locomotive, the special dumping valve being so arranged as to discharge the coal directly into the stoker hoppers. These hoppers are provided with folding bins, arranged when in the open position to receive a considerable quantity of coal and closing in order to clear the tube doors when open for the removal of tubes. The stokers are of the Roney type, manufactured by the Westinghouse Machine Company.

The boilers consist of six 1050 hp batteries of B. & W. steel header type, equipped with two stage, B. & W. superheaters, designed to give a normal superheat of 200 deg. Fahr., at 200 lb. working pressure. A separate saturated steam system is provided for the station auxiliaries. The boilers connect to a single flue which has dampers at each end of the building and sectionalizing damper at the center, the design being such that economizers can readily be added without material change at any future time. The boilers are carried on steel and concrete supports, the construction including reinforced concrete ash hoppers, which discharge directly into tip cars at the ground level. The steam piping system of the



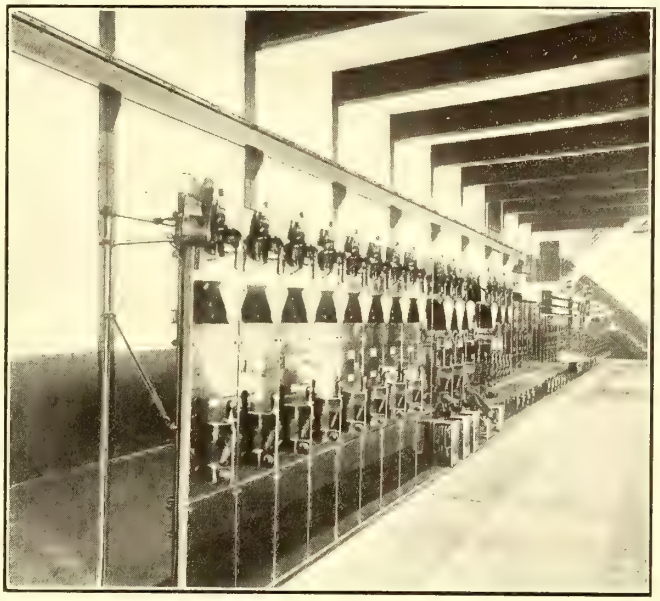
Lehigh Valley Transit—Wiring Diagram, Showing the System of Connections in the Generating Station

boiler room comprises individual connections from the respective boilers into the main steam loop located in the ground story, and similar connections to a central loop system for the auxiliaries, as will be seen by reference to the plan view of the ground floor. At present a single Custodis radial brick stack 11 ft. x 225 ft. is located at one end of the station; the future stack will be located at the opposite end.

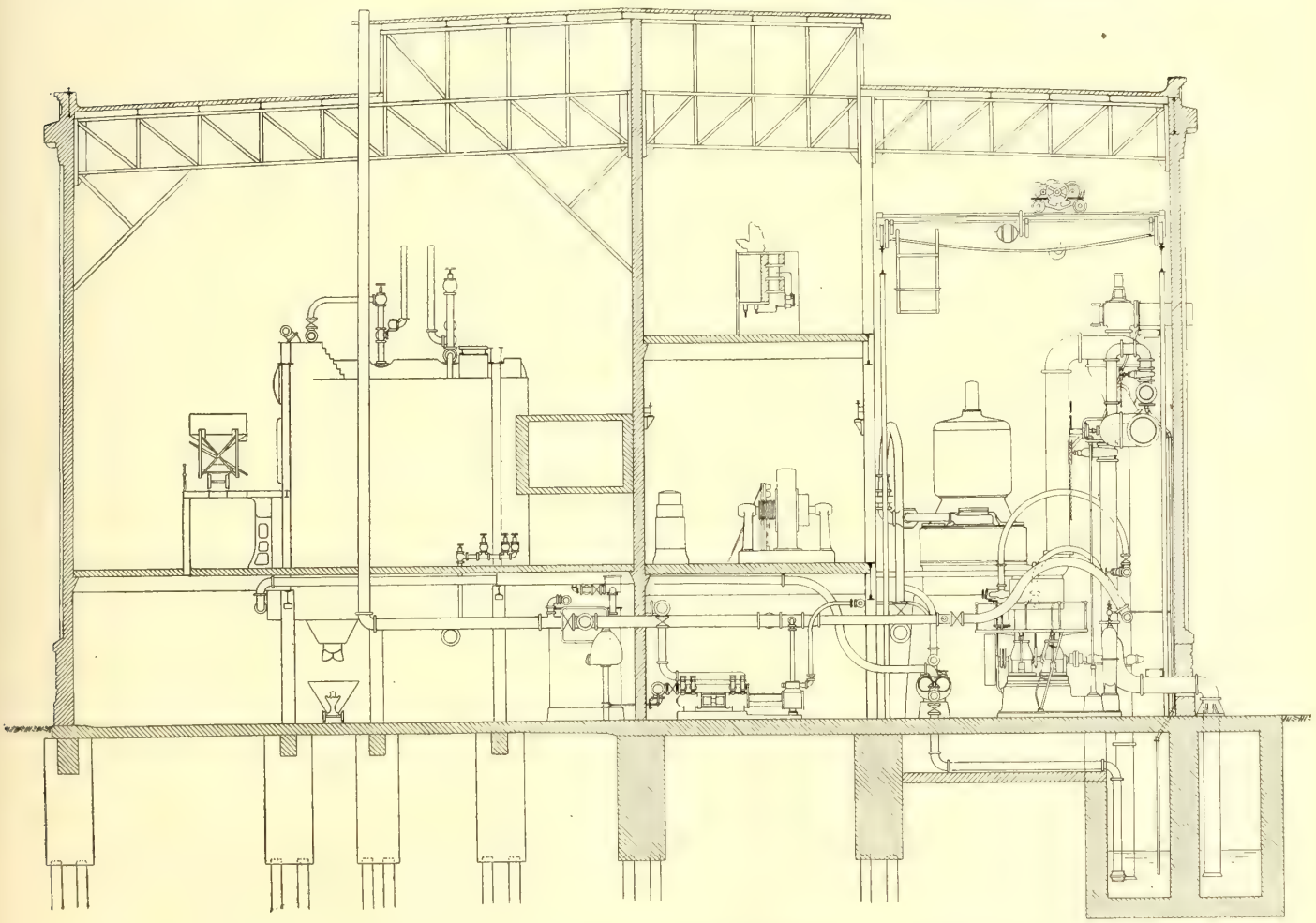
The generating equipment consists of two 2000 kw, three-phase, 25-cycle, 13,200-volt railway turbo-generators; and one 2250 kw, one 1000 and one 500 kw 2300-volt, three-phase, 60-cycle lighting turbo-generators of the vertical Curtis type, with provision for three additional units of sizes up to 5000 kw. The exciting current is provided by two 75-kw horizontal Curtis turbo-generators, which also furnish the station lighting. Provision is made for future motor driven exciters and frequency changers, should such be required. There is also provided an 800-amp "Chloride" storage battery, floating on the exciter bus as a guarantee against interruption in the excitation, a feature which has proved of considerable value in operation.

The turbines are each equipped with independent Worthington barometric jet condensers, supplied from a central centrifugal pumping plant located at the center of the station. Particular attention is called to this arrangement, which was adopted on account of the wide variation in the respective station loads, to secure a much better operating efficiency than could have been had by the use of entirely independent units. This arrangement also permits the much quicker starting of an additional unit, due to the pumps being in operation, and avoids the delay which would otherwise be required for priming the circulating pumps at times of low water level. As before mentioned, the Lehigh River is noted for the amount of suspended material carried down in times of flood and for the serious amount of acid. For these reasons primarily, the use of jet condensers was determined upon, and subsequent operation has proved the wisdom of this choice as reducing the maintenance and avoiding clogging of the condensing equipment.

The center crank rotary dry vacuum pumps, located at the center of the station, are also of the Worthington make. The various pumps for constant service, boiler feed, step-bearing and oil pressure systems are located in the open pump room, immediately beneath the lower switchboard gallery on the main floor. This arrangement secures an extremely light station,



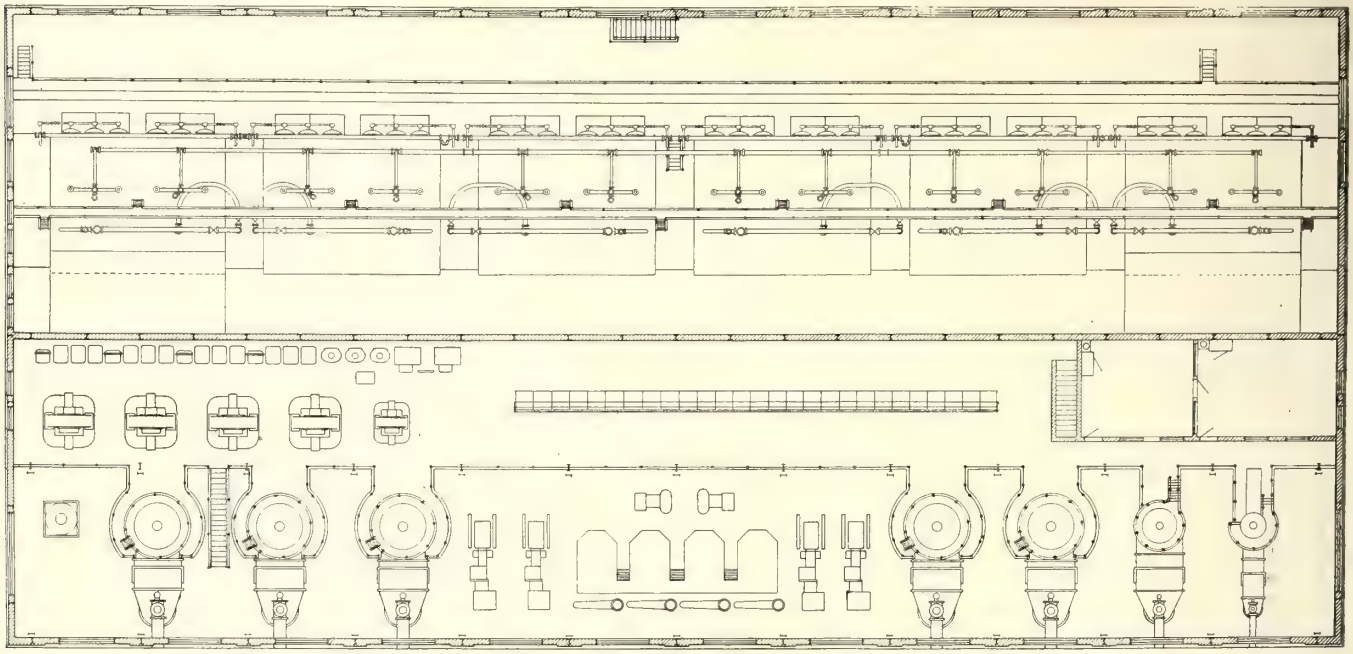
Lehigh Valley Transit—Main Switchboard with D.C. Railway End in the Foreground



Lehigh Valley Transit—Typical Cross-Section Through the Generating Station

with the machines perfectly accessible. These pumps are of outside, end-packed plunger type and are controlled by automatic governors, the speed of the pump being automatically regulated in accordance with the varying demand. It will be noted that all of the auxiliaries are centrally located on this floor, stairways on each. Suitable platforms also are provided for access to the condenser control valves, etc. The arrangement in this gallery will be evident from inspection of the views of the corresponding parts.

The substation apparatus for the local Allentown railway



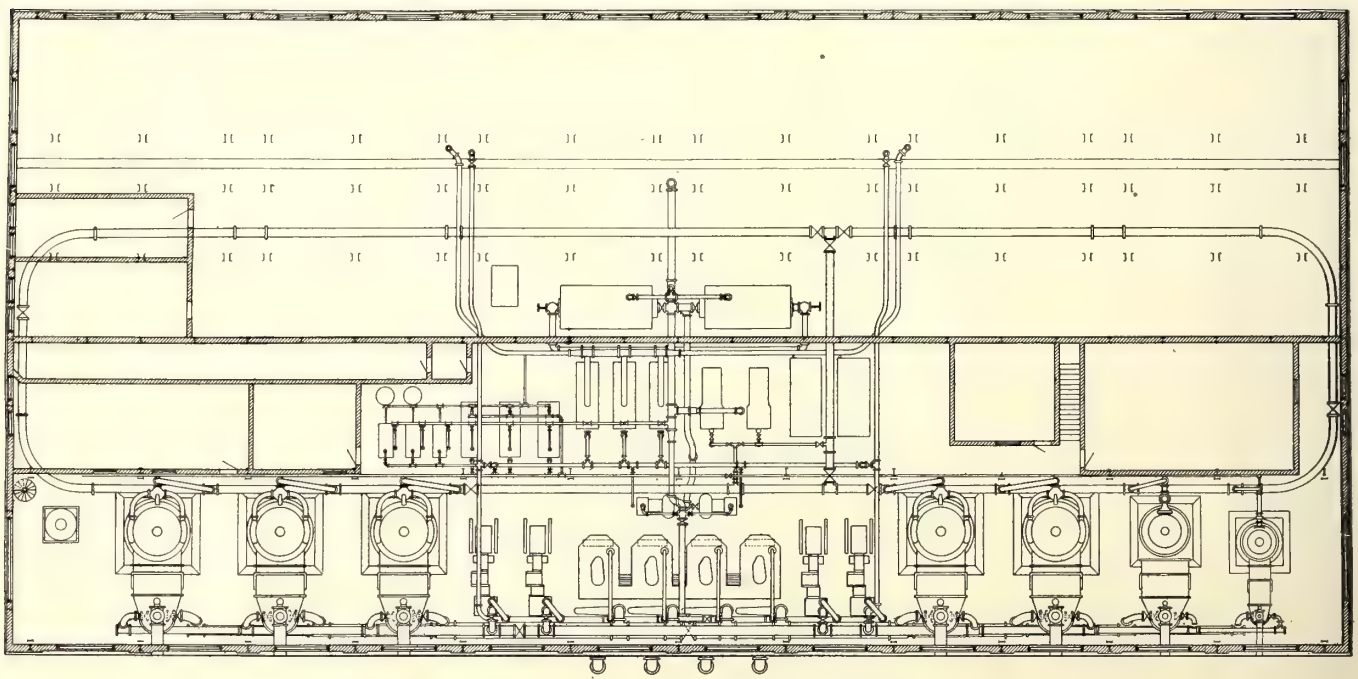
Lehigh Valley Transit—First Floor Level of the Power Station

requiring a minimum of attendance and simplicity of pipe connections. These auxiliaries exhaust into the duplicate open Cochrane feed water heaters located in the boiler room basement. They embody the Sorge-Cochrane system of feed water purification. The remaining portions of the ground floor are divided for storage battery, toilet, lamp testing and storage rooms, and the air blast compartment for the substation transformers.

On the first gallery of the turbine room, corresponding in elevation to the main floor of the boiler room, are located the

service consists at present of three 500-kw rotaries with corresponding banks of step-down air blast transformers and reactances, the machine and railway feeder panels being located at the adjacent end of the main panel board as will be noted from one of the accompanying illustrations.

The upper switchboard gallery is devoted to high-tension switch compartments located at the respective ends of the station, the railway lines being carried out at one end of the station, and the lighting lines at the opposite end to terminal towers. The lightning arresters are located on the upper gal-



Lehigh Valley Transit—Ground Floor Level of the Power Station

controlling switchboards, offices and local substation. This gallery connects directly to the lower operating galleries of the respective turbines, the upper galleries of these units being reached from the corresponding lower gallery by means of

lery opposite the respective line oil switches. The central portion of the upper gallery is occupied by the motor-driven arc machines, space being provided for future additions, and for step-up transformers for additional transmission lines.

While the owners of this generating station do not deem it desirable to give out the detailed operating costs of the station lighting and traction system, it may be noted in general that the cost of power has been reduced to less than one-half of that under the old arrangement of stations. At the inception of this work the officers of the Lehigh Valley Transit Company were: President, Harry C. Trexler; general manager, W. S. Hall; chief engineer, W. H. Hall, and consulting engineer for bondholders, David Young. The present officers are: President and general manager, R. P. Stevens; superintendent of the lighting department, A. H. S. Cantlin; auditor, C. M. Walters, and chief engineer, W. W. Bromley. The consulting and constructing engineers for this power rehabilitation and improvements were the Scofield Engineering Company, Philadelphia.

REPORT ON THE TRANSPORTATION PROBLEM IN PITTSBURGH

B. J. Arnold has just submitted two reports to Mayor Magee on the transportation system in the city of Pittsburgh. In the first he discusses the general subject, and says:

"Pittsburgh's traction problem, like those of other cities, can not be settled now, for all time to come, on account of the increasing demands which will arise from time to time under new conditions, but it has been found in other cities that an educated public opinion regarding transportation matters has assisted greatly toward adjusting and maintaining the proper relationship between the traction companies and the riding public. It is for the purpose of bringing out a comprehensive statement of the entire problem before analyzing each element in detail, that this general discussion, preceding the other parts of the report, is submitted.

"A study of the transit facilities of Pittsburgh, as well as of all the larger American cities, shows that while great advances have been made in the art of transportation, much remains to be accomplished. Nearly every city encounters a different traction problem, and many of them are pressing for some immediate solution. In the majority of cases what is wanted is not only considerable improvement over present conditions, but also a program of development along technical, legal and financial lines which will result in a comprehensive transportation system suitable to meet constantly growing demands.

"The term 'comprehensive plan' is used so frequently that it may be worth while to define the conditions which such a plan should fulfill. In doing this it will be discovered at once that there are many points of view and equally as many opinions as to the relative importance of the elements which enter into the specifications for an ideal system of transportation. In considering the subject, the rights of the patron, the operator, the municipality, the property owner and the financier must each be recognized as well as the requirements for maximum economy.

"*The patron* of the system believes he has a right to expect adequate service, consisting of plenty of cars provided with cross-seats, comfortably heated in cold weather and well ventilated at all times. Every precaution should be adopted for his safety, and after safety and comfort have been secured, the maximum possible speed should be the next consideration. The rolling stock should be noiseless in operation and the track and car equipment should be built for easy riding. Through riding from point of starting to point of destination is desirable, but if this is not possible, the patron has a right to expect universal transfers and one fare for the entire system.

"*The operator* of the system can secure the best results if the equipment is efficient and up to date, if the construction has been sufficiently substantial to reduce maintenance to the most economical point, if the track and paving have been built so as not to encourage vehicles to follow the rail, and if street traffic is so regulated that the surface cars will have the right-of-way, particularly during the rush hours.

"The most favorable conditions for operation exist when the peak loads are not excessive, when there is a large amount of all-day travel, when the flow of traffic is not all one way so that the cars may be evenly filled in both directions, and when the profit of the short-haul business more than offsets the losses from the long hauls.

"*The City* is best served if the passengers are collected and delivered convenient to places of business; and the system should carry passengers to the outlying districts in the minimum of time and at the lowest cost, so as to reduce the tendency toward congestion in downtown districts. Rapid transit should be provided by well-ventilated subways or by means of roads in open cuts, or upon elevated structures designed to present an artistic appearance and to operate with a minimum of noise. Suburban traffic should be handled by electrified terminal systems of the various steam roads so as to avoid smoke and gases. The street railway surface system should furnish and maintain the paving between and adjacent to its tracks; and it should sprinkle the streets and reconstruct its roadbed whenever the streets are torn up for changes in grade, alterations in pavement, new sewers or water mains. Free transportation should be supplied to mail carriers, firemen, policemen or other city employees, and special low rates should be made for school children and workmen. Iron poles should be removed upon request and all transmission and feeder cables should be placed underground. In certain cities and in restricted districts of other cities the underground conduit system is insisted upon. The franchise should be indeterminate so that 'franchise values' will be eliminated, and a system of regulation should be established to insure that the citizens get their full measure of service.

"*The real estate owner* and operator often insists upon the best facilities being provided for his immediate district, even at the expense of the remainder of the city. The owner of property in the central part of the city will point out the advantages of confining the growth of the city by restricting non-paying extensions and by charging two or more fares to reach the outlying districts; while the development of the suburban districts and the building up of home communities inside the city limits depend largely upon extensions of rapid transit facilities and the maintaining of the universal 5-cent fare.

"*Financial requirements* will dictate that the rate of fare be sufficient to cover the expenses of transportation, maintenance, reserve for depreciation and damages, as well as to pay interest charges and a fair return on the investment. If there be any surplus, the excess earnings should be devoted to better service and extensions, or it should be divided with the city in lieu of taxes, franchise payments or other civic burdens.

"In considering rates, credit should be allowed for past burdens of non-paying years and for development expenses involved in creating, combining and building up the property and in bringing it to a paying basis. Extraordinary expenses should be amortised, and reserves for replacement of obsolete equipment, personal damages, fires and other contingencies should be provided.

"A broad economical policy requires that the whole transportation system of a district should be controlled as if under one ownership, and that when one system of transportation more efficient than another can be provided, a transfer of passengers should be encouraged from the less to the more efficient system. Transportation in a city is a natural monopoly; therefore, no district should be served with two competing transit systems when one can furnish better service than with the business divided.

"The building of extensions into undeveloped districts should be assisted by assessment on the property benefited, and the operating loss on non-paying lines should be financed so as not to be too heavy a burden upon the remainder of the system. As districts develop, the improvement of transit facilities should be somewhat in advance of the actual requirements.

"The problem, therefore, is how to find an equitable balance between all these conditions. There is to be provided a maximum of safety, comfort, speed and capacity. Pavements are to be repaired, taxes are to be paid, and all equipment must be

thoroughly maintained and a reserve fund accumulated so as to keep the property abreast of all advances in the art. Separate systems must be controlled or combined to avoid wasteful competition and to secure the efficiency of one management. Extensions must be made into promising territory. Rapid transit systems should be provided for and built in advance of immediate needs, and the losses during the first years of operation must be financed. If private capital is to be attracted for building the transit systems, a return on the investment somewhat larger than current rates of interest should be allowed.

"There are so many elements arising from local conditions that it would be impracticable to develop a formula that would be universally applicable, and while comparisons between different cities will be instructive, the solution of any one problem must be preceded by a study of the relative importance of its elements as determined by the special requirements of the given locality. In each case it is desirable to determine what constitutes a fair requirement for the following items:

"1. Original investment.
"2. Legal, technical and financial development expenses.
"3. Working capital.
"4. Adequate service.
"5. Possible income.
"6. Operating and maintenance expense.
"7. Taxes and franchise payments.
"8. Reserve funds for insurance, damages and depreciation.
"9 Return on investment.
"10. Provision for future extensions.
"11. Facilities for rapid transit.

"Transit facilities may be called the blood vessels of the city or district, and it is only by providing for unrestricted flow of traffic from any one district to every other district that we have the most favorable conditions for strength and growth. Hamper this free intercourse by poor transit facilities, at once there is an arrested development. On the other hand, if facilities are extended too far and too fast, there follows a dissipation of strength. What is always wanted is to find an equitable balance, and then a constructive program which will continuously maintain this balance.

PRESENT TENDENCIES

"It may be of benefit to indicate briefly the present tendencies which are more or less marked in the movement for transit betterments. There is a decided tendency, for instance, toward recognizing the actual investment required to provide adequate service. This tendency is shown by the valuations of traction properties which are now under way by various authorities and by the studies that are being made by engineers to determine not only the 'first cost' and the 'cost to reproduce' certain properties, but the probable additional expenses which have been involved in building up the property and securing a good business. It is hard to see how the problem of reorganization and of rate making can be fairly handled without making a fair valuation of the reproduction cost, and in some cases, of the depreciated or present value.

"There appears to be a constantly growing sentiment in favor of building extensions into new territory by means of assessment; that is, charging the property benefited with at least the cost of the permanent way. This method of financing branch lines which will be operated at a loss for some time, has been worked out in Berlin in connection with the underground road, and petitions are now being signed in certain districts of New York which is likely to result in its adoption in this country.

"There is also a gradual tendency toward a higher standard of service. Better lighted, better heated and more comfortable cars are in demand and a limit to the crowding allowed is resulting in more adequate service. While it is generally recognized in this country that a seat for every passenger is impracticable during rush hours, knowledge of the fact that such a policy is possible in foreign cities seems to justify the more insistent demands for more seats here at the time passengers wish to travel.

FARES

"There has been some demand for 3-cent fares, especially in the Middle West, and experiments have recently been made to demonstrate the possibility of this fare. The results, however, have been rather to prove that cheap fares and good service cannot be secured at the same time and the conclusion has been reached that, as a rule, the rider wants good service and is willing to pay reasonably for it.

"On the other hand, the movement to raise the city fare above the 5-cent limit has received little encouragement, and there seems to be no decided sentiment in this country in favor of the European zone system. It appears that a concerted effort must be made to work out our transit problems on the basis of a single 5-cent fare for a ride in one general direction. And it will probably only be when failure to do this, due to excessive length of average haul, has been demonstrated, that it will be advisable to consider raising the fare above 5 cents. Then it will probably come in the form of making a small charge for certain transfers. In other words, of all the possible solutions the augmenting of income by charging more than 5-cents for a ride within the city limits would appear to be one of the last suggestions to be considered.

"An effort has been made elsewhere to increase income by abolishing transfers, but there is a question as to the benefits to be derived from such a course. The abuse of the transfer privilege should rather be eliminated. Its intelligent use always has been a logical and economical method of handling and increasing traffic. The tendency should be toward one comprehensive system with consistent transfer facilities between the different branches. If the collection and distribution of passengers can be accomplished more conveniently and economically by means of the transfer than by means of the 'direct' system, which often means the duplication of service, then the transfer system should have the preference.

"When it is understood that the operating expenses per car-mile are from three-quarters to one-half as much for a car in a subway or an elevated structure as upon the street surface, and that at the same time the subway or elevated car runs at fully double the speed and carries at least 50 per cent more seats, it will be seen that, as far as operating expenses are concerned, rapid transit subway and elevated lines have a great advantage. The problem is to secure sufficient business to run enough car-miles over the more expensive structure so that the fixed charges per car-mile will not be excessive. As a rule, any subway or elevated system will not prove financially successful in which the car-miles run during any year are not equal in amount to at least half the investment in dollars then in the property (that is, an investment of $2 for each car-mile on a yearly basis). Experience is gradually showing us that there are economical limits—both high and low—between which a certain density of traffic will justify a corresponding transportation system. Beyond these limits some other system should be provided. For instance, in Boston, when the surface system became congested with traffic in the downtown districts, it was found more economical to transfer passengers to an elevated structure. In the course of time, as traffic increased, it was found desirable to extend the limits of the elevated road zone and to use subways. The same conclusions are being reached in Brooklyn, where, as in Boston, the elevated and surface roads are both under one management. In other words, a unit system of construction is naturally being developed, together with a zone system of operation rather than a zone system of fares. But this is only possible when the entire transportation system is practically under one control.

SHORT HAUL AND DENSITY

"The fact that the operating expense per car-mile of the surface lines is greater than the cost of operating a mile through a subway or on an elevated line naturally leads to a more serious study of the possible economies in surface line operation. Progress in this direction shows a decided movement to reduce the relative weight of the car per seat, resulting in lower power costs and less annual cost for maintenance of roadway. At the same time, the income is being increased and

conserved by the introduction of impro... tems. There remains to be devised, however, s... operation on the surface lines for the handling of s... passengers in short-haul cars. There is a large profit in all o... our cities from the short-haul business. But, as a rule, it is now being handled in cars which run practically to the ends of the various lines so that much of the advantage of the short-haul profit is offset by the expense of operating cars with empty seats in the outlying districts.

"It must be recognized that there are two things which reduce the cost of transportation per passenger—one is density of traffic and the other, short haul. In Paris, the subway system is a paying investment, because the average haul is less than 2 miles and the cars are operated over comparatively short lines. Universal free transfers are provided over the entire system, but the lines are not physically connected and the densest traffic is handled by trains running only 6 miles, at the end of which distance they are looped back. On the other hand, the present subway in New York furnishes a continuous ride of 17½ miles for one fare, while the average passenger travel is about 5 miles. Taking into consideration the relative purchasing value of money in New York and in Paris, a comparison of the two cities shows that in the Paris subway the fare is equivalent to 4 cents for an average ride of 2 miles or at the rate of 2 cents per mile, while in New York the fare is 5 cents for an average ride of 5 miles, or at the rate of 1 cent per mile. On a mile basis, therefore, New York gets its subway transportation at half the Paris rate, but the New Yorker travels more than twice as far on each ride as the Parisian, so that the average fare per passenger is greater in New York than in Paris. New York has the advantage of density of traffic; Paris has the advantage of short haul. New York should cultivate the short-haul business in short-haul cars as is done in Paris and thus enjoy the benefits of both elements—short haul and density of traffic—and thus be relieved of the present uncomfortable overcrowding in the short-haul district which now seems to be necessary in order to secure the very long rides for a universal 5-cent fare.

TAXES

"The question of taxation is being more carefully studied and it is recognized by some students of transportation problems that perhaps the railroads have been called upon to carry more than their share of the tax burden. For a time the only apparent method available for the people to get their share of the profits, often imaginary, derived from the railway business, was by means of taxes. Hence special taxes of various kinds were devised. But as logical methods of control and regulation are being introduced and as the records of investment, earnings and operating expenses are being more intelligently studied, this fact is becoming apparent that there is very little surplus left for taxes, particularly for the payment of a franchise tax, if a company is to furnish adequate service, properly maintain its property, provide for depreciation due to renewals and obsolescence and pay even a moderate return on the investment so that needed extensions may be financed.

"As legislatures can establish commissions which have power to regulate service, control operation and fix rates, there apparently is nothing left, under such conditions, of what has been termed 'franchise value.' In fact, the term 'indeterminate franchise' implies this very feature. Now if there is no franchise value, there should be no tax upon it. The burden of maintaining paving is an inheritance from horse car days, when the horses used in hauling the street cars actually wore out the pavements between the rails. And there is justly a growing sentiment toward the removal of this burden, providing, of course, that the money saved to the railway company is diverted to furnishing better service or toward offsetting some of the other legitimate expenses of transportation.

DEPRECIATION

"There is much discussion as to setting aside each year out of earnings some definite amount to offset the depreciation of the property due to obsolescence and other causes, and it is gen... ...d that this is a duty and necessity that no longer ... What should be done with the past obliga... ...ave accumulated through years of ... ss is a problem which is receiving much consideration, but here hardly have been sufficient decisions reached to out... a final conclusion or even to indicate a decided tendency.

RATE OF RETURN

"It is certain, however, that as all these requirements of successful and growing transportation systems are being more thoroughly analyzed and understood that there is being developed a conclusion that the profits from the transportation business are, as a rule, no longer excessive, and the removal of the idea that a franchise for a street railroad in a center of population is 'as good as a gold mine' is having a good effect toward reaching a sane solution of transportation difficulties. Money actually used to produce a property should be assured a fair rate of interest, and if private capital is to be attracted an additional profit over current interest rates must usually be allowed, varying in proportion with the hazard of the enterprise. It must be admitted, however, that under conditions where the enterprise has become established, the fair rate of return considered necessary is approaching nearer and nearer toward just the interest charge at current rates; and the surplus earnings are being called upon to satisfy the demands for extensions, for effective maintenance and for reserve to cover depreciation.

"The rate of interest is being reduced in some places by raising money for rapid transit systems by means of city credit, but in these cases the furnishing of the money required for equipment and for the operation of the system has been left to private capital. In other cases, as in Chicago, the actual investment in the surface street railway system has been determined by appraisal and an exact accounting of the expenditures for rehabilitation, betterments and extensions has been made. Thus in Chicago, on the total investment there has been allowed a return of 5 per cent, plus a share of the profits, amounting to 45 per cent of the net earnings, the other 55 per cent going to the city. In other cities where the relation between the investment and the return has not been so carefully determined there is a tendency either to force a reduction of the rate of fare or to complain of the service rendered. It also must be recognized that if some method were available absolutely to keep the operation of the road 'out of politics' there would be a decided tendency in some cities toward municipal ownership and municipal operation.

CONCLUSION

"It will be seen from the foregoing that any attempt to formulate decisions of a hasty or prejudicial nature would very likely fall far from the truth and that a coherent solution of the problem requires analysis from many viewpoints and by various minds.

"*The patron* should learn to recognize that empty seats cost as much to operate as occupied seats; that a seat for every passenger during rush hours must mean the curtailment of the service during the non-rush hours, and that new cars and new tracks cannot be furnished until old equipment has been in service a reasonable length of time.

"*The operator* should adopt the policy of continually trying to please the public and should arrange his schedules and routes to accommodate the greatest number. If the best service can be rendered by establishing through routes and giving transfers, these methods should be adopted in an effort to increase gross earnings by making it easy to ride. It should be realized that publicity of intention and results is the best policy.

"*The City* should co-operate with the company on street traffic regulation, widening the streets where necessary and issuing permits for extensions and new connections which are absolutely necessary for the best routing system. Unnecessary taxes and the burden of paving maintenance should be removed in the interest of allowing more money for better service.

"*The property owner* should recognize that the general prosperity of the entire district is not only vital to him, but to others, and that routes and extensions cannot be controlled for his particular benefit.

"*The financier* must realize that the day for exploitation of established enterprises has passed and that the fixed charges on such properties must be reduced to a fair return on the actual investment. New capital which is absolutely necessary for the continued life and usefulness of any public utility must be furnished, and this flow of new blood should be supplied in advance of actual needs, if it is to have a strengthening influence on the system.

"Economy and a continuation of an equitable balance dictates efficient management, and the setting aside out of earnings each year of a fund to provide for renewals.

"These several elements have been considered in some detail for the purpose of emphasizing as strongly as possible the danger of a one-sided judgment of the Pittsburgh traction problem. And it is hoped that the reading of this discussion will place one in a better position to consider the specific phases of the problem that will follow, such as: Records of operation of the Pittsburgh Railways Company, comparisons with other cities, and Pittsburgh transportation, past, present and future."

REPORT ON PITTSBURGH'S IMMEDIATE NEEDS

The report on the transportation problem in Pittsburgh by B. J. Arnold printed above was followed on July 19 by another addressed to the Mayor, upon the City's immediate needs, in which Mr. Arnold said:

"The operation of and the service supplied by the Pittsburgh Railways Company have been objects of comment and complaint for sometime. There are a number of more or less official reports which have covered various phases of this subject. These have all had an influence in forming public opinion, which after all is the final tribunal before which any case must be settled. These contributions to the situation are as follows:

Report on Transit Conditions by Subcommittee on Rapid Transit to the Mayor, Geo. W. Guthrie	February 4, 1907
Message of the Mayor, Geo. W. Guthrie to Councils	April 13, 1908
The Transit Situation in Pittsburgh, an article in Pittsburgh Survey Report, by John P. Fox	February, 1909
Message of the Mayor, Geo. W. Guthrie to Councils	March 8, 1909
Report of Stone & Webster, Consulting Engineers to Pennsylvania State Railroad Commission	February 20, 1909
Recommendations of the Pennsylvania State Railroad Commission	April 23, 1909
Report of Henry C. Wright to Mayor Wm. A. Magee	August 21, 1909
Report on City Planning for Pittsburgh to Pittsburgh Civic Commission by Messrs. Olmstead, Freeman and Arnold.	December 11, 1909
Report to Pennsylvania State Railroad Commission by Emil Swensson	March 26, 1910
Reply of Pittsburgh Railways Company	May 10, 1910
Communication to Pennsylvania State Railroad Commission by Mayor William A. Magee	May 10, 1910
Recommendations of Pennsylvania State Railroad Commission.	June 25, 1910

"It is not the province of this report to review or recapitulate the findings of these reports, to add to the catalogue of deficiencies which they reveal, nor to pass upon the justice of the complaints or the answers made to them. An effort has been made, however, to discover the underlying causes which have evidently hampered the development of a more satisfactory street railway system in the Pittsburgh District.

UNDERLYING CAUSES OF DEFICIENCES

"The present troubles may be largely traced to one or more of the following causes:

"Excessive Actual Cost of Property. Some of the lines have been rebuilt a number of times, first as horse car lines, then as cable lines and finally as electric lines. All these changes have been capitalized. Many of the lines are built on private right of way, some on streets that were not yet opened or graded by the city, and numerous bridges, viaducts, retaining walls, cuts and fills have been required on account of the rugged topography of the district.

"Non-Paying Extensions. In an effort to cover the territory and keep out competition, a number of lines have been built in advance of an actual demand sufficient to justify them, and these pioneer lines must be carried for a period of time until the district develops. The whole system may be said to be over expanded.

"Overcapitalization. In order to bring about a consolidation of the many separate subsidiary companies into one system, rentals were often agreed upon in a form of a guaranteed dividend on stock which was often part 'water.' Companies have been absorbed with considerable profit to their former owners, and in raising money on bonds, rates of interest have been high and discounts liberal. Although the present property consists of 581 miles of single track, a new system consisting of about 550 miles of single track could be produced which would perform equally as good or better service at a cost of about $100,000 per mile or $55,000,000, which is about half the capitalization of the present system.

"As a general rule the actual investment in a surface system should not exceed $5 for each dollar of probable annual earnings. Pittsburgh's earnings are now approaching $20,000 per mile of single track actually operated, and the investment should therefore be limited to about $100,000 per mile until the earnings increase.

"The actual capitalization of the system is not important as there are some of the securities upon which dividends have never been paid. But the amount of 'fixed charges,' consisting of interest and guaranteed dividends, is the figures which should be studied. For the last fiscal year, ending March 31, 1910, the fixed charges were as follows:

Rentals of leased property	$2,278,869.21
Interest on funded debt of Pittsburgh Railways Company and leased companies	1,869,989.90
Miscellaneous interest and discounts	435,756.85
Total "fixed charges"	$4,584,615.96

"On a basis of 5 per cent return, these fixed charges would justify a capitalization of about $92,000,000, but the net earnings after deducting operating expenses and extraordinary repairs were not sufficient to pay all of the fixed charges. The 'deficit' for the year amounted to $1,321,453.13—bringing the amount for fixed charges actually earned down to $3,263,162.83. This figure, capitalized at 5 per cent would amount to $65,263.000; or if capitalized at 6 per cent instead of 5 per cent, then the capitalization of the company as determined by its earning capacity would be $54,200,000, which is about the figure that would produce a new property equally as good as the present property for serving the District. It must be understood of course that the present value of the property is not as great as the reproduction value of the present property, but it should also be understood that the rate of return on the investment, whatever may be considered fair, should be figured on the total cost, or on the reproduction value of the present property and not on its depreciated value. This conception of a 'fair return' on the investment presupposes an obligation on the part of the company to take care of depreciation out of earnings as it occurs.

"It will thus be seen that as the railway system was operated last year, the actual earnings cannot be said to be very excessive, although the question naturally arises—how is the deficit of over a million dollars to be financed and what provision is to be made for past, present and future depreciation?

NO DEPRECIATION ACCOUNT

"During the eight years the present company has been in control, only about one million dollars of its earnings have been put back into the property to take care of renewals; whereas the deterioration of the property due to causes other than ordinary wear and tear has been going on at the rate of at least a million dollars per year. While several million dollars have been expended by the company for renewals during this period, this money which should have been taken from earnings was not available owing to the high fixed charges which were agreed upon at the time of the consolidation of the various underlying companies constituting the present system operated by the Pittsburgh Railways Company. It was apparently necessary, therefore, for the present management of the Pittsburgh Railways Company to raise this money by adding it to capital account.

with the result that possible permanent improvements, such as new cars and better tracks—for which it could otherwise have been expended—were delayed. This failure to take care of renewals out of earnings is one of the chief causes of the present defective condition of the property.

LOSS OF BUSINESS

"The gross earnings have not been as great as was expected at the time of consolidation, as two periods of business depression have affected the entire district during the past eight years. At the same time, the efforts of the company to curtail expenses, in order to offset the loss in anticipated earnings, have resulted in poor service and neglected maintenance of equipment. The natural effect has been cumulative, and the dropping off in business has been more marked than it would have been if the quality and amount of service had not been so decidedly reduced. The company has thus lost the good will of the patrons, which should be one of its best assets, and the forbidding appearance of some of its cars is having a depressing effect on the business.

INCONSISTENT ROUTING

The routing of the cars is the result of development and not of design. More cars are run on some main streets than are needed, and at other places there is a decided lack of cars. The looping in the terminal or down town district leads to congestion, and the effort to operate direct cars from one locality to several other localities causes confusion, and often infrequent service. The forcing of passengers to use certain routes by curtailing the transfer privilege is inconvenient, resulting in long waits on the part of the patrons, with resulting dissatisfaction. The lack of through routes across the business district, serving the short haul business, is not in accordance with the best accepted practice. The existence of routing agreements between the various companies, the franchise requirements for certain service in the outlying boroughs, the lack of turning facilities at the ends of some of the lines and the narrow streets which prevent the running of modern double truck cars, are disadvantages which should be removed or modified.

CUMULATIVE EFFECTS

"It will be seen that the longer this situation is allowed to drift the greater becomes the accumulation of difficulties, in fact they accrue at what might be termed a compound rate. Rebuilding follows redesign, capital is added to capital, combination follows competition, operating losses follow non-paying extensions, rentals in the form of guaranteed dividends are paid to take over prior leases, capitalization increases and stock is issued as collateral for guaranteed bonds, wear and tear is neglected until the equipment becomes either practically scrap or an excessive burden for repair, depreciation is not recognized and obsolescence of equipment is followed by constantly growing losses of possible patronage due to inefficiency. A falling off in business is followed at once with a withdrawal of cars, which causes a still further reduction in patronage. Next comes the cutting down of the expense of cleaning, of inspection and of repair, and more cars break down and drop out of service, general dissatisfaction takes the place of pride, and the riding habit of the community is reduced to the demands of actual necessity. Thus if something is not done to check the cumulative results of these serious defects, the usefulness of the railway as a public utility will rapidly diminish.

"The problem then is to get the railway company to develop and disclose a consistent, comprehensive and continuous program, which when carried out, will accomplish the following results:

"1. Rehabilitate the physical property.
"2. Secure new capital for improvements.
"3. Provide for depreciation.
"4. Re-route the entire system.
"5. Provide adequate service.

"If a comprehensive program is not worked out and adhered to, the traction situation in Pittsburgh may be expected to develop along any of the following lines:

"1. Depreciation of property will continue, and, as this influence, if unchecked, works at a constantly increasing rate, much of the track and many of the cars will soon reach a state of disrepair, which will first be uncomfortable, then dangerous and finally entirely inoperative.

"2. Lack of equipment and neglect of maintenance will mean poor service, which will not only be the subject of just public complaint, but will fail to secure the increase in business, which well maintained cars giving adequate service is sure to develop.

"3. Co-operation between the city and the company cannot be expected under those circumstances. Re-routing which could be arranged for the benefit of all concerned will not be worked out. Eventually, either through the efforts of the city in maintaining its rights or through the attempt of the holders of underlying securities to protect their 'guaranteed dividends,' the system will be broken up into many of its original constituent parts. This means a period of poor service and of unsatisfactory operation, a long drawn out legal battle, a reduction of securities and eventually a reorganization along lines which cannot be far from those suggested in the above program.

CO-OPERATION AND PUBLICITY

"The question for the city and for the company to decide at the present time is, whether the struggle is worth while. Co-operation in the planning, building and operation of the system, publicity of plans and results and a fair division of the burdens and the benefits of operation, would appear to be the best plan One city—one system and adequate service is the object which should be worked for by all those charged with the responsibility of making decisions.

AIR BRAKE INSTRUCTION IN PORTLAND

Motormen in the employ of the Portland Railway, Light & Power Company, Portland, Ore., formerly applied voluntarily to W. W. Abbott of the company for instruction in braking. It was decided a few months ago, however, to make instruction imperative, and all motormen are now required to receive instruction at the time most convenient for them. For the benefit of those who work during the day, Mr. Abbott conducts a class between 7 p. m. and 9 p. m. A class composed of men employed at night is conducted from 10 a. m. to 12 noon. Two days a week are set for this, generally Monday and Thursday.

Mr. Abbott has installed in the shops a set of the A M and M air brake equipment including apparatus used on a trailer so that it can be handled and inspected. The air used in operating the instruction set is applied by a motor-driven compressor somewhat larger than that used on motor cars. Brake rigging is not used and the piston in the brake cylinder is allowed to force itself against blocks of wood cut in sizes suitable to show the various stages of piston travel.

Mr. Abbott first follows the course taken by the air and explains the various parts in detail and describes their use. He then discusses the pressure and illustrates the proper method of applying the brakes. He also shows the various parts of the brake valve, triple valve, feed valve and pump governor dissembled and explains the functions of the parts.

The men are finally shown how to cut out a brake and how to locate trouble. Particular stress is laid on the handling of the brake valve while using single cars or cars in trains, and comparisons are made between the two. Economy in using air and sand is also discussed and the best method of handling cars on slippery tracks is thoroughly explained. The differences between the automatic and straight air brake are considered with the particular end in mind of preventing confusion between the graduated and the straight air release. The names of those in attendance at the meetings are taken and questions prepared by the instructor are asked regarding the parts, etc. Those who answer a reasonable percentage of the questions are considered to have passed. The company has sought to present the matter to the men as attractively as possible and the subject is kept constantly before them by notices and advices regarding the sessions which are issued by the inspectors.

MR. SHAW ON LONDON TRAFFIC

James F. Shaw, president of the American Street & Interurban Railway Association, returned to the United States last week after a business trip to London which lasted about six weeks. Mr. Shaw, before sailing for London, intended to visit a number of cities on the Continent but his time was so much occupied by business affairs in London that he was able to make only a short trip of four days to Paris. While in London, he had an opportunity of going over the London underground system with Albert H. Stanley, general manager of the company. He also met A. L. C. Fell, chief officer of the London County Council Tramways and was much interested in the engineering work which Mr. Fell is doing on the largest municipal tramway system in the world. In talking with a representative of this paper about his impressions of the electric railways in London and Paris, Mr. Shaw said that, so far as his limited observations went, he believed that the travelling public in the cities of the United States got more for their money from the street railway companies than the travelling public on the other side. The cars and service were superior and the length of ride was greater for an equivalent fare. The tramway track in the streets of London is particularly fine, and in Mr. Shaw's opinion, it is superior to any track in this country.

Speaking of the work which Mr. Stanley is doing in traffic development on the London Underground Electric Railways, Mr. Shaw said that the earnings on this system were now good and that the company was enjoying an increased traffic and he believed that the system had a very bright future. The problem in London and in Paris also was not simply to provide cars enough to carry all the people who wanted to ride, but to provide service which would attract the travelling public away from patronizing cabs and motor busses. Mr. Shaw said that none of the underground roads abroad approached the New York subway in density of traffic or extent of service.

While in London, Mr. Shaw had the opportunity of meeting A. DeTurckheim, secretary of the Tramways & Light Railways Association. Mr. Shaw was interested to learn that this association had been discussing at its meetings many of the same questions which were before the American Association and made arrangements with Mr. DeTurckheim to exchange copies of the papers and discussions of the two associations in the future. The Tramways & Light Railways Association is a much smaller body than the American Association and in fact none of the European organizations of electric railway officers can compare in size or work done with the American Street & Interurban Railway Association. All of the electric railway officers whom Mr. Shaw met abroad were interested in the work which is being done by the American Association and while it is doubtful whether any of them will be able to attend this year's convention, it is hoped that their interest in the affairs of the association can be maintained and that they can be prevailed upon to attend some of the conventions in the future.

BERNE INTERNATIONAL RAILWAY CONGRESS

The International Railway Congress, which has been holding a convention at Berne, Switzerland, adjourned July 16. The congress meets every five years. In 1900 it met in Washington and at the Berne meeting voted to meet in Berlin in 1915.

Franklin K. Lane, a member of the American Interstate Commerce Commission, and W. F. Allen, the general secretary of the American Railway Association, were elected members of the Permanent International Commission. George W. Stevens, president of the Chesapeake & Ohio Railway Company, and a member of the same commission, was re-elected.

The club house equipped for the employees of the Portland Railway, Light & Power Company, Portland, Ore., at the company's grounds at the golf links in Portland, has been formally turned over to the employees by the company.

MEETING OF EQUIPMENT COMMITTEE, A. S. & I. R. E. ASSOCIATION

The committee on equipment of the American Street & Interurban Railway Engineering Association held an all-day meeting on July 18 at the Hotel Westminster, Boston, for the purpose of considering a number of matters referred to it for report to the convention of 1910. Present at the meeting were John Lindall, chairman, Boston, and Milan V. Ayres, South Framingham, Mass., of the committee, and John W. Corning, secretary-treasurer of the A. S. & I. R. Engineering Association. E. H Anderson, General Electric Company, Schenectady, was also in attendance. The other members of the committee were unable to be present, but it was decided to consider the various topics assigned and advise the absent members as to the action of the session.

The question of a gage for mounting wheels was first considered. The importance of securing a gage which will fit any wheel was emphasized, and the committee determined that it would be advisable to cut off the back part of the gage in order to escape the limitations of flange shape on the outside of the wheel.

Taking up the question of a standard taper for pinions the committee considered that a standard would facilitate ordering this equipment from the manufacturers, and in view of the absence of opposition to the establishment of a standard from the manufacturers it was decided advisable to recommend the taper of 1¼ in. in diameter per foot.

"Gears and Pinions" was the next topic. A protracted discussion was held, and the committee came to the conclusion that it would invite suggestions from the manufacturers regarding the allowable limits of wear and kinds of material desirable. The general opinion of the meeting was that the present is not a good time to attempt to standardize ratios and gear designs in detail.

"Specifications for Wrought Iron Bars" was then considered. The committee recommended that the specifications of the International Association for Testing Materials for purchasing wrought iron be adopted as printed in Bulletin 24 under date of Aug. 12, 1901, with the change that the iron shall be inspected at the shop where it is used, and that if it fails to meet the requirements will be rejected and returned at the expense of the manufacturer.

A report on "Rolled Steel Wheels of Light Design for One Wear" was submitted by letter to the committee by one of its members, H. A. Benedict, Albany. The report stated that all wheel manufacturers agree that a wheel having a rim less than 2¼ in. thick is impracticable of construction at the present time. Mr. Benedict stated that he will make a test of the comparative power consumption of a car equipped with wheels weighing 650 lb. each and a car having wheels of 550 lb. weight. Mr. Anderson stated that the additional cost of power would be at least $40 per year with wheels 100 lb. heavier. The committee decided to prepare figures upon the cost of purchasing and operating wheels of light design for presentation in its report and took the general question of one-wear wheels and the weight of wheels under further advisement.

The committee then took up the question of "Proposed Standards for Rolled Steel Wheels," with special consideration of reductions in the weight of the web and rim, but decided to withhold its conclusions in the absence of representatives of interurban systems. Action was also postponed upon the question of two-motor vs. four-motor equipments.

The committee considered at length an exhaustive report by M. V. Ayres with addenda by Chairman Lindall on "Methods of Reducing Weights of Cars, with Due Consideration of the Strength of Parts." The report discussed the principles and practice of car framing design, and considered the question of units of comparison, with possible sources of reduced weight, notably in the use of forced motor ventilation, use of fireproof insulation in motors, and in the construction of single-ended cars. It was decided to submit the report as it stands for the consideration of the convention.

THE RELATIONS OF THE CLAIM AND OTHER DEPARTMENTS OF A STREET RAILWAY

BY EDMOND O'CALLAGHAN, CLAIM AGENT, BOSTON & NORTHERN STREET RAILWAY COMPANY

The exact relations and limitations of the various departments of a street railway are seldom guided or clearly defined by any established policy. Each general manager has views of his own, and to a certain extent the local conditions make such a course advisable. However, as a general proposition the duties and limits of each ought to be clearly defined to prevent any friction or misunderstanding. For instance, even a slight discord in the relations of the operating, claim, and legal departments should be guarded against and complete harmony secured. It is often difficult to accomplish this without clearly defined lines, showing where the authority of one ends and the other begins.

This condition should not be left to work itself out as chance, personal influence or the superior ability of the head of a certain department may direct it, because what may work satisfactorily to-day may be very harmful to-morrow. Divided or uncertain authority is always a handicap. Assuming that the three heads of the departments named are on the friendliest terms and that the general manager has perfect confidence in all of them, conditions and situations are sure to arise where the absence of co-operation invariably increases the expense. An understood limitation of functions is even more necessary in those cases where each superintendent is pulling for himself.

The exact status of the claim agent is often very uncertain, and there are probably no two roads in the country where he exercises like authority. The claim agent has a very important and exacting position. He is the outer guard or sentinel for his company. The success or failure of any claim, however high it may be carried, depends in a great measure on his ability properly to gage its importance at the outset. He should enjoy the unlimited confidence of his associates and superiors so that he will have no difficulty in securing a fairly accurate knowledge of the liability in any case, no matter how, or in what department it occurs. This does not necessarily imply that he is any brighter or even as bright as the superintendent of the department concerned. Nevertheless, from constant investigation of all kinds of accidents and claims, and the weighing, testing and outcome of evidence given in court, he naturally is in a position to give good off-hand opinions of the proper course to be pursued.

Many times he can forestall accidents by suggestions based on his observations of certain conditions which could contribute largely to accidents. He should be encouraged to give such reports without arousing any jealousy. In other words, teamwork is as helpful and necessary in railroading as in baseball and should be encouraged and developed.

The claim agent knows his district and is more or less in touch with its men in political, civic and professional life. He knows just what bearing a settlement in any particular case will have on the affairs of the company. His authority under the general manager, should be absolute. He should have full charge of all claims during all stages until final disposition by adjustment, verdict, or decision. No settlement should be made at any stage without his approval.

The claim agent knows every particle of evidence in the case and often is familiar with something of importance which does not and cannot appear in any of the records. He may be aptly described as the "bogy man or nightmare" of the shyster. Any policy that eliminates him as a direct factor in negotiations for settlement is his "rabbit's foot," for if the shyster can avoid the claim agent by entering suit and then dealing directly with the trial attorney or legal department, he may often get by with a worthless case. At the same time he will do what counts for more in his business than the settlement of a few cases for he is discrediting the claim agent before the public. This is exactly what his doctor, his runner and himself are continually striving for, that is, to make the public believe that the only way to secure justice or even recognition is through the attorney.

Such settlements are an added expense to the company and to the claimant because the compensation which should pass from the claim agent directly to those entitled to it is diverted to illegitimate channels, namely, the shyster attorneys, the disreputable doctors, and a host of runners, all of whom are a positive menace to society.

No doubt there are many reasons which may be advanced in opposition to the foregoing statements, but any experienced claim agent should be able easily and readily to refute them, not alone with logic but with what is most convincing and conclusive, facts and figures.

ROADWAY DEPARTMENT INSTRUCTIONS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

It will be recalled that Martin Schreiber's article in the June 18 issue on "Some Suggestions for Economical Track Maintenance and Construction" contained several references to the keeping of accurate and complete records, standardizing trackwork, etc. In connection with this subject, George B. Taylor, who is now engineer of way, Philadelphia Rapid Transit Company, has courteously furnished this paper with that company's roadway department instruction book, the contents of which are summarized in the following paragraphs:

The first chapter of the book relates to survey instructions, the engineer being reminded that it is better to make a few more measurements while on the ground than have to go out again for additional information at some later date. The location of all obstructions, such as poles, letter boxes, hitching posts, manholes, drains, etc., must be indicated on the sketch. The location of rail joints is also indicated as well as the condition of rails, special work and paving.

The second chapter explains the classification of drawings used by the maintenance of way department. Drawings are divided into six classes, as follows: Special work working drawings, which include all drawings of special work having a definite location and all necessary information for building and laying the same; city plans, subdivided into those relating to track location and conduit work, respectively; detail drawings, including special work, having no definite location; all detail track construction and drawings of tools and appliances used or originated in this department; standard drawings, including tools and appliances which have been adopted as standard; maps, drawings and tables.

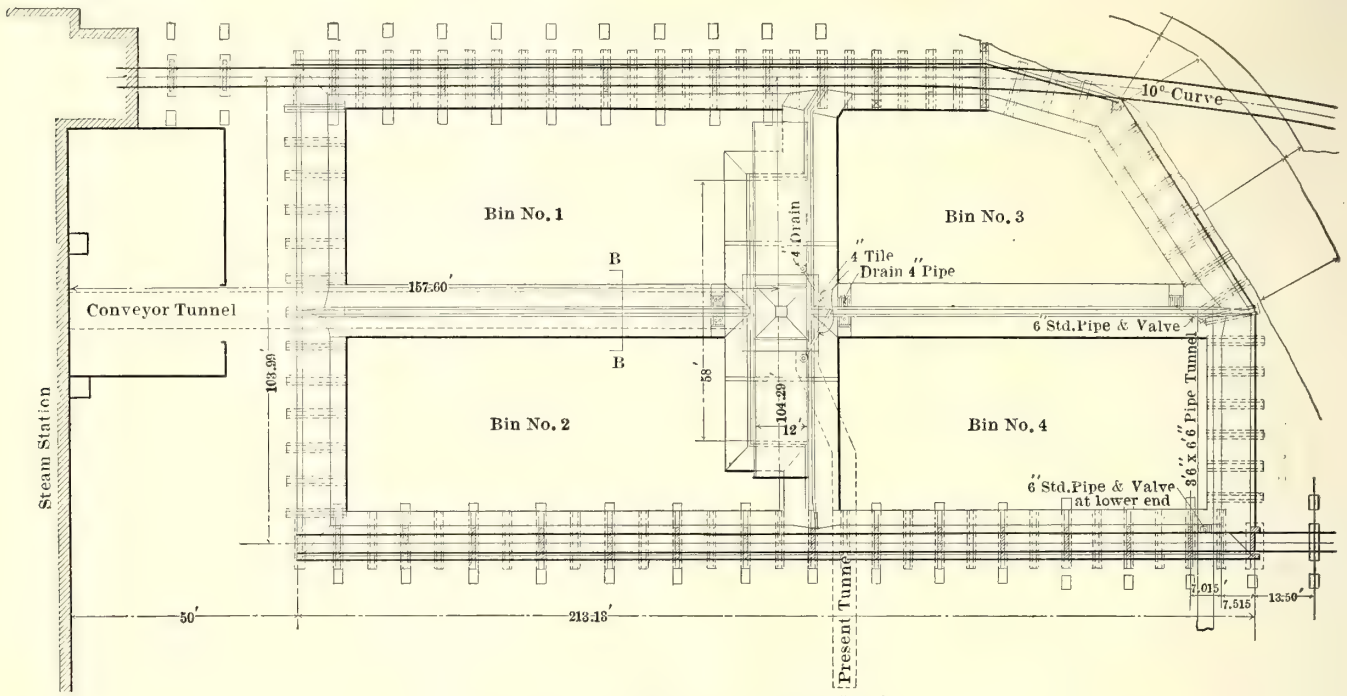
Other paragraphs explain how working drawings of special work should be prepared, covering such details as the size of the sheet, the position of the north point, scale, survey data, computation, point of accuracy, designation of lines, data to be computed, marking of connecting rails, rail section to be used, arms of different rail sections, joints, drilling, punching, general data, titles and indexes. Similarly, details are furnished regarding the make-up of city plans, both for track location and conduit work, detail drawings and standard drawings. The final chapter relates to full instructions regarding the completing and checking of changes of drawings. This instruction book is bound in durable cloth.

The Allgemeine Elektricitäts Gesellschaft has received an order for the electrical equipment of the Rjukan Railway, Norway, the principal business of which will be to carry artificial saltpeter made at Saaheim. The line will consist of 16-km (10 miles) and 30-km (18.6 miles) sections respectively built on opposite sides of Lake Tinos and joined by a ferry. The overhead trolley potential will be single phase at 10,000 volts, 15 cycles transmitted from three-phase hydroelectric stations at Saaheim and Svolgfös. The first power station will have two 400 kva units and the second three units of the same size. The initial equipment will consist of three locomotives carrying four 25-hp motors and two locomotives carrying two 125-hp motors.

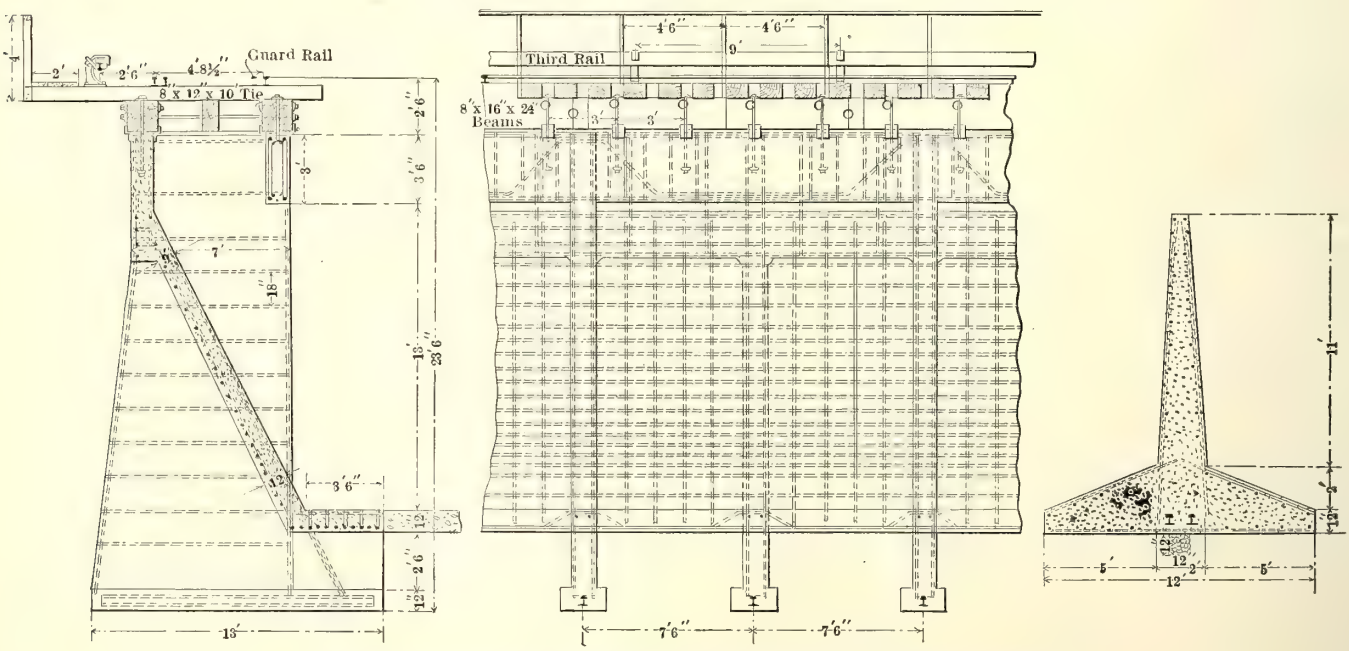
BINS FOR SUBMERGED COAL STORAGE AT MINNEAPOLIS

The Twin City Rapid Transit Company has just completed the construction of a group of four coal bins which will permit the storage under water of 12,000 tons of coal. These bins are located 50 ft. distance from the boiler house of the main steam station of the company. The accompanying drawings show the principal construction features of the new coal bins. At Minneapolis it is possible to get an ample supply of screenings from December to April, but in the summer the supply is interrupted and therefore coal must be stored in the winter for summer use. With the new storage arrangement and provision for submerging the fuel it will be possible to accumulate enough screenings during the winter to run the plant in the summer. In this connection it should be noted that the steam generating station of the Twin City Rapid Transit Company operates in parallel with two nearby water-power stations which can carry a considerable part of the load during the summer.

Briefly, the new coal-storage plant comprises rectangular-shaped bins with reinforced concrete walls and a reinforced concrete floor. The four bins are not interconnected. Each is watertight and is provided with intakes so that it may be filled from the bottom. At the center of the group of four bins is a hopper leading to a coal crusher from which the fuel is carried into the boiler house by a belt conveyor and there dumped onto the distributing conveyor which delivers it to the bunkers. Each of the two long sides of the storage bins is surmounted by a railway track supported on steel and concrete bents. Coal is received in hopper-bottom cars and dumped directly into the storage bins. A derrick car with a grab bucket also operated on these railway tracks is used to lift the coal from the bins into the central hopper leading to the crusher and the boiler-house conveyors. The tracks on which the derrick car operates are about 20 ft. above the floor level of the bins.



Plan of Coal Storage Bin at Steam Station



Section of South Trestle and Coal Storage Bin at Steam Station

Referring to the drawings it is noted that the four bins are formed by cross walls which subdivide a concrete structure 213 ft. long by 104 ft. wide. The center partition walls are 14 ft. high. Each of the four bins is a water-tight structure with

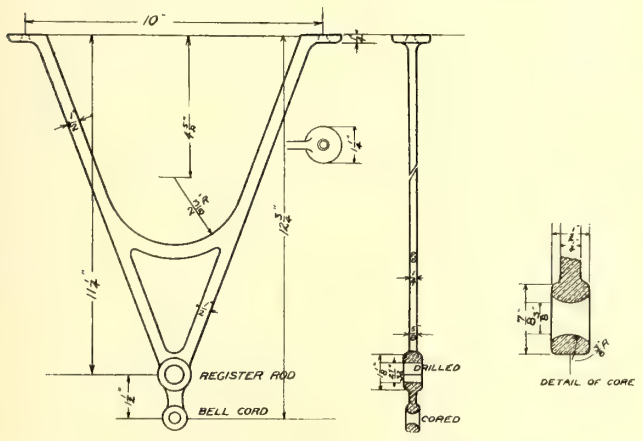
a floor slab 12 in. thick reinforced with ½-in. square rods laid 24 in. on centers in both directions. The outside walls also are 12-in. thick and are reinforced by ⅞-in. and ½-in. rods spaced 16-in. apart horizontally and from 6 in. to 12 in. apart vertically. The side walls have a batter of 6 in. to the foot and are supported at the back by a series of reinforced concrete buttresses spaced 6 ft. and 7 ft. 6 in. on centers. The center division walls have reinforced concrete foundations 12 ft. wide. The division walls are 11 ft. high above the foundation reinforced longitudinally and vertically with ½-in. rods. The coal tracks above one side wall are supported by a structural steel trestle encased in concrete. The track on the other side is supported by concrete girders 12 in. x 36 in. in section heavily reinforced and spanning the buttresses and bents which brace the side wall. The track structure is the ordinary railway timber-deck type wih a 2-ft. walkway on one side.

The piping system for flooding the tanks is fed from the power house through a main which branches to terminate in a valve under gratings in each of the four bins. The pipe mains are carried in the concrete tunnel through which the coal-conveying belt operates. The central hopper leading to the coal crusher and the conveyor which carries the coal to the power plant is about 12 ft. square. Leading to this hopper are extension slides with extreme dimensions of 80 ft. x 12 ft. These slides are made of steel plate supported on concrete and steel columns. The hopper with its slides is protected from the coal by reinforced concrete walls connected with the central division walls. This hopper is so placed that coal can readily be dropped into it from the grab bucket operated by the locomotive crane on the trestle tracks along the sides of the coal bins.

Experience has shown that coal can be protected from spontaneous combustion without total submersion. When the bins are completely filled and water is forced into the bottom it is noted that the moisture climbs practically to the tops of the coal piles by capillary attraction.

RICHMOND BELL AND REGISTER FIXTURE

The accompanying drawing shows a rather interesting cast-brass bell cord and register rod fixture installed in many of the cars operated by the Virginia Railway & Power Company, Richmond, Va. This arrangement is built for installation along the center line of the car and has a wide opening at the top to clear the lighting fixtures. The most interesting points about this bell and register fixture, however, are the bell-cord hole



Register Rod and Bell Cord Bracket

and the spacing between the cord and register rod. It will be observed that the hole for the bell cord is beveled, thereby avoiding the creation of sharp edges which would soon cut into the rope. The provision of a space of 1½ in. between the bell-cord and register rod was due to the fact that when a smaller clearance was used, the conductors could not operate the bell rope without bruising their knuckles against the rod.

CIRCULAR LETTER ON TARIFF CONSTRUCTION IN THE STATE OF NEW YORK

The following self-explanatory letter has been sent to all street and interurban railway companies operating in New York State by the traffic committee appointed at the Cooperstown meeting of the Street Railway Association of the State of New York.

TO ALL INTERURBAN AND STREET RAILWAY CORPORATIONS IN NEW YORK STATE:

"At a meeting of the New York State Street Railway Association held at Cooperstown, N. Y., on June 28 and 29, 1910, a traffic committee was appointed to consider matters relating to transportation of passengers and property with a view of securing more uniform regulations relative thereto, and also to take up the question with the Public Service Commission having supervision over matters of tariff construction in order to secure a greater degree of uniformity in the construction and the expression of the matter contained in tariffs, and, if practicable, the adoption of specific forms covering the various kinds of tariffs required to be issued, which would be of great assistance to carriers when issuing tariffs.

"After its appointment the committee perfected its organization, and as a representative of the division of tariffs of the Public Service Commission, Second District, was in attendance at the convention, he was invited to a conference with this committee. At this conference it developed that the commission was considering the schedules now on file with it by interurban and street railway carriers with the view of perfecting methods along the same lines as this committee is empowered to act. Important features in relation to tariff construction were called to the attention of this committee, and it was pointed out wherein present tariffs could be greatly improved.

"The committee regrets that it was not possible for all members of the association and others to have heard this discussion with the representative of the commission, as it feels sure that it would have been of great benefit.

"The appointment of this committee has been due to the fact that during the past three years the attention of numerous carriers has been called by the commission, upon complaints received by it, to various matters relating to their rates and charges which upon consideration by the carriers involved resulted in various voluntary changes. In a few instances changes in carriers' tariffs have been made necessary through opinions rendered by the commission upon cases after hearings were held, and it was thought wise on the part of this association to enter upon a full consideration and endeavor to work out a more perfect understanding as between themselves and the regulations of the law and the commission's tariff regulations.

"In undertaking this work the committee is assured of cordial co-operation on the part of the commission. This movement had the unanimous support of all members of the association who were in attendance at the convention, and individual members of the committee were advised prior to the convention of support to such a movement, which would be given on the part of other members who could not be present. Therefore it has practically the unanimous support of all members.

"It is the intention of the committee, immediately upon receipt of answers to this circular, to arrange for a conference of all carriers with the Public Service Commission, Second District, which conference will be called as soon thereafter as will meet the convenience of the commission, and at which time the committee will be prepared to submit tentative matter for consideration.

"The object of this circular is to ascertain your views and to solicit your co-operation."

(Signed) J. M. CAMPBELL, Chairman,
Buffalo, Lockport and Rochester Railway.
Rochester, N. Y.

DECISIONS IN INTERSTATE CLASSIFICATION OF ACCOUNTS

Accounting Bulletin No. 5, issued by the Interstate Commerce Commission, gives the decisions upon questions raised under classifications of accounts prescribed by the commission for electric railways. This bulletin supersedes a previous one issued on Aug. 16, 1909. The earlier bulletin contained decisions upon 58 questions. The new bulletin republishes the decisions upon those questions except in one instance, Case No. 33, to which an amended answer is given, and gives additional queries, making a total of 185.

Prof. Henry C. Adams, in charge of statistics and accounts, in an introductory letter to Bulletin No. 5, says:

"Accounting Bulletin No. 5 contains a file of important cases relating to the classifications for electric railways that were submitted before March 1, 1910.

"As a matter of information it may be proper to state that the answers to questions recorded in this bulletin have received the approval of the committee on standard classification of accounts of the American Street & Interurban Railway Accountants' Association."

Some of the queries and decisions follow:

CASE 33 (AMENDED), WORK CARS

Query. To what account or accounts should be credited charges made against operation and construction accounts for electricity furnished by an electric railway company for the use of its shop motors, car-house lighting, running of construction cars engaged in company service, such as building new tracks, etc.?

Answer. The classification of operating expenses of electric railways does not require a segregation of the cost of power to shops, car houses, etc. The last paragraph on page 7 of the classification provides that any carrier may "keep any temporary or experimental accounts, the purpose of which is to develop the efficiency of operations: *Provided, however,* That such temporary or experimental accounts shall not impair the integrity of any general or primary account hereby prescribed; and that any such temporary or experimental accounts shall be open to inspection by the commission." It is therefore permissible for any carrier to ascertain for its own information the cost of power used at shops or car houses.

The classification of operating expenses of electric railways does not contemplate that any distribution shall be made to maintenance accounts for electricity furnished by an electric railway for the use of its shop motors, car-house lighting, or running of work cars engaged in maintenance.

The actual cost of operating work cars for construction purposes, such as building new tracks, etc., is properly chargeable to construction accounts, and proper credit may be given to revenue account No. 9, "miscellaneous transportation revenue."

CASE 60, WIDENING STREETS

Query. A company is required by its franchise to widen one of the streets upon which it operates, and pay all expenses of excavating, moving back and resetting curbs, constructing new catch-basins with sewer connections, adjusting all sidewalks and cross walks disturbed, readjusting all pole lines, hydrants, etc., owned by other corporations, and laying a new asphalt pavement between brick-paved railroad strip and the curbs. Would it be proper to consider this as an incidental cost of the road itself and chargeable to account No. 2, "right of way," or should the cost be charged to account No. 44, "miscellaneous?"

Answer. The cost should be charged to account No. 2, "right of way," except cost of paving, which should be charged to account No. 10, "paving."

CASE 65, STRUCTURES FOR SUPPORTING OVERHEAD CONSTRUCTION

Query. In account No. 19, "poles and fixtures," in the classification of expenditures for road and equipment of electric railways is the statement, "To this account should be charged the cost of * * *, brackets and other pole fixtures, * * *, also structures for supporting the overhead electric construction." In account No. 22, "distribution system," in the same classification is the statement, "To this account should be charged cost of material used and labor expended in constructing distribution system, including * * *, overhead trolley lines, including cost of trolley, guard, span, strain, supplementary, and other wires." Since brackets used for supporting trolley wires are analogous to span wires, should not the cost of such brackets be charged to account No. 22, "distribution system?"

Answer. Brackets used for supporting trolley wires are distinctly pole fixtures and should be charged to account No. 19, "poles and fixtures."

Possibly there has been some misunderstanding as to the meaning of "structures for supporting the overhead electric construction" in account No. 19. This is intended to cover such structures as steel catenary bridges which are used by some railways to carry the double-track overhead lines and which have two side towers and a connecting truss built of light angles and channels.

CASE 66, ELECTRIC LOCOMOTIVE

Query. Our master mechanic asks that we define the term "electric locomotive" as used in the classification of operating expenses of electric railways, his desire being to know whether the build of the machine or the use to which it is put governs. We have a machine with standard express car body, but with low speed, high-power motor equipment, which is used in handling ballast cars, flat cars, etc., in maintenance work, and sometimes in hauling such freight as lumber, wood, etc., in car lots.

Answer. In defining the term "electric locomotive" the build of the machine, rather than the use to which it is put, should govern. If it is so arranged that it can carry freight or passengers within itself, it should be considered a car.

This distinction seems necessary, as it frequently happens that regular passenger cars, freight cars, or work cars are used to haul other cars and to treat them as locomotives, when so used, would undoubtedly lead to confusion.

CASE 75, PREMIUMS FOR GUARANTY BONDS

Query. Please advise if premiums paid to guaranty companies for bonds furnished municipalities in accordance with franchises granted for the privilege of constructing and operating railroads on the streets should be charged to account No. 83, "insurance," in the classification of operating expenses of electric railways. The bonds referred to are given for the faithful performance of all the terms of the franchise, including the construction of the line, the payment of a percentage of the gross receipts, and in some instances the maintenance and operation. The bonds are continuous and run during the life of the franchise.

Answer. Such payments should be charged to account No 44, "miscellaneous," in the classification of expenditures for road and equipment of electric railways, when the payments are incurred in connection with construction work; and to account No. 79, "miscellaneous general expenses," in the classification of operating expenses of electric railways, when the payments are incurred in connection with operation.

CASE 77, DESTINATION SIGNS

Query. This company uses large numbers of portable iron signs, which are hooked on the front of the cars to indicate their destination. They are in nowise permanent fixtures of the cars, but are used on different cars as occasion requires. On some of our new cars we have adjustable signs which consist of rolls with various destinations painted thereon and are attached to the cars themselves. To which accounts should the cost of these signs be charged?

Answer. The portable signs should be charged to account No. 63, "miscellaneous car-service expenses," and the adjustable signs attached to the cars to account No. 32, "passenger and combination cars."

CASE 79, WAGES AND REPAIR ACCOUNTS

Query. Should the wages of engineers and other employees engaged in operating power stations and substations be charged to repair accounts when engaged in making minor repairs during their regular hours?

Answer. It is not intended that any portion of the wages of

engineers and other employees engaged in station operation should be charged to repair accounts when they are engaged incidentally during their regular shifts in making minor repairs.

As a general rule, it is not necessary to distribute the wages of a regular employee to the several accounts affected if part of his time is devoted only incidentally to repair work. If, however, he is required to devote a considerable part of his time to such repairs, his wages should be apportioned to the proper accounts in accordance with the work performed.

CASE 84, CHARGES FOR WORK-CAR SERVICE

Query. Since commencing operation we have adopted the policy, in connection with our work-car service, of charging our several departments with the use of work cars at the rate of 65 cents per car-hour. This has been done for the reason that we have had to do considerable hauling for the contractors who built the road. We have also charged each department in order that the department head would have it brought more forcibly to his attention that it was the desire of the management that the work cars be used as little as possible. This charge of 65 cents per hour has been credited—50 cents to "purchased power" and 15 cents to "miscellaneous revenue," which division is based upon an estimate of the amount of power used and the amount necessary to compensate the company for loss through wear and tear, etc. Is this correct?

Answer. No charge should be made against maintenance or other operating accounts for the use of work cars. In the case of cars used on construction work by the company itself, if charge is made against construction accounts it should be as near actual cost as possible, and credit should be given to revenue account No. 9, "miscellaneous transportation revenue." When a charge is made against a contractor for use of equipment, credit should be given to account No. 9. Wages of conductors, motormen, and other employees engaged in this service should be charged to account No. 62, "miscellaneous car-service employees."

CASE 109, RESERVE FOR LOSS AND DAMAGE CLAIMS

Query. Is there any objection to the creation of a reserve fund to take care of settlements of loss and damage claims filed by shippers of freight? The intention is to make charges of an arbitrary amount so as to take care of claims of this nature during the period within which the damage is done.

Answer. There is no objection to including in operating expenses each month a proportion of the total amount which it is estimated will be necessary to expend on account of loss and damage claims, provided that the charges are adjusted annually so far as practicable.

CASE 110, MOVING POLES OF ANOTHER COMPANY

Query. To what account should be charged the expense of moving the poles of another company which were located closer to our tracks than we deemed safe, and which we moved back to give proper clearance? When the line was originally constructed the location was presumably all right, but in the course of time, in consequence of operating larger cars and at an increased speed, the present management did not consider the clearance sufficient.

Answer. It is proper to charge the cost of this work to account No. 2, "right of way," in the classification of expenditures for road and equipment of electric railways, unless the amount involved is insignificant. In case it is decided to charge the cost to operating expenses, it should be charged to account No. 19, "other miscellaneous way expenses."

CASE 124, AMOUNT RECEIVED FOR LOSS OF BUSINESS

Query. A blast, set off by a concern doing work for itself, so damaged our high-tension system as to cause a good many interruptions in the power and consequently our car service was somewhat delayed for several hours.

In addition to reimbursing us for the expense of restoring the high-tension system to its original condition, the concern has agreed to pay us a certain sum of money to reimburse us for the estimated loss suffered from service interruption.

To what account shall we credit the amount paid to us for the estimated loss of the transportation business?

Answer. The amount may be credited to account No. 9, "miscellaneous transportation revenue." Strictly speaking, this is not a transportation revenue, but as it is paid to replace what is conceded to be a transportation revenue, it may be so considered.

CASE 132, CAPITALIZATION OF INSIGNIFICANT AMOUNTS

Query. Would it be proper to charge to road and equipment account No. 8, "special work," the cost of labor and material used in running a wire from a substation to several of our sidings for the purpose of turning on electric switch lights at said sidings by means of a switch at the substation?

Answer. No. The cost should be charged to account No. 17, "interlocking and other signal apparatus," in the classification of expenditures for road and equipment of electric railways. However, it is not the intention that carriers should be required to capitalize insignificant amounts.

CASE 152, PAVEMENT REPLACED AFTER REMOVAL OF OBSTRUCTIONS

Query. To what account should be charged the cost of renewing a pavement taken up during construction work for the purpose of removing obstructions such as gas and sewer pipes? This paving is more or less removed from the paving described as the paving strip extending approximately two feet outside of the outside rail and between the rails, and is not maintained by the street railway company.

Answer. The cost of replacing a pavement taken up for the purpose of removing obstructions such as gas and sewer pipe should be charged to account No. 10, "paving," in the classification of expenditures for road and equipment of electric railways, whether or not such pavement is outside of the so-called paving strip maintained by the company in consequence of municipal requirements.

CASE 171, INSTALLING FIRE HOSE

Query. To what account should be charged the cost of installing fire hose?

Answer. The cost of first installation of fire hose should be charged to the same account under road and equipment as the building in which the hose is installed. It is not intended, however, to require carriers to charge insignificant items to road and equipment accounts.

THEATRICAL PERFORMANCES AT UNION PARK.

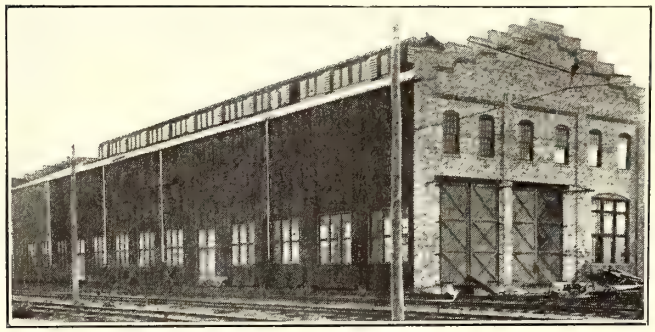
The Union Electric Company, Dubuque, Ia., has recently entered upon a new venture to increase the popularity of Union Park, which it owns. It has engaged for its park theater a stock company, known as the Park Players, and under the management of Charles D. Connolly. This organization recently inaugurated its season by presenting the comedy "Facing the Music." The initial performance was well received by an audience of more than 2500 people and was also commented upon editorially by the local press. Regular performances will be given every evening and matinees on Sunday, Thursday and Saturday. The theater proper has a seating capacity of 2600 people. An admission fee of 10 and 20 cents is charged for these seats. The south end of the theater is entirely open and here the company has built an amphitheater seating 3000 people for which no charge is exacted.

The Union Electric Company has expended a large sum during the past year or more in beautifying Union Park, by planting additional shrubs and flowers. It has also installed several fountains, a concrete wading pool and sand piles for the children, swings, playground devices and other pleasure producers. All these amusement devices are free to the patrons of the company. The park also contains a dancing pavilion, several refreshment stands and bowling alleys. General descriptions of this park were printed in the *Street Railway Journal* of February 29, 1908, and in the ELECTRIC RAILWAY JOURNAL of Feb. 27, 1909.

The summer theater of the Grand Rapids (Mich.) Railway at Reed's Lake, one mile east of Grand Rapids, has been enlarged by the addition of a balcony and a roof garden.

GRANITE CITY REPAIR SHOP ILLINOIS TRACTION SYSTEM

With the completion of the McKinley bridge, which will give the Illinois Traction System an entrance into the city of St. Louis, additional facilities for shopping cars at the south end of this large electric railroad will become necessary. Therefore, a new shop building 250 ft. x 60 ft. in ground dimensions has been erected. For the present this building will be equipped with facilities for doing the maintenance work on



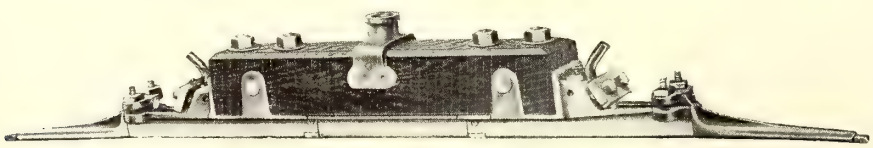
Granite City Car Shops of the Illinois Traction System

the 30 large double-truck pay-as-you-enter cars which will operate in suburban service between St. Louis, Mo., and Granite City and Venice, Ill.

The shop is located in Granite City about one mile east of the Illinois approach to the McKinley bridge. It is built with concrete foundations, floors and pits and a steel superstructure with brick walls, except on one side where extension is contemplated. The structural steel on this side is covered with 1-in. x 8-in. siding laid diagonally, protected with No. 22 corrugated iron. The building encloses two pit tracks, 120 ft long with connecting tunnels, and an open wheel transfer pit A space 28 ft. wide and extending the whole length of the building will accommodate the necessary shop tools and pro vide floor space for repair work. The superstructure of the building is designed to accommodate an overhead traveling crane with a span of 57 ft. The entire structure has been designed with a view to making this building suitable as one section of the larger shop group which eventually will be necessary at the south end of the Illinois Traction System.

A NEW SECTION INSULATOR

The Indianapolis (Ind.) Brass Company has recently brought out the section insulator shown in the accompanying illustration. The insulating body is of specially treated, second-growth, split hickory, 2½ in. square and 15 in. long. The insulating runner piece is of renewable lignum vitae, with non-arcing metal terminals attached with screws to be easily re-



Section Insulator

movable. The runner is extra high to insure a smooth under-running surface.

The wire terminals are attached to the insulator body by two ½-in. Norway iron bolts, and one ½-in. Norway iron bolt passing through the wood body at right angles and securing the terminals at the sides. This construction prevents the possibility of the wood being split. The terminals are of bronze with a two-screw clamping plate. The renewable clinching approaches are firmly bolted to the terminal piece, and tapered so as to expose a V-shaped section of the underside of the wire to the bearing surface of the trolley wheel.

The jumper terminals are so cast as to strengthen the terminal piece proper. They have slotted binding screws set on top and these are easily accessible in case it is necessary to jump the circuit. A substantial hanger boss is firmly riveted to the insulating piece and tapped to accommodate standard hanger bolts. The complete insulator is 38 in. long, including the two end approaches and is designed to meet extra heavy strain and high speed service.

TESTING CARBON BRUSHES

The influence of a high-grade carbon brush on motor maintenance costs is now so well appreciated that it may be of interest to give some particulars of the shop tests on brushes made by the Speer Carbon Company, St. Mary's, Pa. This company has recently enlarged its testing laboratory which is in charge of Alfred Müllhaupt, Jr., electrical engineer, formerly with the General Electric Company.

Starting with the raw materials every ingredient is tested for chemical composition as some of the raw materials vary considerably in the amount of impurities which they contain. The physical qualities of carbon brushes also may vary a great deal if the conditions under which the various processes are carried on are not held constant. Consequently, the company's plant is equipped with instruments and records to detect all variations. In some cases even hourly readings are made so that variations in the physical properties of the finished brushes may be traced to the particular man in charge.

All grades of brushes are tested periodically for mechanical strength in two ways. The easiest to make and probably most important on that account is the cross breaking test. Samples 2-in. x 1-in. x ½-in., which may be obtained from any brush, give a test of the brush as it is found in practice and are not like tests of prepared samples as in cement work. Carbon is stronger in compression than in tension, so the values as computed give breaking strength in tension rather than compression. In the second or vibration test the brushes are run for six hours in a vibration machine built according to the specifications of the American Street & Interurban Railway Engineering Association as adopted at the 1908 Atlantic City convention.

The coefficients of friction and contact resistance are obtained on a short-circuited commutator on which 12 2-in. x ½-in. x 2½-in. brushes are run. The commutator is mounted on the shaft of a 3-hp shunt-wound motor, the whole being mounted on a stiff cast-iron bed plate which is bolted to a concrete foundation. One of the brush holders is insulated from the rest and the contact resistance is obtained by grooving the brush near the face and fastening a wire to get the potential as near the face of the brush as possible. Much work has been done on this machine to determine the effects of the temperature of the commutator on the coefficient of friction. The effect of the humidity of the air is also being noted and results will be published shortly by the company.

A 35-hp motor is being installed for a sparking test, in which the brushes will be run out of neutral to give a potential of from 10 volts to 15 volts between the bars to determine the ability of brushes to withstand severe arcing. Glowing tests are run on a smooth ring as required in the specifications of the American Street & Interurban Railway Engineering Association.

On July 23 the members of the Albany Society for engineers made a trip of inspection of the double tracking of the Albany Southern Railroad which is being done by J. G. White & Company. The engineers left by special car and went to Electric Park, about half way to Hudson. On the trip the special features of the new work was explained by Engineer Luther Dean and afterwards the party was entertained at lunch at the Park by representatives of the company.

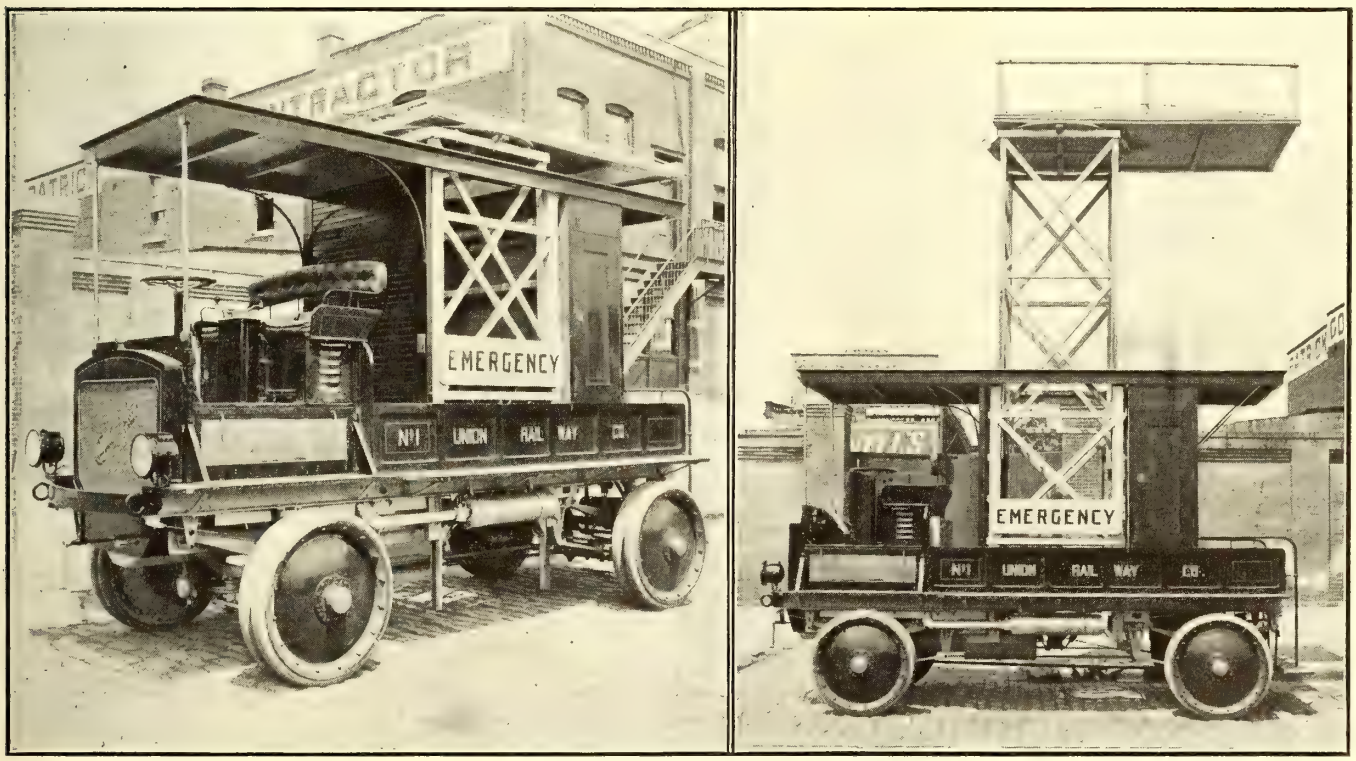
A GAS-ELECTRIC EMERGENCY WAGON

The Union Railway Company, of New York, has just placed in service the novel gas-electric emergency truck shown in the accompanying illustrations. This wagon will be used on 110 miles of single track in the Borough of the Bronx for the pulling in and out of underground cables, drawing aerial cables over poles, removing wrecks and heavy trucks, replacing cars on the track, towing, etc., in addition to serving the usual overhead line construction and repair purposes. Perhaps the most advantageous feature of this truck is the nicety of its speed regulation, in which respect it is much superior to a horse-drawn vehicle. Owing to the exactness of the speed control it has been found possible to run the wagon for a stretch of 150 ft. at a speed slightly less than ½ m.p.h. The specifications called for a speed of 20 m.p.h. on level paved streets, but in service the wagon actually has attained a maximum of 27 1/16 m.p.h. with 190 volts on the motors and maintained an average of 18¾ m.p.h. at 150 volts. The weight of the truck is about 10,000 lb., and its carrying capacity 3½ tons. It will haul a loaded wagon weighing 10 tons when one wheel of the latter has been removed and the axle placed upon a skid.

The truck was furnished by the Couple-Gear Company, New York, and includes a novel system of transmission called the couple gear and designed by the Couple-Gear Freight Wheel Company, Grand Rapids, Mich. Power is applied to both sides of every wheel without using countershafts by a single motor carrying two pinions which pull up on one side of the wheel and down on the other. The motor is fixed at a slight angle, which enables each pinion to engage its respective gear and run free of the other. The axle stubs on which the wheel turns are integral with the motor castings, which are brought together in such a manner as to insure perfect bearing alignment. The principle involved is the same as that used in winding a watch with the thumb and finger except that the motion is continuous. The practical application of this couple-action is made possible with the couple-gear because the motor is contained inside of the wheel or driving member, and is so placed that the pinions on both ends of the motor shaft are permitted to drive from their opposite sides. An equalizer divides the force equally between the two pinions regardless of unequal wear. In this truck each of the four wheels contains a 3-hp couple-action motor, with an overload capacity of 200 per cent for two minutes.

The chassis is constructed of steel with deep channel side members and with all intersections between the side and cross-members braced with triangular gusset plates. The four springs are of semi-elliptic type made of an alloy steel with flake graphite placed between the leaves. Spring brackets are attached to the main frame and springs with means provided for lubrication. Auxiliary coil springs are also placed at all springs to limit the compression. The wheels are constructed of dished steel plates with steel tire channels and crucible-steel hub castings, the whole being designed to take 36-in. rubber tires. The hubs are furnished with roller bearings and ball-end thrust collars. The outside disk of each wheel is provided with two closely fitting removable hand-hole covers.

The body of the truck is constructed with a standard removable Trenton tower, which, when extended, is 19 ft. 4 in. high and when lowered 11 ft. in the clear. The tower platform is electrically insulated from the remainder of the wagon in all positions. The illustration showing the tower in its lowered position would make it appear that the inner tower guides are touching the paving, but this is not so, as these guides have 9 in. clearance when the tower is in its lowest position. It has been found advisable since the truck has been put in service to cut down the panels on the opposite sides of the tower frame so that the chauffeur can see what is going on behind him. The cover over the engine and the floor between the dash and the seat are removable to facilitate the inspection of machinery.



Gas-Electric Emergency Wagon for the Union Railway Company, New York

The engine is of the four-cylinder, four-cycle, water-cooled type rated at 40 hp. It was constructed by the Schlosser Manufacturing Company, New York. The carbureter is also of the Schlosser design. The ignition is of the dual system having a jump spark with Bosch magneto and batteries. The lubrication system embraces a forced-feed oiler with leads to each cylinder and to each end of the crankshaft. The base is used as a reservoir for the splash system employed in combination with the forced-feed oiler. The generator is so designed that the maximum rise in temperature of any part for an hour's run under average operating conditions does not exceed 40 deg. C., and its

overload capacity is 200 per cent for two minutes. The generator frame is of cast steel with aluminum bearing housings. The bearings are of removable plastic bronze, dustproof and lubricated by oil reservoirs and rings. The armature shaft is turned on one piece of carbon steel and integral with the coupling flange. The power plant is placed in the chassis in a separate frame on three-point suspension, these points being cushioned with heavy rubber.

The electric control of the motors is through a street railway type controller placed in the front of the seat. The electric braking feature is incorporated in the motor control, the operation consisting of throwing the handle to the reverse position. The steering is accomplished through all four wheels by a large hand-wheel with enclosed worm and sector on both axles. The braking equipment consists of external band brakes on all four wheels, operating in pairs through two pedals. The electric brake is used only for emergencies.

A honeycomb type radiator having 940 sq. in. front surface is placed on the front end of the chassis. The capacity of the water system is 10 gal. A gasoline tank of 20-gal .capacity is placed under the seat.

MEASUREMENT OF INSULATION

A few years ago a direct-reading insulation resistance instrument was invented by Sidney Evershed, and under the trade name of "The Megger" has been manufactured for several years in England, and recently introduced in this country by James G. Biddle, Philadelphia.

The "Megger" complete and ready for use is illustrated in



Fig. 1—The "Megger"

Fig. 1, where the instrument is shown one-sixth of full size. The insulation resistance to be investigated is connected between the binding posts, one of which is marked "line" and the other "earth," when the crank is turned at fair speed and the amount of insulation resistance in megohms read from the scale. The whole process requires a few seconds, the operation can be conducted by anyone and it is stated that the results have an accuracy considerably higher than that usually obtainable with other apparatus available for such measurements. The instrument is portable, weighing about 20 lb., is self-contained and is not affected in any way by its surroundings. The scale may be marked up to as many as 2000 megohms.

In Fig. 2 is shown diagrammatically the arrangement of the interior parts. Permanent magnets *MM* are so arranged that a closed magnetic circuit is formed. In this magnetic circuit at one end a pair of pole pieces are placed between which a dynamo armature revolves. At the other end is another pair of pole pieces, within the field of which the moving system works. The dynamo, driven by the crank placed as shown in Fig. 1 furnishes the e.m.f. by means of which the instrument operates. It usually supplies either 250 volts or 500 volts, which is generated on a drum armature by a winding so arranged that the various coils end on commutators of peculiar disk form, the edges of which at opposite sides are gripped by spring washers which roll with them and keep good contact, acting as brushes.

The moving system is made of three coils rigidly connected to each other. The coil *AA* of the moving system is in series with the apparatus under investigation through the resistance *R'*; this coil exerts a deflecting force in the field where it is placed proportional to the current in it. Coils *B* and *B'* are connected in series. They, with the resistance *R* in series, are put directly across the dynamo terminals, and constitute the controlling coil of the instrument, the amount of their restraining force being a function of the position they take. As shown in Fig. 2, the indicating needle points to zero on the scale; coil *AA* has large current in it and coils *BB'* are exerting a maximum restoring force. The current is led in and out of the coils through very slender copper ribbons, which produce no torque; there are no springs, and the needle takes a position determined wholly by the torque of current in a magnetic field.

The proper relation between deflecting and restoring forces is secured through the use of the ↄ-shaped iron piece within coil *AA*, which may be seen in Fig. 2. It is mounted on the frame which supports the moving system.

The fact that the instrument is of the moving-coil-permanent-magnet type gives it all the good points which belong to this class, while being an ohmmeter it is even more constant in calibration. For some purposes the variable e.m.f. derived from the dynamo operating at various speeds is very useful, while for others it is bad. Whenever required, a friction clutch is interposed between the last gear and the dynamo armature, so contrived that when operated above slipping speed the e.m.f. is practically constant.

The direct applications of the "Megger" to the measurement of insulation resistance are too obvious to need explanation.

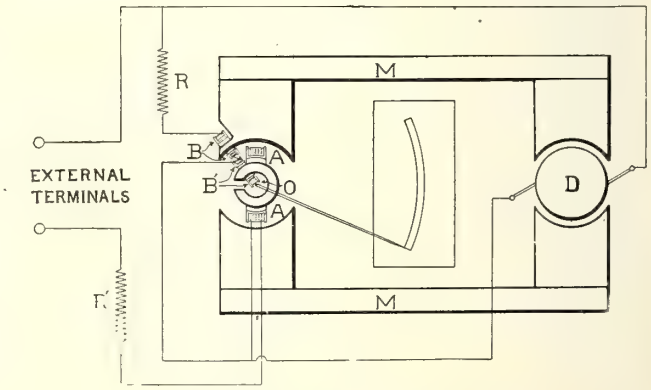


Fig. 2—Diagram of Instrument

Because of the fact that the resistance determinations on moderate voltage circuits are made at line voltage or perhaps at higher than line voltage, a sort of combined insulation resistance and break-down investigation can be made. Among the many indirect applications of insulation resistance measurements one or two may be mentioned. Periodic examination of apparatus for insulation resistance, as is done so readily with the instrument, will reveal any depreciation whether due to moisture —a temporary cause—or to the development of a permanent defect. In this way faults and break-downs can be anticipated and avoided. New apparatus is likely to have insulation resistance so low on account of moisture that it must be dried out before it can be put into service.

The London, Brighton & South Coast Railway has ordered 28 additional single-phase equipments from the Allgemeine Elektricitäts Gesellschaft. Each equipment will consist of four 150-hp single-phase motors. It is intended to use the new apparatus on the southern suburban lines of this company. The trolley potential will vary from 6300 volts to 6800 volts and the frequency will be 25 cycles.

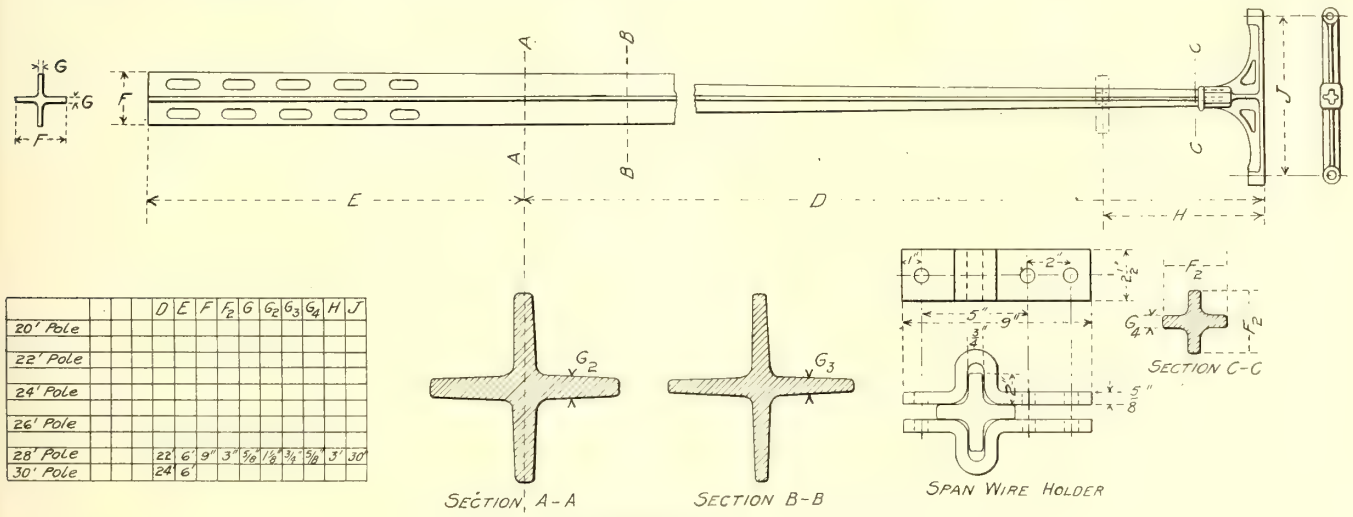
CAST-STEEL POLES

The Butte (Mont.) Electric Company installed some time ago 74 solid cast-steel poles furnished by the Pittsburgh Track Specialty Company, Pittsburgh, Pa. One of these poles as installed at Butte is shown in the accompanying half-tone illustration while the accompanying drawing gives the dimensions of various parts of this pole design for lengths of 20 ft. to 30 ft. and drawings of the fittings such as the cross-arms and span wire holder. These poles can be made hollow by coring out the center from end to end and putting into the arms of the cross the metal which is thus saved. The hole could be so cored that the four disunited sections of the castings would be regularly connected every 15 in. or 18 in., so that the connections would form steps to climb the poles. The Butte poles are 28 ft. long and weigh about 900 lb. each. The 30-ft. poles of this type weigh about 1100 lb. and the 33-ft. poles weigh about 1200 lb. These weights include the cross-arms, lugs and other fittings. The maker furnishes a very simple grappling climber.



Cast-Steel Pole in Butte, Mont.

The principal advantage of these cast-steel poles as set forth by their manufacturer is that they are practically indestructible since cast steel will withstand corrosion much better than the various forms of rolled steel or wrought iron. It should be noted that these poles can be made of extra thickness at and below the ground line, to allow for the deterioration common at those sections of a pole. The poles are made of 25 point carbon steel and so can be straightened in case of accidental bending. Furthermore should any part of the pole break it would be easy to weld the fractured parts to restore the structure to its original condition. The view of the Butte installation was taken by J. S. Mathey, superintendent of the Butte Electric Company. It shows quite effectively the difference between the modern steel pole and the old-time wooden telegraph poles nearby.



	D	E	F	F_2	G	G_2	G_3	G_4	H	J
20' Pole										
22' Pole										
24' Pole										
26' Pole										
28' Pole	22' 6"	9"	3"	5/8"	1/2"	3/4"	5/8"	3"	30"	
30' Pole	24' 6"									

Details and Dimensions of Cast-Steel Poles

NEW HORIZONTAL WATER TUBE BOILER

The illustration on page 194 shows the principal features of the horizontal water tube boiler made by the Casey-Hedges Company, Chattanooga, Tenn. The boiler consists primarily of one or more horizontal drums with wrought-steel header or water leg, riveted on the bottom at each end, and these headers are connected by two nests of tubes.

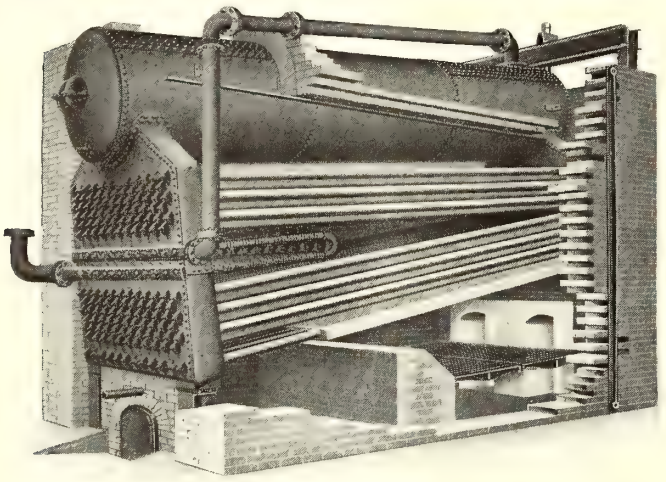
The manufacturers of the boiler have appreciated the necessity of unimpeded and rapid circulation of the water. The water legs have a large area and extend well up on the sides of the drums, providing for large passages leading from the drums to the water legs. The areas of the passages are not restricted as in the cases of some boilers in which the water passes through a nipple from the drum to the water legs. The upper nest of tubes is parallel to the drum which is inclined at a ratio of 1 to 12, and the lower nest of tubes is inclined at the ratio of 2 to 12. This results in a more rapid passage of water through the lower nest of tubes where the temperature is higher, and the heat bubbles are liberated with ease. As the amount of heat transmitted through the walls of a tube depends on the difference in temperature of the water inside and the heat outside, the rapid circulation of water augments the efficiency of the heating surface. Immediately over the throat of the front water leg and under the main steam opening in the drum shell there is a baffle plate which rests in a slanting position. This gives the flow of water a backward thrust as it emerges from the water leg.

There are no nipples between the water legs and drum to become loosened by vibration. The throats of the water legs are flanged outward at the top and securely riveted directly to the drum. The rapid circulation of the water through the lower nest of tubes prevents their being overheated, and as a result the tubes do not have to be replaced often, as is the case in boilers in which no provisions are made for more rapid circulation at the point subjected to the greatest heat.

The lower row of tubes in this boiler is entirely encircled by the baffle tile. This protects them from exposure to cold air that is admitted through the furnace doors when the boilers are hand fired, and the strains and buckling caused from this source in so many boilers are eliminated. The tile maintain a uniform temperature in the tubes and the bad effects result-

ing from a hot fire being built quickly under the boiler are not present.

A very important feature in the boiler is the arrangement of the baffle, which is such that it gives a Dutch oven effect. The designer has found that this feature makes the boiler exceptionally popular in localities where cheap grades of fuel are used, and it is also an advantage in localities where both low and high grades of fuel can be had, as the cheap grade can be burned and a considerable saving effected in the fuel bill. The baffle tile become incandescent white hot and thoroughly ignite the hydro-carbon as it travels under them toward the rear of the setting. The method of baffling used is considered superior to



Water Tube Boiler

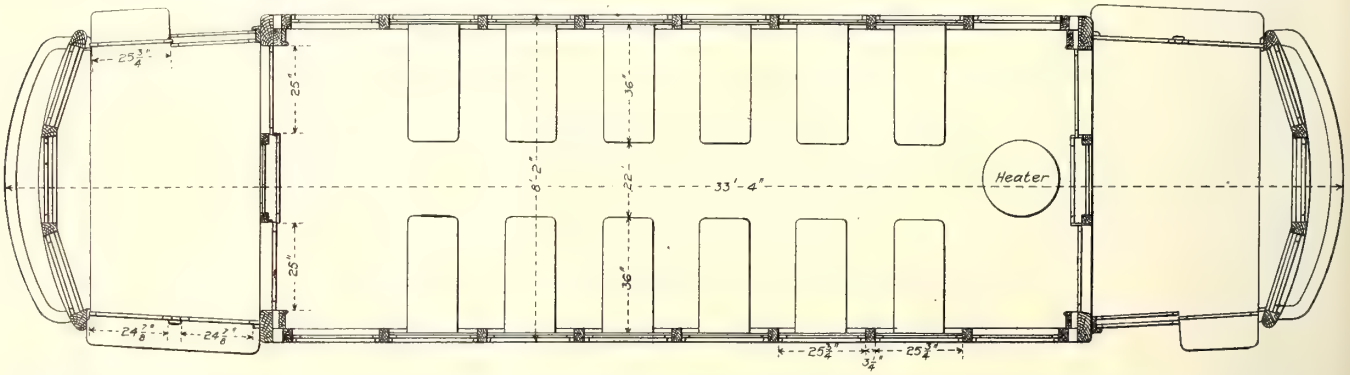
covering only the tops of the lower tubes and permitting the hydro-carbons to come in contact with the cooling surface before ignition. If the hydro-carbons were brought in contact with the cooling surface too quickly it would refrigerate them, and the furnace would never reach the high temperature attained with the Casey-Hedges method of baffling. The Dutch oven effect cannot be obtained with the vertical baffle which brings the flames from the fire directly in contact with the tubes and divides them into small bodies that are cooled as they are drawn through the nest of staggered tubes. Numerous tests are said to show that the parallel travel of the gases gives better results than the transverse travel. The spreading of the two nests of tubes at the rear provides for a second mixing, or combustion, chamber, resulting in the consumption of all gases that have passed through the furnace and lower nest of tubes unconsumed.

While the water legs are deep, the rear water leg is flared as it nears the bottom in order to bring the tube sheet at a right angle to the lower nest of tubes; all the tubes being the same length. This increases the storage capacity of the water leg which causes the water to linger at this point, giving an opportunity for the precipitation of all solids at the lowest point in the boiler and at a point where they will cause no damage. A blow-off for solids is provided on the bottom of the rear water leg. The boiler is fed by a pipe entering the top of the drum shell and emptying into a mud pan suspended a short distance from the bottom of the drum. The mud that collects in this pan is blown off through a pipe that leads through the rear head of the drum. The rapid circulation of the water through the tubes prevents the adherence of scale to them and forces it to places in the drum and legs that are not attacked by gases of a high temperature. The drum is provided with an Eclipse manhole in rear head. In the water legs opposite each tube is an oval-shaped handle of such construction that the plate, bolt and gasket on being removed from position remain intact. Several tubes can be cleaned internally through one manhole. The tubes are cleaned externally through the hollow staybolts.

A very liberal factor of safety is used in designing the boiler. The staybolts are made of heavy seamless cold-drawn steel tubing. In the boiler proper there are no cast-iron parts. One very prominent feature is that a superheater can be attached at any time during the life of the boiler without disturbing the brickwork. The superheater is conducted through the rear water leg by false tubes that are placed between the upper and lower nest of tubes. The suspension illustrated affords expansion and contraction of the boiler without undue strains. The suspension is independent of the brickwork, and any settling or cracking of the walls does not affect it. The brickwork is even more simple than the brickwork of the horizontal return tubular boiler, and therefore does not present any difficult problem of installation. The boilers are constructed in units from 100 hp to 800 hp, for pressures up to 250 lb.

PAY-AS-YOU-ENTER CARS FOR THE BENTON HARBOR-ST. JOE RAILWAY & LIGHT COMPANY

The Danville Car Company has built for the Benton Harbor (Mich.)-St. Joe Railway & Light Company four pay-as-you enter cars of the Brill semi-convertible type. These cars are 31 ft. 8 in. long over all, 20 ft. 8 in. long over the car body and 8 ft. 2 in. wide over the posts above the belt rail. As shown on the accompanying plan both platforms are 5 ft. 6 in. long and are arranged for railed entrances and exits each 24⅞-in. wide. The doors on this side of the platform are of the swinging type but a sliding door with 25¾-in. exit is installed on the opposite side. The car body proper has two single sliding doors at each end. The seating capacity for 24 persons will be furnished by 12 reversible slat cross-seats of the Brill "Winner"



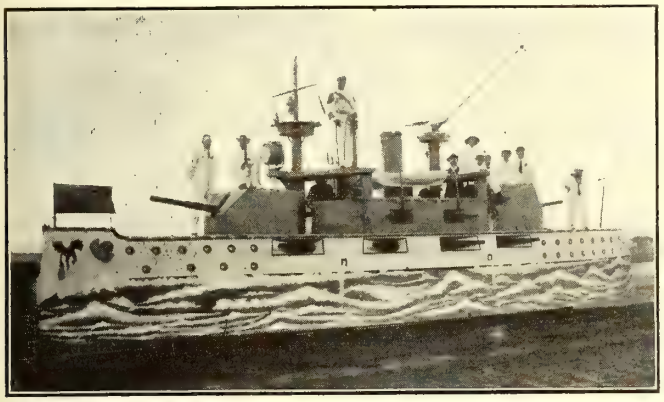
Plan of Pay-As-You-Enter Car for the Benton Harbor-St. Joe Railway & Light Company, Showing the Door and Platform Arrangements

type. The bottom framing of the cars consists of 5-in. x 3⅜-in. yellow pine side sills, 3½-in. x 8⅝-in. white oak undersills, 3¼-in. x 4¾-in. white oak center cross joists. The body framing includes 3¾-in. corner posts and 2¾-in. side posts. The inside finish is of cherry and the ceiling finish is painted and decorated artificial lumber. The body is mounted on Brill No. 21 E. trucks, equipped with 33-in. Griffin wheels 2¾-in. tread, ¾-in. flange for 4-in. axle. Among other features of these cars are GE-67 motors, Brill track scrapers, Providence fenders and Syracuse headlights.

TROLLEY FLOAT IN MANILA

The possibilities in the way of operating floats on trolley flat cars have been recognized in a number of cities, and this paper has published views of floats of this kind exhibited at San Francisco, Amsterdam and elsewhere. One of the most ambitious structures of this kind was shown during the 1910 carnival by the Manila Electric Railroad & Light Company.

This float was christened battleship "Bill Payne" and was built on the platform of the sprinkler car, the tank having been removed. The length was 50 ft. over all, width 8 ft., height 17 ft. 6 in. to top of mast. The ship carried 14 guns. The two turret guns were made of 3-in. steel tube with a 4-in. jacket over the firing chamber. A mixture of kerosene and air under 30-lb. pressure was injected into the firing chamber and an electric spark was used to ignite the guns. The guns had a



Battleship Trolley Float

firing speed of about 50 shots or explosions per minute and could be heard for a distance of one mile.

The broadside guns in the substructure were made of 1¾-in. tubing and were connected to the air supply of the ship at 90 lb. pressure. Cartridges made of tissue paper filled with confetti and carnival red devil advertisements were shot from these guns into crowds of people on the sidewalks, etc. The guns had a range of 60 ft. or more. The muzzles of these guns were choked so that the cartridges broke on leaving them. The ship was operated from the forward substructure and smoke was made by burning green grass in special pans inside of the stacks.

The crew consisted of seven men to man the guns and operate the ship. There was also a full equipment of lights for decorative and night signaling purposes, as well as searchlight, bells, fire control and whistles. The accompanying photograph of the float was furnished by J. G. White & Company, operating managers of the Manila Electric Railroad & Light Company.

DEVELOPMENT OF INTERSTATE SYSTEM OF ACCOUNTS

Prof. Henry C. Adams, in charge of statistics and accounts, Interstate Commerce Commission, outlines in the twenty-first annual report on the statistics of steam railways in the United States, covering the year ended June 30, 1908, a proposed further development of the system of accounts. Professor Adams states:

"In the report for the previous year will be found an account of the development of a uniform system of accounting for transportation agencies subject to the jurisdiction of the commission, so far as it was at that time developed. To the classification and accounting rules there described there have been added during the year covered by this report the classification of expenditures for additions and betterments and the form of general balance sheet statement, as prescribed by the Interstate Commerce Commission for steam roads, effective on July 1, 1909. The general structure of the accounting system is now completed.

"The further development of that system concerns itself with a uniform system of shop accounts, a uniform classification of employees, uniform rules for computing average daily compensation of employees, a uniform classification of commodities carried as freight, and similar problems which, now that the main classifications are completed, may be undertaken. The development of satisfactory rules for the assignment of revenues and expenses to States, a task urged by the National Association of Railway Commissioners, is another problem which presses for solution. In this connection, also, should be mentioned provision for more perfect statistics of transportation services rendered at terminals and stations. All railway statistics without exception, as well as the theory of railway tariffs which many countries aim to realize, call for a separation of terminal and train expenses. One step has been taken for working out the problem thus suggested, but much remains to be done. It is mentioned in this connection as indicating the further development of the system of statistics and accounts which the results already accomplished make possible."

FLEXIBILITY IN THE WORCESTER FEEDER SYSTEM

In Worcester, Mass., the generating plant of the railway system is located about 2 miles south of the business center of the city, while 2 miles east of the business center is a lake resort. The maximum traffic to the lake occurs in the evening and on half-holiday or Sunday periods, and the cars operated between the city and the lake are obliged to ascend a long and heavy grade at a point about 4 miles from the power station. The power demands of the lake service are met by special feeder lines which pass through the center of the city.

During the lighter hours of the day, the copper capacity of the lake feeders is in excess of the demands of that particular line, while the periods of heavy traffic call for all the conductance which the company can afford to supply. It has therefore been arranged to operate the feeders of the lake line independently when the travel is heavy, but when it is light, the carrying capacity of these lines between the power plant and the center of the city is utilized by cutting into them with a tap near the business center, the switch being operated by the company's starter or inspector on duty at the most congested point within the city. By this plan the copper between the station and the Worcester city hall district is kept at work practically all the time at high efficiency, and about 50 per cent of the line is always doing heavy service. The location of the center of the load in Worcester at a considerable distance from the power plant renders this long-hour reinforcement most advantageous.

MUNICIPALIZATION IN COPENHAGEN

In June the city of Copenhagen, by a majority of eight, decided to take over the electric tramways of the city beginning August, 1911. The system in question includes 25.5 miles of double track and 10 miles of single track, and employs 279 motor cars and 191 trail cars. Five of the latter are single horse cars. The company has a capital stock which in American currency would be about $3,000,000. In 1909 the company carried 70,949,345 passengers and about 8,000,000 motor car-miles were run. According to the franchise terms, beginning August, 1898, the tramway system would revert to the city, without any payment, after a lapse of 30 years, or could be taken over, at a fixed price, at periods of three years, after one year's notice, these periods to commence with 1907-08. In 1907 the city decided not to utilize the right, but this year the vote to purchase was carried by the small majority mentioned. The price to be paid will be settled by arbitration.

Under the existing franchise the city receives 5 per cent of the company's gross receipts, and also has a monopoly of supplying it with power at 4 cents per kw-hour. The profit from this latter arrangement amounted to more than $200,000 last year and the city's net income in 1909 from both sources amounted to about $300,000. The company now charges a uniform fare of 3 cents and gives free transfers. The maximum travel possible for a single fare, without transfer, is about 7 miles.

News of Electric Railways

Final Hearings on Projected Boston & Eastern Road

After proceedings lasting for about four years the hearings by the Massachusetts Railroad Commission upon the petition of the Boston & Eastern Electric Railroad Company for a certificate of exigency granting it the right to build a high-speed interurban line between Beverly and Boston were brought to a close on July 22, following three days of final evidence and arguments by counsel on each side. The principal feature of the closing days was an offer by the Boston Elevated Railway to take the passengers of the Boston & Eastern road at Porter Street, East Boston, and transport them through the East Boston tunnel to the heart of the city, there bringing them in touch with the extensive transfer facilities now in force and facilitating rapid transit to all parts of the metropolitan district.

Frederic E. Snow, counsel for the Boston Elevated Railway, stated that the capacity of the East Boston tunnel is far from utilized, and that the average number of passengers per car is at present only 30, while the seating capacity per car is 52. By completing the western terminus of the tunnel and building a loop at Scollay Square, the traffic capacity could be further increased. The Boston Elevated Railway objects to the entrance of any competing rapid transit line into the heart of the city, in view of its present large investments in subways and tunnels, and its committal to other large projects for the future.

Mr. Snow said that the company estimates that the East Boston tunnel can be extended, if necessary, to Porter Street, a distance of 1800 feet, at a cost of about $500,000. He contended that on account of the close connection of the East Boston tunnel with the existing elevated, subway and surface lines, the passengers coming into the city via the Boston & Eastern road would reach their destinations more rapidly in spite of the Porter Street change. If the Boston & Eastern line should terminate in Post Office Square, Boston, the time required to reach the Boston Elevated service would be more than that lost in the change at Porter Street. If the Boston Elevated road takes the passengers the new company would be saved an investment of about $2,800,000, which should enable it to reduce fares materially.

Woodward Hudson, for the New York Central Lines; B. N. Johnson, for the General Electric Company, and T. A. Babson, Corporation Counsel for the city of Boston, opposed the new road. Bentley W. Warren, counsel for the Boston & Northern Street Railway Company, reiterated his belief that the Boston & Eastern road could not operate profitably in the territory which it proposes to occupy. He contended that the establishment of the road should not be permitted unless the board was convinced that it will be a great public inconvenience not to have it. He filed 16 requests for rulings with the board, and urged that until the existing companies cannot or will not improve their facilities if so ordered by the board, the commission has no ground upon which to declare the necessity for the Boston & Eastern road.

William H. Coolidge, counsel for the Boston & Maine Railroad, spoke at length in opposition. He said that the Boston & Eastern road, with only $250,000 capital, asks the right to encumber all the titles to real estate in Boston and through Lynn and Salem to Beverly. He stated that the interest and taxes on the investment will amount to at least $700,000 per year. The gross earnings of the company must be at least $2,000,000 per year. The total passenger earnings of the Boston & Maine, the Boston & Northern, and the Boston, Revere Beach & Lynn roads in their competitive territory do not exceed over $2,000,000 per year. The existing territory is already served by 300 trains per day, and by electric cars every few minutes. The only theory upon which electrification can be justified, and the north and south tunnel built in Boston, is that Lynn, Salem and Beverly people will use the Boston & Maine Railroad. How can the money be raised, and who will buy the new securities which must be issued to pay for electrification and tunnels if a competitive road is justified? The State cannot have consolidation and monopoly of transportation facilities one year and destructive competition the next. Both Mr. Mellen and Mr. Tuttle say that short-distance suburban travel ought to be cared for by the Boston Elevated road and the trolley companies, but that the outer suburban traffic should be handled by the existing railroad companies.

A letter was filed with the board from C. S. Mellen, president of the New York, New Haven & Hartford Railroad, in connection with the contention of the petitioner that the New Haven suburban business at New York represented a liability rather than an asset. Mr. Mellen stated that to appreciate the company's position one must be familiar with the situation about New York City, its contracts for the use of the Harlem road for 12 miles out of the city, and for the use of the Grand Central terminal. The letter stated that it may well be that conditions which will make a business unprofitable about New York may not have any existence about Boston, unless, possibly, within the 10-cent fare zone. The letter concluded as follows: "Whether the business is profitable or not, there is an obligation upon the existing suburban routes that it shall be handled efficiently, and any policy which diverts the business from the existing routes, or prevents its increase to a very much greater volume than at present, simply prolongs the agony and loss to existing transportation lines, and it would seem to me the true policy should be to build up the business on existing lines until the volume of the same may overcome the loss now the result of rates made to attract volume and possible future profit."

The closing argument was made by C. S. Baxter, counsel for the Boston & Eastern company. He contended that the board was committed to a decision in the company's favor; that the East Boston tunnel proposition of the Boston Elevated Railway is unsuited to the plans of the new line for high speed service; that the ablest consulting engineers in the country have passed favorably upon the financial prospects of the new road, and that it will provide a service now given by no type of transportation agency in Massachusetts. The board took the case under advisement.

Strike Declared in Columbus, Ohio

Following a decision of the State Board of Arbitration, made public on the evening of July 23, in which most of the points were against the Columbus (O.) Railway & Light Company, preparations were made by the union men to walk out on the following morning, provided the company did not conclude to abide by the terms of the finding. The management of the company made known the fact that it would not accept the finding of the board, and at once posted notices in the car houses that the men would be expected to present themselves to take out their cars on July 24, and that if they did not do so they might consider themselves discharged.

Leaders of the union movement called a meeting to be held after midnight on the morning of July 24, and a vote was taken on the question of a walk-out, every man present voting for it. The time set for the walk-out was 4 o'clock that morning.

The State Board of Arbitration called for a meeting of representatives of the men and the company, with the idea of securing a settlement by asking both sides to yield points. However, the men appeared to be determined to strike, and the company was not willing to yield.

In order to prevent a repetition of the disorder that accompanied a former strike, Mayor Marshall conferred with Governor Harmon on the subject of help from the State troops if it should be found that the police force could not cope with the trouble. The Governor stated that he would be willing to furnish troops in case it becomes necessary.

The first day of the strike was one of decided disorder, but with little injury to property. The company kept 84 out of the usual 122 cars in operation through the day, but they were taken to the car houses in the evening. At some points the cars were stoned and the tracks obstructed, but

police officials in automobiles dispersed crowds and kept matters in fair shape. Several arrests were made, and one man will probably be compelled to stand trial for stoning a car, a penitentiary offense in Ohio. The car crews stood the hoots and yells of the strikers well, and but one or two minor accidents were reported. General Manager E. K. Stewart complimented the Mayor and the police department on the work of the first day, and stated that he would endeavor to operate all lines on schedule Monday.

Mr. Stewart stated that there are many men among the strikers whom the company would be glad to take back, if they would report at once for work.

The company has secured a number of men from Cleveland and other places. It has a sufficient number of men to operate the cars and will do so, as long as ample protection is afforded.

The cars were used by very few people during the forenoon on July 24, but in the afternoon it is said they were all comfortably filled. Reports from Columbus, Monday, stated that most of the lines were operated on schedule and that up to noon but little disorder had prevailed. The reports further stated that indications are that the company has the advantage, and that the men have not the support of the people.

The greater part of the last week was taken up by negotiations between the company and the union men over a proposition made by the latter on July 19 that the men would abide by the decision of the State Board of Arbitration without submitting any more evidence, if the officers would pledge the company to the same position. Several conferences were held between company officials and attorneys on one side and union committees and their attorneys on the other in an effort to arrive at some amicable understanding on this point, but without avail.

The hearing was concluded on July 21 and the members of the State Board of Arbitration spent the remainder of the week in going over the mass of evidence preparatory to making their report.

Attorneys for the men have asked Mayor Marshall to have City Solicitor Weinland file an injunction suit to prevent the company from declaring a lockout against the union men.

Judge Bigger nullified the ordinance requiring all motormen and conductors to have an experience of at least 10 days on the local lines by deciding that the city has no power or authority to enact such a law.

The hearing regarding the differences between the officials of the Columbus Railway & Light Company, Columbus, Ohio, and the representatives of the employers who claim that they were discriminated against was begun before the State Board of Arbitration on July 5, 1910. E. K. Stewart, general manager of the company, was the first witness.

Mr. Stewart explained the cause of the dismissal of some of the employees, but said he had not made any special effort to learn whether or not the men who had been discharged were members of a union. The company had employed several special policemen since the recent strike, as the city had not given the needed protection.

Witnesses for the men admitted on the stand that they did not know of any instances where officers of the company had attempted to intimidate employees who had joined the body organized among the men. L. G. White, superintendent of the company, stated that there was a general understanding among the officials that no discrimination should be practised.

Attorney Pomerene, for the company, stated that the company had a right to prepare for a strike, when the men continuously harass the company with threats to strike. On July 8 Mr. Stewart stated that George R. Whisner, superintendent of transportation, was in Cleveland, and that he may have arranged for a number of men to take places on the local lines, but that he did not know of any considerable number of men waiting to come to Columbus, as had been intimated by the attorneys for the employees. Mr. Stewart thought it well to be prepared for emergencies. Attorneys for the company stated that their witnesses will refute every charge made against the company. There has been no discrimination, the men dismissed were not discharged without cause, and as much protection is given union as non-union men. In short, there had been no trouble except what the men themselves have caused.

The greater part of the week commencing July 10, 1910, was spent in receiving testimony regarding alleged discrimination against men who had joined the organization formed among the men. A number of men who were called by the company were positive in their statements that no discrimination had been shown and that they had not been favored in any way. Superintendents, car house men and others also stated that they had been instructed that all employees were to be treated alike. Evidence was also submitted to show that infractions of the rules of the company resulted in the same discipline in all cases.

Transit Affairs in New York

H. H. Whitman, of counsel for the Public Service Commission, First District, has made application to Justice Bischoff, of the Supreme Court, to set aside the judgment given by Justice Brady by which a suit to recover $750,000 penalties from F. W. Whitridge, receiver of the Union Railway Company, was dismissed. Mr. Whitman advanced the same reasons which were stated by George S. Coleman at the first hearing before Justice Brady regarding the charges against W. R. Willcox, chairman of the commission, for contempt. This reason was that Justice Brady was disqualified to act because he held stock in the Third Avenue Railroad, which was interested in the Union Railway, and was in the hands of the same receiver.

Joseph H. Choate, Jr., attorney for Mr. Whitridge, opposed the application, stating that the interest of Justice Brady was very remote.

Justice Bischoff reserved decision and stated: "On the question of interest, where are you going to stop? If a stockholder of the Third Avenue Railroad is disqualified why not a creditor of this stockholder, or a creditor of a creditor? I think that as a matter of fact where there is any question of interest a judicial officer should not sit; and I think that was where Justice Brady made a mistake. But there must be some point at which the line should be drawn."

Justice Bischoff intimated that he would not allow this personal opinion as to judicial policy to enter into his consideration of the legal aspects of the case.

New Road Opened in Illinois.—The Woodstock & Sycamore Traction Company has placed its line in operation between Sycamore and Genoa. Gasoline motor cars are being used.

New Texas Road Opened—The Haskell (Tex.) Street Railway has been placed in operation. The line extends from the depot of the Wichita Valley Railroad at Haskell through the city for a distance of 2 miles. It is proposed to extend the line to Hemphill Park, a distance of about 5 miles.

The Cleveland Situation.—In response to an inquiry from Street Railway Commissioner Dahl, President J. J. Stanley, of the Cleveland Railway, has stated that the West Sixty-fifth Street crosstown line will be in operation within a few days and that the Lorain Street extension to the city limits, 1¼ miles, will be completed by Aug. 15. No arrangements have been made regarding new cars or betterments to the service, as nothing can be done until the company can secure a sufficient amount of funds to finance the improvements.

Engineering Question Box.—The American Street & Interurban Railway Engineering Association, through John W. Corning, 552 Harrison Avenue, Boston, Mass., secretary and treasurer, calls the attention of member companies and associate members to a mistake in the question box of the association for 1910, which was mailed on July 9. Under question 45, line 12 reads: "Equipment: Eight 25-ton cars, with four 160-hp motors per car." This line should read: "Equipment: Eight 25-ton cars, with four motors, 160 hp per car."

Data Sheet on Welfare of Employees.—H. C. Page, chairman of the committee on welfare of employees of the American Street & Interurban Railway Association, is sending out this week to the general managers of member companies Data Sheet No. 61, which contains a list of questions relative to the welfare work carried on by the railway companies. The questions are divided under the following

headings: Benefit associations, pension funds, savings funds, club rooms and care of injured employees. The material obtained, together with such other information as may be collected by the committee, will be used as a basis of the final report to be presented at the 1910 convention.

Interurban Terminal Station Proposed for Lafayette, Ind.—The franchise committee of the city council of Lafayette, Ind., has made a report regarding street railway conditions at that point, and has suggested the construction of an interurban terminal station at Lafayette. The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has taken up the matter with the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., with a view to the construction of a joint station at that point. J. Lovering Jones, president of the Ft. Wayne & Wabash Valley Company, has written a letter to the Mayor of Lafayette in which he states that he would like to talk over the question with the city authorities.

New Ordinance in Norfolk Before Committee of Council.—The finance committee of the City Council of Norfolk, Va., has taken up for consideration the new franchise ordinance of the Norfolk & Portsmouth Traction Company, to which reference was made in the Electric Railway Journal of July 23, 1910, pages 133 and 160. John Blair MacAfee, president of the company, said that the ordinance as drawn was submitted largely to supply a base from which to work. Mr. MacAfee filed with the committee a copy of the pamphlet referred to in the Electric Railway Journal of July 23, 1910. The committee has requested the company to reduce to the form of an ordinance the provisions contained in the tentative measure presented by Mr. MacAfee.

Annual Outing of Electric Club of Chicago.—The Electric Club of Chicago will hold its annual outing at Ravinia Park, on Saturday, Aug. 6. A special train will leave the Wells Street Station of the Chicago & Northwestern Railroad at 10:15 A. M. Various athletic sports and games will take place, and prizes will be given to the winners. Donations from electrical concerns are solicited as prizes, and should be sent to George H. Porter, Western Electric Company, chairman of the entertainment committee. Other committees are as follows: Finance, R. M. Van Vleet, J. G. Pomeroy; publicity, H. A. Mott, F. S. Hickok; athletics, W. S. Taussig, F. W. McClement; entertainment for ladies, Otis B. Duncan, W. R. Bonham, F. T. Wilbur; reception, William Carroll, W. L. Abbott, Robert E. Mitten, F. F. Skeel, Jas. H. Delaney and J. J. Schayer.

Attitude of Mayor of Philadelphia on Subway and Elevated Lines.—Officials of the Philadelphia Suburban Elevated Railway Company have issued a statement commending the attitude of Mayor Reyburn, of Philadelphia, concerning the construction of subway and elevated lines, requesting him to examine the plans of the company and make suggestions, and offering to furnish detailed information at any time to the committee appointed by the Mayor which now has under consideration a comprehensive subway plan. Mayor Reyburn announced that he would refuse to approve any franchise for the construction of subway or elevated lines until the investigation on the subject now under way on behalf of the city is completed and a comprehensive plan to serve as a guide for the arrangement of subways for the future has been prepared.

The Detroit Situation.—Mayor Breitmeyer, of Detroit, has proposed a new plan for settlement of the differences between the city and the Detroit United Railway. The suggestion is that a 15-year contract be executed providing for an increase of rental to $1,200 or $1,500 a day, the issue of six tickets for 25 cents throughout the day and universal transfers. Snagford Ladd, representing the Michigan United Railways, has appeared before the committee on franchises of the City Council of Detroit in connection with the application of that company for a franchise. Mayor Breitmeyer is quoted as having expressed his opposition to the entrance of a new company to the city streets, and to have repeated that what he desires is a settlement with the Detroit United Railway. Announcement has been made that the Michigan United Railways, if granted a franchise, will accede to two concessions which have been suggested on behalf of the city. The company, however, will exact the right to operate interurban cars into the city for a definite term of years.

Financial and Corporate

New York Stock and Money Market

July 26, 1910.

More than 100 of the more active issues on the Stock Exchange list reached new low levels for the year to-day. The selling movement which had been in progress for several days became insistent and was not checked. Large quantities of stock were offered and the liquidation of small holdings was very heavy. At the same time the bear element in the trading continued. The slump was the result of liquidation, forced and voluntary, and further bear selling. The traction issues have shared in the activity and have declined.

There is no appearance of tightening in the money market. The banks are overflowing with funds and rates are phenomenally low. Quotations to-day were: Call, 1 @ 2 per cent; 90 days, 4 per cent.

Other Markets

In sympathy with Wall Street, the Philadelphia market for the last few days has suffered from active liquidation. All traction securities have gone lower.

There has not been a great amount of trading in traction stocks in the Boston market. Massachusetts Electric and Boston Elevated shares have declined fractionally.

In the Chicago market there has been very light trading in traction issues. The market has been lower, in sympathy with the general movement to dispose of holdings, but traction securities, on account of inactivity, have been affected but slightly.

In Baltimore there continues to be considerable trading in United Railways shares, with prices practically unchanged at 14½ @ 15.

Quotations of various traction securities as compared with last week follow:

	July 19.	July 26.
American Railways Company	a42½	a42½
Aurora, Elgin & Chicago Railroad (common)	*52	a45
Aurora, Elgin & Chicago Railroad (preferred)	*86	82
Boston Elevated Railway	126	126
Boston & Suburban Electric Companies	a15	a15
Boston & Suburban Electric Companies (preferred)	a74	a74
Boston & Worcester Electric Companies (common)	*10½	a10
Boston & Worcester Electric Companies (preferred)	37	37
Brooklyn Rapid Transit Company	77¼	71⅜
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82½	80
Capital Traction Company, Washington	a130	a129
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a80	a75
Chicago Railways ptcptg., ctf. 2	a17	a15
Chicago Railways, ptcptg., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4s	a6¼	a5½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a74	a73
Consolidated Traction of N. J., 5 per cent. bonds	a103	a105
Detroit United Railway	*45	*45
General Electric Company	144	135¼
Georgia Railway & Electric Company (common)	a107½	a107½
Georgia Railway & Electric Company (preferred)	a87	a86
Interborough-Metropolitan Company (common)	17¾	15
Interborough-Metropolitan Company (preferred)	50¼	43
Interborough-Metropolitan Company (4½s)	80	78
Kansas City Railway & Light Company (common)	a25	a25½
Kansas City Railway & Light Company (preferred)	a79½	a79½
Manhattan Railway	128	128½
Massachusetts Electric Companies (common)	*15	a14¾
Massachusetts Electric Companies (preferred)	a80	a79
Metropolitan West Side, Chicago (common)	*23½	*23½
Metropolitan West Side, Chicago (preferred)	*58½	58½
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68½	65
Northwestern Elevated Railroad (common)	18	*18
Northwestern Elevated Railroad (preferred)	a65	*65
Philadelphia Company, Pittsburg (common)	a44	a42
Philadelphia Company, Pittsburg (preferred)	a43½	a43
Philadelphia Rapid Transit Company	a19	a16¼
Philadelphia Traction Company	*84½	*84½
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs	a99	a99
Seattle Electric Company (common)	a109⅜	a109
Seattle Electric Company (preferred)	a100	a99½
South Side Elevated Railroad (Chicago)	*72¾	a67
Third Avenue Railroad, New York	10⅜	8¼
Toledo Railways & Light Company	*7⅝	*7⅝
Twin City Rapid Transit, Minneapolis (common)	107½	106
Union Traction Company, Philadelphia	a45	a42
United Rys. & Electric Company, Baltimore	a14½	a14½
United Rys. Inv. Co. (common)	*30	*30
United Rys. Inv. Co. (preferred)	60¾	60¾
Washington Ry. & Electric Company (common)	a32½	a32½
Washington Ry. & Electric Company (preferred)	a88	a87
West End Street Railway, Boston (common)	a87	a88
West End Street Railway, Boston (preferred)	a100½	a100½
Westinghouse Elec. & Mfg. Company	*59	50
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. *Last Sale.

Annual Report of the Twin City Rapid Transit Company

Gross earnings of the Twin City Rapid Transit Company of Minneapolis, Minn., in the year 1909 were $6,969,776, an increase of $570,266 or 8.91 per cent as compared with the previous year. Operating expenses were $3,294,627, an increase of $128,571 or 4.06 per cent, while net earnings gained $441,695, or 13.66 per cent.

The comparative statement of revenues and expenses contained in the report does not give the details of revenues or expenses for 1908. An explanatory note states that the comparison is omitted because of the adoption on Jan. 1, 1909, of the new classification of accounts prescribed by the Interstate Commerce Commission. The figures as published are as follows:

RECEIPTS.	1909.	1908.
Revenue from transportation	$6,924,656	.....
Revenue from operation other than transportation	45,120	.....
Total operating revenue	$6,969,776	$6,399,510
EXPENSES.		
Maintenance of way and structure	$256,990	.....
Maintenance of equipment	345,753	.....
Traffic expenses	41,835	.....
Conducting transportation	2,038,577	.....
General and miscellaneous expense	611,472	.....
Total operating expense	$3,294,627	$3,166,056
Net revenue	$3,675,149	$3,233,454
Interest on debt and taxes	$1,466,527	$1,359,363
Surplus available for dividends and depreciation	$2,208,622	$1,874,091
Dividends preferred stock	$210,000	$210,000
Dividends common stock	1,055,250	1,005,000
Total dividends	$1,265,250	$1,215,000
Surplus from operation	$943,372	$659,091
Appropriated for renewals	703,000	544,000
Income account, surplus	$240,372	$115,091
Per cent total operating (including taxes and renewal appropriations) to total revenue	64.20	64.35

An increase of $157,414 in the charge for taxes, interest and dividends is divided as follows: Taxes, $69,024; bond interest, $38,140; dividends on common stock, $50,250. The increased charge on account of taxes includes $20,459 set aside to meet the new corporation tax levied by the United States Government. The increase in dividends is due to the advance in the rate of dividend from 5 to 6 per cent.

C. G. Goodrich, the president, states:

"The property has been maintained in the same high state of efficiency as heretofore. The amounts charged in this account for actual maintenance aggregated $523,499, an increase of $26,823 over the corresponding charge of last year. In addition there was expended for renewals, and charged against the renewal funds, the sum of $304,850. To this fund has been added, on account of depreciation during the year, the sum of $703,000 and interest on the invested renewal funds, amounting to $50,050. The renewal fund, at the close of the year aggregates $1,621,914, of which $1,173,500 is invested in the 5 per cent consolidated bonds of the company.

"The following statement shows the percentage that the appropriations for maintenance and renewals bear to the gross earnings during the last four years:

Year.	Maintenance and renewal.	Per cent of gross earnings.
1906	$917,253.34	16.25
1907	985,456.92	16.27
1908	1,070,475.56	16.73
1909	1,276,548.91	18.31

"The insurance fund has been increased during the year by $27,221, making a total now in the fund of $134,467. Of this amount, $107,000 is invested in the 5 per cent consolidated bonds of the company, and the balance is in cash ready for investment.

"An appropriation from surplus of $100,000 has been made to the contingent reserve fund, to which there was charged during the year $65,488.

"In our recent controversy with the City of Minneapolis, the right was claimed by the city to alter and amend the ordinance or contract under which the Minneapolis Street Railway Company was operating on the ground that said original ordinance or contract was forfeited when the company accepted the electric franchise granted it in 1890. Acting on this theory, an ordinance was passed by the city to compel the company to sell six tickets for 25 cents. The company at once brought suit in the Federal court to have the issue definitely decided. The decision of the Federal court was that our original ordinance was a contract which could not be altered or amended by the city, without the consent of the company thereto. The city thereupon carried the case to the United States Supreme Court. On Jan. 3, 1910, that court affirmed the decision of the lower court. By this decision the franchises of your company have been fully sustained. From the fact that the same question as to the St. Paul ordinance or contract was settled in 1904, the validity of the company's ordinances of contracts with the Twin Cities, or its right to charge a full 5-cent cash fare in each city cannot be further questioned."

The capital charges for new construction during the year amounted to $846,112, of which $327,916 was for car equipment.

Traffic statistics compare as follows:

	1909.	1908.	1907.
Revenue passengers carried	135,729,811	123,508,388	117,414,647
Transfers redeemed	44,124,296	39,830,225	35,261,823

Quarterly Earnings of New York City Companies

The Public Service Commission of the First District of New York has issued a statement comparing the earnings of the railways in New York City for the quarters ended March, 1910, and March, 1909. Following are the principal operating figures for several of the large properties:

QUARTERS ENDED MARCH 31, 1910, AND 1909.

System or company and year.	Railway operating revenue.	Railway operating Expenses.	Net revenue railway operations.	Gross income for corp. and leased prop.
Hudson & Manhattan:				
1910	$648,576	$261,110	$387,466	$563,771
1909	211,743	132,518	79,225	209,693
Interborough Rapid Transit:				
Elevated Div., 1910	3,791,067	1,605,651	2,185,416	1,811,999
Subway Div., 1910	3,814,203	1,226,028	2,588,175	2,614,582
Both Div., 1909	7,039,526	2,723,614	4,315,912	4,169,254
Brooklyn Rapid Transit:				
1910	4,866,796	3,167,713	1,699,082	1,476,704
1909	4,468,665	3,151,537	1,317,128	1,108,137
Metropolitan St. Ry.:				
1910	3,440,880	2,570,326	870,554	639,556
1909	3,317,241	2,302,424	1,014,817	703,344
Third Ave. Railroad:				
1910	1,871,934	1,231,529	640,405	567,492
1909	1,638,290	1,179,231	459,059	392,548
Coney Island & Brooklyn:				
1910	285,507	(a)209,949	(a)75,558	(a)56,201
1909	285,468	190,397	95,071	86,902
Grand Total, all companies:				
1910	19,221,923	10,788,008	8,433,915	7,721,980
1909	17,409,647	10,137,904	7,271,743	6,659,744

(a) Includes construction plant.

Belton & Temple Traction Company, Belton, Tex.—The court has confirmed the sale of the property of the Belton & Temple Traction Company under foreclosure to the representatives of the bondholders of the company.

Chicago (Ill.) Consolidated Traction Company.—Judge Grosscup, of the United States Supreme Court, has made public his finding in the controversy between bondholders of the Cicero & Proviso Street Railway Company and the Chicago Railways Company. C. G. Goodrich, president of the Twin City Rapid Transit Company, and George G. Moore, financial director of the Michigan United Railways, assisted Judge Grosscup in an advisory capacity in reaching the decision in this case. The finding is as follows: "1. We adopt the reorganization plan as made requiring that $381,000 of receiver's certificates be paid by the Chicago Railways Company in cash. 2. We adopt the reorganization plan in so far as it provides for the payment of the back interest by funding bonds. 3. We find the value of the Cicero and Proviso properties to be $1,260,000 instead of $1,150,000. 4. We divide the securities to be given the bondholders as follows: $630,000 of purchase bonds and $650,000 of funding bonds instead of $300,000 of purchase bonds and $850,000 of funding bonds as provided in the original plan." Judge Grosscup declared that the report was the independent judgment of himself and of both of his advisors.

Charleston (S. C.) Consolidated Railway & Lighting Company.—This company has formally acquired, under a 99-year lease, dated June 21, 1910, the property of the Charleston Consolidated Railway, Gas & Electric Company. The lease provides for payment of interest on the outstanding bonds and rentals sufficient to pay dividends of 6 per cent on $500,000 of preferred stock and on the $1,500,000 of common stock as follows: 4 per cent to July 1, 1911; 5 per cent to Jan. 1, 1913, and 6 per cent thereafter.

Dartmouth & Westport Street Railway, New Bedford, Mass.—The Dartmouth & Wesport Street Railway has called for payment on Oct. 1, 1910, at the office of the International Trust Company, Boston, Mass., at 105 and interest the $90,000 of first mortgage 20-year 5 per cent bonds of the company dated 1895. The Railroad Commission recently authorized the company to issue $237,500 additional capital stock at $150 a share to retire these bonds and to pay for improvements.

Eastern Ohio Traction Company, Cleveland, Ohio—The segregated parts of the Cleveland & Eastern Traction Company, the property of which was sold under foreclosure recently, will be operated by the Cleveland & Eastern Traction Company and the Cleveland, Youngstown & Eastern Railway. The officers of both companies are H. P. McIntosh, president; H. Clark Ford, vice-president; Robert D. Beatty, secretary and general manager, and C. A. Taylor, treasurer. The directors with one exception are also identical. For the Cleveland & Eastern Traction Company they are H. P. McIntosh, H. C. Ford, A. Harman, W. D. Reese, Henry White and W. N. Bates. For the Youngstown & Eastern Railway the directors are the same except that E. W. Moore replaces W. D. Reese. The capital stock of the Cleveland & Eastern Traction Company has been increased from $10,000 to $1,100,000.

Interborough-Metropolitan Company, New York, N. Y.—It has been announced that the subject of the retirement of a portion of the Interborough-Metropolitan Company's $67,825,000 of 4½ per cent collateral trust bonds will be brought before the directors of the company for consideration at their meeting in September, 1910.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has filed a formal order authorizing the discontinuance of two suits commenced by William W. Ladd, receiver of the New York City Railway, against the Metropolitan Securities Company and the Interborough-Metropolitan Company. The recommendations of Judge Lacombe regarding the settlement of these suits were referred to in the Electric Railway Journal of July 16, 1910, page 125.

New Hampshire Electric Railways, Haverhill, Mass.—A dividend of 1½ per cent has been declared on the preferred stock, payable on July 30 to holders of record July 20. This dividend compares with the payment of 1 per cent semi-annually since July, 1908.

New York, New Haven & Hartford Railroad, New Haven, Conn.—A list of shareholders of this company, as of April 1, 1910, shows the Adams Express Company as the owner of 34,730 shares. The Pennsylvania Railroad Company held 34,900 shares on the date named, but has since acquired nearly 25,000 shares additional. The New England Navigation Company held 172,946 shares. The Mutual Life Insurance Company of New York owned 35,640 shares. Peter C. Dolan, of Pittsfield, owned 1000 shares.

Power, Transit & Light Company, Bakersfield, Cal.—Control of the Power, Transit & Light Company is said to have passed to interests identified with the San Joaquin Light & Power Company, Fresno, Cal., through the purchase of the holdings of John Martin, San Francisco, Cal., and Frank Drum, Oakland, Cal., in the Power, Transit & Light Company.

Springfield (Mass.) Street Railway.—The Springfield Street Railway has petitioned the Railroad Commission for approval of the agreement for the purchase of the franchise and property of the Springfield & Eastern Street Railway. Under the agreement the shares of the Springfield Street Railway are to be exchanged share for share with the Springfield & Eastern Street Railway, and the capital stock of the former company is to be increased $900,000.

Traffic and Transportation

Cash Bonuses in Washington

On July 1, 1908, the Capital Traction Company, Washington, D. C., adopted the merit system to govern the department of motormen and conductors and to stimulate and encourage the employees in performing their duties promptly, faithfully and intelligently. In accordance with the provisions of that system the company has recently distributed among 311 employees the sum of $18,825 which was earned by them in performing their duties faithfully during the year which ended on June 30, 1910. Originally the employees were divided into three classes, A, B and C, as follows: Class A, comprising all men who had served the company satisfactorily for two years. Class B, comprising all men who had served the company satisfactorily for five years. Class C, comprising all men who had served the company satisfactorily for 10 years. On July 1, 1908, Class X was created, to comprise all men who had served the company satisfactorily for one year.

Awards of bonuses are made among the members of the various classes, as follows:

For each additional year of good and efficient service members of Class A receive as a gratuitous reward $50 until they have served five years, and thereby become eligible to membership in Class B.

Members of Class B receive for each additional year of good and efficient service $75 until they have served 10 years, and thereby have become eligible to membership in Class C.

Members of Class C, for each additional year of good and efficient service, under like conditions, receive $100.

Members of Class X receive $25, and at the completion of a year of service become eligible to Class A.

The awards are made by a board of three members, consisting of the president of the company, the second vice-president and general manager, and the superintendent of the particular division to which the employee belongs. An employee renders himself ineligible to receive the reward if within the year the record charges him:

1. With six reprimands for violations of the rules or regulations severally of the company; or
2. With two reprimands for the violation of the same rule or regulation, and three reprimands for the violation of the rules and regulations severally; or
3. With one suspension and two reprimands for the violation of the rules and regulations severally; or
4. With two suspensions; or
5. With continued indifference and inattention in service, without a positive violation of rule or regulation when said inattention or indifference has been called to his attention at least three times within the year by the general manager.

Dismissal, of course, forfeits all opportunity for reward.

To make the action of the board which bestows the rewards more certain the following rules were adopted to apply to the violation of rules governing operation:

1. A violation or breach of rule or regulation, governing operation, but not causing accident or loss, shall subject the offending conductor or motorman to reprimand.
2. A second violation or breach of the same rule or regulation will subject the offender to suspension.
3. A third violation of the same rule or regulation will subject the offender to dismissal.
4. A violation or breach of rule or regulation, governing operation, and causing accident in the loss of life, injury to person or destruction of property, will subject the offender in the discretion of the company to suspension or dismissal, and when such violation or breach is attended by evidence of gross carelessness or recklessness, or a wilful disregard of the employee's obligation to the company or to passengers or to the public, the offender shall be dismissed from the service.
5. A violation of two or more different rules or regulations governing operation will in the discretion of the company be punished by reprimand, suspension or dismissal, according to the number of offenses and their gravity.

The following rules were adopted to apply to the violation of rules and regulations governing the conduct and

deportment of conductors and motormen, and their treatment of passengers:

1. A violation or breach of any rule or regulation, governing the conduct of conductors and motormen in their relation to the company, or to passengers, or to the public while on duty will for the first offense entail reprimand, for the repetition of the same offense suspension, and a third breach of the same rule or regulation will in the discretion of the company be punished by dismissal.

2. A breach of several different rules regulating conduct will, in the discretion of the company, be punished by reprimand, or suspension, or dismissal, according to the number and gravity of these offenses.

3. Continued indifference in the performance of duty, half-hearted service, or unsatisfactory conduct, will subject the offender to reprimand, suspension or dismissal.

4. The use of intoxicants while on duty, or intoxication at any time, dishonesty, false statements or disloyalty to the company, are severally offenses that will in all cases incur immediate discharge.

Under the conditions which these rules impose 72 men in Class A received $100 each for the year ended June 30, 1910; 66 men in Class B received $75 each; 94 men in Class A received $50 each, and 79 men in Class X received $25 each. The following letter was addressed by George E. Hamilton, president of the company, to each of the men who participated in the rewards:

"Under the merit system you were entered in Class —, whose members become eligible for —— dollars for a year of continuous good and efficient service.

"It is our pleasure to inform you that for the year ending July 1, 1910, your record, according to the report of the board of awards, entitles you to receive the sum of—— dollars, and accordingly a check for that amount is herewith enclosed, together with a receipt, which you will please sign and return.

"In making this communication, I desire to urge upon you the necessity of a strict compliance with the rules and regulations of the company, and a uniform and polite attention to the traveling public. The awards made, in addition to wages paid, evidence the desire of the company to deal fairly and liberally with its employees, and to reward and encourage efficient service. This action on the part of the company should strengthen in you the desire and effort to raise the standard of service of the Capital Traction Company to the highest level possible. Obedience to the regulations, care in the handling of cars, and strict attention to passengers will enable you to co-operate with us in the accomplishment of the end desired."

On July 1, 1909, the total number of conductors and motormen in the service of the company was 624, of whom 382 were in the classified service. Sixty-seven men were dropped from the classified service during the year for various reasons, leaving 315 men in this service on June 30, 1910, 311 of whom received bonuses. On July 1, 1910, there were 701 men in the employ of the company, of whom 445 are in the classified service and eligible for bonuses on July 1, 1911, provided their records merit it.

Trolley Freight Franchise Granted in Worcester, Mass.—The Board of Aldermen of Worcester, Mass., has granted the Worcester (Mass.) Consolidated Street Railway a 20-year franchise to carry freight on its lines in Worcester.

Near-Side Stops at Intersections in Baltimore.—The ordinance which has been in effect in Baltimore for some time providing that street cars shall stop on the far side of intersecting streets has been amended recently. It is now provided that cars shall stop on the near side of streets where railways intersect. The amendment went into effect on July 7, 1910.

Seats on Elevated Station Platforms.—The Chicago City Council, on July 18, passed an ordinance requiring every elevated railroad in the city to provide seating accommodations for patrons on the outside platforms at all stations. The ordinance goes into effect immediately after its approval, and provides for a fine of not less than $50 or more than $200 per day for each failure to provide seating accommodations.

California Company Increases Wages of Its Employees.—The Central California Traction Company, San Francisco, Cal., has announced an increase in wages of its employees. The trainmen on the Stockton lines will receive 27 cents an hour, an increase of 2 cents an hour over the previous wage schedule. The men on the interurban division, between Stockton and Lodi, will receive 28 cents an hour, an increase of 1 cent an hour.

Increased Transfer Privileges on Berkshire Street Railway.—Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, has given notice that the Berkshire Street Railway will grant transfers between New Lenox and Lenox. With the transfers granted in Lenoxdale this makes a 5-cent fare in the town of Lenox. The company will not grant the request for a 10-cent fare from Lenox to Pittsfield. The fare between these points will remain 15 cents.

New York Commission Asked to Reduce Fare.—The New York Public Service Commission, Second District, has received a complaint from the board of trustees of the village of Wappingers Falls and various residents of that village against the Poughkeepsie City & Wappingers Falls Electric Railroad Company as to alleged poor service and exorbitant rate of fare charged between Wappingers Falls and Poughkeepsie. The petition asks for a reduction in fare to daily patrons of the road.

Prevention of Accidents—The paper on the prevention of accidents which was presented by E. F. Schneider at the meeting of the Central Electric Railway Association at South Bend, Ind., on March 24, 1910, was read before the members of the Stone & Webster Club of Washington at their last meeting by J. M. Wilmot of the Seattle Electric Company at the request of A. L. Kempter, president of the club. The paper has also been reprinted in full in *The Live Wire*, which is published by the Seattle Electric Company.

Illinois Traction System, Champaign, Ill.—The Illinois Central Railroad is considering an arrangement whereby the Illinois Traction System will operate passenger cars for the former company between Decatur and Monticello, if it will electrify its line between those two points. At present the two lines are competing between those two points, and if the arrangement is finally made the Illinois Central road will receive all the freight business, while all the passenger business will go to the traction line.

Long Excursion Train on South Shore Route—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., on July 10, 1910, operated successfully an 11-car train carrying an excursion party of 900 people from Pullman, Ill., to Hudson Lake, Ind., a distance of 61 miles. The train was in charge of W. O. Woodward, traffic manager of the company. The multiple-unit equipment of the Chicago, Lake Shore & South Bend Railway operates with single-phase current at 6600 volts. The 11-car train was made up of six motor cars and five trailers, and the crew consisted of a motorman, a conductor, a collector and a flagman.

Signs at Fire Crossings in New York.—The receivers of the Metropolitan Street Railway, New York, N. Y., have applied to the president of the Borough of Manhattan for permission to erect warning signs for passengers at crossings over which fire apparatus is operated. The design for the proposed signs has been approved by the Municipal Art Commission. It calls for a post 7½ ft. high, bearing a board with the words: "Fire Street; Cars Stop This Side." Engines going to and from a fire always pass through certain cross streets, and the city traffic regulations require cars to stop on the "near" side at "fire" crossings instead of the "far" side.

Indianapolis & Louisville Traction Company Encourages Trade Relations—The Indianapolis & Louisville Traction Company is encouraging traffic relations between the towns of Southern Indiana and Louisville. R. J. Thompson, of the traffic department of the company, in behalf of the Louisville Commercial Club, invited the Merchants' Association of Seymour, Ind., to visit Louisville this fall as the guests of the commercial organization and the invitation has been accepted. It is likely that the representatives from Seymour will be entertained during the State Fair. They will go to Louisville in a special car of the Indianapolis & Louisville Traction Company.

Traffic and Fare Ordinances Passed in Tacoma.—The Municipal Commission of Tacoma has passed an ordinance which provides that the Tacoma Railway & Power Company, Tacoma, Wash., shall operate a sufficient number of cars on all lines between 6 a. m. and 9 a. m. and 4 p. m. and 7 p. m. to provide a seat for each passenger from whom a fare is demanded. Persons who desire to be transported shall not be required to wait longer than 10 minutes for a car in which there are vacant seats, according to the ordinance. The commission has also passed an ordinance to prohibit the company from charging more than 5 cents fare to any part of the city. Penalties of $50 and $100, respectively, are provided for violation of the new ordinances.

Standing Passengers in Syracuse.—Walter W. Magee, Corporation Counsel of Syracuse, N. Y., says that the Common Council of that city has no authority under the franchise granted to the Syracuse Rapid Transit Company to compel the company to increase its facilities. He says that the Council has recourse to the Public Service Commission of the Second District if it feels that the facilities afforded by the company are in any way inadequate. Mr. Magee says in part: "It is the duty of a street railway to provide reasonable accommodations for the transportation of persons over its lines. Each person riding upon its cars should be provided with a seat, and a failure of the company to do so would be a breach of contract; but, if no seat is available, such person can stand in the aisle of the car or upon the platform thereof, if permitted to do so by the company; and such person in consenting to ride in such manner waives the right to a seat; and upon refusal to pay a fare the company could lawfully eject him from the car."

Hearing on Revere Transfers.—The Massachusetts Railroad Commission recently gave a hearing on the petition of residents of Revere for a 5-cent fare on the Boston & Northern Street Railway between Revere and Lynn. The petitioners contended that as a 5-cent fare prevails on the main line of the company, free transfers should be given to points on the branch lines within the town. The petitioners also desired the company to build a loop at Ocean Avenue, Revere, to facilitate car movements. Bentley W. Warren, Boston, Mass., counsel for the company, stated that the loop would cost at least $20,000, and that the company does not consider the expense warranted. The company could not afford to grant a free transfer to provide a 5-cent fare to Lynn, as it is already carrying much traffic in Revere at a loss. If one branch line was given free transfers, all the rest would have the same opportunity to ride at reduced cost. No figures were offered by the company, but Mr. Warren stated that it stands ready to submit any statistics which the commission may desire in connection with the case. The board then took the matter under advisement and closed the hearing.

Report of Montreal Street Railway Mutual Benefit Association.—The report of the Montreal (Que.) Street Railway Mutual Benefit Association for the year ended April 30, 1910, as presented at the annual meeting of the association held on June 22, 1910, shows that $14,075.50 was received from members for fees and dues, $15,476.53 was received from the company, and $13,864.88 was received from a picnic, interest on investments and interest on bank deposits. As there was an accumulated reserve from preceding years of $54,237.84, the total revenue for the year was $97,654.75. The expenses of management were $30,898.73, making the surplus for the year $12,518.18, and the total accumulated reserve $66,756.02. The following statement made in the report shows the extent of the relief work of the association during the year: Number of members disabled through sickness or injury, 705; number of visits made by physicians to disabled members, 1205; number of consultations given by physicians to disabled members, 6131; number of prescriptions issued, 5103; amount paid for sickness and injury, $8,874.90; amount paid for medicine, $1,614.85; amount paid for pensions, $289.50; amount paid for withdrawals, $99.70; amount paid for death and burial insurance, $12,183.35. W. G. Ross, president, calls attention to the fact that the amount paid out in death and burial benefits is almost double that paid out in the preceding year, and is almost equal to the total amount received from the members in fees and dues for the period.

Personal Mention

Mr. E. E. Rollins, vice-president of the Kankakee (Ill.) Electric Railway, has also been elected secretary of the Kankakee & Western Electric Railroad, Kankakee, Ill., to succeed William Fraser, deceased.

Mr. Allison P. Lathrop, president of the American Light & Traction Company, New York, N. Y., has been elected president of the Milwaukee (Wis.) Gas Light Company to succeed Mr. Emerson McMillin, now chairman of the board of directors.

Mr. Arthur J. Wolfe has been appointed chief engineer of the Scioto Valley Traction Company, Columbus, Ohio, to succeed Mr. Julian Griggs, resigned. Mr. Wolfe has been connected with the Scioto Valley Traction Company since its organization and located the tracks when the line was built. Later, when the road was extended to Chillicothe, he was made resident engineer at Kingston, and following that was made assistant engineer, which position he has held for four or five years. As chief engineer of the company Mr. Wolfe will have his headquarters in Columbus.

Mr. M. A. Coffey has been appointed superintendent of transportation of the West Penn Railways, Pittsburgh, Pa., to succeed Mr. J. W. Brown, who has resigned to become superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Chicago, Ill. Mr. Coffey has been connected with electric railways for 20 years. He was connected with the Cumberland Railway, Carlisle, Pa., for seven years, and for 13 years was superintendent and manager of the Pittsburgh, McKeesport & Greensburg Railway, Greensburg, Pa. When the latter railway was merged with the West Penn Railways Mr. Coffey was continued as superintendent.

Mr. H. N. Hurt, who resigned recently as superintendent of transportation of the Georgia Railway & Electric Company, Atlanta, Ga., entered the employ of the Atlanta Consolidated Street Railway as a civil engineer on May 1, 1891. At that time there was only one street railway in Atlanta equipped with electricity. The rest were operated by horses. For two years after entering the service of the company Mr. Hurt was engaged in equipping dummy and horse car lines with electricity. On May 1, 1893, he was made superintendent of transportation of the company and continued in that capacity until quite recently. Prior to entering street railway work Mr. Hurt was connected with steam railroads in Alabama, Florida, Kentucky and Georgia.

Mr. J. P. Clark has been elected vice-president and general manager of the Piedmont Traction Company, Charlotte, N. C., which is building an electric railway from Charlotte to Spartanburg, S. C. Mr. Clark also holds the same position with the Greenville, Spartanburg & Anderson Railway, which owns the Anderson (S. C.) City Railway, and operates an interurban line from Anderson to Belton. An extension of this line is now under construction from Belton to Spartanburg, and other points in South Carolina. This company is closely allied with the Piedmont Traction Company, and will form a part of the system. In taking charge of these properties, Mr. Clark has retained his financial interests in the Michigan United Railways, and is still one of the vice-presidents of that company. Mr. Clark has been connected with electric railways for the past 20 years. During that period he has been with Stone & Webster, Boston, Mass., and has been active in the management of a number of properties.

Mr. H. B. Nichols, engineer of way of the Philadelphia (Pa.) Rapid Transit Company, has been appointed chief engineer to succeed Mr. W. S. Twining, who has resigned. Mr. George B. Taylor has been appointed engineer of way to succeed Mr. Nichols. Mr. C. B. Voynow and Mr. Thomas K. Bell have been appointed assistant engineers of way. Mr. Bell began his business career with Isaac A. Shepard & Company, Baltimore, Md., and retained this connection for eight years, passing through the various branches of the iron industry. After this experience he completed a course at Maryland Institute, graduating in 1890. After graduation he spent one year with the Pittsburgh Locomotive Works, in general engineering work, and then one year with R. D. Wood & Company, Camden, N. J.,

on special hydraulic tool and machine work. In 1893 he entered the employ of William Wharton, Jr. & Company as draftsman, and in 1899 was made chief draftsman. About 1904 he was made chief engineer of the company. In 1906 he resigned to become chief engineer for the Interstate Railways, Philadelphia.

Mr. Nelson Graburn has resigned as master mechanic of the Montreal (Que.) Street Railway to engage in the railway supply business in British Columbia. Mr. Graburn served an apprenticeship with the Canadian Pacific Railway as mechanical engineer from 1881 to 1887, when he became connected with the Edison Electric Illuminating Company, Brooklyn, N. Y. In 1899 he resigned from the latter company to take the students' course in electric railway work at the Lynn works of the Thomson-Houston Company. After completing this course Mr. Graburn was sent to Canada by the General Electric Company to look after contracts. He resigned this position to become assistant electrical engineer of the Montreal Street Railway. In 1894 Mr. Graburn was appointed electrical engineer and assistant superintendent of the Montreal Street Railway, and in 1899 he resigned from the company to become consulting engineer of the Compagnie Générale de Traction, Paris, France. Subsequently the electrification of the Alexandria & Ramleh Railway, Alexandria, Egypt, was carried out under his supervision. Mr. Graburn re-entered the service of the Montreal Street Railway as master mechanic in September, 1904.

Mr. V. F. Fabian has been appointed assistant superintendent of the Western Massachusetts Street Railway, Westfield, Mass., to succeed Mr. William Walker, who as previously announced in the ELECTRIC RAILWAY JOURNAL has been appointed assistant superintendent of the Milford, Attleboro & Woonsocket Railway, Milford, Mass., and the Interstate Consolidated Street Railway, North Attleboro, Mass. For several years Mr. Fabian, who is 28 years old, was in the employ of the Northern Pacific Railway in various departments at St. Paul, Minn., Fort Dodge, Ia., and Livingston, Mont. He resigned from the Northern Pacific Railway to become secretary to Mr. L. S. Storrs, president of the New England Investment & Security Company. Mr. Fabian desired to become versed in the management of electric railways and in April, 1909, was appointed dispatcher on the Worcester & Blackstone Valley Street Railway and the Uxbridge & Blackstone Street Railway with headquarters at Uxbridge, Mass. From January, 1910, until he was appointed assistant superintendent of the Western Massachusetts Street Railway, Mr. Fabian was connected with the power station and track department of the Worcester (Mass.) Consolidated Street Railway.

Mr. Philander Betts was appointed on July 19 chief engineer of the Board of Public Utility Commissioners of New Jersey. Mr. Betts is a resident of Hackensack, although he has been acting as consulting engineer and expert in Washington for several years, and is also assistant professor of electrical engineering at George Washington University. He graduated in 1891 from the electrical course of Rutgers College, New Brunswick, and later entered the employ of the Field Engineering Company, New York, for whom he superintended the electrical equipment of roads in Newark and Philadelphia. In June, 1893, he became associated with the Westinghouse Electric & Manufacturing Company, for whom he equipped railway power stations at Hazleton, Pa., Gloucester, N. J., and other cities. While on this work he carried on many tests on power consumption, the effect of grades, curves, etc., which he embodied in a thesis for which Rutgers College gave him the degree of Master of Science, in 1895. While in Washington he has been engaged as expert principally in electric lighting and electric power distribution problems, a large part of it being for the Washington Railway & Electric Company, for whom he has also done expert work in the electric railway field. He is a member of the Washington Society of Engineers, of the A. I. E. E., and is chairman of the Washington section of the latter organization. He is also a member of the Illuminating Engineering Society and of the Society for Promoting Engineering Education. He was the author of an article in the ELECTRIC RAILWAY JOURNAL of March 12, 1910, on the reconstruction of one of the electric lines in Washington.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Fairview & Oklahoma City Railway, Oklahoma City, Okla.**—Chartered in Oklahoma to build a 4½-mile railway from Fairview to Rusk. Capital stock, $100,000. Incorporators: O. E. Snyder, Oklahoma City, president; H. A. Noah, Alva, secretary; M. M. Fulkerson, Alva, treasurer; W. D. Bowling, H. A. Bower, H. Clay Willis, all of Fairview, vice-presidents.

***Norristown Transit Company, Harrisburg, Pa.**—Incorporated in Pennsylvania to build a 4-mile electric railway in Norristown on Swede Street, Airy Street and Marklay Street to the Borough line and return by the Old Swede Road. Capital stock, $25,000. Incorporators: Charles E. Ingersoll, president; Penllyn McAllister, St. Martin's; G. H. Frazer, Jenkintown; E. B. Smith, Cwynedd Valley; Gerland Holsman, Philadelphia, and H. S. Farquhar, Bryn Mawr.

FRANCHISES

San Francisco, Cal.—The United Railroads has been granted permission by the Board of Public Works to lay its tracks on Presidio Avenue from Jackson Street to California Street.

Carterville, Ill.—The Egyptian Traction Company, Eldorado, has been granted a 50-year franchise by the Council to build an electric railway in Carterville. It has also been granted a similar franchise by the Councils of Carbondale and Dorrisville. The company will ask for franchises in Marion and Crainville. This is part of a plan to build a proposed 100-mile railway to connect Mt. Vernon, Ind., and Murphysboro, Ill. T. E. K. Hixon, Eldorado, general manager. [E. R. J., July 9, '10.]

Chicago, Ill.—The Chicago City Railway has been granted a franchise by the Council to build the Riverdale extension from Gardner's Park to the city limits at 138th Street. A franchise was also granted this company for an extension of the Stony Island Avenue line north to Fifty-sixth Street.

South Holland, Ill.—The Eastern Illinois Railway, a subsidiary company of the Consolidated Railways, Chicago, has asked the Village Board of South Holland for a franchise to build a railway in South Holland.

Milford, Ind.—Omar Neff, Milford, has been granted a franchise by the County Commissioners to build an interurban railway from Bremen to Mishawaka via Woodland. [E. R. J., May 21, '10.]

Baltimore, Md.—The United Railways & Electric Company, Baltimore, has been granted a franchise by the Baltimore County Commissioners to extend its Monument Street line to Orangeville.

Egremont, Mass.—The Berkshire Street Railway, Pittsfield, has asked the Council for a franchise to build a railway in Egremont. A similar franchise will be asked by the company at Great Barrington. This is part of a plan to build an extension of this railway from the end of the line at Great Barrington to South Egremont, a distance of 4 miles. It is expected that work will be soon started.

Springfield, Mass.—The Springfield Street Railway has been granted a franchise by the City Council to build an extension of the St. James Avenue line to connect with Chicopee.

Auburn, N. Y.—The Auburn & Syracuse Electric Railroad, Syracuse, has been granted a franchise by the Common Council to double-track its line in East Genesee Street, Auburn, thereby insuring the early construction of the proposed cut-off between Skaneateles and Auburn. The work of double-tracking will be started immediately and that of building the cut-off some time early next year.

Corning, N. Y.—The Corning & Painted Post Street Railway has been granted a franchise to double-track its railway in Corning.

Albany, Ore.—The Albany Interurban Railway has been granted a franchise by the Council to build an electric railway over certain streets in Albany. This proposed railway

will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. P. A. Young is interested. [E. R. J., May 14, '10.]

Eugene, Ore.—The Oregon Electric Railway, Portland, will ask the City Council for a franchise to build an extension of its lines through Eugene. It is the intention of this company to build to Eugene.

Butler, Pa.—The Pittsburg, Butler, Slippery Rock & Grove City Railway, Butler, has been granted a franchise by the Supervisors of Brady Township to build its lines in Brady. Franchises have been granted to this company by the Supervisors of Slippery Rock, Mercer, Pine and Liberty. J. A. Smith, Butler, secretary. [E. R. J., Apr. 30, '10.]

***Norristown, Pa.**—The Norristown Transit Company has been granted a franchise to build an electric railway on Swede Street, Airy Street and Markley Street in Norristown. The franchise also gave permission to construct elevated tracks from Schuykill River at Swede Street to Penn Street.

Waynesburg, Pa.—The Waynesburg & Blacksville Street Railway has been granted a certificate of extension by the Secretary of State to extend its lines from Waynesburg via Rogersville, Rutan, Graysville and Crow's Mill to the West Virginia State line, a distance of 26 miles; also from Graysville to Wheeling Creek and Templeton's Fork, thence across the divide near West Finley and to the State line, a distance of 12 miles; also from Waynesburg via Grimes to Ruffs Creek. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., May 14, '10.]

Bellingham, Wash.—The Bellingham-Skagit Railway has asked the City Council for a franchise to build an electric railway in Bellingham. This is part of a plan to build an interurban railway to connect towns in Bellingham and Skagit County. Chas. M. Drummond, president. [E. R. J., June 18, '10.]

Seattle, Wash.—The Seattle, Renton & Southern Railway will ask the City Council for a franchise for a line on Stewart Street and to eliminate certain rights from its original franchise.

***Romney, W. Va.**—Ira V. Cougill and R. P. Monroe have asked the County Court of Hampshire County for a 50-year franchise to build an electric railway between Romney, W. Va., and Winchester, Va., via Augusta, Pleasant Dale, Hanging Rock and Canopy Bridge, Hampshire County, to the Virginia and West Virginia State boundary.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company has nearly completed preliminary arrangements for building a new line between Los Angeles and Pasadena.

San Joaquin Valley Electric Railway, Stockton, Cal.—This company is reported to have secured financial backing for building its proposed 32-mile railway to connect Stockton and Modesto. It is expected to eventually continue this line to Fresno. Morris L. Brackett is interested. [E. R. J., May 14, '10.]

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—It is stated that this company, which recently opened its line between Grand Junction and Fruita, will extend it the entire length of the Grand River Valley.

Augusta-Aiken Railway & Electric Company, Atlanta, Ga.—It is announced that Redmond & Company, New York, N. Y., who have closed a deal for the holdings of the E. H. Harriman estate in the stocks and bonds of this company and allied properties, propose to build an interurban electric link from Atlanta, Ga., to Columbia, S. C., via Augusta, a distance of 280 miles. It is stated that preparations for extending the line will be started without delay.

Chicago, Ill.—It is stated that bids will soon be called for to remove columns on the elevated structures and other changes to permit the installation of several new through routes on the surface lines.

Decatur Southern Traction Company, Decatur, Ill.—The stockholders of this company will hold a meeting Aug. 31 to vote on an increase of capital stock from $25,000 to $1,500,000, and to mortgage the property and issue bonds. H. C. Simmons, Virden, secretary. [E. R. J., July 23, '10.]

Freeport, Ill.—W. T. Raleigh, Freeport, promotor of a proposed electric railway to connect Freeport, Polo and Dixon, has revived interest in the project and it is probable that surveys will soon be started. [E. R. J., June 5, '10.]

***Palatine, Ill.**—The amount necessary to insure the building of a proposed electric railway from Palatine through Lake Zurich to Wauconda has been subscribed and it is said surveys for the line will be made this fall. Power will be obtained from the North Shore Electric Company.

***Springfield & Central Illinois Traction Company, Springfield, Ill.**—Isaac A. Smith, Bank of Commerce Building, St. Louis, Mo., promoter of this company, announces that surveys will soon be started and right-of-way obtained for this projected 225-mile interurban railway to connect Springfield, Pawnee, Morrisonville, Hillsboro, Coffeen, Greenville, Carlyle and Centralia. A branch line will be constructed from Coffeen connecting Vandalia, Kinmunday, Flora and Mount Carmel, and another connecting Greenville, Alhambra, Edwardsville and East St. Louis.

Mississippi Valley Interurban Railway, Springfield, Ill.—This company has started grading on its new extension from Rochester to Pawnee.

Sioux City (Ia.) Service Company.—This company reports it has now under construction 1½ miles of new track.

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—It is reported that this company will let contracts about Sept. 1 for building this projected 60-mile railway to connect Louisville and Mammoth Cave. There will be two steel bridges and a water power station at Green River. J. M. Richardson, president. [E. R. J., July 23, '10.]

***Louisville, Ky.**—A company has been organized to build a line from Louisville, Ky., to French Lick, Ind., with the expectation that the farmers and business men along the line will assist financially in the undertaking. The intention at present is to operate with the McKeen motor car. The line, as now laid out, will touch Paoli, Chambersburg, Hardinsburg, Fredericksburg, Palmyra, Greenville, Galena, Mooresville, New Albany and other points.

Bangor Railway & Electric Company, Bangor, Me.—This company is making surveys for an extension of the Hammond Street division from its present terminus at Fairmont to Northern Maine Junction in Hermon.

Hampden Railway, Springfield, Mass.—This company, recently incorporated to build a 25-mile railway between Springfield and Bondville, with a spur to Holyoke, advises that it will petition the Board of Railroad Commissioners for a certificate of exigency as soon as the necessary preliminary arrangements, etc., have been completed. This line will connect with the Massachusetts division of the Boston & Maine Railroad at Bondsville, and will also connect with the New London Northern, a division of the Grand Trunk System near Bondsville. A. D. Robinson is one of the directors. [E. R. J., July 16, '10.]

Owosso & Corunna Electric Company, Owosso, Mich.—This company, it is said, will lay new rails over the whole line with the exception of the paved district of Owosso.

Twin City & Lake Superior Railway, Minneapolis, Minn.—This company, it is stated, has secured financial backing and will soon resume construction of its proposed 130-mile electric line to connect Minneapolis and Duluth. It will be a third-rail line and power will be obtained from the St. Louis River.

St. Joseph & Savannah Railway, St. Joseph, Mo.—This company has let the contracts to the J. H. Flick Construction Company, Chicago, for building its proposed 15-mile railway between St. Joseph and Savannah. The bridges will include one pile trestle 500 ft. long and 50 ft. high, and nine smaller trestles from 14 ft. to 56 ft. long. John H. Van Brunt, St. Joseph, president. [E. R. J., June 25, '10.]

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—According to a statement of D. C. Nevins, president, this company is said to have floated an issue of $15,000,000 in bonds in Paris for the construction of its line. It is expected that construction will be started soon. The line as projected will connect St. Louis and Kansas City via Blue Springs, Oak Grove, Odessa, Higginsville, Marshall, Arrow Rock, New Franklin and Columbia, tapping the coal fields of Missouri. Power houses are to be built near the coal fields. D. C. Nevins, president. [E. R. J., June 18, '10.]

***Dakota, Neb.**—M. O. Ayres, Dakota, and associates have raised $2,000, which will assure the building of a 5-mile electric railway from Dakota to Sioux City, Ia.

Hudson Valley Railway, Glens Falls, N. Y.—This company has been granted permission by the Public Service Commission, Second District, to exercise a franchise granted in Saratoga Springs, whereby the Glens Falls division is connected with the Waterford division. The company is allowed to construct its track over the Boston & Maine Railroad at grade, provided it constructs and maintains a trolley trough and derails in its track.

Columbus, Mt. Vernon & Mansfield Railway, Columbus, Ohio.—It is said that the capitalization of this company will be increased to $2,000,000 within a short time and that authority will be secured to issue a like amount of bonds. More than one-fourth of the bonds have already been subscribed. J. M. Adams is interested. [E. R. J., July 23, '10.]

Tri-State Traction Company, Steubenville, Ohio.—This company reports it expects to rebuild about 1 mile of track in Wellsburg, W. Va., this summer.

Berlin & Bridgeport Electric Street Railway, Berlin, Ont.—This company reports it has recently contracted for material to build a new iron bridge 105 ft. long over the Grand Trunk Railway.

Berlin & Waterloo Street Railway, Berlin, Ont., Can.—This company reports it will purchase during the next six weeks derail and interlocking apparatus. V. S. McIntyre, Berlin, general superintendent.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company advises it expects to soon complete 3½ miles of track to Pain Court, Dover Township, Ont., Can., and also to build a 50-ft. steel bridge over the new Government dredge cut in Dover.

Hamilton, Waterloo & Guelph Railway, Hamilton, Ont.—This company is reported to be securing financial backing for its new lines between Hamilton and Berlin and Hamilton and Guelph. John Patterson, general manager.

Albany (Ore.) Interurban Railway.—This company, recently incorporated, has completed surveying and construction will soon start on its proposed 85-mile electric railway to connect Albany and Sweet Home, thence across the foothills to Holly and down through the Calapooia valley, reaching Albany again via Brownsville, thereby completing a circle. The enterprise is financed by local capital, and the officers are: P. A. Young, president and general manager; Geo. H. Crowell, secretary; A. C. Schmitt, treasurer; W. H. Davis, M. J. Cameron and W. A. Barrett.

Berwick & Nescopeck Street Railway, Berwick, Pa.—This company reports it expects to place contracts during the next 4 weeks for building from 4 to 8 miles of new track.

South Dakota Interurban Railway, Centerville, S. D.—This company has filed with the Secretary of State an amendment to its articles of incorporation, increasing the capital stock from $1,000,000 to $2,000,000. The company proposes to make Chamberlain on the Missouri River its western terminal, instead of Bijou Hills, which has been the terminal under the provisions of its original charter. While no construction work has been done on this line, the promoters have been busy securing right of way and completing other preliminary work. W. E. Miller, Bijou Hills, president. [E. R. J., July 9, '10.]

Tennessee Traction Company, Memphis, Tenn.—This company has completed preliminary surveys and is securing right-of-way for its proposed 210-mile railway from Memphis to Jackson. It is expected to raise the capital stock of the company from $50,000 to $1,000,000. Geo. E. Busnell, Memphis, general manager. [E. R. J., Apr. 9, '10.]

Vancouver (Wash.) Traction Company.—This company has recently completed and placed in operation a 6-mile extension from Vancouver to Sifton.

Mount Adams Railway, White Salmon, Wash.—This company is said to have awarded the contract to the Northwest Engineering & Construction Company for surveying its proposed 40-mile electric railway to connect White Salmon, Bingen, Bristol, Pine Flat, Snowden, Timber Valley and Glenwood. Work will be started at once. Theodore F. Shepler, general manager. [E. R. J., June 18, '10.]

Sheridan Railway & Light Company, Sheridan, Wyo.—This company is said to have completed preliminary arrangements for its proposed 13-mile interurban railway in Sheridan. Albert Emanuel and Wm. Sullivan, Conover Building, Dayton, Ohio, are promoting the line. [E. R. J., May 21, '10.]

SHOPS AND BUILDINGS

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company advises it expects to soon place contracts for building a combination freight and passenger station at Elkhart, Ind., also one at Niles, Mich. Work is to be started shortly.

Bowling Green (Ky.) Railway—This company states it is now building a new concrete car house at Bowling Green. H. D. Fitch, president.

Louisville & Eastern Railroad, Louisville, Ky.—This company advises it has just placed contracts for building a brick fireproof sub-station in Louisville. Richard Meriwether, Louisville, Ky.

Vicksburg (Miss.) Traction Company.—This company reports that during the next 6 months it will build a car house and repair shop in Vicksburg. W. B. Moorman, Vicksburg, general manager. [E. R. J. Apr. 2, '10.]

Public Service Railway, Newark, N. J.—This company has awarded a contract to the S. D. Hyde Company, New York, for building a new car shed at Clinton Avenue, Spring Street and Elm Street, West Hoboken. The structure will be 200 ft. x 220 ft. and will be constructed of steel, brick and wood. It will house 80 cars. The cost is estimated to be $75,000.

Chickasha (Okla.) Street Railway.—This company, it is reported, will soon build a car house at the corner of Nineteenth Street and Dakota Avenue, Chickasha. The structure will be 25 ft. x 100 ft.

Du Bois Electric & Traction Company, Du Bois, Pa.—This company reports that it will place contracts during the next 4 weeks for building an addition to its car house and repair shop in Du Bois. [May 28, '10.]

POWER HOUSES AND SUBSTATIONS

Sioux City (Ia.) Service Company.—This company states it has under construction a new boiler room in Sioux City. All material is contracted for.

Louisville & Eastern Railroad, Louisville, Ky.—This company states it has recently purchased two 500-kw rotary converters with necessary switch boards, transformers and lighting arresters from the Westinghouse Electric & Manufacturing Company.

Western Massachusetts Street Railway, Westfield, Mass.—This company is making additions to its power plant in Emery Street, Westfield, which will double the capacity of the plant. It will install a new boiler, generator, condenser and engine.

Vicksburg (Miss.) Traction Company.—This company states that during the next 6 months it expects to purchase coal-handling machinery for its plant in Vicksburg. W. B. Moorman, Vicksburg, general manager.

Southwest Missouri Electric Railroad, Webb City, Mo.—This company expects to soon build a substation in which it will install a 500-kw, 25-cycle rotary, transformer and switch board. A. H. Rogers, Webb City, general manager.

Buffalo & Depew Railway, Depew, N. Y.—This company reports it has just installed three 110-kw transformers, and it is now using power from the Niagara, Lockport & Ontario Power Company.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company is said to be considering plans for extensive improvements to its power plant on Madison Avenue, Elmira. F. M. Reynolds, chief engineer.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has awarded a contract to Westinghouse, Church, Kerr & Company, New York, N. Y., for the construction of an 11,000-hp reserve station on the Jordan River, near the company's present transformer station and steam plant. The cost of the new plant will be between $600,000 and $750,000.

Manufactures & Supplies

ROLLING STOCK

Bowling Green (Ky.) Railway will purchase at once two 20-ft. closed cars.

Bangor & Portland Traction Company, East Bangor, Pa., is considering the purchase of a snow plow.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., will build two cars in its own shops.

Northampton (Mass.) Street Railway has ordered three 28-ft. 8-in. cars from the Wason Manufacturing Company.

East St. Louis & Suburban Railway, East St. Louis, Ill., has ordered one 12-bench open car from the Danville Car Company.

Connecticut Company, New Haven, Conn., has placed an order with the Wason Manufacturing Company for nine 8-wheel snow plows.

St. Joseph Railway, Light & Power Company, St. Joseph, Mo., has purchased five 30-ft. closed pay-as-you-enter cars from the American Car Company.

Columbus Railway & Light Company, Columbus, Ohio., has ordered seven 31-ft. 6-in. closed pay-as-you-enter cars from the G. C. Kuhlman Car Company.

Norfolk & Bristol Street Railway, South Walpole, Mass., expects to purchase one or two double-truck car bodies and trucks, also one double-truck snow plow.

San Antonio (Tex.) Traction Company has ordered four semi-convertible, double truck, pay-as-you-enter cars, 28 ft. 10 in. long, over all, from the American Car Company.

Portland Railway, Light & Power Company, Portland, Ore., has placed an order with the American Car Company for 30 28-ft. 8-in. closed pay-as-you-enter cars and 10 31-ft. 6-in. cars of the same type.

Monterey & Del Monte Heights Railway, Monterey, Cal., which has under construction a 4½-mile line between Monterey and Seaside, is planning to purchase three electric trolley or storage battery cars.

Calgary (Alta.) Street Railway, noted in the Electric Railway Journal of June 18, 1910, as having ordered three semi-convertible cars from the Ottawa Car Company, Ltd., has specified the following details for these cars:

Seating capacity.....44	Bumpers .....channel steel
Weight (car body only), about 20,000 lbs.	Car trimmings.....Ottawa
	Control system.....West.
Length of body....33 ft. 6 in.	Couplers ..Ottawa standard
Over vestibule.....45 ft. 6 in.	Curtain fixtures....Forsythe
Width over sills..8 ft. 4¾ in.	Curtain material...pantasote
Over posts at belt...8 ft. 6 in.	Fenders .....Providence
Sill to trolley base.....9 ft.	Hand brakes.....Peacock
Height from top of rail to sills .....37 in.	Heating stystem, Consolidated
Body .....wood	Headlights ....Crouse-Hinds
Interior trim...cherry finish	Sanders .....Ottawa
Underframe .....composite	Seats ..... Ottawa
Air brakes....Can. G. E. Co.	Seating material.....rattan
Bolsters, body.....Ottawa	Scrapers .....Root
Bolsters, truck.....Brill	Step treads .....Stanwood
Brakeshoes .....Brill	Trucks, type....Brill 27-G-1

TRADE NOTES

Ford, Bacon & Davis, New York, N. Y.—R. L. Crump has rejoined the engineering force of Ford, Bacon & Davis and is attached to the New Orleans office of the firm.

John F. Schurch, chief clerk to the president of the Minneapolis, St. Paul & Sault Ste. Marie Railway, has been elected treasurer of the Railway Materials Company with office in the Old Colony Building, Chicago, Ill.

Jeffrey Manufacturing Company, Columbus, Ohio, is changing the location of its Denver office from 1711 Tremont Place, and after Aug. 1 will occupy a commodious suite of rooms in the First National Bank Building.

Theodore G. Empie, Wilmington, N. C., a large dealer in ties, southern white cedar poles and other timber, advises that he is obliged to move his stock within 40 days, owing to the sale of the property on which his yards are located. He will dispose of his present stock, which includes about 10.000 poles from 25 ft. to 55 ft. in length, at cost.

Berry Brothers, Ltd., Detroit, Mich., manufacturers of varnish, conducted a most successful convention of their managers and salesmen at Detroit on July 6-8. Some 65 of their traveling force, many accompanied by their wives and daughters, attended. While business matters naturally received the principal attention of those present, a most agreeable social program was also followed, including boat trips and a banquet.

Chamberlain & Howell, Chicago, Ill., is a new firm of consulting engineers. It is formed by Paul M. Chamberlain, who has been engaged as consulting engineer at the Marquette Building, and Sylvester S. Howell, formerly with the Underfeed Stoker Company, American Blower Company, Green Fuel Economizer Company and other corporations. The firm pays special attention to the design of new power plants, improvements of old plants and general power-plant engineering.

Griffin Wheel Company, Chicago, Ill., has purchased a plot of 15 acres in Los Angeles as a site for a new factory. The plant will be located at Fifty-fourth Street and Santa Fé Street, and will consist of four buildings. The foundry will employ nearly 300 men, and will cost, it is estimated, $200,000. It will be reached by the Southern Pacific Railroad, and the Atchison, Topeka & Santa Fé Railroad. The company will manufacture car wheels at this plant to supply its Pacific coast trade hitherto supplied from its plant at Denver.

Edgar Allen American Manganese Steel Company, Chicago, which is preparing to manufacture manganese steel castings of every description, is organizing its selling department since its purchase for manufacturing purposes of the Chicago Heights works of the American Brake Shoe & Foundry Company and the New Castle, Del., plant of the Tropenas Steel Company. Associated with the company in its manufacturing department are steel experts who have had many years of experience in the successful manufacture of manganese steel castings for all classes of service, and the management feels that with modern, well-equipped plants, whose product is already favorably known, the purchaser is assured of prompt delivery and excellent castings. The executive and general sales offices will be at 193 Michigan Avenue, Chicago. W. S. McKee, general sales manager, will be located there. In addition to these offices the various sales agencies which had been established by the manganese steel department of the American Brake Shoe & Foundry Company will now represent this new company. The locations of these agencies are as follows: V. W. Mason, Jr., eastern sales agent, 30 Church Street, New York, N. Y.; P. M. Vilas, 425 New York Life Building, Minneapolis, Minn.; A. T. Herr Supply Company, 414 Ideal Building, Denver, Colo.; F. E. Johnson, 605 Newhouse Building, Salt Lake City, Utah; J. W. Plant, 644 Monadnock Building, San Francisco, Cal., and Carl Clausen, Bisbee, Ariz.

ADVERTISING LITERATURE

Nelson Valve Company, Philadelphia, has issued a two-leaf folder describing the construction of its gate valve.

G. Drouve Company, Bridgeport, Conn., is mailing a folder describing and illustrating its straight-push sash operator.

Richard J. Flinn, West Roxbury, Mass., has issued a circular which describes and illustrates the Flinn differential steam trap.

Emil Calman & Company, New York, N. Y., have issued a 36-page catalog describing various kinds of insulating varnishes and compounds.

The J. G. Brill Company, Philadelphia, Pa., has issued a catalog entitled Six-Wheel Truck, No. 27-M. C. B. The publication is being distributed among and is intended principally for steam railroad men. It also contains a description, with numerous illustrations, of the Brill half-ball brake hanger.

Jesse C. Coogan, Milwaukee, Wis., has issued bulletin No. 5, which describes the Coogan system of hot water heating for shops, factories, mills, institutions and groups of buildings. Among other installations of the Coogan hot water system is one which was made last year in the large new car house of the Utah Light & Railway Company, Salt Lake City, Utah.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, AUGUST 6, 1910 No. 6

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 6, 1910

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Increase in Commutation Rates in New York

The steam railroad companies entering New York which announced increases in their commutation fares two months ago put these rates into effect on Aug. 1. There was a delay of a month at the request of the Interstate Commerce Commission which decided, however, not to interfere at present, but stated that it might order decreases in fares later in individual cases where proof was offered that the rates were too high. Naturally, there has been some grumbling among commuters at the higher prices charged for tickets, but as a whole the increases have been accepted without serious opposition, confirming the statement which we made editorially in our issue of Oct. 31, 1908, immediately after the collapse of the Mayor Johnson's 3-cent fare enterprise in Cleveland, that the first desire of the public, not only in Cleveland but elsewhere, is for good service and not a low rate of fare. The commuters around New York realize that the operating expenses of all the railroad companies have increased during the past few years and that most of them have also greatly bettered their service through the installation of expensive improvements. Hence the increases in fare are accepted as a legitimate result of the present era of higher prices.

Rowdyism in Cars

If a street railway almanac should be prepared along the lines of those traditionally used by farmers, the months of July and August would undoubtedly contain the admonition "about this time look out for rowdyism." We do not know whether the warm weather brings the spirits of the average hoodlum to a state of ebullition until they boil over, or relaxes the feelings of restraint which at other times keep him within the bounds of propriety. At any rate he is very apt, especially when returning from a Sunday afternoon baseball game or an evening's outing, to show disregard for the feelings of his fellow passengers by acts of rowdyism which are anything but pleasing to others on the car. If these performances are confined, as they often are, to the last car or last few cars at night, an effective way of stopping them is to assign to these cars conductors who are able physically to keep order, supplementing them on certain cars, when necessary, with an officer of the law. Complete success, however, depends upon the attitude which the courts take in regard to such disorderly cases. Last summer there seemed in New York and Brooklyn to be an epidemic of turbulence of this kind. Arrests, followed by lectures and fines, did but little good until the judges commenced to sentence offenders to 30 days in the workhouse when the practice abruptly stopped. This year there were evidences of a recurrence of the trouble, but the courts had learned the best medicine in the pharmacopeia to cure the disorder and have applied it in a number of cases, so that its efficacy has been demonstrated again this year. It is warranted to cure if administered promptly and often.

Unprofitable Suburban Extensions

In these days when the limit of the 5-cent fare has been stretched to the breaking point, it behooves electric railways to beware the blandishments of the suburban realty operator. Even offers from the latter to defray the construction cost of a desired extension should not blind the railway to the fact that a line which does not show even a reasonable prospect of earning its operating expenses is not worth construction. An extension made to satisfy contiguous house-to-house growth is an entirely different matter from building through several miles of non-revenue territory to Lonesomehurst. Special caution should be exercised in cases of the latter kind. If the new suburb is directly in line with the growth of the better-class sections of the city, it is reasonable to hope that the gap eventually will be bridged, and the average length of haul reduced while the traffic increases. On the other hand, if the new suburb can be reached only through a manufacturing or slum district people will be discouraged from moving out of the city, partly on account of the slow, unpleasant ride and partly because with the growth of the city they feel their residences will be less desirable. We have in mind several instances where erroneous developments of this kind have proved a heavy burden on the railways.

Riot and Disorder in Columbus

The striking trainmen of the Columbus (Ohio) Railway & Light Company and their sympathizers lost no time in resorting to assault upon life and property, but, although the State troops have been in Columbus since July 28, they seem to have been unable, for some cause not entirely clear in the dispatches, to repress disorder. This fact is a reflection upon the worth of the public officials who with the force at their disposal should have been able to have safe-guarded the peace of the community. Equally responsible with these delinquent officials in such cases are the vicious and turbulent among the public who seize upon occasions of this kind to gratify their desire for murder and destruction of property, but the ultimate responsibility must be placed upon those in authority who fail to repress the lawless element with force. It is upon their representatives, the public authorities, that the majority of the people, incommoded and worried by the conditions of siege that they see, depend for enforcement of the law. If this majority becomes tired of the indifference which it finds in its chosen representatives and uprises in its indignation, political expediency will be less of a consideration than it is at the present time. The issue is plainly drawn and no especial keenness of understanding is required for appreciation of the fact. In the main the question in Columbus now is whether the cars shall be operated. Both the corporation and the traveling public desire the maintenance of the regular service. That they desire also protection while patronizing the service is merely a statement of the fact that they desire life, not death. The striking employees or their sympathizers, however, determined to prevent operation of the cars, collection of revenue by the company and comfort for the public, promote turbulence so successfully that they create a temporary condition of terrorism which satiates their instincts with dangerous pride. Present conditions in Columbus are an unwholesome advertisement of the city and their rapid betterment is a problem to which the authorities will do wisely to devote themselves before further overt acts on the part of the rioters cause greater disgrace.

PRECAUTIONS WITH HIGH-VOLTAGE DIRECT CURRENT LINES.

In spite of the continual discussion regarding the relative merits of alternating and direct current for long railway lines, both are making sufficient headway to enable the engineer within a few years to get adequate data on both systems. Meanwhile the direct-current system at 1200 volts or higher is making material progress, as reference to our columns during the past year will readily show. Lines of this type are mostly longer interurban lines using overhead conductors and with substations spaced at far more liberal distances than are feasible with the lower voltages. The increase in the number of systems of this character necessarily brings to the operators a new class of precautions to be taken both in the upkeep of the rolling stock and in the line of construction. Doubling the customary working pressure means either the development of new insulating material for overhead work or the lessening of the factor of safety on the old insulating material. The use of 1200 or 1800 volts imposes far greater strain on insulation than has heretofore been usual.

As to the motors themselves, they are apparently made secure against the increase without great difficulty; nevertheless, there is increased possibility of failure of insulation and particularly increased possibility of commutator troubles, which superintendents of rolling stock will have duly to look out for. The change probably means a somewhat more elaborate and thorough system of motive power inspection than is now necessary. Car wiring should be and is carried out with greater precautions and must be correspondingly followed up. Abrasion which could go until the next trip at 600 volts should be attended to immediately at 1200 or 1800. Controllers in good condition to the eye of the ordinary inspector may not be so against the persuasive influence of increased voltage. It is proper, therefore, to direct sharp attention to these points, because while it is absolutely certain that 1200 or 1800 volts can be made to give good results for railway purposes, it is equally certain that there are possibilities of failure not directly due to the motors themselves which can be avoided by close attention and not otherwise. It would indeed be a pity to see a high voltage direct-current system get a black eye from lack of suitable inspection.

The same caution to an equally great degree must be extended to the overhead construction. It is safe to assume that this construction will initially be planned to take care of the extra voltage comfortably. It is not so sure that the necessary vigilance will be kept up in operation. The chances of a short circuit at high voltage are somewhat increased and if there is any falling off in the character of the overhead work short circuits are pretty likely to come. This is specially true in case of systems which are in close relation with urban systems at termini, where undesirably large amounts of the older forms of spare parts are available.

The higher voltage, too, is distinctly dangerous and this is one of the things regarding which the operating foremen must be thoroughly instructed. Five hundred or six hundred volts is as it were on the border line of serious risk. There have been a good many fatal accidents first and last with even this lower voltage, but they are sufficiently in the minority to make linemen and employees generally somewhat careless of them. In working with a tower wagon, for example, conditions which would be perfectly safe at 500 volts would involve at least a

risk of nasty shocks at 1800. A fallen wire at the higher pressures involves very real dangers, and employees should be brought to understand them and to feel as do employees on other high-tension lines that they are dealing with real danger which can be only obviated by reasonable amount of care that must never under any circumstances be forgotten. Unless caution is inculcated there is certain to come with increase in number with these very useful high-voltage roads an increase of accidents to persons and of failures in operation which would tend to discourage development which might otherwise most usefully go on.

BELL SIGNALS FOR CITY AND INTERURBAN CARS

Last year it was considered important that the codes of city and interurban rules should agree in all particulars affecting in any way the operation of city and interurban cars over joint city tracks. This applied especially to such details as communicating bell signals and the 1908 interurban code rule was amended to make it conform to the long-established practice prescribed in the city code rule. In recommending the adoption this year of the wording and numbering of the American Railway Association code rules, the committee on interurban rules sanctions a set of communicating signals very different from those now in universal use on street railway cars. If it is still important that the interurban and city codes should agree on this point at least—either the city code rule should be revised accordingly or the present interurban code rule should be let alone. We believe that there has been no change of opinion on the part of managers of city lines over which interurban cars operate that the bell signals used on all cars should be the same. We are also convinced that the use of one code of signals while running on city tracks and another code on interurban tracks is unwise and tends to create confusion and cause accidents. Men who have been trained on a car for years obey bell signals by instinct rather than as the result of deliberate thought. Instinct cannot be changed at the city limits.

It would be unreasonable to ask the city companies to change their signals merely to permit the interurban companies to use a code of steam railway signals intended for use with air signals and long trains. The city companies employ probably 90 per cent of all the electric railway trainmen in the country and their established and perfectly satisfactory practice in this detail of operation is entitled to first consideration. The communicating bell signals included in the 1909 interurban code meet all ordinary requirements, while the steam railway signals which it is proposed to substitute provide no communicating signals from the motorman to the conductor, and contain at least one entirely superfluous signal used in testing air brakes on long trains. At times it is necessary for the motorman of an electric car to communicate with the conductor on the rear platform. The most serious objection to the steam railway signals, however, is the use of three bells as a signal to stop at the next station. This is the emergency stop signal in general use and its adoption as a regular stop signal on interurban cars might cause serious accidents through misunderstanding. The code of communicating signals is a simple but vital detail of the rules, which should not be changed offhand to conform to steam railway practice merely because it may be desirable to adopt other parts of the steam code.

SCIENCE IN TRANSPORTATION METHODS

The president of a steam railroad which was considering the question of the electrical equipment for some of its suburban lines recently expressed considerable incredulity at the claim of an electrical engineer who was making a report on the proposed electrical equipment of the road that many if not most of the operating details, after the contemplated change, could be determined very closely in advance. It did not seem possible to a man schooled in steam railroad methods, as was this executive, that anyone could predict from a given line, number of cars and composition of train the exact amount of power which would be required to operate each train at different speeds and at different points on the line, or to calculate closely the amount of fuel consumption and cost of power station operation for a given schedule. It is safe to say, however, that no electric railway installation of any magnitude or importance is now undertaken until a careful study has been made of the future engineering conditions and that the preliminary figures thus determined usually coincide very closely with those subsequently found in practice.

This application of scientific principles in electric railway engineering, whether related to construction or operation, is so common as to excite little surprise except when observed for the first time by one who has not been particularly in touch with electric railway matters, like the president of the steam railroad already mentioned. But if we should carry our investigations further we doubt whether the same scientific exactitude in the determination of the relations which exist between cause and effect would be found as generally present in the transportation department as in the engineering department in spite of the fact that the expenses of the transportation department are about 40 per cent of the entire expenses of the average road. Probably this condition is due largely to the fact that the engineering department has to deal with materials and forces which are amenable to well-known physical and mechanical laws, whereas the transportation department is concerned principally with men whose motives and actions cannot easily be reduced to mathematical formulas. It may in part also be due to the fact that the relations of cause and effect being more complicated under circumstances of this kind sight is sometimes lost of the fact that there is any connection between them. We believe, however, that the larger economies of the future for electric railway companies lie principally in the transportation department and that, at least for the present, the same application of thought, scientific analysis and experience in that field will have a greater effect on the total efficiency of the system than when exerted in the engineering department.

For example, we believe that rule of thumb or guesswork methods have no more place in the work of drafting a schedule for different days than in designing a power station or in laying out a feeder system. The power lost in operating an unnecessary amount of dead mileage or of empty car seats is just as serious a drain upon the treasury of the company as the escape of an excessive amount of combustible gases through the stack of the power station or the loss of heat units through the inefficient operation of a condensing apparatus. In a sense the loss in power is much more serious when caused in the way outlined, because it has then undergone several conversions and has reached its final form at the car wheel.

ELECTRIC LOCOMOTIVE PROBLEMS

While remarkable progress has been made in the design of heavy high-speed electric locomotives, both in this country and in Europe, the builders of these machines have by no means exhausted the possibilities of new wheel arrangements, driving mechanisms and general proportions in their efforts to create an ideal type. The locomotives which have been built up to the present time have all been in the nature of experiments, and from their performances many lessons have been learned and some theories upset. There still exist wide differences of opinion among engineers regarding some of the fundamental details of electric locomotive construction, and these differences will not be reconciled until further experiments are made and the disputed points cleared up by the success or failure in actual trials of some of the designs which are now in process of development on the drawing board and in the shops. It is a costly method of acquiring knowledge and experience for each new design represents the expenditure of not less than $100,000 before it can turn a wheel to demonstrate the correctness of the principles embodied in its construction.

The riding qualities of a new design are perhaps the most difficult to predict accurately in advance of its trials. Not all engineers are agreed that a high center of gravity is essential for easy riding. In the discussion of Messrs. Storer and Eaton's paper before the American Institute of Electrical Engineers last month Frank J. Sprague stated emphatically that the hard riding of the original New York Central locomotives was not due in any way to their low center of gravity, but rather to the absence of sufficient resistance in the pony truck centering springs to prevent nosing. He attributed the nosing effect to the tendency of a pair of coned wheels to travel from side to side on the top of the rails. The effect of a high center of gravity is to cushion the side shocks on the rail when the wheels are displaced laterally by some defect in the track. Whether the shocks produced even by a low center of gravity locomotive from this cause approach in magnitude the side stresses due to nosing and centrifugal force is open to question.

The cause of nosing by electric locomotives does not seem to have been satisfactorily explained by any one. The same effect in steam locomotives has been generally conceded to be caused by the reciprocating motion of the side rods and the unbalancing of the piston effort on the two sides of the cylinder saddle, but this explanation would not apply to an electric locomotive. It has appeared in the long, rigid wheelbase locomotives of the New York Central and in short, coupled bogie truck designs, but it has not proved serious in the case of long cars mounted on two centrally pivoted trucks, such as are operated at high speed in interurban and subway service. In the discussion of this phenomenon the effect of angular drawbar pull does not seem to have been considered. The New York Central locomotives have a length over buffers of 37 ft., which offers a moment arm of 18 ft. 6 in. for side pressure on the drawbar, tending to revolve the mass of the locomotive about its central vertical axis. The drawbar pull is intermittent and in running around a curve has an appreciable lateral component. This component acting with a long lever arm could easily set up destructive harmonic vibrations in a horizontal plane. A symmetrical wheelbase would materially assist the amplifying of these vibrations to a dangerous degree. With short coupled bogie trucks the center of rotation would be about the center pin of the rear truck and the lever arm would be shorter, but still long in proportion to the moment arm of the mass in front of the rear truck. The lever arm is very short in comparison with the moment arm of the car body mass in the case of a long double-truck car, and hence the lateral component of the drawbar pull would have little, if any, effect.

The wheel arrangement of an electric locomotive seems to affect the riding qualities and influences the size, location and driving mechanism of the motors. The Pennsylvania Railroad high-speed tests indicated that an unsymmetrical wheel arrangement, such as is used in an "American" type steam locomotive, produced less nosing and the high center of gravity obtained by mounting the motors above the frames eased off the side shocks due to lateral displacement of the wheels from track defects. Two pairs of driving wheels of large size are well adapted for side-rod drive with a single large motor mounted on the frame above them. Geared or gearless motors of moderate size can be used with almost any wheel arrangement, but the limited space between frames and the fact that the motors are in an inaccessible place for inspection and repair are disadvantages. The latest proposed form of drive is a combination of the side-rod drive and the geared drive. This affords a very flexible arrangement suitable for one or more motors of any type and for any number of driving wheels. The motors can be mounted above the frames and by the use of reduction gearing they can be operated at higher speeds, resulting in reduced weight and first cost. The gears are on the outside of the frames and a large gain in the width of the motor over the width available with a side-rod drive is possible. The gear teeth also can be made wide enough with this arrangement to keep the unit pressures well within safe working limits. A locomotive with this type of drive has been built in Austria for a track gage of only 2 ft. 6 in. Each of the two single-phase motors is of 275 hp, geared down in the ratio of 1:2.9 and coupled to three pairs of driving wheels, 31½ in. in diameter. The efficiency of this form of drive should be fairly high and its maintenance should not be excessive as there are no torsional stresses involved which would tend to wear the gears or the rod bearings.

MAINTAINING MULTIPLE-UNIT CONTROL EQUIPMENT

On account of its relative complexity, multiple-unit control apparatus often presents considerable annoyance to shop officers and employees charged with its maintenance. Everyone concerned with this type of equipment desires to anticipate troubles as far as possible by close inspection and proper adjustment, but the best method of procedure is often difficult to determine. In a discussion of this subject before a group of car-house foremen not long since, the advocates of inspection on a time basis made a strong plea in its favor. The work is now handled by two different shops at opposite ends of the system; the cars have to be kept separate in relation to the shops and the mileage of the individual cars varies greatly, some running 80 or 90 miles per day and others making over 200 miles every 24 hours. With daily inspection, it is not difficult for one man to look over 30 or 40 cars, but all the control apparatus is blown out by compressed air before the inspection begins. If an inspector comes across a job that will take so long as to interfere with the rest of his work an extra man is put on the task. The general shop foreman of this company

advocated inspection on a time basis, and pointed out in defense of this plan that breakage rather than wear should limit the periods of inspection. He also recommended a yearly overhauling of the control with the taking down of every piece, renewal of worn parts, and adjustment of imperfect fits and contacts, which, if carefully done, should greatly reduce the amount of work to be done on the daily inspection.

Multiple-unit control equipment is particularly susceptible of "over-inspection," notably through a too liberal use of the file and sandpaper. Unless contact tips are pitted or burned by some unusual cause they are seldom helped by filing, for the surfaces which they acquire by being hammered together and then slid make a far better contact than can be secured with a tool. It is also better to let interlock disks and studs alone unless they are burned badly. If controller fingers show the proper fit after being brushed out it is rare that filing will do any material good. The control parts most susceptible to breakage and failure are shunts, disks, spindles and springs, and as an inspector cannot tell when these will break, the periodic examinations should be frequent enough to take care of the broken parts before they can cause trouble or damage to other adjacent or connected parts. The daily inspection enables the maintenance department to keep a close watch for such troubles as loose terminals, worn-out parts, mechanical binding, and inaccurate lining.

SPECIFICATIONS FOR CITY RAILS

The recent conference between the committee on way matters of the American Street & Interurban Railway Engineering Association and the principal rail makers emphasized the fact that hitherto the street railways have been following too closely the rail specifications of the steam railroads. It has been the fashion to assume that the compositions found best for steam railroad service would prove equally superior in street railway traffic. The two conditions are hardly comparable, however. The principal qualification demanded of a steam railroad rail is that it shall be capable of withstanding unbroken the impact of heavily loaded wheels and axles moving at high speed. Brittleness in such a rail would result in the worst kind of disaster. Hence the ideal rail for steam railroads is one having high carbon content to give hardness, but a low phosphorous content to avoid brittleness. Thus the Pennsylvania Railroad is quoted as paying $2 a ton extra to insure a metal with not more than 0.03 per cent phosphorus. In general, the highest carbon content of steam railroad rails does not exceed 0.7 per cent. While the rail used by the Pennsylvania Railroad may be the very best possible for steam railroad work it is not necessarily the best for city street railways. For the latter, hardness is the prime essential because of the greater amount of wheel movement over the track in a given time. The possibility of breakage is remote, due to the absence of severe shocks; even if a rupture did occur, whether from shocks or low temperature, it would be simply an inconvenience and not a disaster.

The proposed rail specifications of the Engineering Association are a great step in advance in specifying for the better grade rail a carbon content with a minimum limit of 0.72 per cent, a desired content of 0.77 per cent and a maximum of 0.85 per cent. But as the carbon is increased it becomes much more difficult to keep the phosphorus and sulphur to such low limits as 0.03 per cent and 0.06 per cent, respectively. According to the rail makers, it is not possible to roll such a rail at standard prices because of the large proportion of metal which would fail to come within the specified limits of composition. It can hardly be expected that the mills should take all the risk and the railways all the profit due to rolling a rail with very high carbon yet low phosphorus. If such a rail will give longer life it should be worth an increase in price mutually agreed upon by both parties. It is quite likely, however, that further consideration of the problem will show that it is safe to allow the phosphorus and sulphur limits to remain higher for rail in city service and consequently it would not be necessary for the mills to charge more for a rail averaging 0.77 per cent carbon.

THE SUPPLY MAN AND THE PURCHASER

The supply man in the electric railway field occupies a position very different from that of simply the medium through which a sale is effected. He should be, and usually is, an expert, not only in the manufacture, but also the use of the apparatus which he sells. Hence he can very often be of the greatest assistance to an electric railway manager and engineer in advising in regard to the correlation of the apparatus which he supplies to the rest of the equipment on the line, the method of obtaining the best results from it and the most economical way of keeping it in repair. The duties of the average railway man are so multifarious that he cannot expect to be as thoroughly informed on these details of every part of the equipment as a man who is devoting his entire time to the subject. Moreover, the electric railway man does not have the same opportunities of seeing this kind of apparatus in use on different roads or of getting reports of it under various conditions as the supply man. While the supply man thus can be and is of great assistance to railway companies outside of the question of the sale of equipment, competition in this part of his work is so keen that there is danger of considerable "lost motion" when it comes to sales between him and the electric railway company. This phase of the subject is discussed in this week's issue by E. P. Roberts, of Cleveland.

Mr. Roberts points out the fact that the consulting engineer as a purchaser of equipment has necessarily to depend upon contractors and manufacturers and their agents to know the quotations on the equipment which they have for sale and the most recent improvements which they have made in the apparatus which they make for use on electric railways. But this fact does not change the vital relation which always exists between buyer and seller. That is to say, competition to make a sale in practically every case is greater than the competition to buy, hence the seller has every inducement to make the purchase of his apparatus easy for the buyer.

In spite of this fact, the seller, in his anxiety to make a sale, not only often puts the buyer to considerable unnecessary work and expense in answering inquiries, but frequently incurs as large or a greater expense himself by trying to accomplish his purpose in the wrong way. The remedy, in our contributor's opinion, is the establishment of a systematic instead of a haphazard method of exchanging the information which each of the principals to the bargain requires.

Of course, the suggestions in the article are made from the standpoint of the purchaser, and their primary purpose is to economize his time and labor, but the ultimate result of the establishment of such a systematic relation as outlined should be equally if not more beneficial to the manufacturer, partly because he meets the requirements of the buyer and partly because he economizes the time of his representatives.

CARS, SCHEDULES, POWER CONSUMPTION, RUNNING TESTS AND SIGNALS IN LONDON SUBWAYS

The London Underground Electric Railways Company operates, under Albert H. Stanley, general manager, four distinct underground railways, as follows: Metropolitan District, 24 miles; Baker Street & Waterloo, 4¼ miles; Charing Cross, Euston & Hampstead, 8 miles, and the Great Northern, Piccadilly & Brompton, 9 miles. This makes a total of 45¼ miles, and as the total length of all the London subways is 89 miles, it will be seen that more than half the mileage is in the hands of one company. The Metropolitan District runs partly through open cuts and partly through a shallow, roofed subway, and up to the latter part of 1905 was operated by steam. The other three lines are deep underground or tube railways, and were opened for electric service on the following dates: Bakerloo, March 10, 1906; Piccadilly, Dec. 15, 1906; Charing Cross, June 22, 1907.



London Underground—Five-Car Express Train Leaving the Tube at Golder's Green

CAR STANDARDS AND TRAIN COMPOSITION ON THE METROPOLITAN DISTRICT

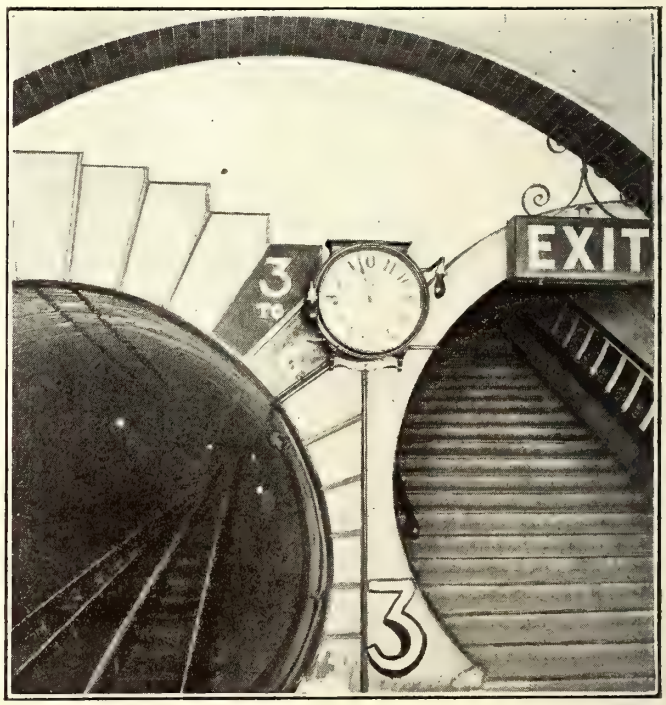
The rolling stock of the Metropolitan District Railway comprises 197 motor cars, 235 trailers and five twin electric locomotives. As shown in the accompanying sketches, the greater portion of the motor cars weigh about 29½ tons each, are 49 ft. 6½ in. long over all, 8 ft. 10 in. wide and 12 ft. 3¼ in. from rails to roof. The cars are variously divided, some having luggage compartments, and others being arranged for smokers or for first and third-class passengers. All of the doors, including those in the center, are hand-operated, and are frequently manipulated by the passengers. The standard trailer, which is also shown in a sketch, weighs over 18 tons, and has the same general dimensions as the motor cars. The locomotives referred to weigh about 76 tons complete, and were built originally to haul London & Northwestern steam trains through the city to Mansion House. As these foreign cars have been excluded for the time being, the independent halves of the electric locomotives are used to haul trains of four trailers each on the inner circle division, so that they always run in the same direction.

The individual motor cars have two GE-69 motors, which are mounted on one truck. These motors are operated at 580 volts to 600 volts for maximum speeds of 35 m.p.h. to 40 m.p.h. Every motor car is also provided with a 10-hp Christensen compressor. All main and control cables are carried under the car body in iron conduit. The cars themselves, whether motors or trailers, are built of fireproofed wood with aluminum panels. Additional steel cars are now being built.

The Metropolitan District Railway runs the longest underground trains in the world, the maximum train composition now consisting of four motor cars and six trailers. It is



London Underground—Signal Interlocker and Illuminated Diagram at Camden Town



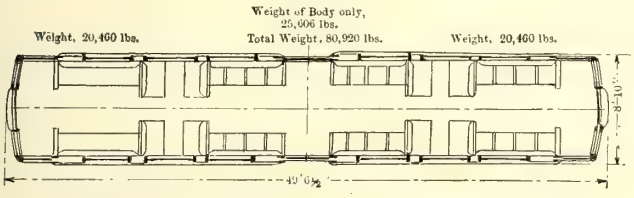
London Underground—Headway Clock Installed Near Important Stations

now intended to make the length of the trains in the east end of the city 12 cars, and to split these trains into trains of six cars at Whitechapel station. The customary heavy service train is composed of three motor cars and three trailers, and the train is adjusted for light traffic by dropping one coach of each type. A seventh car is added to many of the heavy trains.

CAR STANDARDS AND TRAIN COMPOSITION ON THE TUBE LINES

The cars of the three tube lines are substantially alike in design, construction and size. The chief differences are the use of a steel instead of a canvas-wood roof for the Charing Cross cars, and that the Bakerloo cars are finished in cream and red in place of the brown body color considered more desirable for tube service. All motor cars carry two GE-69, 200-hp motors on one truck, and have all the multiple-unit apparatus in the motorman's cab. The Charing Cross line has 60 motor cars and 90 trailers; the Piccadilly line, 72 motor cars and 146 trailers, and the Bakerloo line a total of 108 cars of both classes. The cars are of steel, with an internal paneling of non-inflammable mahogany mounted on asbestos millboard. The length of each car over all is 49 ft. 1½ in.; the extreme width, 8 ft. 4 in. to 8 ft. 7⅛ in.; height from rail to roof, 9 ft. 5 in., and the inside height 6 ft. 4½ in. The seating is of rattan, and is both transverse and longitudinal. The motor cars seat 42 passengers, the trailers 52. A complete motor car weighs 27.50 tons (2240 lb. per ton), and a trailer 16.55 tons.

The makeup of the tube trains differs as follows: Bakerloo line, three-car trains, composed of one motor car, one trailer with control equipment and one ordinary trailer, with six-car theater traffic trains made up of two of the foregoing, with the motors at each end and the control trailers in the center; Piccadilly line is similar to the Bakerloo; Charing Cross line

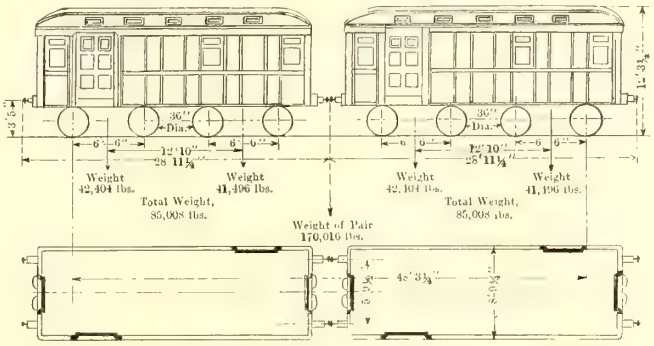


London Underground—Inner Circle Trail Car

varies from two-car to five-car trains, according to traffic. These Charing Cross trains are composed of the following types of cars: Two-car train, one motor and one control trailer; three-car train, one of each kind; four-car train, two motor and two control trailers; five-car train, two motors, two control trailers and one ordinary trailer. The great majority of the trains are short, so that the management can give the very frequent service detailed in the following paragraphs.

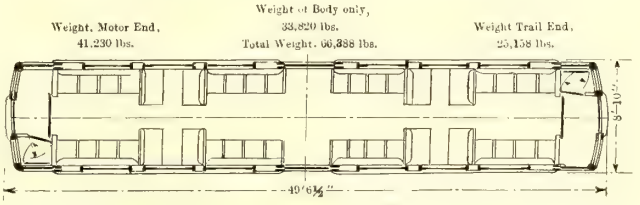
SCHEDULES, SPEEDS, STOPS AND SIGNALS

The introduction of electricity and modern automatic signaling on the Metropolitan District line has had a most favorable influence on running time and frequency of service. The 11-mile trip from the suburb of Ealing to the Mansion House is now made by local trains in 40 minutes, as against 50 minutes by steam. This has been further reduced to 32 minutes by "non-stop" or express trains, which can easily be run on this line owing to the presence of loops and four-track sections at various places. Another "non-stop" run is the one from Hounslow Town to Mill Hill Park, a distance of 4½ miles, which is run in 8 minutes. One run with local trains has been reduced from 26 to 19 minutes, and a second from 32 to 22 minutes. Some typical increases in the numbers of the trains are the following: Ealing, 113 instead of 63; Hammersmith, 237 instead of 109; Putney Bridge, 256 instead of 92. The closest headway is 1¾ minutes, and is maintained over the main line between South Kensington and the Mansion House for all western branches. The total daily number of trains on this line is 494 against 273 for steam in 1905. There are 2 stops per mile on the inner circle division and 1.7 stops per mile between Earl's Court and Mansion House.



London Underground—Inner Circle Twin Electric Locomotives

The headways which are now in force on the several tube lines are considerably shorter than they were in 1907, as will be observed by the following comparisons of rush-hour and ordinary intervals, wherein the earlier headways are given in parentheses: Bakerloo, 1 2/3 minutes (3 minutes) and 3 minutes (4½ minutes); total trains per day in each direction, 468. Piccadilly, 2 minutes (3 minutes) and 3 minutes (4½ minutes),

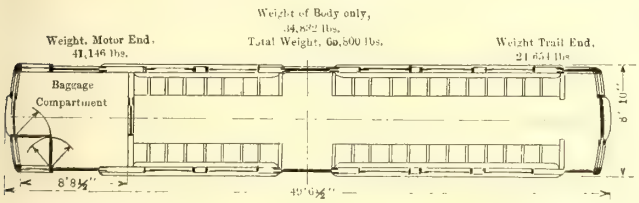


London Underground—Inner Circle Middle Motor Car

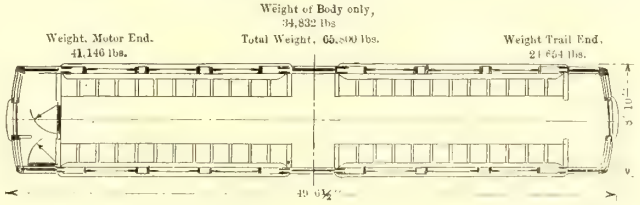
with 1¾ minutes when it has heavy amusement travel; total trains a day in each direction, 417. Charing Cross, main line, 1½ minutes (2½ minutes) and 2 minutes (2½ minutes), corresponding to intervals of double length on the two branches.

Within the last two years the schedule speed on all the tube lines has been increased 1 m.p.h. to 2 m.p.h., and now ranges from 15.04 m.p.h. on the Bakerloo line to 17.79 m.p.h. on the Golder's Green branch of the Charing Cross line. The character of service in each tube is shown in detail in the tables on the following page.

A record of train-miles, car-miles, cars per train in service and kilowatt-hours per car-mile is made out weekly by the superintendent of lines on the forms on the next page, and afterward for semi-annual and annual periods. The power consumption in kilowatt-hours per car-mile differs on each line. The power figures and the stops per mile were as follows:



London Underground—Inner Circle End Motor Car with Baggage Compartment



London Underground—Inner Circle End Motor Car without Baggage Compartment

	Bakerloo.	Piccadilly.	Charing Cross.
For 12 months' period, ending Dec. 12, 1908..	2.27	1.97	2.32
For six months, ending June, 1909.....	2.13	1.92	2.35
For one week, ending July 10, 1909.....	2.12	1.93	2.39
Stops per mile.....	2.35	2.35	2.57

SIGNALS AND RECORDING DEVICES

The signal system which permits the frequent train service

given on the four underground railways is of the well-known Westinghouse electro-pneumatic type, including automatic train stops. The average number of complete signal movements per annum is about 120,000,000, and the average number of such movements per failure is 400,000. A rather novel auxiliary to the signal system is afforded by the use of illuminated headway indicating dials which have been installed near congested stations. Each dial has 12 numbers on it to indicate minutes. When the motorman comes into a section he can see by the clock just how many minutes have elapsed since the train ahead passed by, and thus regulate his running accordingly. When the second train enters the section it cancels the first record and begins to make a new record, since the dial hand moves as soon as the signal hand goes to "danger." This scheme is particularly valuable near stations where some of the stops are unusually long because of the arrival of many baggage-laden steam railroad passengers. The automatic signals at some points are connected with a relay device for making perforations on record ribbons to show the intervals between succeeding trains.

TRAIN STOP TESTS

During October and November, 1908, signal train stop tests were made on these tube lines to determine the feasibility of shortening blocks, especially near terminals and cross-overs. The results of the trial runs detailed in the accompanying tables proved that it would be safe to cut down the distances of the home signal and trip arms from the crossing points as desired.

Referring now to the five Bakerloo tests as presented in the table on the next page. Tests Nos. 1 and 4 were made under ordinary service conditions, the power being shut off at white marks which indicated the beginning of non-current runs; tests 2, 3 and 5 were made under the conditions which would

BAKER STREET & WATERLOO RAILWAY RUNNING TIME.

Location.	Slack service stops, seconds.	Busy service stops, seconds.	Running time between stations, minutes and seconds.	Distance between stations, miles.	Average speed between stations m.p.h.
Elephant & Castle - Westminster Bridge	..	..	1.55	.54	16.87
Westminster Bridge-Waterloo	10	12	1.24	.40	17.14
Waterloo Embankment	15	19	1.28	.42	17.14
Embankment-Trafalgar Square	10	12	0.55	.24	15.64
Trafalgar Square-Picadilly Circus	15	19	1.22	.35	15.33
Piccadilly Circus-Oxford Circut	15	19	1.53	.60	19.15
Oxford Circus-Regents Park	15	19	1.48	.55	18.33
Regents Park-Baker Street	10	12	1.41	.57	20.37
Baker Street-Great Central	15	19	1.4	.32	17.94
Great Central-Edgware Road	10	14	1.5	.27	15.00
	1.55	2.25	14.35	4.26	17.53

Slack time speed, including stops, 15.49 m.p.h. Busy time speed, including stops, 15.04 m.p.h. Speed and running time same on both roads, 1 minute lay-over at each end, making 35 minutes for round trip in slack time and 36 minutes in busy time.

GREAT NORTHERN, PICCADILLY AND BROMPTON RAILWAY RUNNING TIME, AVERAGE SERVICE.

Location. West Bound Road.	Busy service seconds.	Slack service, seconds.	Running time allowed between stations, minutes and seconds.	Average running speed station to station, m.p.h.	Distance in miles, station to station.
Finsbury Park-Gillespie Road	..	..	1.29	17.84	.44
Gillespie Road-Holloway Road	15	10	1.30	18.40	.46
Holloway Road-Caledonian Road	15	10	1.14	18.54	.38
Caledonian Road-York Road	15	10	2.1	23.28	.73
York Road-King's Cross	15	10	1.24	21.00	.49
Kings' Cross-Russell Square	15	15	1.44	19.47	.57
Russell Square-Holborn	15	12	1.21	20.89	.47
Holborn-Covent Garden	15	12	1.21	16.00	.36
Covent Garden-Leicester Square	15	12	0.45	12.80	.16
Leicester Square-Piccadilly Circus	15	12	1.4	19.07	.34
Piccadilly Circus-Dover Street	15	15	1.9	17.74	.34
Dover St.-Down St	15	12	1.10	17.44	.34
Down St.-Hyde Park Corner	15	12	1.4	17.94	.32
Hyde Park Corner-Knightsbridge	15	12	1.7	16.79	.33
Knightsbridge-Brompton Road	15	11	1.16	19.84	.42
Brompton Road-South Kensington	15	12	1.15	16.80	.35
South Kensington-Gloucester Road	15	12	1.21	20.00	.45
Gloucester Road-Earl's Court	15	12	1.30	20.40	.51
Earl's Court-Baron's Court	15	12	2.30	23.76	.99
Baron's Court-Hammersmith	15	12	2.00	13.20	.44
	(Minutes and seconds.)	(Minutes and seconds.)			
Totals	4.45	3.45	28.15	18.88	8.89

Time for round trip, busy service, 68 minutes. Time for round trip, slack service, 66 minutes. Average speed, including stops, busy service, 16.22 m.p.h. Average speed, including stops, slack service, 16.73 m.p.h.

CHARING CROSS, EUSTON & HAMPSTEAD RY. RUNNING TIME.

Golder's Green to Charing Cross Division.

Stations.	Running time.	Stops.	Lapsed time.	Distance.	Speed.
Golder's Green-Hampstead	4.00	15	4.15	1.47	22.05
Hampstead-Belsize Park	2.10	15	6.40	.74	20.46
Belsize Park-Chalk Farm	1.55	15	8.50	.69	21.76
Chalk Farm-Camden Town	1.40	15	10.45	.52	18.68
Camden Town-Mornington Crescent	1.20	15	12.20	.40	18.04
Mornington Crescent-Euston	1.20	15	13.55	.52	23.46
Euston-Warren Street	1.05	15	15.15	.36	20.00
Warren Street-Goodge Street	0.55	15	16.25	.29	19.33
Goodge Street-Tottenham Court Road	1.15	15	17.55	.39	18.72
Tottenham Court Road-Leicester Sq.	0.45	15	18.55	.25	20.00
Leicester Square-Charing Cross	1.05	..	20.00	.30	16.67
	17.30	2.30	20.00	5.93	20.33

Speed, including stops, 17.79 m.p.h. Hampstead round trip, 38 minutes. Golder's Green round trip, 45 minutes.

Highgate to Charing Cross Division.

Stations.	Running time.	Stops.	Lapsed time.	Distance.	Speed.
Highgate-Tufnell Park	1.52	15	2.07	.56	17.97
Tufnell Park-Kentish Town	1.28	15	3.50	.49	20.56
Kentish Town-So. Kentish Town	1.14	15	5.19	.36	17.56
So. Kentish Town-Camden Town	1.11	15	6.45	.36	18.30
Camden Town-Mornington Crescent	1.20	15	8.20	.40	18.04
Mornington Crescent-Euston	1.20	15	9.55	.52	23.46
Euston-Warren Street	1.05	15	11.15	.36	20.00
Warren Street-Goodge Street	0.55	15	12.25	.29	19.33
Goodge Street-Tottenham Court Road	1.15	15	13.55	.39	18.72
Tottenham Court Road-Leicester Sq.	0.45	15	14.55	.25	20.00
Leicester Sq.-Charing Cross	1.05	..	16.00	.30	16.67
	13.30	2.30	16.00	4.28	19.02

Speed, including stops, 16.05 m.p.h. Round-trip time, 36 minutes.

LONDON UNDERGROUND ELECTRIC RAILWAYS—STATISTICS OF POWER CONSUMPTION AND TRAIN SERVICE FOR WEEK ENDING JULY 10, 1909.

	Actual No. of Trips	Train Miles			Car Miles			Cars per Train in Service	Current Consumption Traction Units	Kw.Hours per Car Total Mile
		Service	Idle	Total	Service	Idle	Total			
Baker Street & Waterloo Railway										
Total this week	2828	23,995	152	24,147	72,038	462	72,500	3.00	153,570	2.12
Total last week	2813	23,869	168	24,037	71,608	487	72,095	3.00	154,350	2.14
Total this half year	4134	35,075	226	35,301	105,279	681	105,960	3.00	225,230	2.13
Great Northern, Piccadilly & Brompton Railway										
Total this week	2417	44,102	326	44,428	131,123	939	132,062	2.97	254,921	1.93
Total last Week	2422	44,215	323	44,538	130,756	909	131,665	2.96	251,208	1.91
Total this half year	3528	64,352	472	64,824	191,351	1357	192,708	2.97	370,469	1.92
Charing Cross, Euston & Hampstead Railway										
Total this week	4083	39,199	784	39,983	114,812	3082	117,894	2.93	281,833	2.39
Total last week	4081	39,241	778	40,019	114,783	3077	117,860	2.92	276,126	2.34
Total this half year	5950½	57,068	1146	58,214	167,444	4478	171,922	2.92	407,197	2.37

To..... .....190 *Superintendent of the Line.*

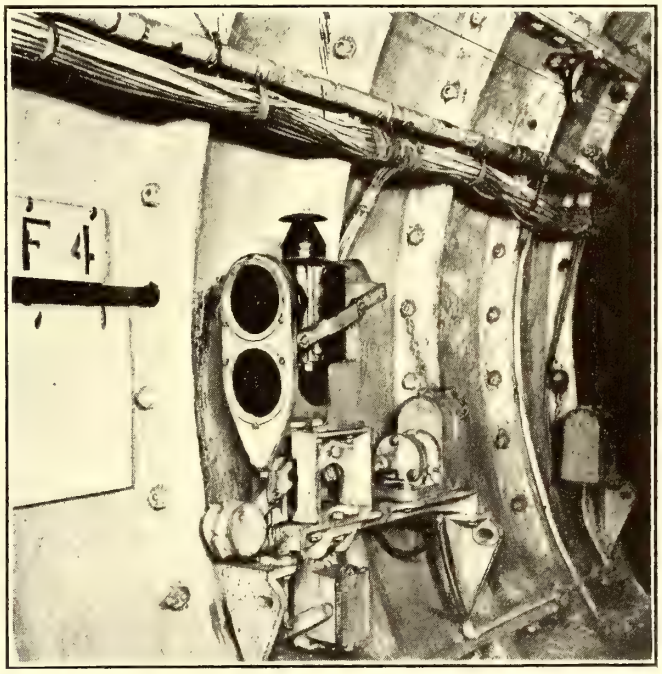
prevail if a motorman were taken ill and fell on to his controller, the signal trip being struck with the controller in the "full-on" position. Speeds were taken at the time of striking the train stop. The train which was used for all of the tests had been in regular service the previous day and had run 616 miles since it was last in the shops. The cars were furnished with Frood fiber brake shoes, and the brake rigging had been used 130 miles since its last adjustment.

Referring next to the five Piccadilly tests given in the second table below. Test No. 1 was made under emergency conditions and run at maximum speed through Holborn Station. Test No. 2 was a service run, and the power was shut off at the white marks previously mentioned. In test No. 3 the signal was approached at maximum speed and the full current kept on until the trip-cock was struck. Test No. 4 was made under service conditions, the current being cut off shortly after leaving Caledonian Road, 0.73 miles from York Road, and the train allowed to coast down to the signal. In test No. 5 the train was started from Baron's Court, 0.44 mile from Hammersmith, and ran at the signal at full speed. The brake shoes were also of fiber, and had been in regular use for three days preceding the test runs.

Referring last to the Charing Cross tests as detailed in the third table below: Test No. 1 was made under emergency conditions, the train being started from Mornington Crescent Station, 0.40 mile from Camden Town and the controller kept open until the train was tripped. Test No. 2 was made under conditions similar to test No. 1. Test No. 3 was an ordinary service run, but it will be noted that the speed and the distance which the train traveled after being tripped were about the same. This was due to the white shut-off mark being quite close to the signal. Test No. 4 was made under ordinary service conditions. Test No. 5 was made under emergency conditions, but the speed shown may be somewhat misleading, and does not represent the actual speed at which the train struck the signal. This was due to the motorman being rather slow in getting into full parallel, and he had not done so until the train had partly covered the measured distance over which



London Underground—Showing Position of Train Stop Outside the Rails



London Underground—Electro-Pneumatic Signal and Valve for Train Stop

BAKER STREET & WATERLOO RAILWAY—SIGNAL TRAIN STOP TESTS ON OCT. 9, 1908, WITH 3-CAR TRAIN NO. 15 (CARS NOS 19, 229 AND 102).

Test No.	Cars in Train	Signal	Grade	Curve Chains	Speed m.p.h.	Seconds Traveled after Striking Trip	Feet Traveled after Striking Trip	Deceleration m.p.h. per Second	Feet from Tripcock to Nose of Switch after Train had Stopped
1	3	Edgware Road (Home).....	Up, 1 in 300	15	17.66	7	116	2.52	....
2	3	Ditto.....	Ditto	15	19.46	7.5	154	2.59	....
3	3	Ditto.....	Ditto	15	20.44	7.5	158	2.72	246¾
4	3	Elephant and Castle (Home)....	Down, 1 in 60	6	24.12	8	146	3.02	....
5	3	Ditto.....	Ditto	6	29.15	10.5	240	2.78	162¼

GREAT NORTHERN, PICCADILLY & BROMPTON RAILWAY—SIGNAL TRAIN STOP TESTS ON OCT. 14, 1908, WITH TRAIN NO. 32 (CARS NOS. 65, 203 AND 131).

1	3	Holborn (East end starter).....	Up, 1 in 110	5	24.07	6	147	4.01	75 from stop to fouling point
2	3	Finsbury Park (Home).....	Up, 1 in 90	40	21.59	5	83.4	4.32	....
3	3	Ditto.....	Ditto	40	23.67	6	128	3.94	184
4	3	York Road (West home).....	Down, 1 in 85	40	25.58	5	162	5.11	270 from stop to fouling point
5	3	Hammersmith (Home).....	Down, 1 in 264	20	20.78	5	157	4.16	300

CHARING CROSS, EUSTON & HAMPSTEAD RAILWAY—SIGNAL TRAIN STOP TESTS ON NOV. 11, 1908, WITH 4-CAR TRAIN NO. 32 (CARS NOS. 32, 149, 118 AND 46, TWO OF WHICH WERE MOTORS).

1	4	Camden Town, N. B. (Home)...	Up, 1 in 100	Straight	26.00	6	136½	4.33	.....
2	4	Highgate, N. B. (Home).....	Up, 1 in 60	Ditto	26.69	6.5	144	4.11	225
3	4	Ditto.....	Ditto	Ditto	26.69	5.5	121	4.85	279
4	4	Charing Cross, S. B. (Home)....	Down, 1 in 120	7	20.45	5.5	126	3.72	319
5	4	Ditto.....	Ditto	7	19.29	6.5	153	2.97	291

the speed was taken. This speed, therefore, is stated only to be an average one, and it is estimated that the signal was actually approached at about 25 m.p.h. Speeds were taken in all tests at the time of striking the train stop. The test train had the usual braking equipment which had been adjusted on Nov. 6 and had been in use on Nov. 7 for runs totalling 220 miles.

TESTS OF POWER CONSUMPTION ON UNDERGROUND LINES

During February and March, 1907, tests were carried out on the Bakerloo and Piccadilly lines respectively by James R. Chapman, then chief engineer, to determine the most economical method of train operation from the power, braking and coasting standpoints. These experiments were based on a continuance of the schedule speeds then in vogue, but shortly thereafter it was determined to raise these schedule speeds throughout as previously detailed. Hence the lessons drawn from the trials could be applied only in part. Nevertheless it may be of interest to present an account of the conditions under which the runs were made and to give the data secured on power consumption per ton-mile and car-mile.

The Bakerloo tests were made on Feb. 11, 1907, with a three-car train composed of one 28.4-ton motor car, two 17.6-ton trailers plus the weight of the passengers. Three runs were made in commercial service between 3 p. m. and 6 p. m. with the same motorman for each trip.

BAKER STREET & WATERLOO RAILWAY POWER TESTS, RUN NO. 1.—NORTH-BOUND TRAIN, WEIGHING 65 TONS, SCHEDULE. SPEED, INCLUDING STOPS, 14.54 M.P.H.; 110 WATT-HOURS PER TON-MILE.

Stations.	Distances in miles.	Stops in seconds.	Running time in seconds.
Elephant & Castle-Westminster Bridge..	.564	10	110
Westminster Bridge-Waterloo.....	.394	13	100
Waterloo-Embankment	.410	6	81
Embankment-Trafalgar Square.....	.232	12	65
Trafalgar Square-Piccadilly Circus.....	.339	15	98
Piccadilly Circus-Oxford Circus.....	.662	17	143
Oxford Circus-Regent's Park.....	.569	7	114
Regent's Park-Baker Street.....	.580	..	128
	3.69	80	839

Run No. 1, south-bound train, weighing 65 tons; length of run, 3.68 miles; schedule speed, 14.73 m.p.h.; running time, 842 seconds; stopping time, 57 seconds; power consumption, 80 watt-hours per ton-mile.

Run No. 2, north-bound train, weighing 65 tons; length of run, 3.69 miles; schedule speed, 14.36 m.p.h; running time, 852 seconds; stopping time, 0.73 seconds; power consumption, 100 watt-hours per ton-mile.

Run No. 2, south-bound train, weighing 65 tons, length of run, 3.68 miles; schedule speed, 14.94 m.p.h.; running time, 802 seconds; stopping time, 85 seconds; power consumption, 70 watt-hours per ton-mile.

Run No. 3, north-bound train, weighting 66.5 tons; length of run, 3.69 miles; schedule speed, 14.06 m.p.h.; running time, 849 seconds; stopping time, 96 seconds; power consumption, 99 watt-hours per ton-mile.

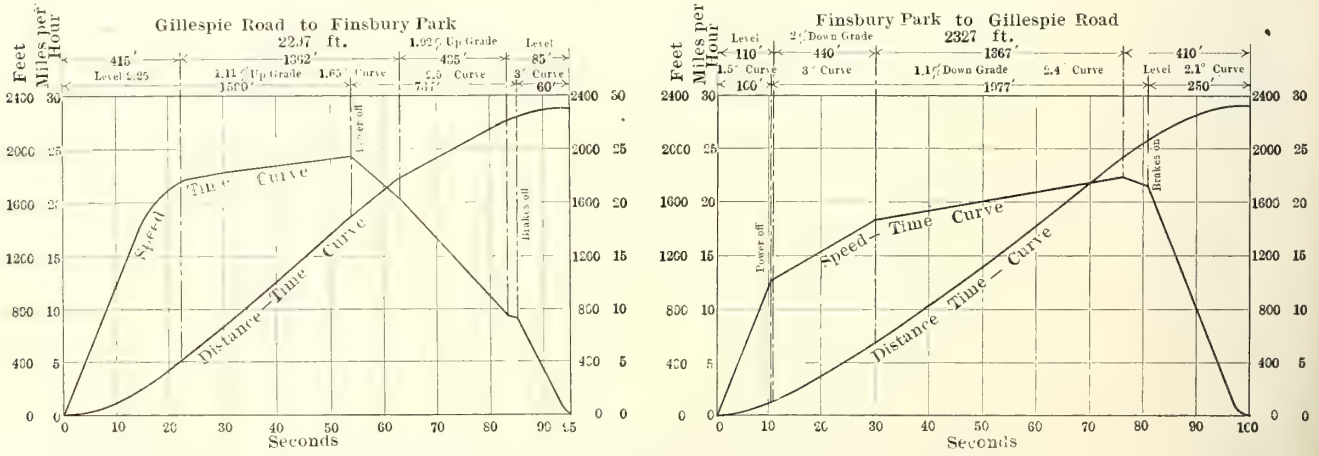
Run No. 3, south-bound train, weighing 66.5 tons; length of run, 3.68 miles; schedule speed, 14.31 m.p.h.; running time, 797

BAKER STREET & WATERLOO RAILWAY—STATISTICS ON POWER TESTS, FEB. 18, 1907.

North & South Bound, Run. No.	Weight of train. Tons.	Power on, per cent— Series.	Parallel.	Total.	Coasting and braking. Per cent.	Watt-hrs. for traction only— Total per run.	Per ton mile.	Per car mile.	Total time for return trip, including stops. seconds.	Schedule speed, m.p.h., including stops.
1	65	37.71	22.31	60.02	39.98	46,600	97	2107	1818	14.59
2	65	23.28	19.89	43.17	56.83	40,540	85	1833	1812	14.64
3	66.5	21.18	19.89	41.07	58.93	41,300	84	1868	1871	14.24

The conditions under which the results presented in the accompanying table was secured, were as follows:

Run No. 1 was made under the then existing running conditions, that is, the motorman operated the controller as usual. Run No. 2 was made in accordance with speed time curves. Blue lights had not yet been installed to indicate the current "on" and "off" points so that the distances were determined by counting the existing white lights and coaching the motorman accordingly. Run No. 3 was made under conditions like No. 2



London Underground—Test Curves Made on the Piccadilly Line Between Gillespie Road and Finsbury Park in Both Directions

and the result showed that a saving in power consumption could be made by running in accordance with the speed time curves. To obtain these results, however, it would be necessary for the motorman to apply power enough to maintain a uniform rate of acceleration to get the full tractive effect of the motors.

The energy required for Run No. 1 was 2107 watt-hours and for No. 2 1833 watt-hours per car-mile, a saving of 12½ per cent. Run No. 3 required 1871 watt-hours per car-mile, owing to a greater passenger weight, but the watt-hours per ton-mile were less than for Run No. 2. The figures for energy consumption were obtained from a portable spring British Thomson-Houston 1000-amp integrating watt-meter and were for traction only as measured at the motor terminals, no allowance being made for lighting and transmission losses. The details of each run are summarized below, No. 1 being given somewhat fully.

The accompanying speed-time curves of a Bakerloo three-car train were plotted to show the length of time and the equivalent distances during which power braking or coasting should apply. The braking in all cases was taken at 1½ m.p.h. per second. For simplicity in calculation the curves have been expressed in terms of degrees, and the grade in per cent, that is, 1 in 100 is expressed as a 1 per cent grade. For obtaining these results it was assumed that the full current would be used from the first to the last running point on the controller and that the motorman would apply power so as to maintain a uni-

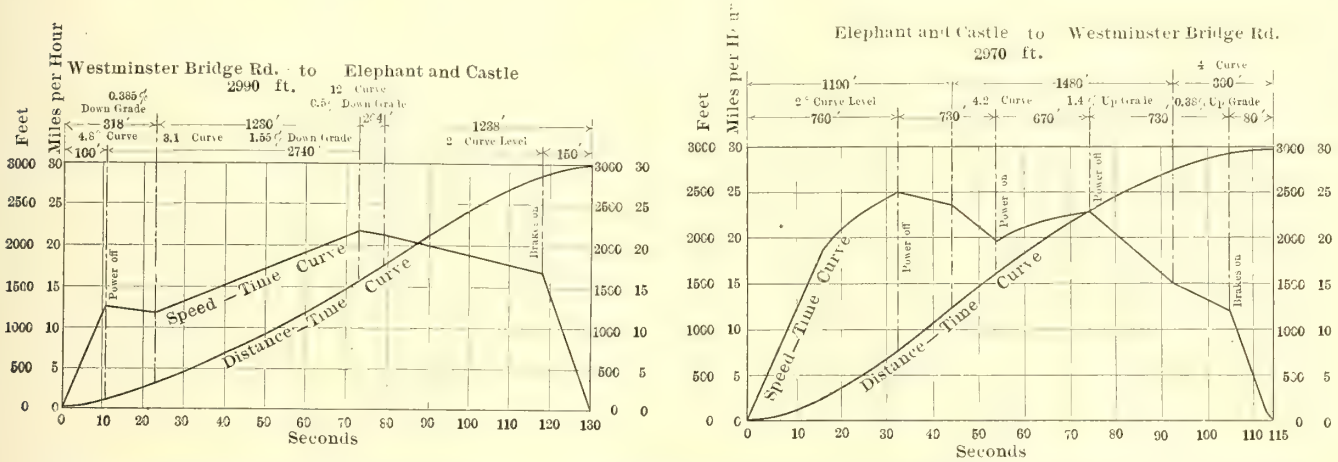
form rate of acceleration to secure the full tractive effort of the motors.

The Piccadilly running tests were made on March 4, 1907, with a train made up of a 27.5-ton motor car and three 16.5-ton trailers, plus the weight of the passengers. The results given herein were obtained from two runs made in commercial service.

Run No. 1 was made by cutting off the power at the blue guiding lights. The running time, not including stops, was 3910 seconds. In Run No. 2 power was cut off 40 ft. to 120 ft. beyond the blue lights. The latter experiment showed that 4 minutes and 7 seconds could be gained at an increased power consumption of 11.8 watt-hours per ton-mile. A series of curves are reproduced showing the running conditions between the stations on the Piccadilly line. Further details of each trip are given below:

Run No. 1, west-bound train, weighing 81 tons; schedule speed, including stops, 14.46 m.p.h.; power consumption, 68.8 watt-hours per ton-mile. Run No. 1, east-bound train, weighing 81 tons; length of run, 8.889 miles; schedule speed, 14.67 m.p.h.; running time, 1946 seconds; stopping time, 235 seconds; power consumption, 75.9 watt-hours per ton-mile.

Run No. 2, west-bound train, weighing 80 tons; length of run, 8.901 miles; schedule speed, 15.28 m.p.m.; running time, 1856 seconds; stopping time, 241 seconds; power consumption, 78.9 watt-hours per ton-mile. Run No. 2, east-bound train, weighing



London Underground—Test Curves Made on the Bakerloo Line Between Westminster Bridge Road and Elephant and Castle in Both Directions

GREAT NORTHERN, PICADILLY & BROMPTON RAILWAY—STATISTICS ON POWER, MARCH 4, 1907.

Run No.	Weight of train. Tons.	Power on, per cent—Series.	Power on, per cent—Parallel.	Power on, per cent—Total.	Coasting and braking. Per cent.	Watt-hrs. for traction only—Total per run.	Watt-hrs. for traction only—Per ton mile.	Watt-hrs. for traction only—Per car mile.	Total time for return trip, including stops. seconds.	Schedule speed, m.p.h., including stops.
1	81	15.40	26.42	41.82	58.18	104,260	72.4	1465	4399	14.56
2	80	14.71	32.53	47.24	52.76	119,940	84.2	1685	4150	15.43

INNER CIRCLE TRAINS—DISTRICT RLY. & METROPOLITAN RLY GENERAL SUMMARY OF CURRENT CONSUMPTION TESTS.

Date	Run No.	Equipment	Weight of Empty Train "Tons" (2240 lbs.)	Train Ton Miles	Passenger Ton Miles	Total Ton Miles	Power Consumption, Watts: Per Ton Mile	Per Car Mile	Per Car Mile Deducting Passenger Load	Time: Running Secs.	Stop Secs.	Total Min.	Total Sec.	Schedule Speed M.p.h.	Signal Stops
1908															
Dec. 1	1	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four Westinghouse type 56 motors each	133.6	1746.15	110.24	1856.39	66.2	2350	2220	2395	652	50	47	15.4	2
"	2	Ditto Ditto	133.6	1746.15	91.35	1837.50	60.5	2126	2021	2426	531	49	17	15.9	0
"	3	District train composed of two motor cars and two trailer cars. Motors equipped with two G. E. 69 motors each													*
"	4	Ditto Ditto	95.3	1245.57	58.67	1304.24	80.9	2018	1927	2624	535	52	39	14.9	2
Dec. 2	1	Metropolitan train composed of one motor car and three trailer cars. Motor car equipped with four G. E. 69 motors	109.4	1429.86	120.12	1549.98	70.2	2082	1921	2752	514	54	26	14.4	6
"	2	Ditto Ditto	109.4	1429.86	80.73	1510.59	69.0	1994	1888	2591	569	52	40	14.9	0
"	3	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four G. E. 76 motors each	128.65	1681.45	69.60	1751.05	72.5	2429	2333	2659	675	55	34	14.1	4
"	4	Ditto Ditto	128.65	1681.45	84.15	1765.60	70.1	2369	2257	2631	585	53	36	14.6	2
Dec. 4	1	District train composed of two motor cars and two trailer cars. Motor cars equipped with two G. E. 69 motors each	95.3	1245.57	104.22	1349.79	79.6	2058	1900	2536	694	53	50	14.5	4
"	2	Ditto Ditto	95.3	1245.57	107.20	1352.77	86.1	2227	2050	2647	510	52	37	14.9	11
"	3	Metropolitan train composed of two motor cars and two trailer cars. Motor cars equipped with four G. E. 76 motors each	128.65	1681.45	61.78	1743.23	65.8	2193	2118	2629	484	51	53	15.1	2
"	4	Ditto Ditto	128.65	1681.45	69.49	1750.94	66.5	2227	2139	2612	561	52	53	14.8	2
Dec. 13	1	District train composed of one electric locomotive and four trailer cars. Electric locomotive equipped with four G. E. 69 motors	111.15	1452.73	27.79	1480.52	81.8	2317	2270	2548	317	47	45	16.4	†
"	2	Ditto Ditto	111.15	1452.73	45.40	1496.13	82.1	2350	2279	2560	465	50	25	15.6	†

* Watt meters wrongly connected. Results of no value. † Current consumption per car-mile based on four cars only in order to obtain a basis o comparison.

80 tons; length of run, 8.889 miles; schedule speed, 15.58 m.p.h.; running time, 1836 seconds; stopping time, 217 seconds; power consumption, 89.6 watt-hours per ton-mile.

The last table shows the results of a series of tests made in December, 1908, on the inner circle railway with various train compositions and equipments. The figures for energy consumption were obtained from two portable spring mounted British Thomson-Houston 1000-amp integrating watt-meters and are for traction only as measured at the railway motor terminals.

THE CHICAGO PLAN OF STREET RAILWAY SUPERVISION AND CONTROL

BY SIDNEY OSSOSKI, FINANCIAL SECRETARY, CHICAGO RAILWAYS COMPANY

The operation of the surface street railways in the city of Chicago has been conducted under franchise ordinances presenting many unique features which it is now possible to discuss in the light of actual experience, in view of the fact that it is now more than three years since the ordinances became effective. It is well known that many of the more drastic features of this franchise were imposed upon the companies in the midst of a campaign of legal warfare between the railways and the city, and resultant wide-spread antagonism, in consequence of which the companies necessarily had to suffer in any compromise of their rights that could be devised.

Accordingly, the Chicago street railway ordinances contain many provisions which under normal conditions would probably never have been imposed, even if it could be assumed that any company, under ordinary circumstances, would have accepted them.

In view of the almost universal interest that has been excited in this and other countries in respect of the practical outcome of the "Chicago Plan," the time seems to be ripe for the presentation of the views and criticisms of the interested parties.

Down to and including the present time, there have been three general lines of development in respect of street railway franchises in the United States:

First: Complete private ownership, including exclusive right-of-way and ownership of right-of-way, under a perpetual or limited franchise, constituting a contract alterable only by consent of the parties, or revocable at any time (as in Massachusetts) by the local authorities, but only upon the approval of the State Board of Railroad Commissioners.

Second: Company's ownership in its right-of-way and track limited to use for street railway purposes, the municipality retaining complete ownership and control of the streets and of the pavement laid down. Franchises were granted upon such terms as were agreed upon and generally for fixed periods of time, of varying duration.

Third: "The Chicago Plan"—a method evolved in the settlement of the traction difficulties in the city of Chicago.

THE CHICAGO PLAN

Under the latter method the city retains the right of purchase at a fixed valuation (the computation of which is defined in the grant) at any time (so long as the companies continue to operate, whether before or after the grant has expired), upon due notice given; and may operate the same after such purchase, through its own agencies (designated "municipal operation"); or, free from any limitations or restrictions as to operation. In this latter event, however, the purchase prices paid to the companies would be augmented by a considerable percentage (20 per cent in some of the Chicago ordinances), a provision which protects the companies from the exploitation of their highly developed properties, for the benefit of intriguing third parties. A further safeguard is granted by preserving the right to the city to have the property taken over by a designated licensee at any time that the city might purchase, and upon identical terms, except that the licensee must pay an additional percentage (equal to what the city must pay in case it buys free from any restrictions as to "municipal operation" referred to above), a provision which is likewise for the protection of the companies against exploitation.

Other distinctive provisions which may be referred to as being of general, rather than local interest, are the following:

First: The permanent fixing of the amount of extensions which the companies are required to build annually.

Second: The obligations of the companies as to service regulations, rolling stock, motive power, supply of power, track and paving construction, buildings, current transmission, plant and machinery are definitely specified.

Third: The companies are subjected to the supervision of a Board of Supervising Engineers consisting of a chairman named in the ordinances and representatives of the city and transportation companies parties to the agreement. The approval of this board is necessary in respect of all plans and specifications in connection with the work referred to in the preceding paragraph. The entire cost of the board for salaries and expenses is imposed upon the companies.

Fourth: The companies' obligations to pay taxes, to stand the cost of paving the right-of-way and maintaining the same, to pay for sprinkling and cleaning the streets, and for removing ice and snow, to permit free use to the city of its poles and conduits, and to carry the city's police and firemen free of charge, and finally, to pay over annually to the city 55 per cent of the net receipts are definitely established. Net receipts are determined as follows: After deducting from the gross receipts (a) all expenses of operation, including maintenance, repairs and renewals and reserve funds; (b) taxation on real and personal property and capital stock tax; (c) 5 per cent on the valuation of the property as defined in the ordinance—the balance, or net receipts, is divided between the city and the company in the ratio of 55 per cent to the former and 45 per cent to the latter.

Fifth: There are special provisions covering the question of what shall constitute "capital expenditures," with the object of preventing the addition of items of cost to capital, other than those referred to in the ordinance. As to certain capital expenditures, such as extensions and subways, the companies must not be required to increase the total capital investment to such an extent that the return thereon, over and above the interest charge of 5 per cent, would be reduced to an inadequate or unreasonably small amount.

Sixth: A fixed 5-cent fare for passengers over the age of 12, 3 cents for passengers under 12; children under seven accompanied by an adult are carried free. This fixed fare is applicable to a ride, no matter how long, within the city limits. Universal transfers, good on all connecting lines of the company, including the right to demand a transfer upon a transfer and through-route requirements in respect of companies operating in the different subdivisions of the city, with the object of providing a trip from one section to another for a single fare.

Seventh: Definite requirements as to the amount that shall be expended annually for (1) maintenance and repairs and for (2) renewals and depreciation, viz., 6 per cent and 8 per cent, respectively, of the gross receipts, are to be expended or reserved in a fund for these purposes, but in no case are the companies to benefit because of any unexpended balance. Moreover, an attempt is made to define and set forth what shall be included in the term "renewals." These requirements are not effective until the completion of the rehabilitation period, three years after acceptance of the ordinances.

Eighth: The companies' obligations as to insurance and the establishment of an adequate fund annually, to take care of personal injury claims, are made the subjects of special provisions. Officers' salaries may be supervised, if objected to as excessive. Annual reports and thorough inspection and audit of accounts are carefully provided for.

Ninth: Stringent provisions as to forfeiture in case of nonperformance of the provisions of the ordinance by the companies (not applicable to the bondholders, however), and penalties for the omission or neglect to perform certain obligations of the companies, in respect to rehabilitation work, are worked out with care and precision.

INSUFFICIENT ELASTICITY OF TERMS

In the way of specific criticism, it may be pointed out, first, that there is not sufficient elasticity in the Chicago grants. They provide no method for alteration of their terms, except by mutual agreement between the city and the companies, and no change can be effected without recourse to the City Council, thereby opening the door to questions of a political character in respect of matters patently of a business nature, solely. This is unfair, both to the companies and to the public. Circumstances arise in every business, with the change of conditions, requiring new methods and altered terms for the transaction of business and most notably is this true of the price of the product offered for sale.

In spite of the added burdens cast upon the companies, namely, increase in length of ride and transfer privileges, better and more costly accommodations and service, higher cost of supplies and materials, higher wages paid, greater comparative contributions to the public revenues—advantages furnished to the public at greatly added cost to the companies—the price of the service has remained exactly the same as it was in the day of the primitive horse car, when the length of ride rarely exceeded 4 miles, over a single line, and usually without transfer privileges.

Legislative grants or ordinances, such as the one under discussion, which, on the one hand, impose regulative terms and conditions entailing expense upon the company and exactions in the way of annual contributions to the public treasury out of the company's resources, and, on the other hand, prescribe exactly how much the company may charge for its service, and how much of its service it must render in return for the price fixed, are an unreasonable invasion of the right of the private owner to conduct and control his own property, and in marked contrast to the more enlightened methods pursued in those communities where respect for the rights of private property and the limitations of the Constitution will stand as a bulwark against popular prejudices.

As an illustration of the "more enlightened" methods referred to, let us take the policy pursued in the Commonwealth of Massachusetts, where the railway public service corporations are under the jurisdiction and control of a Board of Railroad Commissioners—a body that has exercised its functions for over 50 years and is said to be, next to a similar body in the State of New Hampshire, the first established public service commission in the United States.

In Massachusetts, the Board of Railroad Commissioners has power to regulate rates, both upward and downward, but the owners of the properties fix their own rates. If it is desired afterward to increase or reduce the rate, the change may be made, but if a complaint to the commissioners follows, a public hearing must be held and a decision rendered by the board. The same rule covers transfer privileges.

This method concedes to the owners of the property their proper right to fix their own rates, and, furthermore, thereafter to make revision if a change in conditions demands it. Under such a plan, whatever burdens or exactions are imposed on the companies, in the public interests, will be tempered with restraint in view of the fact that every additional expense entailed necessarily diminishes the company's ability to afford the service required at the charges then current—and keep up at the same time payment to the owners of the property of a reasonable return on the money invested. This is sane regulation. It recognizes the rights not only of the public, but of the investor and owner; and so well has it worked in Massachusetts, and with so high a degree of public approval, that I venture to say there is no similar tribunal in the world that has, for so long a period of time, attained to an equal measure of popular commendation and confidence.

The inelasticity referred to is applicable, however, not only to the ordinance provisions fixing the rate of fare, but likewise to all regulative and supervisory terms and conditions and compensation requirements.

These matters are all such as may properly be referred to a tribunal for decision on the application of either party or of any properly interested person in the same manner as the question of the rate of fare may be referred for determination to a board of commissioners in Massachusetts. In this way burdens which are too severe may be mitigated and new conditions and terms be imposed as reason and justice demand.

COMPENSATION FEATURE LIMITS SERVICE

Secondly, criticism may be directed against the Chicago franchise, because of the compensation features worked out therein, which were intended to be a solution of the problem of securing to the city a fair return for the privileges granted. As pointed out above, the company is required to pay the city 55 per cent of the net receipts in excess of 5 per cent on the agreed valuations of the properties, as defined in the ordinances. In the three years since the new ordinances went into effect, that is, since Feb. 1, 1907, the Chicago Railways Company and the Chicago City Railway Company have paid into the city's treasury approximately $4,500,000 as the city's share (55 per cent) of the net receipts, and are paying heavy taxes annually, besides. This new and unique burden imposed upon the company amounts virtually to a tax upon the business or profits, as distinct from taxation upon real and personal property, capital stock or franchise. Moreover, it constitutes an indirect tax upon the public who ride in the cars, for the reason that these sums which might otherwise be expended upon improved service or applied in reduction of fares are now being heaped up in the municipality's treasury vaults "subject to the action of the City Council * * * to be kept and used for the purchase and construction of street railways" by the city.

In a very great measure this tax constitutes a serious limitation upon the company's ability to improve its service. This is the objectionable feature, from the public point of view. From the point of view of the company, the combined requirements for compensation, including taxes and city's 55 per cent of the net receipts, cost of sprinkling and cleaning, street paving and maintenance of pavement, and of snow and ice removal, and the other matters of expense above referred to, constitute too great a burden upon the resources of the company and detract from the attractiveness of street railway properties as an investment.

The aggregate of these contributions to the public treasury on the part of only one of the companies, viz., the Chicago Railways Company, amounted during the year 1909 to a sum total of 16.4 per cent of the gross receipts, and was equivalent to 54 per cent of the net income from operation (viz., gross income less operating expenses); or, to state it in terms of dollars and cents, the public received altogether $2,045,374, which is an aggregate of the following items: Taxes, $612,176; amount of interest charge on account of cost of all street paving, $300,000; cost of maintaining paving, $113,978; cost of removing snow and ice, $74,751; cost of street cleaning and sprinkling, $143,039; city's share (55 per cent) of the net receipts, $801,430.

Is it right that a street railway corporation, unlike a private manufacturing or industrial corporation, should be taxed so highly for its license to do business, and notwithstanding the enormous benefits and advantages which the public gains by granting a franchise for something which it did not have before, namely, transportation?

BENEFITS OF STREET RAILWAYS

It may be well to recall to the public what some of these benefits and advantages are:

First: Street railways are a well-recognized, prominent factor in the general development of communities, and particularly in creating an enhancement of property values. This rise in property values is of direct benefit, not only to the property owners themselves, but to the public, because of the great pecuniary benefit to the city through enhanced taxable revenue from outlying places made accessible, and from all parts of the city in proximity to the lines. So clearly recognized are the benefits to the community, from the opening or extension of transportation lines, that when the new rapid transit law was adopted, in New York, in 1909, there was

inserted a provision for the construction of lines from funds raised, under certain conditions, by assessment of the cost, in whole or in part, upon the property benefitted.

It has been stated that the increase in land values in northern Manhattan and the Bronx, due to the construction of the present New York subway, would not only have built the entire lines, but would have equipped them, provided the rolling stock, built power houses, and paid every other capital expense, and left a margin.

Among other incidental benefits arising out of the general stimulus and advancement afforded communities by the development of transportation facilities in all large cities may be mentioned the relief granted to overcrowding in congested neighborhoods; the bringing of the country nearer to the city, thereby multiplying the demand for private dwellings and affording the city dweller an opportunity to realize family home life in healthier and better surroundings, to which are attached the added advantages of increased space, light, air, comfort, and—last but not least—improved sanitation.

It would be difficult to overestimate the amount of benefit that has been conferred upon our cities in the foregoing details alone by the spread of transportation.

In the crowded streets of the city the trolley lines may, through some unfortunate accident, from time to time, destroy a human life, but many are the thousands of men, women and children, whose lives have been saved through the possibility they afford to the working classes of living outside of the hemmed in, unsanitary and unmoral walls of a city tenement.

Second: Street cars take up less space per passenger carried than any other type of public conveyance. A street-car line on a public street, therefore, reduces, instead of increases congestion on the public thoroughfares by carrying passengers who would otherwise walk or ride in cabs and omnibuses. Without street cars the congestion on our busy city sidewalks and public roadways would be immensely increased.

Third: The low rate of fare charged by street railways, as compared with fares charged for similar facilities on steam railroads, should be regarded as a public benefit. The benefit, too, is all the greater in view of the fact that for the same mileage a modern street railway in our large cities costs at least twice as much to construct and equip as the average steam railroad, and is also much more expensive to maintain.

Fourth: The quantity and quality of the service rendered are in some instances advantageous solely to the public. For example, lines are to be found on every large street railway system, which are being run at a loss, but are continued in operation for reasons which are certainly not founded on their pecuniary value to the companies. The same is true of the unremunerative all-night service of street railways.

We find, therefore, that besides the actual pecuniary burdens imposed upon the company for the benefit of the public, as above outlined, there are these additional public benefits of great value, the like of which are not afforded by any other class of corporation in the State, and yet all corporations are equally organized for profit, and are equally dependent upon the public for at least their corporate life. The fact that a street railway corporation exercises a quasi-public function of hauling passengers through the public streets should be a reason for reserving to the public a proper supervision and regulation, but affords no reason for imposing unusual burdens in the form of taxation.

CAPITAL EXPENDITURES

A third criticism is to be directed against the provisions of the Chicago ordinance, which provide for the definite ascertainment of what shall constitute "capital expenditures." To quote the ordinance: "After such three-year period of immediate rehabilitation, the cost of renewals shall be paid as provided in section 16 hereof, but such expenditures (and only such expenditures) as are made for the purpose of extensions of, or additions to, property, shall thereafter be considered as additions to capital, provided, however, that in the replacement of any principal part of the property, either existing or hereafter acquired, there shall be charged to capital the excess amount that the new property cost over the original cost of the property displaced." In the Chicago ordinances the companies were required to entirely rehabilitate their properties within three years from their acceptance of the grant. This three-year period is referred to as the period of "immediate rehabilitation." It may be of interest to remark that this work has been substantially performed at an expense up to July, 1910, of approximately $43,000,000.

The foregoing provision cannot be defended. It entirely disregards the possible future necessity for elaborate and costly changes and substitutions in the physical property of the company, due to a "change in the art," technically termed "obsolescence" (as illustrated by the changes already made from horse traction to cable traction, and from cable traction to electric trolley traction), or changes and substitutions due to present inadequacy on account of growth of business.

It is perfectly clear that no company would be able, out of its earnings, or out of its ordinary reserve funds, to provide sufficient capital with which to perform any such undertakings as those referred to in the foregoing paragraph.

Experience has demonstrated that such extraordinary changes as these, calling for the expenditure of great sums of money, cannot be provided for in the ordinary way, but necessitate the employment of the company's *capital,* whereby the cost of the improvement will be permanently added to and made a part of the investment.

Other items which are equally debarred by the provision of the ordinance just quoted, from participation in the capital expenditures of the Chicago companies, are the following:

First: Cost of municipal control, supervision and regulation after the rehabilitation period. This item amounted to nearly $300,000 per year, during the period of rehabilitation, and will probably amount to $100,000 per year during the subsequent franchise period.

Second: Cost of changing grade: The habit of the city authorities to change the grade of streets after a work of track reconstruction has been performed is of rather frequent occurrence. Obviously, the cost of such a work should be a part of the original cost of the work, and, therefore, a capital charge.

Third: Cost of track repairs where changes are made in the method of paving streets. This item is of the same general character as the preceding one.

Fourth: Cost of protecting tracks while sewers, gas pipes, water pipes, electric conduits, etc., are laid under them.

All of the foregoing items of expense are imposed upon the companies, because of exigencies with which they have no concern. But it is apparent that these items are not properly operating charges, as they have to do with the cost of the work and are, therefore, entitled to be capitalized.

A further criticism of the ordinance provision has to do with the consideration of the whole subject of what shall constitute proper maintenance and depreciation charges that may fairly and justly be required to be set aside out of earnings for the purpose of maintaining the utilities employed at their highest standard of efficiency, and preserve the capital investment, as near as may be, intact. It is the writer's opinion that the requirements of the ordinance in these regards are too severe, tending to unnecessary waste and dissipation of the funds set aside to these purposes, and arbitrarily depriving the company of a portion of its revenue, over and above what is reasonably requisite to the accomplishment of the ends desired.

It is announced by the Prussian State Railways Administration that plans are being prepared for the electrification of the main lines between Magdeburg, Zerbst, Leipsic and Halle, especially the Dessau-Bitterfeld section. According to a contemporary, a large central power house is to be erected at the village of Muldenstein, near Bitterfeld, the selection of this locality being due to the large quantities of cheap coal available in the district. Alternating-current electric locomotives are to be used employing current at 10,000 volts. Substations will be erected at Dessau and Bitterfeld.

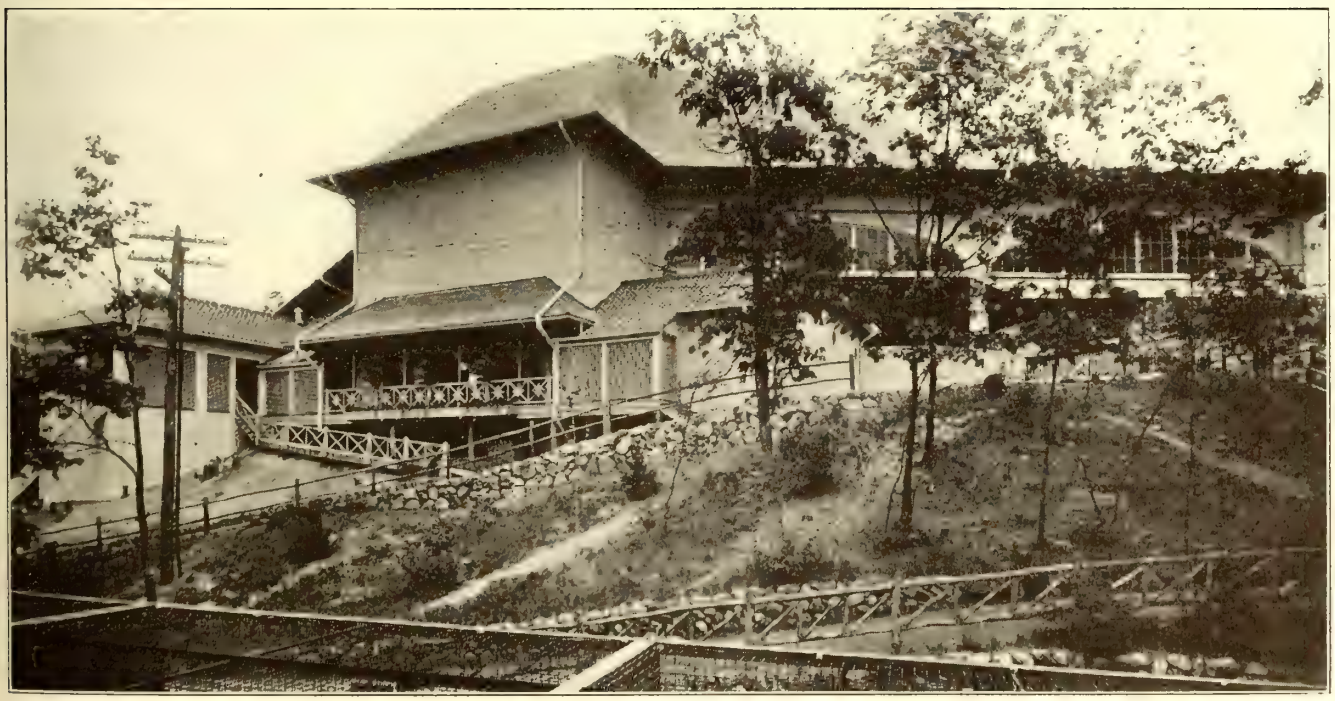
NEW THEATER AT NORUMBEGA PARK

A new steel and concrete open-air theater was opened for patronage at Norumbega Park, Auburndale, Mass., on May 23, on the lines of the Middlesex & Boston Street Railway Company. On June 4, 1909, the theater which had handled the business at the park for a number of years was burned to the ground, and a temporary structure was built in about a week to carry the patronage through the season. The methods of building the temporary theater were described in the ELECTRIC RAILWAY JOURNAL of June 26, 1909, page 1152, the performance being of a record-breaking character in the construction of a theater for street railway park service. The temporary theater provided for a total seating capacity of over 3600, and served its purpose excellently throughout the balance of the season of 1909. Plans were completed during the winter for a new theater which would be placed in service at the beginning of the present season, and construction was rushed accordingly.

The new theater is located on a knoll on substantially the same site as the former structures. It has a seating capacity of about 3500 and cost about $50,000. The general design consists of an amphitheater or auditorium of fan shape, with sloping floor focussing upon a central stage, the entire structure being surmounted by a roof of wood felt and asbestos supported on steel girders and cross-bracing. Interior and exterior views are presented. The auditorium is 131 ft. in width from the rear

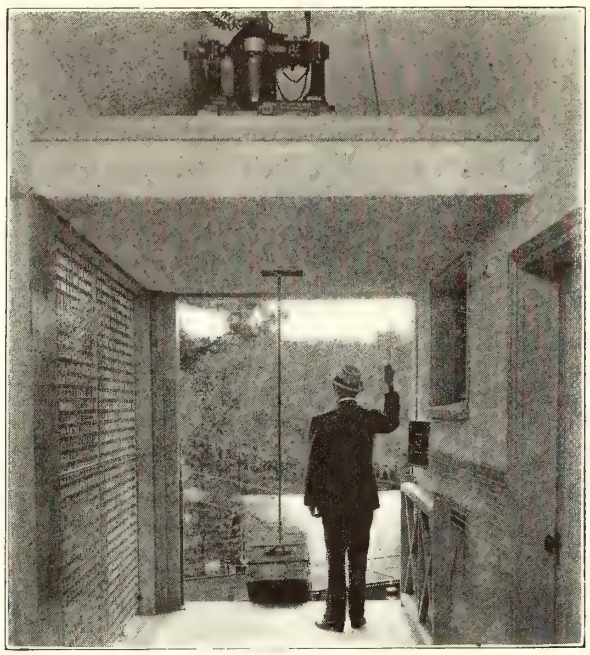


Norumbega Park Theater—Rear View



Norumbega Park Theater—Side View

wall to the footlights, and the two longest roof trusses are each 126 ft. over all and weigh 14 tons each. The stage is 37 ft. long by 33 ft. wide, and there is a total drop in the floor grade of about 20 ft. from the rear of the auditorium to the front. All the trusses are painted a sea-green color, and arches on each side of the stage are fitted with light green translucent "ripple" glass. Awnings are also provided for use in afternoon per-



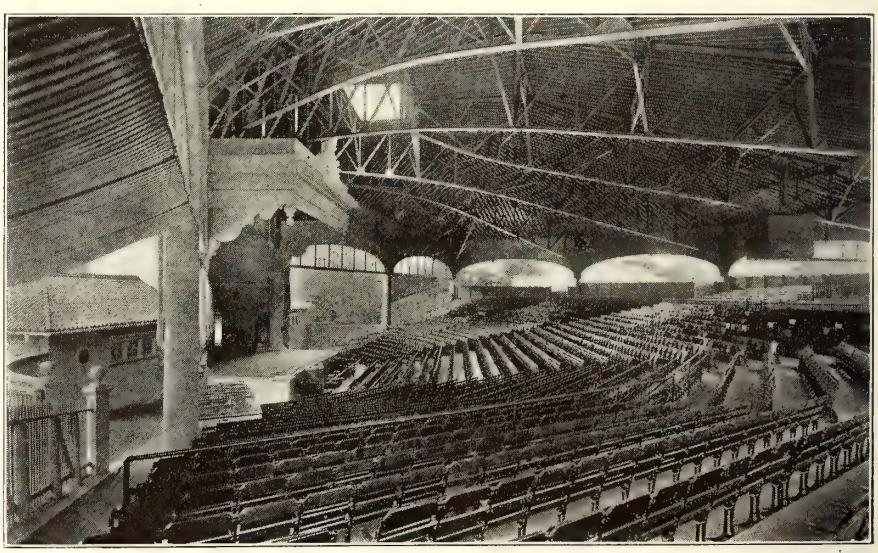
Norumbega Park Theater—Electric Baggage Hoist

formances when the western sun would otherwise interfere with the comfort of the audience.

The posts supporting the arches and roof circumference are built of reinforced concrete, and above these are panels carrying wreaths of staff which relieve the otherwise plain surface below the roof. The walls of the theater are 12 in. thick and are built of metal lathing. Ten enclosed arc lamps are provided for lighting the interior of the auditorium, these being run in two series circuits of 550 volts each. The roof contains 170 tons of steel, erected by the New England Structural Company, of Everett, Mass., and designed by J. R. Worcester & Company, of Boston, consulting engineers. Eight boxes are provided at the right and left of the stage, and a platform is built near the rear center of the auditorium for the use of moving-picture and other projecting equipment. All the wiring in the theater is run in conduit. The moving-picture machines are housed in a fireproof box of asbestos and steel. In the old theater this equipment was located on the floor, but in its new situation it occupies no salable space and is wholly out of reach of the audience. The boxes seat nine persons each and there are about 600 free seats in the auditorium. Red Spanish tiles were employed on the roofs of the property rooms, which are among the most complete in the country for open-air service.

The stage is flanked on each side by a dressing and green room, and below are various property rooms. There are five dressing rooms in the establishment, 12 ft. wide and from 8 ft. to 14 ft. long. An orchestral room 37 ft. long and 33 ft. wide is located below the stage, and a modern toilet installation is provided. The dressing rooms are furnished with running water, and all the lighting is controlled from a marble switchboard panel located in a cabinet at the rear of the stage. Each circuit is provided with a cartridge-type fuse mounted on the front of the board. The switchboard also carries an "Eclipse" ammeter and voltmeter. Every room is equipped with the International sprinkler system, there being a total of 61 heads installed. The operating pressure is about 125 lb. per square inch. The sprinklers are arranged to form a water curtain at the front of the stage, and the stage is provided with a hose line 2½ in. in diameter and 50 ft. long.

The borders, foots and passageways are lighted by incandescent lamps controlled from the stage board. There are 150 32-cp stage lamps, including 35 footlights and 80 frosted lights in the borders. Colored lights are used in the decoration of rustic flower pots at the rear of the stage, and an electric baggage hoist driven by a 2½-hp, 550-volt motor is installed at the rear of the stage. The capacity of the hoist is 800 lb., and the motor, as illustrated, is mounted in a niche above the passageway leading to the property and dressing rooms. Green, blue and other colored lights are used in the decoration of a balustrade at the rear of the stage in order to attract attention from points outside the theater. The theater is provided with a Couch & Seeley telephone equipment for interior service, and there are also various buzzer signals, lamp signals and a 10-station watchman's clock system in use. A telephone is provided in connection with the box office, so that the stage manager can keep in touch at all times with the conditions outside. The appearance of the theater is equally attractive from the front, sides and rear. In its completeness of equipment and excellence of ornamentation it is rivalled by few similar structures used in connection with electric railway operation and patronage. The arrangement in many details is due to Carl Alberte, manager of Norumbega Park, while the general supervision of the work has been handled by Carl A. Sylvester, general manager of the Middlesex & Boston Railway Company. The patronage of the park during the present season is exceeding some of the best records of the past.



Norumbega Park Theater—Interior View

According to *South Africa* the Durban Corporation Tramways at Natal, South Africa, is to try the experiment of having a number of car bodies built locally in the shops of the Natal Government Railway. The present cost of the tramways car bodies built in the United States and shipped to Durban is £410 which includes charges of £112 for freight, packing, and insurance, etc. The cost of wiring and fitting these bodies in Durban amounts to about £100, making the total cost about £510. The cost of one experimental car of the same type built at the shops of the Government Railway was £512, and the tramway system has now on order five cars to be built at these shops at an estimated cost of £400. To this sum must be added £420 for the truck and electrical equipment, making a total of £820.

MEETING OF COMMITTEE ON WAY MATTERS IN NEW YORK

A meeting of the committee on way matters of the American Street and Interurban Railway Engineering Association was held in New York on Monday, July 25, at the headquarters of the American Street and Interurban Railway Association. The committee members present were George Weston, assistant chief engineer, Board of Supervising Engineers, Chicago Traction, Chicago, Ill.; Martin Schreiber, engineer of maintenance of way, Public Service Railway, Newark, N. J.; M. J. French, engineer of maintenance of way, Utica & Mohawk Valley Railway, Utica, N. Y.; C. L. Crabbs, engineer of way and structure, Brooklyn (N. Y.) Rapid Transit Company. There was also present to assist the committee R. F. Kelker, division engineer track and roadway, Board of Supervising Engineers, Chicago Traction, Chicago, Ill. In addition to these gentlemen, there were present later in the day to discuss rail specifications and special work the following representatives of rail manufacturers and rail inspectors: Victor Angerer, William Wharton, Jr., & Company; H. C. Stiff, Lorain Steel Company; F. D. Carney and C. A. Alden, Pennsylvania Steel Company; C. W. Gennet, Jr., Robert W. Hunt & Company.

The chairman of this committee is E. O. Ackerman, engineer of maintenance of way, Columbus (Ohio) Railway & Light Company, who telegraphed that he would be unable to preside at the meeting owing to the strike in Columbus. At his request, Mr. Schreiber took the chair. Mr. Ackerman, however, mailed to the committee his report on rails, while the other absent member, J. M. Larned, engineer maintenance of way, Pittsburgh (Pa.) Railways Company, mailed his report on specifications for open-hearth steel rails.

In opening the discussion on rail specifications, Mr. Weston referred to those used by the Board of Supervising Engineers, Chicago Traction, and said that the Chicago specification called for high carbon content. While the brittleness thus produced would be dangerous in steam railroad work, that was not the case in paved streets, where a broken rail might be objectionable but not very serious. What the street railway companies wanted for paved streets was an extremely hard rail. Railmakers would agree to manufacture such a rail but they asked an extra price. After discussion with the railmakers and laboratory representatives, Mr. Weston concluded in the Chicago work to reduce the percentage of carbon originally demanded to save paying the additional cost. Mr. Schreiber said that 75 points of carbon gave the finest kinds of results according to the experience of the Interborough Rapid Transit Company of New York. George H. Pegram, chief engineer of that company, had informed him that such rails were giving much longer life than Bessemer.

Mr. Weston brought up the question of joints which had been assigned to him. In his behalf, the committee should not recommend any particular type of joint, but should present a report giving a list of the principal mechanical and welded joints and describe the conditions for which they appear to be most suitable. In other words, a progress report could be presented to be supplemented from year to year as more experience developed in connection with the newer designs. The other members agreed that this was the proper thing to do. Mr. Weston will therefore prepare a report on joints along these lines. There was some discussion on the effect which rail inequalities and irregular alignments have on mechanical joints. Mr. Weston thought that rails at the joints should always be butted and inequalties in the height of the rail should be ground off. Mr. Schreiber then described the machine which John Kerwin, superintendent of tracks of the Detroit United Railway, had devised for successfully grinding old rail and even taking out corrugations.

Mr. Weston then read from the advance proofs of the second annual report of the Board of Supervising Engineers, Chicago Traction, some statements relative to experience with manganese steel track work. Three specimens had been tested to ascertain if there was any particular difference in the character of the manganese received from the different manufacturers, but both the physical and chemical tests showed that they were practically alike. Mr. French thought that rather than tell the manufacturer just what he ought to use, it would be better to ask for a guarantee of life.

At this point, the representatives of the rail manufacturers and inspection bureau were invited to discuss with the committee the report which Mr. Larned had submitted on rail specifications. "Bled" ingots were first discussed. Mr. Larned's specification read that no ingot should be used from the interior of which the liquid steel had been permitted to escape. Mr. Carney said this paragraph had been applicable only when ingots were cast in pits and that such troubles were very rare in modern manufacture. Mr. Gennet said that in 25 years' experience he had not seen a single "bled" ingot. Mr. Carney also objected to the paragraph on chilled heats which said that no ingot should be used from a heat in which the steel had been pricked or poured over the top of the ladle. He said that this specification really applied to Bessemer practice. It was quite a common thing in open-hearth work for the stoppers to come out and if the mill was not allowed to judge whether the steel was hot enough to use, this particular paragraph would prevent the use of a metal every time it had to be poured over the top of the ladle. Mr. Weston agreed with Mr. Carney that this paragraph was not of vital importance. Mr. Carney said that the specifications might have been all right with the old Bessemer practice where there were great variations in temperature but such variations do not occur in open-hearth practice. Mr. Gennet said the whole paragraph covered rather a small point and might be omitted. Mr. Schreiber was also of the same opinion, and the committee therefore agreed to reserve decision on this point. Decision was also reserved on retaining the paragraph with reference to reheating which stated that care should be taken to avoid burning the steel. Mr. Carney objected to this, saying that if the inspector should happen to find cinders in the corner of one ingot, he might condemn the whole lot. The cinders were burned out anyway and did no harm. There was no objection to the paragraph on analyses.

The next subject was mechanical composition, in which two classifications, "A" and "B," were made. These read as follows:

Rails Rolled Under Classification A.	Lower Limit.	Desired Composition.	Upper Limit.
Carbon	0.72 per cent	0.77 per cent	0.85 per cent
Manganese	0.60 per cent	0.80 per cent	0.90 per cent
Silicon	0.10 per cent	0.15 per cent	0.20 per cent
Phosphorus	.....	.....	0.03 per cent
Sulphur	.....	.....	0.06 per cent

Rails Rolled Under Classification B.	Lower Limit.	Desired Composition.	Upper Limit.
Carbon	0.60 per cent	0.68 per cent	0.75 per cent
Manganese	0.60 per cent	0.80 per cent	0.90 per cent
Silicon	0.10 per cent	0.15 per cent	0.20 per cent
Phosphorus	.....	.....	0.04 per cent
Sulphur	.....	.....	0.06 per cent

Mr. Carney thought the percentage of carbon was too high. He said that if two kinds of composition were called for, it meant a difference in price. The Pennsylvania Railroad paid $2 a ton extra for .03 phosphorus. Classification "B" was all right for unsymmetrical sections and both open-hearth and Bessemer rails would cost the same under that classification. Mr. Schreiber thought that it was very desirable to have both classifications specified irrespective of price. His company had pretty conclusive evidence that higher carbon content would be much better for street railway practice. In the latter, there were no heavy rolling loads, and broken rails were practically unknown. If the manufacturers wanted any more money for such a rail, the railways could figure out for themselves whether it would profit them to pay the additional price. Mr. Carney thought the specification should definitely state that it intended to cover rail for paved streets such as girders and high Ts. Mr. Schreiber said that there was no reason why street railways should be guided by steam railroad conditions. To him, open-hearth rail appeared very desirable. He thought

the rails for the future would be high Ts and heavy girders, having a large groove and laid with the center of the rail offset from the gage line. Mr. Carney said that it would be many years before the present variety of old sections would be eliminated. If the specifications were intended to cover special conditions, they should so state. Mr. Schreiber also doubted whether a general specification should be expected to cover the enormous number of sections now in use. He was therefore willing to put some kind of a limitation in the specifications regarding the sections to which it should be applicable. Mr. Weston said that there was nothing to prevent the manufacturer from objecting to rolling certain shapes in case he thought the specification was unsuitable for them. Mr. Schreiber asked Mr. Carney what changes he would recommend in composition, assuming that two classifications were adopted. Mr. Carney said that, in his opinion, the compositions as they were specified were not logical. For example, carbon was raised 10 points for a difference of .01 in phosphorus. Mr. Carney said, referring to specification "A," in which the carbon ranged from a lower limit of 72 points to an upper limit of 85 points, that he found the manganese all right but did not believe in a lower limit of .10 for silicon. If he drew the specifications, he would not put any lower limit on silicon but would simply say that it should not exceed .20. The amount of silicon depended more or less on the dimensions of the ingot. Mr. Weston said that the Chicago specifications read "Silicon not to exceed .20 but .15 desired." Messrs. Weston and Schreiber agreed that the reference to sulphur could be omitted from the specifications. Mr. Weston asked Mr. Carney that, assuming a steel with the higher limit of carbon was permissible, what his criticism would be about the rest of the specification. Mr. Carney repeated that he would like to see phosphorus .04 as in classification "B."

Mr. Gennet said that by specifying two classifications, the railways could be given absolutely cold steel which had been reheated. This was a serious matter. If a ton of classification "B" were ordered, and there was obtained a heat with 80 points of carbon and .035 phosphorus, the maker could not roll it in the specified rail. He would have to set the ingots aside and reheat them later for rolling for classification "B" rail ordered by some other company. The less there was specified with regard to commercial composition the better. Mr. Schreiber thought that possibly the simplest thing to do would be to specify a certain carbon content and leave the rest of the composition to the judgment of the railmaker. It was decided by the committee to consider carefully the points brought out in the discussion. There was no objection to the paragraph on discards.

The next paragraph was on rolling and stated that the number of passes and speed of trains should be so regulated that on leaving the rails at the final pass, the temperatures of the head of the rails should not exceed 1900 deg. Fahr. for rails weighing 100 lb. and upward and 1700 deg. Fahr. for rails weighing less than 100 lb. Messrs. Carney and Stiff protested against this paragraph, the substance of their objections being that much depended on the character of the rail section, especially the thickness of the web, which might vary from 9-16 in. to 6-16 in. Mr. Weston said that in the original Chicago specification, the final pass heat of 2000 deg. Fahr. had been specified, but after the first year's experience the temperature was reduced to 1900 deg. Mr. Carney said that the Chicago rail section was especially well designed and the conditions that applied to it were not generally applicable to other girder rail and T-sections. Mr. Gennet thought that the temperature requirements were likely to tie up the manufacturer. His experience with pyrometer measurements was that it was very easy to get variations of 150 deg. to 200 deg., especially if the readings were taken at different parts of the rail. There were no objections to the paragraph on branding, straightening, finish, drilling and punching.

The next subject discussed was the conformity of the rail section to the templates, with a list of the following permissible variations: Height, 1-64 in. under, 1-32 in. over; height of head and tram, ⅛ in. under and over; height of base, ⅛ in. under and over; variations in width at gage line not to exceed 1-32 in. Variations in dimensions affecting splice bars not to be permitted.

There was no special discussion on the paragraph relating to the weight of the rails except that Mr. Carney suggested that a greater allowance than ½ of 1 per cent on the specified weight would possibly be more satisfactory. The subject of rail lengths was then taken up. Mr. Carney said that 30 ft. to 32 ft. were standard lengths for steam railroad work, but the committee members pointed out that in street railway service it was desirable to have the longest possible rails on account of the joints being concealed. Lengths of 60 ft. to 62 ft. were most common. Mr. Weston said that the Chicago limits vary from 56 ft. to 58 ft. Mr. Schreiber said that he had 116-lb. rails which were 62 ft. long and also a 114-lb. rail which was 66 ft. long. The latter length had proved too great, however, to be handled conveniently around street corners and other places. It was finally decided that the paragraph on lengths should include some clause like the following: "Lengths of rails at a temperature of 60 deg. Fahr. shall be 60 ft. to 62 ft. when the weight of the rail per yard will permit. Ten per cent of the entire order will be accepted in shorter lengths. A maximum variation of —— in. will be allowed in length."

In accordance with Mr. Gennet's suggestion, the paragraph on drop-testing machines was revised as follows: "The drop-testing machine shall be that recommended by the American Railway Engineering and Maintenance of Way Association." The next subject discussed was that of drop testing. The specification had been left blank for the height of drop covering rails weighing 100 lb. per yard and upward and rails weighing less than 100 lb. per yard. Mr. Carney suggested 8 ft. for the heavier rail, while Mr. Weston thought that not less than 10 ft. should be considered. The Chicago specifications, in fact, called for 18 ft. Mr. Gennet thought it should not be made less than 15 ft. Mr. Carney said that if a high drop was put in, the manufacturer might be tempted to work along to the lower limit of the specification. If the street railways wanted a higher carbon content, they must expect to reduce the drop. Mr. Schreiber agreed with Mr. Carney on this point. Mr. Carney pointed out that another reason for objecting to a high drop was that the rails were unbalanced sections and it would be wrong to submit them to the same requirements as a symmetrical T-rail. Mr. Weston admitted that the drop test was not as important to street railways as to steam railroads, but suggested that the committee adopt 15 ft. for the drop, reducing it later if experience showed that such a drop would limit the carbon percentages. Messrs. Carney and Stiff said that their companies would be willing to make drop tests for the association. Mr. Schreiber suggested that a dozen representative sections might be tried. There was some discussion on the number of drop tests which should be made on each heat. Mr. Weston said that two drop tests were made and if one showed a failure, a third was tried. The heat was rejected if two out of three rails failed. Mr. Carney said that if two drop tests were made on a heat, it meant another short rail. The Baltimore & Ohio Railroad was the only steam railroad in the United States which required two drop tests. All other lines were satisfied with one

The committee then returned to the subject of branding, and it was decided that the heat number should also be added to each rail at a place where it would not be covered up later by splice bars, and that section numbers should be added immediately after the weight. In considering the paragraph on No. 2 rails, second quality, it was suggested that no reference should be made to the lower price for No. 2 rails, so that the final clause of this paragraph would read: "No. 2 rails will be accepted to the extent of 10 per cent by weight of the entire order. Mr. Gennet suggested that a little more might be said about what kind of rail would be accepted as No. 2, with regard to such defects as lumpiness, pipes, etc. Mr. Car-

ney thought that piped rails could be acceptable as No. 2 if they stood the drop test. Mr. Gennet said that rails which show piping should be cut down to the shortest length permissible and if the pipe was not then visible, the rail could be accepted as No. 2. Rails slightly off section could also be classified at No. 2, but they were not applicable to conditions where plain or braced tie-plates and screw-spikes were used. The rest of the specifications referred to distinguishing marks, handling, loading and inspection. Mr. Weston, in the absence of Mr. Larned, volunteered to prepare the modified specification and forward it to Mr. Ackerman. The committee approved Mr. Larned's report on manganese rails.

Mr. French then submitted some rules for gage and flangeways in curves and referred briefly to the work that had already been done on that subject by the association, as reported in its last year's proceedings. There was considerable discussion on these rules by Messrs. French, Angerer and Alden, with the result that certain amendments were made. Mr. French said he had included in the Engineering Association's question box the subject of "Clearance between Street Surface or any Other Obstruction and the Rolling Equipment." The answers could be assembled later for the committee's report.

Mr. Ackerman sent in a report on the standardization of girder rail, including nine blue-prints of various sections, four of which had already been recommended in the past by the association. It was the general opinion of the committee that, inasmuch as the standard rail adopted by the committee had not yet been adopted by anybody, although the Cleveland Electric Railway's rail was almost exactly the same, it would be unwise at this time to add any more proposed sections. Mr. Schreiber thought that the matter ought to be allowed to stand over another year, when more information would be available on the behavior of those sections which most closely approach the standard. Mr. Angerer suggested that it might be possible to pick out from some of the present sections a number of standards which could be recommended for general use. The Boston section was worthy of particular attention. One of the members stated that the Connecticut Company which operates in a large number of cities and towns and villages, under various conditions, had found it possible to get along with only two sections, which showed what could be done when there was unity of purpose. Mr. Schreiber said that it was a pity that the standards suggested by the association had not been properly advertised. He thought that the railmakers would have gladly shown them in their catalogs if the matter had been brought to their attention. Mr. Kelker said that the manufacturers could also help standardization along if they would advise the committee what sections were considered obsolete. Mr. French suggested that the proposed standard rail sections should be illustrated in the next committee report.

The next subject was standard layouts for special work, which are to be considered in Mr. Schreiber's report on mechanical maintenance. Mr. Schreiber and the manufacturers of special work present agreed that most of the standardization would have to be on switch pieces rather than on frogs or curve rails. Mr. Schreiber pointed out how he had succeeded in using 100-ft. switches in almost all situations. Messrs. Weston and Kelker also said that while they were obliged to use 80-ft. and 160-ft. switches in Chicago, they had nevertheless succeeded in standardizing a great many details. Mr. Alden stated that, anticipating a discussion of this subject by the committee, there had been held a conference between the principal special work manufacturers, as a result of which there had been prepared a blue-print showing standard switches and mates, standard frogs for turn-outs and cross-overs. The tables and drawings accompanying the print also contained the recommendation that the 100-ft. radius lateral and 200-ft. radius Y should be used wherever practicable. Mr. Alden said that the proposed standard had been approved by the following companies: Barbour-Stockwell Company, Buda Company, New York Switch & Crossing Company, Cleveland Frog & Crossing Company, Lorain Steel Company, Pennsylvania Steel Company, William Wharton, Jr., & Company. Mr. Alden submitted some figures showing that about 52 per cent of the switches made by his company were for 100-ft. radius. Mr. Schreiber said that the point was not necessarily the adoption of a 100-ft. radius switch as the standard, but the primary thing was to get standard dimensions for different radii. To his knowledge, quite a number of large companies were using 100-ft. radius switches, among them being the Public Service Railway, Newark, N. J.; the International Railway Company, Buffalo, N. Y.; the Detroit (Mich.) United Railway, and the Cleveland (Ohio) Electric Railway.

The meeting closed with a discussion on rail corrugation, opened by Mr. Crabbs, who mentioned the various theories. He thought that a harder rail would tend to reduce this trouble. The members also gave the experiences they have had with various grinding machines for removing corrugation.

RESOLUTIONS ON THE DEATH OF FREDERICK H. LINCOLN

A committee composed of H. H. Adams, chairman, Paul Winsor and J. S. Doyle which was appointed by W. J. Harvie, acting president of the American Street & Interurban Railway Engineering Association, has sent to the family of Frederick H. Lincoln an engrossed copy of the following resolutions expressing in fitting terms the sorrow of the members of the Engineering Association in his death:

"*Whereas,* through the tragic death of Frederick H. Lincoln the American Street & Interurban Railway Engineering Association has been deprived of the services and wise counsel of an honored past president and an esteemed and valuable member; and,

"*Whereas* his associates in the electric railway industry with which he was conspicuously identified for more than 20 years have suffered the loss of a friend, who by his marked ability in electric railway engineering, high character and amiable personality endeared himself to all who knew him, it is hereby

"*Resolved* that this association place on record in its minutes its profound sorrow and sense of bereavement in his death and its high appreciation of his engineering attainments and inventive achievements; and it is also

"*Resolved* that an engrossed copy of these resolutions be sent to his family as an expression of heartfelt sympathy from the members of this association."

HUNGARIAN ELECTRIC RAILWAYS

The Hungarian Government has issued the following statistics of electric railways of Hungary at the end of 1909:

(*a*) Interurban.	Single track km.*	Double track km.	Route length km.
Budapest-Budafok	12.470	8.373	13.274
Budapest-Szentlörincz	12.114	8.265	11.690
Hölak-Trencsénteplicz	5.936	—	5.538
Miskolcz-Diósgyör	8.277	—	6.943
Poprádfelka-Tátrafüred	15.700	—	15.700
(*a*) Total	54.497	16.638	53.145
(*b*) City.			
Budapest Street Railway	71.960	67.955	71.885
Budapest City Railway	48.156	45.149	48.085
Franz Josef Subway (in Budapest)	3.700	3.700	3.700
Budapest-Ujpest-Rákospalota	16.488	11.267	17.208
Budapest Suburban Lines Operated by Budapest Street Railway	6.841	3.725	6.770
Fiuman	4.413	—	3.982
Miskolcz	7.347	—	6.578
Nagyszeben	2.395	—	2.395
Nagyvárad	19.184	1.810	15.763
Pozsony	11.027	3.227	7.800
Sopron	4.578	—	3.810
Szabadka	10.000	—	10.000
Szeged	14.436	4.250	14.436
Szombathely	3.026	—	2.810
Temesvár	10.877	6.849	10.877
(*b*) Total	234.428	147.032	226.099
(*a*+*b*) Grand total	288.925	164.570	279.244

* Kilometer = .62 mile.

The total increase in single trackage over the preceding year was 28.541 km.

AN ENGINEER'S SUGGESTION TO CONTRACTORS AND MANUFACTURERS' AGENTS

BY E. P. ROBERTS, PRESIDENT THE ROBERTS & ABBOTT COMPANY

Whenever even the vaguest and most fragmentary item is published in the technical press concerning some proposed railway, or other construction work, the consulting engineer for the project is overwhelmed by a mass of letters and advertising matter from labor contractors and manufacturers of every kind of material. As it is impracticable for most consulting engineers to answer all of these letters or acknowledge all of the catalogs thoroughly without a great increase in their office force, a large part of these communications finds its way to the waste-basket to the chagrin of the would-be contractor and to the possible detriment of the engineer's client. This fact does not indicate that the engineer does not desire to be courteous in answering all legitimate inquiries. In fact, he desires to be informed relative to all machinery or material applicable to his line of work, its peculiar or special field, its limitations and its cost; also to know who are the most reliable contractors in different parts of the country. Of course a large part of this information is already in his files, but these files have necessarily to be replenished and renewed continuously, for conditions with regard to men and apparatus are always changing.

The relative position of the engineer and the seller is the same as with ordinary business, the primary interest is that of the seller. He must compete whereas the buyer simply exercises the right of selection. It follows, therefore, that the easier it is for the engineer to reply to the inquiries of the seller the more likely is that seller to attract attention and eventually obtain the coveted order.

First of all it is advisable for the seller to ask all of his questions on a standard form because the engineer will then be more likely to file the questions and answers for his own use when that particular point in the work is reached. An agreement between manufacturers and contractors on the one hand and engineers and architects on the other might be made with regard to the character of such a form. National organizations would be a good medium for the authoritative development and adoption of an inquiry blank of this kind. However, it is not necessary to wait for the necessarily slow action of large bodies since there is nothing to prevent individuals from devising forms to simplify the work of preparing and answering inquiries.

These forms should cover two classes of data as follows:

First, the information the contractor, manufacturer or supply agent wishes to convey relative to himself or to his products; second, the information wanted by the inquirer from the engineer relative to the project. It is desirable, of course, that a stamped return envelope should accompany this request for data, as it will almost assure a reply, or at least an acknowledgment.

The first form, namely that relating to the seller's description of his apparatus, should be either on commercial size letter paper or on a card suitable for card files of a standard size. If the information can be given on a single card (even using both sides), the latter is preferable if a standard size card can be agreed upon. The second form, which contains the questions to be answered by the engineer, should be on commercial size letter paper and be forwarded in duplicate in order that the engineer may retain a copy for his own record. On both of these forms, the spacing between all writing should be liberal so as not to require undue care by the stenographer in registering the data and to avoid misunderstanding.

The wording of the form is important but the following suggestions may be of service:

FORM NO. 1

No. 1. Business of sender, such as grading contractor, bridge and structural steel, coal and ash handling machinery).

No. 3. Name of sender.

No. 4. Address of principal office.

No. 5. Address of agent nearest engineer's office.

No. 6. If sending relative to some specific job—so state.

No. 7. If sending merely to be placed on engineer's principal list—so state.

No. 8. If forwarding catalog, blue prints, prices, or other data—so state.

No. 9. If representative is about to call—so state.

No. 10. If the sender is not known to the engineer, give references. (a) Customers. (b) Financial—bank, etc.

No. 11. Work done of similar character, especially near home office of engineer.

The following is an example of form No. 1 filled out for an assumed case, it being noted that the portion in brackets is to be filled in and the balance printed as above outlined.

No. 1. (Grading contractor.) No. 2. Date (Apr. 22, 1910.)

No. 3. (Jones & Company.)

No. 4. Principal office (Chicago, 200 X Street).

No. 5. Agent nearest your Cleveland office (Adams & Company, Cleveland, Ohio).

No. 6. Are writing to you relative to (the grading for the X-Y Railroad).

No. 7. Are sending you our name and information requesting that you investigate, and place us on your list of (grading contractors).

No. 8. Are forwarding by mail * (Adams)—express catalogs*, blue prints of.....*, price list and discount sheet*, approximate weights*, approximate general dimensions.

No. 9. Our Mr. (A. J. Smith) will call on you about (April 5th). He is (not) authorized to quote prices.

No. 10. We refer to (a) (M. & N. Railroad, chief engineer, A. Brown, Chicago).

(b) (The First National Bank, Chicago.)

No. 11. We did the grading on the B. & O. Railroad near Columbus, Ohio.

Note: *Cross out if to be omitted.

FORM NO. 2

Sent in duplicate—portion in ( ) filled in by Jones & Co.—portion in [ ] filled in only by the engineer.

No. 1. Relative to (X. & Y. R. R.—grading), Jones & Co. Jones & Co. Serial No (1027).

No. 2. Received from (The R. & A. Co., consulting engineers, Cleveland, Ohio). Their Serial No. [F-100].

No. 3. Sent (April 22, 1910), received reply (April 25, 1910).

No. 4. When will specifications and plans be ready for bidders?—[About June 1, 1910], or [not now known].

No. 5. Where can we see specifications and plans? [Our Cleveland office.]

No. 6. Will you send us copy of specifications and plans, we agreeing to be responsible for same and return them when and as instructed, and to pay transportation charges?

[Yes.]

[No.]

[Can not now state.]

No. 7. Will (grading) be let separately? [Yes.]

No. 8. Will (grading) be included in bid of (a general contractor)? [May be.]

Alternative. Example: Will (valves) be included in general piping contractor's bid? [Yes.]

No. 9. Do you wish us to send you

(a) Catalogs.

(b) General dimension prints.

(c) Weights.

(d) Prices for estimating.

(e) Please inform us as to any other information or data you desire relative to our (goods), (work).

[Send A. & D. for.....]

No. 10. How long after plans and specifications are on file for bidders before bids must be in?

[Approximately two weeks.]

No. 11. Is there any additional information you desire rel

ative to us, our work, goods, or financial standing, if so, please state.

The writer realizes, of course, that there is other information which the contractor or manufacturer often desires. Some of this information the engineer can not give, and some he may not desired to give until the specifications are complete, as, for example:

When will bids be opened?

Where will bids be opened?

When will contract be awarded?

Where will contract be awarded?

When the bids are in, the engineer opens and tabulates them and consults his client. This takes time. He may desire further information relative to some of the bids or bidders. He does not want bidders hanging around his office for several days or possibly weeks, and it is not fair to the bidders to put them to this unnecessary expense. The engineer and his client may decide that the contract will be awarded to some one bidder without further notice, or that it is advisable to have two or three appear before them, and so will notify such bidders. It is not fair to notify bidders merely to use them as a club for their competitors, but, unfortunately, this is done. The bidder should be treated honorably in all cases.

The bidder sometimes asks for information as to the financial standing of the "Purchaser" or "Owner." The proper party to answer such question is a credit agency, not the consulting engineer.

ANNUAL REPORT OF THE VIENNA MUNICIPAL TRAMWAYS

Through the courtesy of director Spangler, the following particulars are available from the annual report of the Vienna municipal street railways for the year 1909: This system comprises 498 km (308.76 miles) of track of which 38 km (23.56 miles) were operated by steam, 30 km (18.6 miles) were operated by electric conduit and the rest by overhead trolley. During the year the electric lines operated 75,923,000 car-km (47,072,260 car miles) over 199 km (123.38 miles) of road, an increase of 9.36 per cent over the car-miles of the preceding year. The passenger revenue was 37,050,835 crowns ($7,410,167) an increase of 9.4 per cent over the preceding year. This gave an income of 48.8 hellers per car km (15.5 cents per car mile). The operating cost per car km excluding charges for employees' welfare and accidents was 29.9 hellers (9.6 cents per car mile); including all charges the cost was 33.4 hellers per car-km (10.7 cents per car mile). The operating expenses were 60.6 per cent of the gross earnings, excluding welfare and accident charges and 61.1 per cent including them. After paying all fixed charges, reserve fund allotments, 2,700,000 crowns ($540,000) were turned over to the municipality for the relief of taxes. The largest amount of traffic on any one day was Oct. 30 when 940,000 passengers were carried. This added to the traffic of Oct. 31 made a total of 609,000 passengers carried over 524,000 car-km (324,880 car miles). The day of maximum traffic required 1097 motor cars, 1131 trailers and 5310 platform men.

In view of the increased cost of operation and the larger amounts set aside for various welfare purposes several fare increases were made, among which were the following: Children's fares from 10 hellers (2 cents) to 12 heller (2.4 cents); early morning service up to 7.30 a. m. raised 2 hellers (0.4 cent) and owl car service after 11 p. m. increased 8 hellers (1.6 cents). During the year the municipality built six car houses. Experiments with current time clocks were so successful that it was determined to install these devices on all cars. Extensive tests were also made with both grease and oil for gear lubrications as the result of which oil was adopted as standard. At present experiments are being conducted with interpole motors; motors with oxidized aluminum field coils; various types of brakes including the Ackley; ball bearings for car axles; and the placing of motor grid resistances so that they can be used for heating the car in winter.

MEETING OF COMMITTEE ON HEAVY ELECTRIC TRACTION

The committee on heavy electric traction of the American Street & Interurban Railway Engineering Association held a meeting at the association office in New York on Aug. 2 to consider proposed changes in the specifications for heat-treated axles which were referred back to this committee at the Denver convention. Those present were: J. S. Doyle, Interborough Rapid Transit Company, chairman; Norman Litchfield, Interborough Rapid Transit Company; W. A. Bostwick, Carnegie Steel Company; E. A. C. Acker, Bethlehem Steel Company; W. P. Barba, Midvale Steel Company; Mr. Furness, Midvale Steel Company, and J. L. Replogle, Cambria Steel Company.

The advisability of presenting two sets of specifications, one covering high-grade material suitable for the most severe service and the other covering moderately good material for ordinary service which could be furnished at a lower price, was first discussed. It was the consensus of opinion that only one specification for high-grade steel should be recommended for adoption as standard, as the service to which any axle is put is such that the best material obtainable at a reasonable price should be used throughout. It was pointed out that during the past year a number of companies had made inquiries for prices on heat-treated axles to be furnished to a specification practically the same as that finally adopted by the meeting.

The details of the proposed standard specification were then taken up and the following physical properties were approved: Ultimate tensile strength, 85,000 lb. per square inch. Elastic limit, 50,000 lb. per square inch. Elongation, 22 per cent. Reduction of area, 45 per cent. The elastic limit is to be determined by extensometer readings, the increments of load between readings above 40,000 lb. to be 1000 lb. The percentage of phosphorus is to be not more than 0.04. It was recommended that warped axles be straightened hot and before offering the axles for test.

The chairman stated that a report of the minutes of the meeting would be sent to each of those present for their criticism or approval before the report is printed for distribution early in September.

PHILADELPHIA RAPID TRANSIT FIRE INSURANCE

The Philadelphia Rapid Transit Company has completed the placing of its fire insurance. The total amount for which its properties are insured is $16,000,000; the rate is 50 cents on the hundred dollars. The insurance is divided into four items, as follows:

Buildings, $4,169,000; contents of buildings, $5,831,000; rolling stock other than that leased from the Union Traction Company, $4,500,000; rolling stock leased from the Union Traction Company, $1,500,000.

It is provided that losses under the first three items shall be payable to the Rapid Transit Company, and that losses under the last item shall be payable to the Commercial Trust Company, trustee of the equipment lease upon which the loan of $1,500,000 was recently negotiated, by which the Union Traction Company purchased the equipment from the Philadelphia Rapid Transit Company.

The heaviest items of insurance on buildings and their contents are the following: General offices and shops at Eighth and Dauphin streets, buildings, $220,000; contents, $200,000; shops at Kensington Avenue and Cumberland Street, buildings, $235,000; contents, $200,000; substation, Sansom Street below Eighth, building, $40,000; contents, $150,000.

The company's buildings in Delaware County are insured for $310,500 and their contents for $120,000, a total of $430,500. Insurance on the Montgomery County buildings is $102,000 and on their contents $222,500.

Green has been adopted as the standard body color for the cars of the Jacksonville (Fla.) Electric Company.

A. S. & I. R. A. NEWS

J. W. Corning, secretary of the American Street & Interurban Railway Engineering Association, announces the appointment by Acting President Harvie of H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, New York, as chairman of the committee on power generation of the Engineering Association. Mr. Stott takes the place made vacant by the resignation of William S. Twining, recently chief engineer of the Philadelphia Rapid Transit Company.

H. C. Donecker, secretary of the American Street & Interurban Railway Association, announces the accession of 16 member companies to the association between Feb. 8 and Aug. 3. Among them are the United Railways Company of St. Louis, Cleveland Railway and the Pennsylvania Railroad, whose membership, as mentioned in a recent issue of this paper, has been taken out on account of its extensive electric railway interests through the operation of the West Jersey & Seashore Railroad, the Long Island Railroad and its New York terminal. A list of these new member companies follows:

Chicago, Aurora & DeKalb Railroad, Aurora, Ill.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.

Citizens' Railway, Waco, Tex.

Citizens' Railway & Light Company, Ft. Worth, Tex.

Cleveland Railway, Cleveland, Ohio.

Grand Forks Street Railway, Grand Forks, N. D.

Hornell Traction Company, Hornell, N. Y.

Interurban Company, Helena, Ark.

Missoula Street Railway, Missoula, Mont.

Pennsylvania Railroad, Philadelphia, Pa.

People's Railway, Wilmington, Del.

Pictou County Electric Company, Ltd., New Glasgow, Nova Scotia.

Texarkana Gas & Electric Company, Texarkana, Ark.

United Railways Company of St. Louis, St. Louis, Mo.

Vicksburg Traction Company, Vicksburg, Miss.

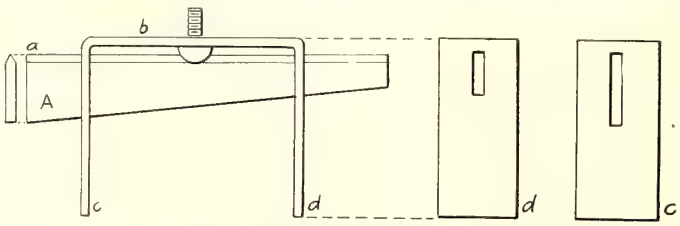
Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.

Secretary Donecker also has announced that 127 associate members have joined the association between Feb. 8 and Aug. 3.

TO HOLD MACHINE SCREWS

It is often necessary to run the thread further down on machine screws, to cut them shorter, or to file them to a point. To hold them between the jaws of a vise spoils the head and will not hold the screw firmly. The jig shown in the accompanying cut is very simple and easily made, and will hold any screw with a slot.

A is a piece of iron ¾ in. wide, ⅛ in. thick and 4 in. long, tapered down to ⅜ in., so it can be adjusted to fit any size head.



Device for Holding Machine Screws

Bevel the edge so it will fit slot in the screw as in *A*. *B* is made from the same size iron, 2¼ in. long. *C* and *D* are 2 in. high.

Cut a slot ⅛ in. x ¾ in. in *C*, and in *D* ⅛ in. x ½ in. Drill a ¼-in. hole in the center of *B*, as shown in the sketch, to hold the screw. Place the screw into the ¼-in. hole in *B* and slide the tapered bar *A* through the oblong hole in *C* into the screw slot and then through the oblong hole in *D*. Strike the end of the bar lightly with a hammer, so it will hold the screw firmly. The jig can be clamped (*C*) into the vice and the necessary work done.

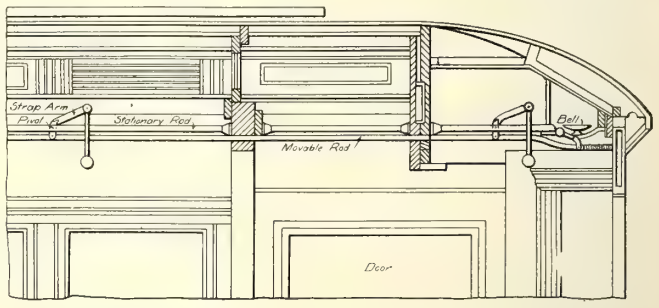
REPORT OF GLASGOW TRAMWAYS

The annual report of the Glasgow Corporation Tramways for the fiscal year ended May 31, 1910, shows traffic receipts of £893,591 as compared with £889,530 for the previous year. Other receipts were £3,129 last year as compared with the £3,220 in the previous year, making a total income of £896,720 and £892,750 in the 1910 and 1909 fiscal year respectively. The working expenses, excluding depreciation, were £502,911 last year as compared with £505,617. They were equal to 56.083 per cent of receipts in 1910 and 56.636 per cent in 1909. The net balance remaining after all deductions was £53,027 last year against £66,275 in the previous year. The net balance stated was appropriated for the common good in accordance with a section of the Glasgow corporation act passed in 1909 which provides that after the payment of working expenses, interest, sinking fund and depreciation the surplus shall be so utilized.

The amount of the depreciation and permanent way renewals fund at the close of the fiscal year 1910 was £1,537,641; at the close of the previous year it was £1,383,289. To this amount there was added from the revenue for the year to meet depreciation and renewals £193,606. The sum of £39,254 was deducted, being the amount expended during the year. The balance in the fund is invested with the common good and the corporation of Govan. There was expended on the upkeep of the tramway track in ordinary repairs £39,877. In addition £82,918 was laid aside from revenue to meet the cost of renewal of track.

BELL SIGNAL FOR CARS WITH POWER-OPERATED DOORS

Thomas F. Carey & Company, Boston, Mass., have brought out a passenger signal more particularly intended for cars in which the doors at both ends are operated by power. The signal includes a bell near each door and mechanical means to operate both bells simultaneously from any part of the cars just before the doors are closed. This is accomplished by a movable bar extending longitudinally through the car and so connected with the bells that the movement of the bar in one direction causes both to ring. The bar is supported by a series of levers pivoted to a stationary upper support extending longitudinally through the car. In the drawing this upper supporting bar is suspended from the ceiling of the car by hangers and may also be carried otherwise. The supporting bar shown is provided with slots through which the levers are extended and the latter have upwardly inclined arms to which straps are fastened within easy reach of the conductor. In this case the opposite ends of the movable bar are operatively connected in the following manner:



Bell Signal for Car with Power-Operated Doors

The movable bar is pivotally connected with one end of a striker lever which is pivoted to a suitable support for the bell or gong. The operating levers have their arms extended in the same direction so that the bar will be moved in the same direction by the operation of any one of the levers. For instance, when a strap is pulled down it lowers a corresponding lever arm and turns the lever on its pivot so as to move the lower bar forward in the direction indicated by the arrow. Thus both bells are operated to give a warning that the doors are about to be closed. As soon as the strap is released the bar is drawn back to its normal position by a spring.

IMPROVED MANHOLE TRANSFORMER

The Westinghouse Electric & Manufacturing Company has recently brought out a new manhole transformer. The magnetic circuits and coils are the same as those of its regular type "S" transformer, but they are mounted in a different style case, especially adapted to manhole service where freedom from flooding is essential. The cases, therefore, have been made water and airtight at the joints between the case and cover and where the leads issue from the case. The transformer can be quickly connected or disconnected from the lines without removing the cover or otherwise opening the case. A safety or relief valve is also provided to avoid danger which is sometimes caused by the expansion of the heated oil compressing the air in the upper portion of the transformer case.

A SELECTIVE TELEPHONE AND SEMAPHORE SYSTEM

The Baird Electric Company, Chicago, Ill., has brought out a selective telephone and semaphore which provides the train dispatcher or chief operator with a simple means for lighting a set of lamps, ringing a bell or setting a signal. Normally no telephones are connected with the line except that at the dispatcher's office and thus when he calls one station the line is practically clear. With this selective system and with signal lamps at each siding, the dispatcher can turn on any combination of the lights, leave burning those that he wishes and turn off any or all of the others in any order desired. It will be understood, therefore, that the conductor is relieved from resetting the lamps or performing any other duty at the telephone booth when answering the telephone call.

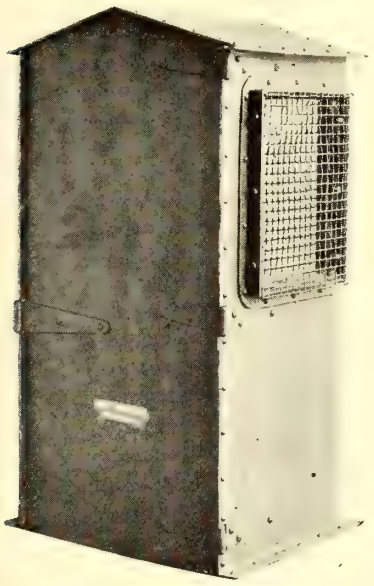
The system includes, first, an ordinary metallic telephone line and telephones. The lamp semaphore cabinet contains all the necessary selective apparatus of a substation and is simply an attachment to the regular telephone system. The semaphore has two 8-in. x 10-in. red windows protected by steel-wire netting so arranged that they appear black even if the sun is shining directly on the cabinet. The entire cabinet is armored with moisture-proof sheet steel. The station selector is enclosed in an air-tight brass case. Each window has three 100-volt lamps, the six being fed from the feeder or trolley. The use of six 100-volt lamps prevents their injury when the potential goes over 600 volts, while, on the other hand, they will appear brilliant even when the potential is as low as 250 volts.

The dispatcher's equipment is small and compact and usually is mounted on a flat-top desk. It consists of line drops and jacks for each line and a selective master key, which controls the master selecter, located at any convenient place any distance from the desk. The master key contains small numbered buttons corresponding to selective way-stations. A standard portable telephone is used by the dispatcher.

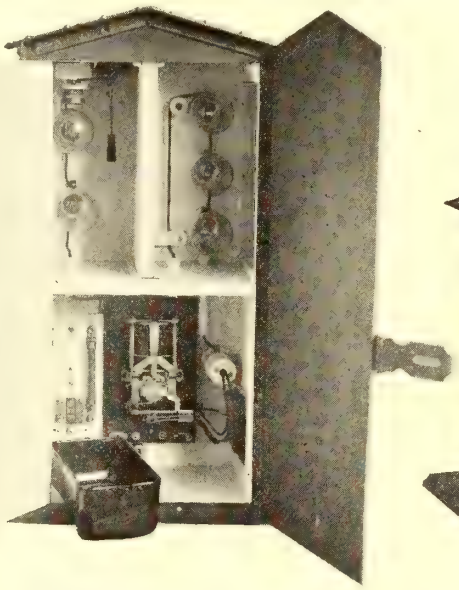
To operate the system, the dispatcher places a twin plug in the jack of the line to be used, depresses a button of the master key corresponding to the number of the station to be selected, holding a small ringing lever in the operating position until he receives a lamp signal. The time required to select depends upon the number of the station wanted, taking about one-sixth second per station: thus, station "6" will require 1 second to select, etc. Only the lamps at the selected station light up. There the approaching car stops, the conductor calls up and hangs up the receiver when through. The dispatcher extinguishes the lamps either before the conversation is completed or afterward and restores all other stations to the normal position by pushing the "C," or "clear," button of the master key.

If it is desired to stop a car when its exact location is not known several way stations in its vicinity may be lighted. This is done like calling one station, except that it is necessary to press the numbered buttons of the master key correspondng to every station to be lighted. All pressed buttons of the master key remain depressed and locked until another is pushed to call the next station, thereby restoring everything automatically. The semaphores at all selected stations light until cleared by the dispatcher. Conductors call the dispatcher by ringing on an ordinary magneto telephone. If the dispatcher is not on the line, a line drop will fall ringing a bell until the drop is restored.

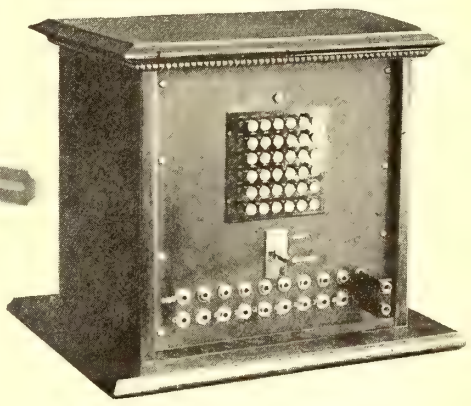
A marked advantage of the system is that telephone bells can be located in power houses, substations and ticket offices. They are operated by the dispatcher like the lamp semaphore stations except that the substation signal is a bell instead of a lamp. The telephones at any desired place can be provided with lock-out features, which will absolutely prevent anybody from listening while the line is busy. However, all stations can signal the dispatcher at any time. This feature, together with the inability of stations to signal each other, puts the line under the absolute control of the dispatcher; makes all conversations private and increases the talking efficiency, so that it is equivalent to an independent line to every telephone. If one station desires to talk to another station, it calls the dispatcher, who can cut the stations together almost instantly. In case the dispatcher is not on duty at night, switches may be provided at the necessary stations to enable them to call each other as on a bridging line. The system can be operated over any reasonable distance and the number of stations increased to 50. The master selecter will handle several hundred stations. All selective equipment is operated by a dry battery. Batteries in offices of less than 100 telephones are said often to have lasted 18 months.



Signal Box Closed



Signal Box Open



Dispatcher's Cabinet

IMPROVED TROLLEY RETRIEVER

The Trolley Supply Company, Canton, Ohio, has recently put on the market a new retriever known as the No. 5 Knutson. It employs the same retrieving apparatus as in the No. 2 Knutson. The principal objections found to the No. 2 were the insufficient opening in the case and the method of connecting the rope to the reel by means of a chain, screw-eye, ferrule and rivet. In the construction of the No. 5 the method has been adopted of connecting the rope to the reel by simply typing a knot in end of rope and inserting in slot in reel as shown in the illustration.



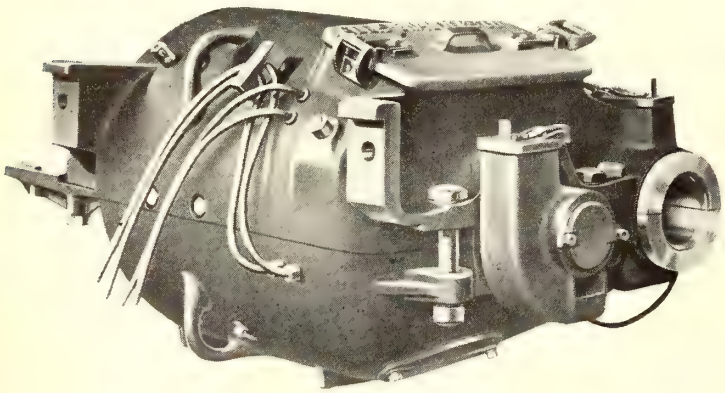
Sectional View of Retriever

As soon as this knot is inserted it releases the knot pawl and throws the weak spring in action. This is considered an important point, because if the rope should break while the retriever is in use, it will not be necessary to take it from the car to replace the rope, as the operator can do this himself in a very few minutes by simply tying a knot in rope and inserting it in slot in reel.

Other features in the No. 5 retriever are: long bearings for the reel; equal balance of the reel; anti-friction design of rope opening and simplicity of construction.

NEW INTERPOLE RAILWAY MOTOR

The Allis-Chalmers Company has recently placed on the market a new type of railway motor, known as No. 501. It is provided with interpoles and has been developed to meet severe conditions of operation, especially on lines which use a potential of 600 volts or over. It also has desirable features for cases where a lower voltage is employed. As is seen by the accompanying engraving, the motor has ample provision for wearing surface in the bearings and special arrangements are made for ventilating.



Exterior of Interpole Motor

The field frame is of cast steel and is split horizontally through armature and axle bearings so that it may be opened downward. The commutator and brushes can be readily inspected by means of an opening of large size which can be covered when the motor is not being inspected. The main pole pieces are of soft steel punchings, securely clamped between malleable iron end plates, to which they are riveted. The interpole or commutating pole pieces are of solid steel. The field coils are of the mummified type. The bearings are bronze with a thin lining of babbit and are carefully fitted to the bearing housings.

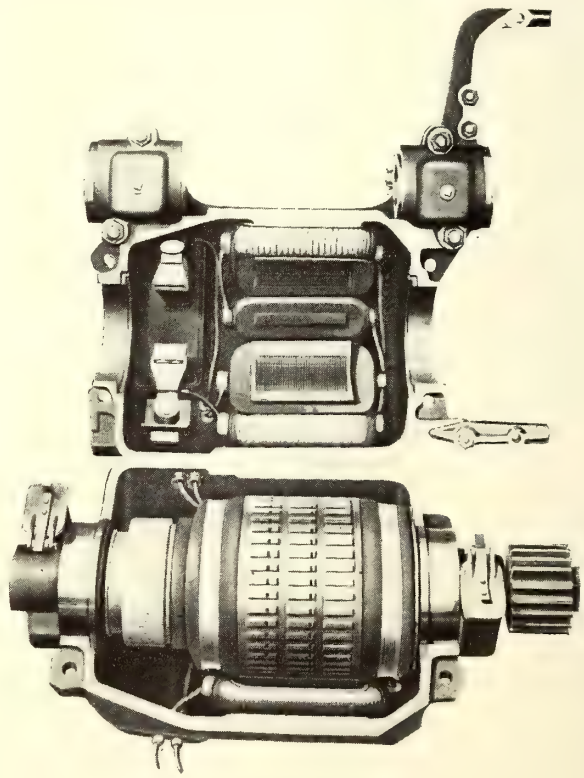
The gears are of high grade cast steel and are furnished either in the solid or split type. The pinions are of hammered steel. The gear case can be supplied either of sheet steel or malleable iron. The former is preferred as it combines lightness with strength and Allis-Chalmers Company has worked out a special construction which does away with difficulties formerly experienced.

The armature core is of soft steel laminations, built up on a cast spider and provided with ventilation ducts. The spider also carries the commutator so that shaft renewals can be made without disturbing the windings. The coils are wire wound and insulated in the usual way but after being pressed in steam heated moulds are cooled under pressure, which gives each the same dimensions. This makes the coils absolutely interchangeable. Hard drawn copper commutator bars are mounted on a cast steel sleeve, and a one-piece mica cone ring is employed.

Two cast brass brush holders are mounted in the top half field frame and each is adjustable to care for commutator wear. The brush end of the copper shunt or "pigtail" is so arranged that an exchange of brushes is easily effected.

The 501 motor has a capacity of 50-hp on 600 volts or 42 hp on 500 volts on the rating and a continuous capacity of 36 amp at 400 volts. The motors are designed for either double or four-motor equipment and standard gear ratios are employed.

The Allis-Chalmers Company is now building—in addition to the type 501 interpole motor described, the non-interpole type 301 rated at 40 hp, type 302 rated at 55 hp, and type 303 rated at 75 hp.



Interior of Interpole Motor

At the end of 1909 there were 17 electric and 37 horse tramway lines, with a total of 550 miles of track, in operation in Japan.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Alabama.—Death—Injury to Wife—Recovery by Husband —Damages—Amount.

Where plaintiff's wife was thrown on the ground by the premature starting of a street car, and was struck in the right side, injuring and bruising her side and body, and causing her to be confined in bed six weeks, which hastened her death from tuberculosis about thirteen months thereafter, a verdict for $1,200 was not so excessive as to require a new trial. (Birmingham Ry., Light & Power Co. vs. Lavender, 47 S. Rep., 1026.)

Alabama.—Street Railroads—Injuries to Persons on Track—Contributory Negligence—Duty of Motorman.

A driver may cross a street railway track, though he sees a car, if he may reasonably suppose he can cross before it will reach him.

It is the duty of a motorman to slacken the speed of his car to avoid a collision, where it becomes apparent to him that a driver has miscalculated the distance, or supposed the car was traveling at a lawful speed when in fact traveling faster, or is not aware of the approach of the car. (Birmingham Ry., Lt. & Pwr. Co. vs. McLain, 50 S. Rep., 149.)

California.—Injury to Passenger—Negligence—Res Ipsa Loquitur—Burden of Proof.

Mere injury to a passenger while aboard a car or while alighting from it creates no presumption that it was caused by negligence of the carrier operating the car; but it must be first shown the injury came from the movement of the car by those in charge of it, or from something connected therewith, or in control of the carrier, and then it is presumed that the thing causing the injury was due to the carrier's negligence, throwing on it the burden of disproving the prima facie case.

If the alleged negligence in an action for injury to a passenger while alighting is denied, plaintiff must prove it "by a preponderance of the whole evidence.—Wyatt et al. v. Pacific Electric Ry. Co. (L. A. 2,273), 103 Pac. Rep., 892.)

Delaware.—Right to Use Streets—Care Required—Crossing Warnings—Mutual Duties of Company and Travelers—Injuries—Contributory Negligence—Proximate Cause—Definition—"Ordinary Care"—Effect—Last Chance Doctrine—Injuries to Pedestrians—Weight of Evidence —Death—Measure of Damages.

The public, as well as a street railway company, has the right to use the streets; but, in using them, each is bound to exercise reasonable care to prevent accidents.

The employees in charge of street cars must use reasonable care to see that the cars move at a reasonable speed, and slow up, or stop, if necessary, where danger of collision is imminent, and could, by exercising reasonable care, be seen in time to prevent it.

Street car employees must give proper warning of the car's approach at a public highway crossing.

A street railroad company and pedestrians are both required to exercise reasonable care in the use of streets, and the rights of each must be exercised so as not to unreasonably interfere with the rights of the other, a greater degree of care by both being required as the danger increases; and both the motorman and the pedestrian approaching the car must use their senses of sight and hearing, and exercise such reasonable caution as ordinarily prudent persons in like circumstances would exercise to prevent accidents.

One whose vision is obstructed on approaching a street car crossing must avail himself of his knowledge of the locality, and look for approaching cars in time to avoid collision, and is negligent if he does not do so.

If intestate's death by being struck by a street car was not the result of the company's negligence, it is not liable.

"Negligence" is the want of such care as a reasonably prudent person would exercise under similar circumstances.

The "ordinary care" required in the operation of electric street cars imports all the care and discretion which the place of the danger and the occasion requires, and such care increases or diminishes as the danger of accident increases or diminishes in the operation of the cars.

If intestate's own negligence was the proximate cause of his death by being struck by a street car, or proximately contributed thereto, his administrator cannot recover therefor.

If intestate's death was proximately caused by a street car company's negligent failure to use ordinary care to prevent injuring him after becoming aware of his danger, the company would be liable, though intestate was also negligent; his negligence not being such contributory negligence as bars recovery.

In an action against a street car company for intestate's death by being struck by a car, the company must prove contributory negligence, proximately causing the injury, to the jury's satisfaction, by a preponderance of the evidence, in order to escape liability.

If the motorman saw, or by ordinary care could have seen, a pedestrian on the track in time to stop the car and prevent striking him, the company will be liable for his failure to do so; but if the pedestrian suddenly approached the car, and the motorman used all care to prevent injuring him, but could not stop in time after discovering the danger, the company will not be liable.

In a death action by the administrator against a street car company, the measure of damages would be such sum as decedent would probably have earned during his life, and which would have gone to his next of kin, taking into consideration his age, ability, and disposition to labor, and his habits of life and expenditure.—Lenkewicz v. Wilmington City Ry. Co, 74 Atl. Rep., 11.)

Indiana.—Crossing Accidents — Complaint — Negligence — General Allegations—Witnesses — Questions — Earning Capacity—Construction—Death — Damages — Instructions.

In an action for death at a railroad crossing, a complaint, alleging that decedent was traveling westward on the highway, and that defendant at the time negligently ran one of its electric cars over the crossing so that as a consequence, and solely by defendant's negligence, defendant ran its car against decedent's buggy, killing him, sufficiently alleged that decedent was on the highway at the time he was struck.

In the absence of a motion to make more specific, a complaint stating decedent's injury, and alleging that it was caused as a consequence and solely by reason of defendant's negligence, sufficiently charged actionable negligence.

In an action for death of a farmer, a question calling for decedent's earnings for the preceding year from his business as he conducted it was not objectionable as calling for decedent's gross earnings, but was proper as calling for an estimate of the value of his services as a farmer.

Where, in an action for death, the court charged that, if the plaintiff had proved the material allegations of the complaint, they should award such damages as in their judgment would fairly compensate his widow and children, if any, dependent on him for support, not exceeding the amount named in the complaint, a further instruction that the administrator, if entitled to recover, should be allowed such damages as would compensate the widow and children for the injuries sustained, not exceeding the amount demanded in the complaint, unless it appeared from the evidence that decedent was negligent, was not objectionable for failure to limit the jury to the evidence or the law.—(Indianapolis & Northern Traction Co. v. Newby. (No. 6,564.) 90 N. E. Rep., 29.)

Iowa.—Master and Servant—Injuries to Servant—Contributory Negligence—Evidence—Custom.

Plaintiff, a street car hostler, was sent by the barn foreman to bring in a disabled car, being told that the trolley stand was loose. He climbed on top of the car, and knowing that there was danger of the trolley platform falling down under such circumstances, unless carefully handled, attempted to reverse the pole by swinging it around, and, while so engaged, the platform and pole fell, and plaintiff, falling with them, was injured. Held, that plaintiff was negligent as a matter of law.

Where a car which plaintiff, an employee of a street railroad company, was sent to bring in, was disabled, but not "dead," a custom to send out a wrecking car to bring in "dead" cars was irrelevant on the question of the railroad company's liability for injuries to such employee.—(Moore v. Des Moines City Ry. Co., 123 N. W. Rep., 324.)

Kentucky.—Carriage of Passengers — Injuries — Actions — Questions for Jury—Care Required—Duty to Keep a Lookout—Contributory Negligence—Injury Avoidable Notwithstanding.

In an action for injuries to a street car passenger by being struck by another car going in the opposite direction as she was passing around the end of the car from which she had alighted, evidence held to require submission of defendant's negligence and plaintiff's contributory negligence to the jury.

A carrier's duty to exercise a high degree of care toward passengers continues until the passenger alights from the car, and has reasonable opportunity to reach a place of safety.

Where a street car motorman is about to pass a car which has stopped at a street crossing to discharge passengers, it is his duty to keep a sharp lookout for persons alighting from the car, and who might be expected to cross immediately behind it, and to have his car under such control that he might stop it at a moment's warning.

Where a passenger, after alighting from a street car, passed round the end of the car, and was struck by a car traveling in the opposite direction, which she could not see until just before she was struck, she was not barred from recovering by contributory negligence, if the motorman by ordinary care and by keeping a sharp lookout and having his car under control could have stopped the car in time to have avoided the injury. (Louisville Ry. Co. v. Mitchell, 127 S. W. Rep., 770.)

Louisiana.—Injuries to Persons on Track—Duty of Motorman.

It is the duty of a motorman in charge of an electric car, moving it up a narrow street, to guard against running it upon vehicles on the track directly in front and in full view of him. He should exercise the greatest prudence and caution to avoid inflicting injury. He has the vantage ground over the parties in front, in knowing the exact situation and condition of affairs ahead of him. He would have no right to take advantage of even tardy action on the part of a driver of a wagon in removing it from the track, to run into and crush it. He should use every exertion to save the situation and enable the vehicle to be placed in a position of safety. (Weisshaus v. New Orleans Ry. & Light Co., 50 S. Rep., 640.) (Syllabus by the Court.)

Michigan.—Street Railroads—Death of Pedestrian—Negligence—Jury Question—Evidence—Opinions—Effect.

Whether a street railway company was negligent in suddenly backing a car against a pedestrian, without ringing the gong or having a lookout on the rear platform, held under the evidence a jury question.

In an action for the death of a pedestrian struck at night by a backing street car, the jury were not bound by witness' estimate of the distance between decedent and the car when he stepped upon the track, where he was between witness and the car, and the only light came from the car.—(Canerdy v. Port Huron, St. C. & M. C. Ry. Co., 120 N. W. Rep., 582.)

Missouri.—Carriers—Carriage of Passengers—Personal Injuries—Setting Down Passengers—Contributory Negligence.

It is the duty of a carrier of passengers to carry them safely to their destination, and put them off at safe places.

A street car passenger carried by his station and directed to alight in a dark, strange place has the right to assume that the place is safe, in the absence of directions how to reach his destination.

A street car passenger discharged into a dark, strange place between stations, who is ignorant of the fact that he has been carried by his station, must use ordinary care for his safety in proceeding to his destination; but he is not required to walk on the right of way to the next station.—(Cossitt v. St. Louis & S. Ry. Co., 123 S. W. Rep., 569.)

Missouri.—Carriers—Injuries to Passenger—Presumptive Negligence—Street Railroads—Sufficiency of Evidence—Negligence—"Accident."

Whenever something unusual occurs in the operation of a public conveyance carrying passengers for hire, proof of such fact and of a consequent injury to a passenger raises the presumption of negligence.

In an action against a street railroad for injuries to a passenger, plaintiff's evidence showed that defendant's cable car on which plaintiff was riding made an unusual and violent stop, so that the glass in the windows of the car was shattered and plaintiff was thrown against a stove; that another passenger was thrown against a window with such force as to not only break the glass, but to bend the protecting bars, and that the car was run over the crossing at the full speed of the cable, which, according to defendant's testimony, was violative of its rules. There was also evidence tending to show that an iron plate which was along the side of the cable conduit was struck by the grip shank and dented. Held to make out a case of presumptive negligence.

An "accident" is such an unexpected casualty as occurs without any one being to blame for it; that is, without anybody being guilty of negligence in doing or permitting to be done, or omitting to do, the particular things that caused such casualty.—(Briscoe v. Metropolitan St. Ry. Co., 120 S. W. Rep., 1162.)

New Jersey.—Negligence—Use of Land—Care as to Trespassers—Unprotected Third Rail—Liability.

A landowner need not keep his premises in a safe condition for the protection of a trespasser, even though the trespasser is an infant, his sole duty being to refrain from wilfully injuring him, and whether the danger is latent, and its extent and gravity, are immaterial.

Where decedent was killed by contact with the unprotected third rail which furnished the electric power for the operation of defendant's street cars, while he was crossing its right of way from a meadow, defendant was not liable for his death, since it was under no obligation to him except not to wilfully injure him, nor would it be liable, under the circumstances, under the rule making a landowner liable for injuries caused by an unguarded excavation upon his land so near to a public highway as to endanger travelers.—(Sutton v. West Jersey & S. Ry. Co., 73 Atl. Rep., 256.)

New York.—Master's Liability—Negligence of Servants—Imputed Negligence.

The rule that the negligence of the driver of a vehicle cannot be imputed to another does not apply where the relation of master and servant exists between plaintiff and the driver.

It was the duty of a driver of a vehicle, upon approaching a street upon which he knew vehicles and street cars were continually passing, to exercise care to see whether any street cars, etc., were approaching, and to avoid collision.—(Wood v. Coney Island & B. R. Co., 117 N. Y. Sup., 703.)

New York.—Street Railroad—Rights in Streets—Injuries—Actions—Jury Question—Contributory Negligence.

While a street car company has a paramount right to use its tracks in a street, and the driver of a vehicle must leave the track promptly on hearing the signal, he can drive on the street car tracks and assume that a car will not collide with him from the rear without giving him warning of its approach and an opportunity to leave the track, and that the car will not approach in excess of the speed limit.

In an action against a street railroad company to recover damages to plaintiff's horse and wagon, etc, caused by defendant's negligence in striking the rear end of the wagon, whether plaintiff was guilty of contributory negligence held for the jury.—(Normand v. Hudson Valley Ry. Co., 117 N. Y. Sup., 1076.)

Texas.—Damages—Personal Injuries—Elements of Damages.

Mental and physical suffering is an element of damage for personal injuries, and the value of lost time or capacity to attend to business or to earn money is also an element of damage, and both of these elements may be considered in fixing the amount of recovery without the verdict being subject to the objection of awarding double damages. (Houston Electric Co. vs. Seegar, 117 S. W. Rep., 900.)

Texas.—Damages—Personal Injury—Pleading—Sufficiency—Future Consequences.

Allegations that plaintiff was seriously and permanently injured internally and externally in and on her back, spine, head, etc., and that her nervous system was seriously impaired, warranted proof that she was a mental wreck and her mind was seriously affected 18 months after the accident, and that, if her condition was not cured, she might become insane.

A general allegation of damage from personal injury admits proof of such damages only as naturally and necessarily result from the injury charged, but it is not essential, to warrant proof thereof, that all the results of the act or injury complained of be pleaded in detail, if such results are necessarily or legally implied from the injuries alleged.

Recovery can only be had for such future apprehended consequences of an injury or existing condition as will reasonably or probably result therefrom, and the jury in assessing damages therefor should be confined by the charge to such probable results. Rapid Transit Ry. Co. vs. Allen, 117 S. W. Rep., 486.)

CHARTERS, ORDINANCES AND FRANCHISES

California.—Municipal Corporations—Powers Conferred—Grant of Franchise—Void Condition—Severability—Irregular Contract—Benefits—Estoppel.

A municipal corporation has only such powers as are expressly or by necessary implication conferred on it by the Constitution or by statutes passed thereunder.

Under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, authorizing trustees of a city of the sixth class to permit the laying of street railroad tracks, etc., under such restrictions as they deem proper, the power to grant leave to build such tracks and impose restrictions is legislative in its nature, and not referable for its support to the power of making contracts.

Under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, authorizing trustees of cities of the sixth class to permit the laying of street railroad tracks, etc., under such restrictions as they deem proper, a city cannot exact from the grantee of a franchise to lay tracks, etc., an undertaking conditioned on the completion of the road between outlying towns and through the city within a certain time, since the grant, being legislative in character, could have no extraterritorial effect.

Where a city of the sixth class grants a franchise under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, to lay street railroad tracks, and exacts from the grantee an undertaking conditioned on the completion of the road between outlying towns and through the city, and the undertaking is void because the restriction operates extraterritorially, the condition is not severable so that it could be held good as to the part of the road running through the city, especially in view of the provision of the granting ordinance, declaring that it was not intended to grant a franchise for a street railroad within the limits of the city.

A party contracting with a city regarding a subject-matter within the scope of the city's power may, where he has received the benefit of the contract, be precluded from asserting that the contract was not on the part of the city executed in the manner required by law.

Where, under Municipal Corporation Act (St. 1883, p. 269, c. 49) sec. 862, a city grants a franchise for a street railroad, and exacts from the grantee an undertaking which is void because the condition has an extraterritorial effect, the grantee is not estopped to assert the invalidity of the undertaking, since the undertaking was one without the scope of the city's power to exact.—(City of Arcata v. Green et al., 106 Pac. Rep., 86.)

Illinois.—Licenses—In Respect to Land—Estoppel to Revoke—Against City—Acquiescence.

A city ordinance authorized an elevated railway company to cross a river in the city by means of a bridge to be constructed from such plans in such manner as might be approved by the commissioners of public works, and provided that the railway system should be constructed under and subject to inspection and supervision by that officer. The railway company built a bridge pier on clay land near the river, and no objection was made by the city to such use of the land until eight years after the bridge was completed. Held, that the city must be presumed to have consented to the railway company's use of the land, and the company having expended large sums of money thereon, to the knowledge of the city, the city is estopped from revoking its permission and repossessing the property.

A city may be estopped by long acquiescence unaccompanied by any affirmative act of the city.—(Sanitary Dist. of Chicago v. Metropolitan West Side Elevated Ry. Co. et al., 89 N. E. Rep., 800.)

Kansas.—Municipal Corporations—Repeal of Street Railway Franchise—Liability of City—"Imposed Duties."

A city is not liable in damages for the repeal of a street railway franchise ordinance which does not engage the city in any private proprietary capacity, nor for the conduct of the officers in publishing and subsequently enforcing the repealing ordinance.

"Imposed duties" for the neglect of which a city may be liable are those which are superadded to merely governmental functions like the special private corporate duty to maintain streets in safe condition for public travel, or the duty to maintain and manage corporate property so that city employees shall have safe places in which to work.—(Edison v. City of Olathe, 105 Pac. Rep., 521.)

Massachusetts.—Dedication—Misuser or Diversion—Municipal Corporations—Use of Public Land—Tunnels—Construction—Submission to Electors—Street Railroads—Construction of Subway—Powers of Railroad Commission—Constitutional Law—Delegation of Legislative Authority.

Property dedicated by donors to a particular public use cannot, at least without the exercise of the right of eminent domain, be appropriated to a use of a different character, in disregard of the rights of the donors and their legal representatives.

Boston Common was dedicated by its owners in 1634 "for the common use of the inhabitants of Boston as a training field and cow pasture." Held, that the Legislature had authority to authorize, by St. 1906, p. 742, c. 520, the construction of a railway tunnel or subway under part of the Common; such use not being at variance with the general purpose of the donors, it appearing that the occupation above the surface for all proper purposes will be changed hardly perceptibly, and that the increase of facilities for approaching the Common will be a convenience to the public in the use of it.

The city holding the title to Boston Common only in its municipal capacity as an agency of the government for the benefit of the public, and the power of the Legislature to represent this interest being supreme, St. 1906, p. 742, c. 520, authorizing the construction of a railway tunnel or subway under part of the Common is a sufficient authority for such construction, without a vote of the city government or of the citizens of the city.

St. 1906, p. 742, authorizes the construction of a railway tunnel or subway between Cambridge and Boston. Section 23 provides that the tunnel shall, except as otherwise expressly provided herein, be constructed and paid for on the terms, so far as applicable, and with the same rights as to construction, which are hereby conferred for such purposes on the Transit Commission, the Board of Railroad Commissioners, the city of Boston, and its treasurer, the railroad company, and other public officers or parties in interest, respectively, including any persons sustaining damages by the taking of or injury to property by the commission, etc., as are prescribed by St. 1902, p. 449, c. 534, for construction of the tunnel therein provided for, including the rights and powers conferred by section 13 of said act, which section shall also apply to the location of the tunnel and to the construction of the subway referred to in this section, if that is constructed. It also provides that if the Elevated Railway Company is dissatisfied with the decision of the Transit Commission it may apply to the Board of Railway Commissioners, who may finally determine the question. Held, that the said section 23 does not relate to the question whether the tunnel shall be constructed, but only to the question how it shall be constructed after it is determined that it shall be built, and hence does not require the submission to the voters of Boston whether the tunnel shall be constructed.

St. 1906, p. 754, c. 520, sec. 23, authorizing the Boston Transit Commission to construct on the request of the Boston Elevated Railway Company a subway, provides that, if the company is dissatisfied with the determination of the commission as to which of certain structures shall be constructed, it may apply to the Board of Railway Commissioners, who may finally determine the question. Held, that the commission is an administrative board of public officers, whose members do not act judicially in the matter, but as representatives of the public in the administration of the law, and the determination of a majority of a quorum after notice and opportunity to act is binding.

St. 1906, p. 754, c. 520, sec. 23, authorizing the Boston Transit Commission to construct a railway tunnel on such one of two designated routes as the commission may determine, does not involve an unconstitutional delegation of legislative authority.—(Codman et al. v. Crocker et al., 89 N. E. Rep., 178.)

LONDON LETTER

(*From Our Regular Correspondent*)

The Plymouth Corporation Tramways committee is considering a report by its general manager, Mr. Everson, regarding the advisability of applying for powers to install trackless trolleys on its outlying districts. The report describes very fully the various systems in use in Germany, Austria and Italy, and states that the very latest example of the trackless trolley system is at Mülhausen. This line was opened in October, 1909, and, according to reports, the authorities are well satisfied with the results. There are four trolley lines, two positive and two negative, on this system, and the cars weigh 6000 lb. each. The gradients on this route are very severe, the steepest being 1 in 12. The energy is supplied to the trolley wire at 500 volts, and the price paid is 1d. per unit. Mr. Everson estimates that the cost of the overhead lines and feeding cables would work out at about £1,600 per mile, and the 'bus itself would cost about £600. He also states that the same overhead wire could be utilized for an ordinary tramcar system, if at any time the traffic should warrant the laying of tram lines, with a very small cost for alteration.

In this connection it is interesting to mention that the bill by which the Corporation of Leeds is seeking powers to operate trackless tramways and which has already passed through the House of Lords, came before the examiners of the House of Commons, and as there was no opposition at this stage the bill was ordered to proceed to its next stage. In his evidence before the committee Mr. Hamilton explained that the capital charge was about one-fifth of the ordinary trams, and that the cost of working was pretty much the same.

Remarkable strides have been made in the matter of electric tramway development all over the country, and perhaps no part of the country has progressed more rapidly than Lancashire. Many of the towns in Lancashire are linked up by various tramway systems, and it is possible to journey from Manchester to Liverpool, and, with a short break, it is also possible to journey from Manchester to Leeds. The latest interesting Lancashire scheme is the proposal to link up Horwich, Chorley and Preston, which would have the effect of putting Manchester and Preston in direct connection by electric tramways.

The Tramways Committee of Leeds has been considering for some time the question of placing on its lines goods trams for the conveyance of parcels and general goods, believing that it would be a convenience to the districts not served by railways.

So satisfied are the directors of the London, Brighton and South Coast Railway with the results of the electrified section that they have now made the statement that they have definitely decided to electrify a further portion of their suburban line as far as the Crystal Palace.

A deputation of tramway managers recently visited Huddersfield to inspect a new type of car which has been built to the order of the Huddersfield Corporation. This car has been built to the specifications of P. Kavanagh, of Liverpool, the special feature about it being that passengers are able to get on and off the car simultaneously. This car has an entrance at the back, as at present, and an exit at the front, enabling passengers to get on at one platform and leave by another. By means of folding and hinged doors, opened and closed automatically, passengers always alight on the safe side of the street, no matter in which direction the car may be running.

At a recent meeting of the London County Council, the finance committee pointed out that the average fare per passenger on the Council's trams was 1.06d., as compared with 1.07d. for the previous year, and that the total expenses for power amount to 1.58d. a car mile, as against 1.71d. in 1908-9. This decrease in the cost of power is due to the development and fuller use of the Greenwich generating station and was fully expected. The surplus on working the electric lines is 5.06d. a car mile, and although the receipts per car mile are decreasing very slightly the expenses are also decreasing, with the result that the surplus of 5d. per car mile on which financial estimates for some years have been based has been maintained. The estimates for 1910-11 provide for the electrification of about 14½ miles of horse lines, which will leave 5½ miles still to be dealt with. The total length of the system at present is 135½ miles, of which 115½ are already electrified. The total number of passengers carried during the year was 418,000,000 by electric, and 33,000,000 by horse traction, and the car miles run were respectively 39,000,000 and 3,000,000. The new lines to be electrified will cost nearly half a million pounds, and the highways committee recommend that 250 new cars be purchased. It has also been stated by the chairman of the highways committee that permission had now been granted by the Board of Trade for the use of trailer cars, with the object of obviating difficulties arising from the crowding in the early morning. The experiment will be tried first on the line from Euston Road to Hampstead Heath. With regard to the extension of the tramways system from Woolwich to Eltham, as this tramway lies within a 3-mile radius of Greenwich Observatory, and as the traffic is not sufficient to justify the use of the conduit system, the London County Council has adopted a special method of overhead construction, instead of the usual single wire. Two overhead wires have been provided, and the cars are being furnished with two trolley arms. The length of tramway being constructed in this manner is about 5 miles, and throughout this distance the two wires are 3 ft. 6 in. apart, and the center of the two pairs are 8 ft. 6 in. apart. The cars which are to be used on this section are also being equipped with a special switch to alter the connection from the negative overhead wire to the rail for operating on the other portions of the system.

The Corporation of Belfast has decided on important extensions of its tramway system, particulars of which we have referred to in previous issues. Various extensions will be made in different directions, but the most important will be the extension of the tramway to M'Art's Fort, which will entail the construction of a new road and the purchase of about 200 acres of ground contiguous to the tramway on the hill. The idea of the Corporation, following Mr. Nance's recommendation, is to build villas on this ground to rent at about 4s. per week to the working classes of Belfast. It is also intended to acquire both sides of Carr's Glen, to a point about opposite the Horseshoe Curve, and to lay it out as a public park, with various attractions for the entertainment of the public. It is estimated that if the Corporation was able to transplant about 1700 artisan families to this new district, there would be sufficient tramway traffic to support the service. The estimated cost of the scheme is £132,350.

The Bournemouth Town Council has considered the reports of the General Manager and of the Tramways Committee which recommended the abandonment of the conduit system and the substitution therefor of the overhead trolley system through the center of the town. It was decided to seek further advice, and it was agreed that Mr. Fell, the General Manager of the London County Council Tramways, be asked for a report.

The Southampton Corporation, as owner of the electric tramways undertaking, has determined to increase considerably the present service.

The proposal to link Wimbledon and Sutton by the construction of a new railway, to be worked electrically by the District Railway Company, has been assented to by a committee of the House of Commons. The scheme is promoted by local landowners, and the estimated cost of the undertaking is £311,554. From a junction with the District Railway at Wimbledon, the new line will proceed, with six intervening stations, to Sutton, where the terminus will be alongside the station of the London, Brighton & South Coast Railway. The only opponents of the bill before the Commons committee were the last-named company.

The service given by the Dolter surface contact system at Torquay has not been very satisfactory to the tramway company, which some time ago petitioned for leave to replace it with the overhead system. Part of the trouble consists in studs remaining alive when they should not, and part from studs not becoming alive when they should. Excessive cost of repair is also alleged. Messrs. Mordey and Dawbarn recently made a report on the subject and believe the troubles can be remedied. This conclusion has been adopted by the authorities who have authorized the tramway committee to do what it could to retain a surface contact system in Torquay.

A. C. S.

News of Electric Railways

Disorder Follows the Columbus Strike

Destruction of property, attacks upon car crews and passengers, attempts to blow up cars with dynamite, and other species of wild riot and disorder characterized the street railway strike at Columbus last week. Mayor Marshall proved to be unable to control the situation. A call was made for State troops by the Mayor, and on July 28 about 1,600 men arrived and pitched their camps near the various car houses, power houses and other places that needed protection.

Headquarters were established in the State-house grounds, and Troop A, of Cleveland, camped there, while the horses are quartered within a roped enclosure on Broad Street, the finest thoroughfare in the city, in order to be ready on a moment's notice. All the troops were thoroughly equipped for strike duty, being provided with clubs, as well as ordinary and riot guns.

No cars were in operation on the night of July 28, and an agreement was reached between the city and the company that no cars should be put into operation on any of the lines until the next afternoon. General W. V. McMaken, in command of the troops, informed Mayor Marshall that his men could not do patrol duty without special arrangements, but that they would be sent to any part of the city to quell outbreaks or preserve order. Seemingly it was the intention of the Mayor that the soldiers should take the place of the patrolmen for this purpose. On the arrival of Governor Harmon from his summer home in Michigan, the decision that soldiers should not do patrol duty was confirmed. However, the trend of events later caused a change in conditions, and the men were distributed over the city to protect the people and property.

The decision to ask for military aid was reached on the night of July 27, after a number of cars had been damaged, and many people hurt by the rioters.

Trouble seems to have broken out all over the city at the same time on the evening of July 27, and it was of a somewhat different variety from that encountered earlier in the week. Attacks were made from corners and dark places in the streets, where the men could not be seen. Such a wide territory was covered in this way that the police department was unable to reach all sections affected. The company sent its cars to the car houses earlier than had been intended, in order to stop the rioting.

Boulders and timbers were placed on the tracks, and when the car crews alighted to remove the obstacles they were attacked by mobs of hundreds of men, women and children. Several of the car men were badly beaten and a number of cars were left standing on the tracks. Switch points were removed on several occasions, in order to make it impossible for the cars to pass over these places.

In his instructions to the commanding officers of the troops, Mayor Marshall stated that the strikers' pickets must be allowed to occupy their places, and that a proposed mass meeting in the State-house yard on Sunday must not be interfered with. He placed special emphasis upon the necessity of guarding the property of the company, however, and looking out for the safety of citizens. A special proclamation was issued to the people, asking that so far as possible they remain in their homes and not subject themselves to the danger of violence on the streets. All saloons were closed Monday, and have remained closed since.

The cars were started again on the afternoon of July 29, and, notwithstanding the presence of the troops, the night following was one of wild disorder. Owing to the order that soldiers could not do patrol duty, there was a misunderstanding as to what they really were expected to do, and their services were not often called for, except in the case of Colonel H. G. Gatroy and his men, who opened up two avenues and allowed the cars to operate. Early in the evening Captain Bush, with two sections of Battery C, dispersed two gatherings by arriving with two rapid-fire guns, mounted on automobiles. These guns have been in service since on several occasions. As a result of the night's work a number of motormen and conductors were injured, and several cars damaged.

The militia took complete control of the city on July 30, although the civil authority was still in the hands of Mayor Marshall nominally. Details of soldiers were sent out along the car lines in the evening, with instructions to do police duty and co-operate with the department in every way. The city was divided into four districts, and the soldiers were instructed to see that no crowds gathered.

Notwithstanding the activity of the military authorities, the rioting was continued Saturday night. Cars were stoned and men beaten, and the few passengers on the cars were the targets for bricks and other missiles. A large number of arrests were made by the soldiers, and 15 or 20 of the men captured were charged with rioting, the others with being loiterers. The penitentiary authorities have notified the military officials and city officers that there are about 300 vacant cells in the institution, and that if the jails become congested the cells may be used to take care of the prisoners.

So serious has the situation become that two more regiments have been called out, and Maj-Gen. Charles Dick, United States Senator, division commander of the Ohio National Guard, has been ordered to assume command of the troops. The two regiments comprise about 1,500 men, which will make over 3,000 men on duty in Columbus.

On the evening of July 29 the turbulence resulted in the injury of 27 employees of the company, while several passengers were hurt more or less severely, 30 riot calls were received, and a number of cars were demolished.

The Rev. Theodore R. Reese, president, and Joseph Bishop, secretary of the State Board of Arbitration; and Charles Pretzman, president of the Columbus Chamber of Commerce, held a conference with General Manager E. K. Stewart, of the Columbus Railway & Light Company, on the afternoon of July 30, in an endeavor to commence negotiations for a settlement. They were informed by Mr. Stewart that if the men applied for employment as individuals they would be taken back in that capacity, but not otherwise.

Comparative quiet followed the arrival of additional troops, and but few outbreaks occurred on July 31, notwithstanding the fact that a mass meeting was held on the State-house grounds. Those who addressed the meeting did not say anything of an incendiary nature. State guard officials secured positions where they could oversee the crowd.

Governor Harmon, on July 29, began formulating plans to bring about a settlement between the men and the company. After consulting with officers of the company he met representatives of the men at the home of Adjutant General Weybrecht, on the evening of July 31, and asked for a proposition from the men.

Major-General Charles Dick took command of the troops on the morning of Aug. 1, and divided the city on a line with Broad Street, running east and west. General McMaken was put in charge of the southern half, and General Speaks, the northern part, with about 1,500 men each. Each commander has a company of cavalry.

The soldiers have been instructed to report police officials who do not do their duty in cases of disturbances. This was done because it is charged that some of the men are not doing their duty as they should.

Pittsburg Traction Situation

Mayor Magee has notified the Pittsburg Railways Company that he has signed an ordinance passed by the City Council revoking the franchise of the Pittsburg & East Liberty Passenger Railway. He ordered the company to cease operating cars on lines covered by the franchise. He also ordered the company to see that five-sevenths of the street car passengers on all lines get seats, that no passenger be allowed to stand between the seats of summer cars, that cars be cleaned and fumigated at least once a week

and that the other provisions of ordinances passed recently be observed.

James H. Reed, president of the Philadelphia Company, which controls the Pittsburg Railways, is quoted as saying:

"The company will contest the validity of the ordinances signed by Mayor Magee. As to the ordinance forfeiting the rights of the Pittsburg & East Liberty Passenger Railway, there is nothing in it, as that road has been dead and buried over 40 years. The Pittsburg, Oakland & East Liberty Passenger Railway was built under an entirely different charter and has nothing whatever to do with the Pittsburg & East Liberty Passenger Railway ordinance."

J. D. Callery, president of the Pittsburg Railways, has written City Comptroller Morrow, of Pittsburg, as follows, in reference to a resolution introduced in the Council and referred to the finance committee, asking that committee to have the Comptroller make a demand for the books of several companies:

"The Citizens' Passenger Railway Company, and Citizens' Traction Company mantain separate corporate existences, with a board of directors and officers quite distinct from our organization. Neither I nor any of the officers of the company with which I am associated have possession of the books of either of these companies.

"While I desire to treat yourself and the finance committee of Councils with all proper respect and to give you any assistance which I may in the performance of your duties, you will permit me to suggest that there is nothing in the ordinances of the city of Pittsburg, nor in the legislation of the State, which authorizes the finance committee to call upon me or any of the officers of the Fort Pitt Traction Company, the Consolidated Traction Company, or the Pittsburg Railways Company to produce their books for an examination by your committee."

Steam Railroad Statistics of the United States for the Year Ended June 30, 1909

The Interstate Commerce Commission has issued an abstract of its twenty-second annual statistical report, which covers the fiscal year ended June 30, 1909. It shows that the total single track railway mileage in the United States was then 236,868.53 miles, an increase of 3,215.18 miles, as compared with the previous year. Substantially complete returns were received for 235,402.09 miles of line operated. In addition there were 20,949.41 miles of second track, 2,169.55 miles of third track, 1,453.36 miles of fourth track, and 82,376.63 miles of yard track and sidings.

The total number of locomotives in use was 57,212, an increase of 479 over corresponding returns for the previous year. The total number of cars of all classes was 2,218,280, or 12,901 less than on June 30, 1908. This equipment was thus assigned: Passenger service, 45,584 cars; freight service, 2,073,606, and company's service, 99,090. Nearly all cars and engines are now equipped with air brakes and automatic couplers.

The total number of persons employed was 1,502,823, an increase of 66,548. The par value of railway capitalization was $17,487,868,935, or $59,259 per mile of line, as represented by the amount outstanding, $13,711,867,485.

The number of passengers carried was 891,472,425, an increase of 1,462,851, and the passenger mileage was 29,109,322,589, an increase of 26,485,645. The number of tons of freight carried was 1,556,559,741, an increase of 23,577,951 tons over the previous year. The ton-mileage was 218,802,986,929, an increase of 421,432,127. The average receipts per passenger per mile were 1.928 cents; the average receipts per ton mile, 0.763 cent. The ratio of operating expenses to operating revenues was 66.16 per cent.

The report shows that the operating revenues were $2,418,677,538; the operating expenses were $1,599,443,410. The corresponding returns for 1908 were: Operating revenues, $2,393,805,989; and operating expenses, $1,669,547,876. The operating revenues averaged $10,381 per mile of line, and the operating expenses averaged $6,865 per mile of line.

There were 8,722 persons killed and 95,626 injured on the railroads during the year. The number of passengers killed was 253, and the number injured 10,311, a decrease of 128 and 1,245, respectively. Nearly 5,000 of the total killed were trespassers on the railroads, and about 5,750 of such were injured.

Association Meetings

Central Electric Traffic Association.—September.

Central Electric Accounting Conference.—Chicago, Ill., September.

Colorado Electric Light, Power & Railway Association.—Glenwood Springs, Col., Sept. 21, 22 and 23.

Oklahoma Public Utilities Association.—Oklahoma City, Okla., Sept. 30 and Oct. 1.

American Street & Interurban Railway Association.—Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

New Line Opened in Mexico.—The Neuvo Laredo (Mex.) Street Railway on July 17 formally opened for traffic its street railway in Nuevo Laredo. The line was built by F. E. Scoville, of Laredo, Tex. Power is purchased from the Laredo (Tex.) Power Company.

Passenger Train Through Detroit River Tunnel.—On July 26 the first passenger train was operated through the tunnel of the Detroit River Tunnel Company, extending from Detroit, Mich., to Windsor, Ont. Regular trains will be operated through the tunnel by Oct. 1.

Toledo Traction Situation.—Officials of the Toledo Railway & Light Company have informed Mayor Whitlock that the engineers are now working on the inventory and that each schedule will be turned over to the city as completed. The Mayor has stated that the task is greater than he anticipated.

New York Electrical Show.—The fourth annual New York Electrical Show will be held in Madison Square Garden, New York, from Oct. 10 to Oct. 20, 1910. Ninety per cent of last year's exhibitors have already contracted for space. George F. Parker is the general manager of the exhibit.

New Line Opened in Colorado.—The Grand Junction & Grand River Valley Railway, Grand Junction, Colo., on July 14 formally opened its line between Grand Junction and Fruita, a distance of 20 miles. The opening was attended by celebrations in which all the towns along the route participated. It is probable that the company will extend the line to Clifton and Palisades.

Charges Philadelphia Franchise Is Blocked.—S. S. Neff, president of the Philadelphia & Suburban Elevated Railroad, has issued the following announcement to the public: "We have absolute evidence that at this moment the Philadelphia Rapid Transit Company is the only influence preventing the granting of a franchise to the Philadelphia & Suburban Elevated Railroad Company."

New Line Desired in Baltimore.—A petition has been received by the Public Service Commission of Maryland asking that the United Railways & Electric Company of Baltimore operate a line from Southwest Baltimore directly to North and Northwest Baltimore. An order requesting William A. House, president of the company, to confer with the commission on the subject has been passed.

Referendum Suggested for New Line.—Citizens of Kansas City, Kan., decided at a mass-meeting to circulate petitions asking for a referendum on the subject of a crosstown railway line between Kansas City and Rosedale. The city commissioners have refused to pass an ordinance for the construction of a line on the ground that the street specified in a recent petition was needed for driving purposes.

Arrangements for Paving Debt at Toledo.—An ordinance has been introduced at Toledo, Ohio, providing for the issue of $18,503.99 bonds to pay the Toledo Railway & Light Company's share of paving Ashland Avenue. When the debt was incurred the city was informed that the company did not have the money for this purpose, but that it would pay its share if made in the form of an assessment over a number of years.

Riot Follows Attempt to Operate Electric Railway in Bogota.—The native residents of Bogota object to the operation of the Bogota City Railway, and the attempt on July 19, 1910, to place the line in operation resulted in so much disorder that the cars were withdrawn. The concession for the line in Bogota was granted to Americans during the Presidency of General Reyes. The first attempt to place the line in operation was made on March 7, 1910. A mob attacked the cars and stoned the American lega-

tion. Another attempt to open the line on March 16, 1910, also resulted in disorder.

Penalty for Delay in Filing Report Disallowed.—A decision rendered by the United States Circuit Court of Appeals holds that the city of Duluth, Minn., cannot collect a penalty of $34,000 from the Inter-State Traction Company because it failed to make a report of its earnings at a certain time. The city claimed a penalty of $100 a day since the report was due and brought suit to collect at this rate for 340 days. It was held by the lower court and is now upheld by the Court of Appeals that, by the practice of accepting reports after they were due and waiving the penalty, the city has lost the right to enforce the penalty.

Pennsylvania Terminal in Manhattan Officially Opened—The new Manhattan terminal station of the Pennsylvania Railroad was declared officially opened on Aug. 1 by James McCrea, president of the company, who accepted from the memorial committee of the board of directors the statue of the late president, Alexander Johnston Cassatt. The statue was unveiled following the presentation by Thomas De Witt Cuyler, chairman of the memorial committee. It is now planned to operate trains in the East River tube on regular schedule, beginning Sept. 8. A description of this terminal was published in the ELECTRIC RAILWAY JOURNAL of April 9, 1910, page 656.

Plans for Geary Street Line in San Francisco—The public utilities committee of San Francisco has decided that the overhead trolley is desirable and the underground conduit system impracticable for the proposed municipal road on Geary Street. Judge Van Fleet of the United States Circuit Court has denied the petition of the United Railroads of San Francisco for a temporary order restraining further progress with the plans for the proposed line. The court held that there were no averments to show that the next steps threatened could be taken before a hearing may be had and determined. No injury, however threatened, was irreparable, the court said, which might be prevented before it occurred. The hearing on the petition of the United Railroads to enjoin the board of supervisors from disposing of the Geary Street bonds has been postponed to Aug. 15.

New Jersey Commission News.—The Board of Public Utility Commissioners of New Jersey, whose appointment by the Governor was mentioned in a recent issue of the ELECTRIC RAILWAY JOURNAL, actively entered into its duties on July 4, under a State law which provides that acts of the Legislature become effective on that date unless some other date is mentioned in the act. As already announced, the commission has appointed Philander Betts chief engineer. The board has appointed Tuesday as the day for holding hearings and has already conducted several hearings at Trenton. The commission will also establish an office at Newark, at which a considerable part of the work connected with electric railways, electric lighting and gas public utilities can more easily be concentrated. The rest of the work, including that connected with the steam railroads of the State, will be conducted at Trenton.

Milwaukee Socialists on Traction Situation.—According to an article in the Milwaukee *Journal* of July 27, harmony is threatened among members of the Socialist party as a result of the conditions which have arisen respecting a new franchise for crosstown lines. Alderman Victor Berger, one of the leaders of the party, is quoted by the *Journal* as having said to John I. Beggs, president of the Milwaukee Electric Railway & Light Company, that unless concessions are granted by the company of greater privileges than those for which provision was made in the present general franchise, no new franchises will be passed during this administration. Mr. Beggs is said to have replied: "Then I don't want any. There positively will not be any additional concessions." According to several leading Socialists, the administration is anxious to settle the traction problems.

Subway Plans in Philadelphia.—The committee on comprehensive plans for a subway system, appointed by Mayor Reyburn, of Philadelphia, has under consideration an extensive system. The tentative plans provide for the construction of a subway, estimated to cost from $60,000,000 to $200,000,000, to be built and owned by the city and leased to operating companies. The plan is to construct the subway under Broad Street, from end to end, with space for four or six tracks. From this central line four branches would be constructed, extending respectively to the northeast, northwest, southeast and southwest sections of the city east of the Schuylkill River. S. S. Neff, president of the projected Philadelphia & Suburban Elevated Railroad, has issued a statement saying that the construction of a system of subways in accordance with this plan would mean the foreclosure of the bonds.

Association of Railway Electrical Engineers.—The annual convention of the Association of Electrical Engineers will be held in the Hotel La Salle, Chicago, Sept. 27 to 30, 1910, instead of a week later as originally planned. E. M. Cutting, Southern Pacific Railroad, Oakland, Cal., is president of the association, and George B. Colegrove, Illinois Central Railroad, Chicago, is secretary. The membership, comprising about 400, is made up of engineers who are interested in the electrical problems of a steam railroad, such as car lighting, signaling and motor drive. A feature of the coming convention will be an exhibit by the Railway Electric Supply Manufacturers' Association, an affiliated organization. The president of the manufacturers' association is W. L. Bliss, of the United States Light & Heating Company, of Milwaukee. J. Scribner, of the Chicago office of the General Electric Company, is secretary.

St. Louis Railway Guide.—The United Railways Company, of St. Louis, has issued a street railway guide containing descriptions and lists of the points of interest in the city and a series of maps which illustrate the 30 routes extending from the business center into outlying sections and the 247 route intersection points where transfers are given. The book also contains a map of the street railway lines of St. Louis County, indicating the number of stops and the places of interest reached. The guide, which is copyrighted by the company, contains in addition to the valuable information indicated, suggestions to passengers designed to prevent accidents and facilitate the performance of good service, rules for conductors and other brief and important references to the work of the railway. Attention is called to the mutuality of the interest of the public, the city and the railway company. The book was printed at the shop of the United Railways Company.

Detroit Traction Situation.—The City Council of Detroit has passed a resolution to increase the daily rental payable by the Detroit United Railway to $500. J. C. Hutchins, president of the company, has written a letter declining to pay more than $300 a day. The letter says: "We are compelled to advise you that we deny the statement contained in the preamble of said resolution of July 19, 1910, to the effect that the rights of the company have expired on the street mentioned therein. We are also advised that the requirements to pay such sums of money are illegal for other reasons. We are therefore compelled to inform you that we decline to pay said sum of $200 per day in addition to the sum we are now paying. We desire to reiterate what we said to you under date of June 30, 1910, and ask you to consider the statements therein contained as a part of this letter." An abstract of the letter to which Mr. Hutchins refers was published in the ELECTRIC RAILWAY JOURNAL of July 9, 1910, page 89.

Defense of Philadelphia Rapid Transit Company Against Penalty Suit.—An answer has been filed by the Philadelphia Rapid Transit Company, through President Charles O. Kruger, to the suit for $261,275 damages brought against the company by the borough of Morton for penalties for alleged violations of the ordinance granting the original franchise by which cars are operated. Section 7 of the ordinance required that cars be operated at intervals of every 15 minutes. The answer denies that the ordinance of May 27, 1889, has been violated, and interprets section 7 as requiring that the cars running in both directions shall be operated every 15 minutes. The contention of the borough was that the ordinance required cars to be operated in each direction every 15 minutes. The answer says that cars are run more frequently than the ordinance requires. While contending that the ordinance has not been violated and that the company has done its best under the existing physical conditions, the company states that the large claim is not a proper one, and that if a violation has taken place, the penalty should be $10.

Financial and Corporate

New York Stock and Money Market

August 2, 1910.

During the last week the stock market has recovered much of the loss it sustained under the heavy liquidation of the week previous. The tone has been distinctly better, but the trading has been very light. This is not an unusual condition. For several months, activity has meant selling and lower prices. There has been no buying activity. The traction shares, especially Interborough and Brooklyn Rapid Transit, have continued to carry their full share in the trading and have all recovered proportionately.

The money market remains remarkably easy, with lenders offering funds at low rates. Quotations to-day were: Call, 1 to 2 per cent; 90 days, 3¾ to 4 per cent.

Other Markets

There has been very little trading in the Philadelphia market during the last week, but prices, following the trend of Wall Street, were a trifle stronger. Rapid Transit has recovered to 18 and Union Traction to 43.

In Boston there has been almost no trading in traction shares. Massachusetts Electric and Boston Elevated have lost much of the activity they enjoyed a few weeks ago, and other issues are not offered.

There have been days during the last week when not a single traction share was sold in the Chicago market. At no time has there been any activity in these issues. A few shares of Chicago Railways Series 2 have been sold at 15.

In Baltimore there is still some dealing in United Railways stock, the prevailing price being about 15¼. The bonds continue to be fairly active at former prices.

Quotations of various traction securities as compared with last week follow:

	July 26.	Aug. 2.
American Railways Company	a42½	a42
Aurora, Elgin & Chicago Railroad (common)	a45	*45
Aurora, Elgin & Chicago Railroad (preferred)	82	*82
Boston Elevated Railway	126	122
Boston & Suburban Electric Companies	a15	*15
Boston & Suburban Electric Companies (preferred)	a74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	37	a37
Brooklyn Rapid Transit Company	71⅜	74⅞
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	80	*80
Capital Traction Company, Washington	a129	a129
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways ptcptg., ctf. 2	a15	a16
Chicago Railways, ptcptg., 3	a11	a10
Chicago Railways, ptcptg., ctf. 4s	a5½	*5½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a105	a103
Detroit United Railway	*45	*45
General Electric Company	135¼	140½
Georgia Railway & Electric Company (common)	a107½	a107
Georgia Railway & Electric Company (preferred)	a86	*86
Interborough-Metropolitan Company (common)	15	16¼
Interborough-Metropolitan Company (preferred)	43	46
Interborough-Metropolitan Company (4½s)	78	77¾
Kansas City Railway & Light Company (common)	a25½	*25½
Kansas City Railway & Light Company (preferred)	a79½	a79½
Manhattan Railway	128½	128
Massachusetts Electric Companies (common)	a14¾	a14¾
Massachusetts Electric Companies (preferred)	a79	a79
Metropolitan West Side, Chicago (common)	*23½	22
Metropolitan West Side, Chicago (preferred)	58½	60
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	65	67½
Northwestern Elevated Railroad (common)	*18	a18
Northwestern Elevated Railroad (preferred)	*65	a60
Philadelphia Company, Pittsburg (common)	a42	a42⅝
Philadelphia Company, Pittsburg (preferred)	a43	a42¼
Philadelphia Rapid Transit Company	a16¾	a18
Philadelphia Traction Company	*84½	83
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs.	a99	a99
Seattle Electric Company (common)	a109	a109
Seattle Electric Company (preferred)	a99½	a98½
South Side Elevated Railroad (Chicago)	a67	a63
Third Avenue Railroad, New York	8¼	a10½
Toledo Railways & Light Company	*7⅝	6⅝
Twin City Rapid Transit, Minneapolis (common)	106	106½
Union Traction Company, Philadelphia	a42	a43½
United Rys. & Electric Company, Baltimore	a14½	a15¼
United Rys. Inv. Co. (common)	*30	*27
United Rys. Inv. Co. (preferred)	60¾	54
Washington Ry & Electric Company (common)	a32½	a32⅛
Washington Ry. & Electric Company (preferred)	a87	a88
West End Street Railway, Boston (common)	a88	a87½
West End Street Railway, Boston (preferred)	a100½	a100
Westinghouse Elec. & Mfg. Company	50	55⅛
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Complication in Plan for Consolidation of Chicago Railways and Consolidated Properties

A decision which has a bearing on the pending negotiations for consolidation of the Chicago Railways Company and the Chicago Consolidated Traction Company was rendered on July 29 by Judge Cutting, of the Probate Court of Cook County. The court denied a petition of L. S. Owsley, executor of the estate of Charles T. Yerkes, for permission to deposit Consolidated Traction Company bonds with the reorganization committee. The claim of the Yerkes estate, including principal and interest, is $5,669,530. Judge Cutting said:

"The plan which is submitted necessarily includes the surrender of dominion over these securities to parties outside of the administration of this estate. It places them in the hands of a depositary not subject to the control of the executor in any way nor of this court. It follows, therefore, that before this compounding can be completed there will be an interval of indefinite length, during which time the assets of this estate will not be in the hands of its executor and will be subject to control by other persons than him.

"If there is one thing better settled than another in the administration of estates it is the absolute liability of the trustee who is named executor for the utmost good faith not only in the disposition of the estate but in the safekeeping and guarding thereof. The principle is too valuable to be impinged upon by construction. The executor must hold his assets absolutely untouched by any other agency.

"This plan is not offensive to the court's idea of what ought to be done, in its ultimate result. If the proposition were to substitute these bonds here, now or at some future date, for the bonds held by the estate, and the court found, as perhaps it might well find, that it were desirable for the benefit of creditors, primarily, and of the other parties interested in the estate, secondarily, I should have no hesitancy in entering an order, I think, permitting such compound, but no such proposition is before the court.

"It is useless to say, in my opinion, that the depositary is responsible, and that the committee is beyond reproach. Both these things are true, as I believe. But the very fact that I mentioned that the depositary is financially sound and that the committee is beyond reproach is of itself a statement, if it had any force at all, which shows that in another case of like character, presented here, the court might find the exact opposite, namely, that the depositary was not financially sound and that the committee was not beyond reproach."

Judge Cutting authorized the executor to pay $60,000 to secure the return of the bonds from New York, where they have been held since the death of Mr. Yerkes.

W. W. Ross, of counsel for Mr. Owsley, said, regarding the decision: "There is nothing in the decision that need worry the reorganizers, or prevent the completion of their plans. The court has gone out of his way to indicate in giving his decision that he does not consider the bargain an unjust one, and he has practically said that when the executor comes to him with a definite offer for the immediate exchange of the bonds he considers that he has power to order the compounding of the claim, if he considers it an advantageous compromise. That is one of the principal points involved in the proceedings. I contend that Judge Cutting's decision is an aid to the consolidation plan."

Levy Mayer, of counsel for Mrs. Yerkes, who opposed the plan, said: "The reorganization committee must have the Yerkes bonds in order to apply them in payment for the property when it is foreclosed, and this was the entire controversy. The court denied the executor's petition and held that there was no power in court to permit the bonds to be deposited. This absolutely ends the reorganization plan. The committee can never utilize these bonds unless with the consent of Mrs. Yerkes, and unless these bonds can be used by the committee there is no possible way for the committee to buy the Consolidated property under the foreclosure of its mortgages. Any new plan will meet a similar fate."

Judge Grosscup, of the United States Circuit Court, appointed John M. Roach and David R. Forgan receivers of the Chicago North Shore Street Railway and the Chicago & Jefferson Urban Transit Company, on July 29. These

are two of the underlying companies of the Consolidated system.

Letters have been sent to holders of the Chicago Railways Company participation certificates, series I, asking them to write letters to the directors protesting against the plan for acquisition of the Consolidated property.

Interborough Rapid Transit Company Statement

The following comparative statement for the years ended June 30, 1910 and 1909, has been issued by the Interborough Rapid Transit Company of New York:

Year ended June 30.	1910.	1909.	Increase.
Gross operating revenue	$28,987,648	$26,524,394	$2,463,254
Operating expenses	11,013,143	10,747,443	265,700
Net operating revenue	$17,974,505	$15,776,951	$2,197,554
Taxes	1,750,422	1,799,807	*49,385
Income from operation	$16,224,083	$13,977,144	$2,246,939
Non-operating income	411,024	1,001,775	†*590,751
Gross income	$16,635,107	$14,978,919	$1,656,188
Interest, rentals, etc., including Manhattan guarantee	10,552,960	10,389,096	163,864
Net corporate income	$6,082,147	$4,589,823	$1,492,324
Dividends	3,150,000	3,150,000	.....
Surplus	$2,932,147	$1,439,823	$1,492,324
Operating per cent	37.99	40.52	*2.53
Passengers carried	562,788,395	514,680,342	48,108,053

* Decrease. † The decrease in non-operating income is largely due to the policy inaugurated July 1, 1909, of not crediting to the income of the company the interest upon the advances made for the construction of the New York & Long Island Railroad tunnel.

Plan for Merger of Chicago Elevated Roads Postponed

Henry A. Blair, who has been conducting negotiations for a consolidation of the Chicago elevated railroads, returned to Chicago on July 27, after a visit to New York, and announced a postponement in the plan for combination of the properties.

Mr. Blair was quoted as follows:

"It is impossible to carry out a financial deal in New York at the present time, such as a merger of the Chicago elevated lines. While I was there the hotels seemed deserted and about everybody who could get away was in the mountains or at seaside resorts. As a result, I did not see the men I expected to hold conferences with. Moreover, there is a blue feeling in New York financial circles just now. Some ascribe it to the crop outlook, and others to legislation against corporations. Under such conditions it is out of the question to carry through an undertaking that involves many millions. I had plans with me for the combination of the elevated lines, but I did not have an opportunity to thrash them out with the men I wanted to see. I feel certain, however, that the deal will be carried out."

Auburn & Turner Railroad, Turner, Maine.—It is reported that the control of this company will be purchased by the Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.

Binghamton (N. Y.) Railway.—Gross earnings for the fiscal year ended June 30, 1910, were $348,786, against $331,776 in the preceding year. Operating expenses were $200,253 as compared with $193,518. Net earnings were $148,533 last year and $138,258 in the previous year. Taxes and interest were, respectively, $15,599 and $92,829 in the last year, as compared with $15,126 and $92,423 in the previous year. The surplus was $40,105 in the 1910 year and $30,709 in the 1909 year.

Coney Island & Brooklyn Railroad, New York, N. Y.—The New York Public Service Commission, First District, has approved the issue of $489,539 of 4 per cent bonds under the mortgage executed on Dec. 15, 1904. The bonds are to be sold at not less than 80.

Denison & Sherman Railway, Denison, Tex.—The contract by which the J. F. Strickland Company, which controls the Texas Traction Company, operates also the Denison & Sherman Railway, will terminate on Aug. 15, 1910. At that time the owners of the Denison & Sherman Railway will again assume the direct management and operation of that road.

Duluth (Minn.) Street Railway.—A trust deed has been filed, securing an issue of $2,500,000 of 20-year, 5 per cent bonds. The Central Trust Company, New York, is trustee.

West End Street Railway, Boston, Mass.—A petition to the Massachusetts Railroad Commission asks for approval of an issue of 27,800 additional common shares, par $1,390,000. The proceeds are to reimburse the Boston Elevated Railway for cost of permanent additions and improvements. The Boston Elevated Railway has made permanent additions to the West End property from Oct. 1, 1907, to Sept. 30, 1909, amounting to $2,777,237. The West End Company recently issued $850,000 bonds, proceeds of which were applied in part payment to Boston Elevated for above improvements. From Oct. 1, 1909, to March 31, 1910, further improvements totaled $165,396, so that the West End Company is now indebted to the Boston Elevated road for $2,080,243, payment for which has been asked.

Groton & Stonington Street Railway, New London, Conn.—The annual report to shareholders presented by Thomas Hamilton, the president, at the annual meeting on July 21, shows gross earnings for the last fiscal year of $112,230, as compared with $108,740 for the previous year. Net earnings were $56,022, as compared with $53,699. Receipts from the express business were $9,085, as compared with $6,023 in the preceding year.

International Traction Company, Buffalo, N. Y.—Louisville, Ky., stockholders have pooled their interests, naming John W. Barr, Jr., president of the Fidelity Trust Company, and John C. Russell, as their representatives. The stock which they hold has been deposited with the Fidelity Trust Company.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has authorized the receivers to pay the United States corporation tax on the various properties in the system.

New York City Railway.—Judge Lacombe, of the United States Circuit Court, has signed an order authorizing Receiver Ladd to sell at public auction stocks and bonds in his possession. The stocks and bonds to be offered include 693 shares Dry Dock, East Broadway & Battery Railway; 8002 shares Forty-second Street, Manhattanville & St. Nicholas Avenue Railway; 22 second mortgage income bonds Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, due June 1, 1915; 5000 shares New York, Westchester & Connecticut Lighting Company, and 2500 first mortgage gold bonds, New York, Westchester & Connecticut Transit Company, due May 1, 1950.

Ocean Shore Railway, San Francisco, Cal.—F. S. Stratton, receiver, in a petition filed before Judge Van Fleet, of the United States Circuit Court at San Francisco, says that it will be impossible to run the road during the coming winter without loss, and that it is for the best interests of all concerned that the road and everything connected with it be sold immediately before any more expense is incurred. Mr. Stratton states that during the summer months the road can be operated at a profit, but during the winter months the loss is so great that it exceeds the income from the summer business. Since the receiver took charge the receipts from freight have increased, but those from passenger travel have materially diminished. The decrease is due to the fact that the future of the road is doubtful, and the exploitation and sale of lots in the towns along the line and adjacent thereto has greatly diminished. Total receipts since the receiver took charge on Dec. 9, 1909, were $345,326, of which all but $6.79 has been expended.

Third Avenue Railroad, New York, N. Y.—The New York Public Service Commission, First District, has disapproved of the reorganization plan of the bondholders' committee. A formal order of disapproval, however, will be held in abeyance, in order that the applicants may have an opportunity to amend their petition and submit proof that the present position of the company justifies the issue of the new securities proposed.

Toledo (Ohio) Railways & Light Company.—Robert C. Pew, vice-president of the Sun Oil Company, of Toledo, has been elected a director of the Toledo Railways & Light Company to succeed August Ropke, of Louisville, who resigned following his arrest on the charge of having embezzled funds of the Fidelity Trust Company, of Louisville.

Traffic and Transportation

Progress of Arbitration on Wages in Massachusetts

The hearings before the committee on arbitration in the investigation regarding wages on the lines controlled by the New England Investment & Security Company were completed on July 30, after six days of continuous sessions. C. W. Bosworth, Springfield, Mass., conducted the case for the company, and W. B. Fitzgerald, Troy, N. Y., represented the employees.

Mr. Bosworth pointed out that what other companies pay and the conditions of supply and demand for labor are vital considerations. When a company employs men the main point is what it must pay to get them, while with the men, the issue is whether they can get any job elsewhere which pays more. Henry C. Page, general manager of the Worcester Consolidated Street Railway, presented a comparison of wages covering 30 companies in Massachusetts. The comparison showed that on the whole there was not a company which in the long run paid as much as those in Springfield and Worcester, the two largest centers of the New England Investment & Security system. After 6 years' service not a company on the entire list had as favorable terms as those at Worcester and Springfield. In the seventh year the two cities named were from 1 cent to 1.5 cents per hour above the rest, and so in the eighth and ninth years. In the tenth year of service the Worcester and Springfield men obtain 25 cents per hour against 24.2 cents on the Boston Elevated Railway. In Maine and New Hampshire, Mr. Page said that the rates for a full day's work were materially lower, but in the case of an 8-hour day the rates were from 26 to 27 cents per hour on account of the small number of hours in question. In Vermont the rates were lower, with a range of from less than 20 to 22 cents maximum. In Connecticut the rate was somewhat below the Massachusetts standard. Only 5 roads in New England have as high wages as the Worcester and Springfield lines in the first six months, and as for the second 6 months of the first year, only one company equalled Worcester and but one Springfield. Mr. Page said that the Rhode Island Company's rate is pending before an arbitration board. At present the Providence rates are slightly higher than those of Worcester and Springfield, while the wages in Hartford and New Haven are in general slightly lower. Higher pay is given with each of two 5-year sleeve stripes on the Worcester and Springfield lines. The average length of service on the Worcester system is 3.8 years for conductors and 4.81 years for motormen. On the Worcester and Holden line it is 2.5 years average for both.

Comptroller J. T. Harmer of the New England Investment & Security Company stated that on the Westfield division of the Springfield company the average wages are 22.56 cents per hour, or $13.54 per week, making $703.94 per year per man, on the basis of 60 hours per week. Most of the men work more than 60 hours per week by asking for overtime. On all the Springfield lines the average is 22.81 cents per hour, or $711.61 per man per year; on the Worcester and Southbridge, 22.63 cents per hour, or $706.23 per man per year; on the Worcester Consolidated 23 cents per hour or $717.60 per year; on the Marlboro and Westboro, 22.76 cents per hour, or $710.41 per year; on the Worcester and Holden, 22.12 cents per hour, or $690.33 per year; and on the Blackstone Valley, 21.52 cents per hour, or $671 per year. In some cases motormen by working overtime made as much as $21 to $22.50 per week.

Mr. Fitzgerald interjected that at the end of a year all men should receive the same wages. In reply to this Mr. Bosworth brought out the points through Mr. Page that men of limited experience miss more fares and are liable to more accidents than the older employees.

General Manager Dickson, of the Springfield Street Railway Company stated that the yearly wages of the members of the employees' committee varied from $651.74 to $1011.73, which showed the capacity of the service for enabling a man to make a good living.

Mr. Bosworth introduced the report of the Massachusetts Bureau of Statistics of Labor for 1908, and showed that in the automobile industry the average wage was $752.11; in the manufacture of agricultural implements, $548.31; baskets, rattan and willows, $432; brick and tile, $468.30; carriages and wagons, $696.66. The yearly average of glass workers was $828.53; malt liquors, $880.73; refrigerators, $776.64; scales and balances, $761.18; and show cases, $809.66. Mr. Bosworth said that employments containing many women were excluded and urged the greater permanence of street railway work.

Continuing, Mr. Harmer gave figures based on the average attained by the first 10 men in each class of employees. For the week ending April 8, Springfield conductors of the highest class received for regular and overtime sums varying from $15 to $21.12. Overtime varied from nothing to 13.5 hours. In the $2.40 class of conductors the highest overtime was 12 hours per week and the highest weekly receipts per man $19.68. For the $2.35 class the highest overtime was 14 hours and the maximum receipts, $19.74. For the $2.05 class the figures were 14 hours and $17.22. Motormen's wages varied as much as those of conductors.

Mr. Dickinson said that there was no system of distributing overtime among the men. No preference is given to the men of lowest pay, but the actual overtime is largely a matter of chance. The older men in service have a preference for the extra runs. The older men bid in the runs. In Springfield if a man works a short run of 9 hours he is paid for 10. Not enough men bid in for the theater extras to perform the service.

Mr. Harmer's data showed that in the week ending Oct. 8, 1909, the number of employees was 363 at Springfield, and these earned an average weekly wage of $15.60, or $811.20 per year. In April, 1910, the average weekly wage was $15.16. Mr. Harmer said that the average wage obtained by dividing the total payroll by the total number of men was $826.68 for Springfield. This included all employees and all earnings. In Worcester the average wages obtained by the men working 60 hours a week and 52 weeks per year was $717.60, against $703 for Springfield, taking the two without overtime. For the Springfield, Palmer and Westfield divisions the total average per man per week was 62 regular and 5.5 overtime hours. The average of day runs was about 9.5 hours; for night runs it was from 8 to 8.5 hours.

Mr. Dickson said that the morning extras tended to give the men more money than corresponded to the actual hours which were run, and the evening extras are as a rule run by the day men, who thus earn two or three hours' extra pay daily.

President Storrs said that the company is complying fully with the Massachusetts laws regarding the hours of labor of street railway employees.

Mr. Bosworth then presented additional data regarding the average wages paid in different industries, which in the main ranged from $500 or $600 per year. In wood turning and carving the wages averaged $415 per year.

Mr. Dickinson stated that the company in Springfield had no difficulty in getting all the men it desired; it was, in fact, often embarrassed by too many applications for employment. The number is far in excess of the needs, and only the best men are put on the waiting list. Mr. Page said that the conditions were similar in Worcester.

Mr. Bosworth said that the United States Bureau of Labor of 1909 and the report of the Senate Committee on wages and commodities show that wholesale prices are lower than in 1907. He pointed out that in 1907 the present wage agreement was made, and at that time boarding house keepers were raising prices. He contended that the company's net earnings are decreasing and that it cannot stand the increase of wages desired by the men, although the gross earnings are increasing. Of 100 present motormen and employees who were in the Springfield company's service in 1907, 80 per cent. had received an increase in wages of from 4.16 to 15 per cent. in the last three years.

Final argument for the company was made by Mr. Bosworth. He stated that statistics in evidence showed that on May 1 no street railway in New England pays higher wages than the Worcester and Springfield companies, except the Boston & Worcester and the Milford & Uxbridge companies. On Jan. 1 the Rhode Island Company was the only one paying higher wages. The speaker argued at some length on the desirability of street railway work as an employment, compared with agricultural and other industrial occupations. Only two occupations in Springfield

pay their men over $700 per year—brass casting and finishing and marble and stone working. In Hampden County copper smithing and sheet iron work are the only occupations which are more remunerative. The average yearly wages in Springfield for occupations employing mostly men are $665, and in Hampden County only $590. The Springfield Street Railway Company pays an average of at least $826.28, and the men work little over 60 hours per week. The regular man in Worcester does slightly better. That is why there are so many applications for employment at the street railway offices in each city. The working principles of the street railway industry can be learned in three weeks, but the men improve greatly in the quality of the service as time goes on. Since efficiency increases with the years, the sliding scale of compensation is equitable. The supply and demand of conductors and motormen is ample for the company's needs.

Mr. Bosworth said that the company admits that the cost of living has increased, but claims that there is much humbug mixed with the truth. At the time the agreement of wages was made, three years ago, the wholesale prices were higher than ever before, and they fell materially afterward. Of the Springfield men 40 per cent are single, and it is probable that for these the cost of living has not increased materially. There was a tendency on the part of the employees not to answer the company's inquiries about their individual cost of living, although these were made entirely in the spirit of finding out what there was in the situation to remedy. The wholesale rate for beef in the last half year of 1907 was $8.32; for half of 1908 it was $7.90, and for the last six months of 1909 it was $8.22. Mr. Bosworth said that if the cost of living should be made the basis of wages the social system would be wrecked. The present year is apparently normal with the Springfield system, but the company is falling behind in its power to pay dividends. The stock must be figured at the premium at which it was purchased. Six per cent is not an adequate return on an average investment of $134. In Worcester, paying 6.5 per cent with a last surplus of but $10,000, the surplus might be wiped out by a single costly accident. If wages are increased the money must come out of maintenance. President Storrs has denied absolutely having said that the company could afford to pay more wages. It is not equitable to take higher wages out of the dividends of the stockholders, who are not now receiving more than a fair return upon the money which they have put into the enterprise. As for taking the higher wages out of the public, every company in the country is confronted with the propositions of higher cost of operation and higher wages. It is very hard to raise fares or reduce facilities. It is nothing less than death in front and destruction in the rear. No satisfactory solution can be reached otherwise than by letting supply and demand do their work.

The closing argument was made by Mr. Fitzgerald, who reviewed the testimony which had been introduced on the cost of living. He contended that a man became fully competent earlier than the company maintained, and that the conditions of service were harder in street railway work than in other industries. He argued that the men should be paid 30 cents per hour and allowed to work six days per week. He quoted figures from the annual reports to prove that the company could afford to raise the wages. The committee then took the case under advisement.

Lectures to School Children on Accident Prevention Planned in Seattle, Wash.

George C. Carson, claim agent of the Seattle (Wash.) Electric Company, will ask permission of the board of school directors to have lectures delivered in all the public schools in Seattle in the coming year. The lectures will be part of a campaign against accidents, like that which has been conducted successfully in Portland, Ore.

In an interview, discussing his plans, Mr. Carson said:

"The effort to train school children to avoid moving street cars and other traffic is becoming nation wide, and so successful has the work been so far and so gratifying have been the results that as soon as possible I will lay my plan before the Seattle school board.

"In Portland the school children and teachers have organized the Portland Safety Society League. Each member pledges himself or herself to do all possible to save life and limb, first, by using caution in crossing streets where cars are operated, in not crossing ahead of moving cars at all times and, most of all, by example and precept to induce others, and especially little children, to refrain from running or playing in streets where there is constant danger.

"Many of the accidents are due to that mysterious desire of young and old to jump across the tracks in front of a car in the belief that they can get ahead of the car. A great percentage of much of the danger from this cause, it has been demonstrated, can be eliminated by training the children to stand still until the car has passed by and all danger is gone.

"In Portland, as elsewhere, where safety leagues have been organized, the children have been trained also to do their playing and running remote from the street car tracks. It is planned to have well-informed lecturers on these matters speak in all the schools of Seattle during the coming school year and thereafter, if, as is expected, our plan meets the approval of the school authorities, which has been given gladly in other cities."

Lectures on the prevention of accidents are delivered to the trainmen of Seattle each week.

Accidents in New York City in June

The New York Public Service Commission, First District, has issued the following report of accidents during June, 1910, as compared with 1908 and 1909:

	June 1908	June 1909	June 1910
Car collisions	167	124	118
Persons and vehicles struck by cars	1070	928	937
Boarding	707	614	767
Alighting	1252	1022	1103
Contact electricity	50	34	26
Other accidents	2493	2161	2135
Totals	5739	4883	5086
Injuries.			
Passengers	2517	2148	2423
Not passengers	639	527	485
Employees	634	518	610
Totals	3790	3193	3518
Serious (Included in above).			
Killed	42	30	27
Fractured skulls	16	9	10
Amputated limbs	10	4	8
Broken limbs	40	33	39
Other serious	194	135	175
Totals	302	211	259

Transit Affairs in New York

Mayor Gaynor, of New York, contributes an article to the *Outlook*, in which he says: "The subway question in the city of New York has now reached a critical point. It needs to be considered in the most even temper of mind, without acrimony or spirit of contention. We are at the parting of the ways. Shall we construct another subway line, disconnected from and independent of the city's present subway system, or shall we construct the natural extensions and branches of the present subway system, and keep on doing so in the future, so that we shall have one growing general system, with a single fare, as was designed from the beginning?"

Stephen M. Hoye, president of the New Jersey & Staten Island Junction Railroad, has announced that plans are under consideration for the construction of a subway to connect the Fourth Avenue (Brooklyn) subway at Eighty-sixth Street with Stapleton, Staten Island.

Improvements for Employees at Omaha.—The Omaha & Council Bluffs Street Railway will install pool tables and libraries for employees at four car-houses.

Transportation and Theater Tickets Combined.—The People's Railway of Wilmington, Del., has started the operation of special cars to Brandywine Springs Park in the evenings. A charge of 25 cents, which is made on the cars, covers transportation in both directions and admission to the theater at the park.

Traffic Ordinance in Seattle, Wash.—A new traffic ordinance effective in Seattle, Wash., beginning on Aug. 12, requires that the speed of street cars in the crowded districts is not to exceed 12 m.p.h. All vehicles must be

kept at least 6 ft. from the steps of a car which is taking on or discharging passengers.

Strike in Rutland, Vt.—Thirty trainmen of the Rutland (Vt.) Railway, Light & Power Company struck on July 30 because of the refusal of the company to grant the wages asked. The men have been receiving 18 and 20 cents an hour and asked for a flat rate of 25 cents. The company was prepared for this action and operated the cars.

Operating Agreement in New Jersey—The Morris County Traction Company, Morristown, N. J., has made an agreement with the Public Service Railway whereby cars of the former company are operated from the Elizazbeth City line at Union Township to the Elizabeth station of the Central Railroad of New Jersey over the tracks of the Public Service Company.

Collection of Fares Urged in Sioux City, Ia.—A bulletin has been posted in the car house of the Sioux City Service Company, Sioux City, Ia., directing conductors to collect fares in the future from members of the families of employees. Attention was also called to the order forbidding newspaper carriers to ride to the ends of their routes without the payment of fare.

Operation of Car Between Schenectady and Troy, N. Y.—The Public Service Commission, Second District, has closed upon its records the complaint of G. P. German, and other employees of the General Electric Company, as to the operation of a limited car by the Schenectady Railway on weekday evenings from Schenectady to Troy. Arrangements have been made for the operation of the limited car in advance of the local car running between these cities.

Waiting Room Needed No Longer—The Public Service Commission of the Second District of New York has authorized the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., to discontinue the waiting room on the Hospital Branch of the Central New England Railway at North Street, Poughkeepsie. The Hospital Branch is now operated by electricity and the waiting room and shelter will no longer be used or required.

Service Stripes in Portland, Ore.—The Portland Railway, Light & Power Company, Portland, Ore., has adopted the plan of having its employees were service stripes to indicate to the public their length of service with the company. For each year of service up to four years one silver stripe will be worn. For five years' service one gold stripe will be worn, an extra gold stripe to be worn for every additional five years of service.

Abandonment of Portion of Buffalo Line Approved—The Public Service Commission of the Second District of New York has approved the abandonment of that portion of the route of the Crosstown Street Railway in Buffalo, in Kehr Street between French Street and Genesee Street. The Common Council of Buffalo has consented to this abandonment and the property owners whose property abuts upon that portion of the route have also consented to it.

Wages Increased by Winona, Ind., Companies.—The Winona Interurban Railway and the Winona & Warsaw Railway have announced increases in the wages of trainmen. The new schedule, showing the wages per hour, is as follows: Winona Interurban Railway—First six months, 18 cents; second, 19 cents; third, 20 cents; fourth, 21 cents; fifth, 22 cents; sixth, 23 cents; seventh, 24 cents. Winona & Warsaw Railway—First year's service, 17½ cents; second, 18 cents; third, 19 cents; fourth, 20 cents; fifth, 22 cents.

New Ordinance Regulating Smoking on Los Angeles Cars.—Notice has been given by the Los Angeles Railway that smoking will be permitted only on the front platforms, beginning July 28. Employees of the company are instructed to call the attention of the passengers violating a new ordinance on this subject to the fact that they are disobeying the law. If passengers refuse to go to the front platform or to discontinue smoking, employees of the company are instructed to stop the car at the next crossing and notify a policeman.

Electric Railway Accidents in Pennsylvania.—Seventeen people were killed and 359 injured on the electric railways of Pennsylvania during May, 1910, according to statistics compiled by the Pennsylvania State Railroad Commission. Of the killed, one was a passenger, and of the injured, 191 were passengers. During May, 1909, 14 people were killed, 3 of whom were passengers, and 379 injured. Of the latter 243 were passengers. Two employees were killed and 16 injured in May, 1910. In May, 1909, no employee was killed, but 23 were injured.

Five-Cent Fare Claimed in Long Beach, Cal.—J. McMillan, general manager of the Pacific Electric Railway, has addressed a letter to City Clerk Boynton, of Long Beach, Cal., stating that he does not know of any violation of franchises under which the lines were built. The city council, in accordance with its interpretation of the franchise ordinances, has ordered the city attorney to take steps to compel the company to establish a 5-cent fare in all parts of Long Beach. The city covers a larger area than when the franchises were granted. Mr. McMillan asks for particulars regarding the property which the city council believes to be entitled to a 5-cent fare.

New Folder Issued by Suburban Lines at Boston—The Middlesex & Boston Street Railway, Newtonville, Mass., has issued a folder in which points of interest on its lines are described under the title "Around the Hub by Trolley." The folder contains a map of the Middlesex & Boston Street Railway and the Lexington & Boston Street Railway, a large bird's-eye view of Norumbega Park and the Charles River in colors and attractive photographs of the new theatre at Norumbega Park and of points reached by the company's lines. Attention is called to the advantages of special car service. A list of picnic grounds is also included in the publication and the relation of the company's lines to others in the vicinity is indicated.

Request for Rehearing Denied by Commission.—The Public Service Commission, Second District, has denied the application made by the Warren & Jamestown Street Railway for a rehearing on the complaint of Wright Broadhead, and others. The commission made an order requiring that just and reasonable service be given by this company and that it be required to stop passenger cars at a point in the town of Kiantone. The commission states that upon the hearing in the case the principal defense made upon the merits was that making the stop required would affect the time schedule of the railroad, also be injurious to its power plant. The company asked for a rehearing upon the ground that the commission had no power to make the order in question, and that the stop was ordered on a private right of way where the statute of the state requires fences to be erected.

Traffic Conditions in Schenectady.—Traffic conditions in Schenectady, N. Y., were considered on July 21, at a meeting of aldermen and various city officials, with E. F. Peck, general manager of the Schenectady Railway, and Bertram Penoyer, engineer of maintenance of way. The report of the New York Public Service Commission, Second District, containing various recommendations, was read. The representatives of the company tendered a plan involving changes in routes which they thought would relieve the situation greatly. Mr. Penoyer said that the company was negotiating for the installation of an electric switch. The aldermen voted to invite Commissioners Carlisle and Sague, of the Public Service Commission, to go to Schenectady and have a meeting with the city officials and representatives of the railway company in order to consider the existing conditions.

Transfers on Staten Island.—Justice Lester W. Clark, of the Supreme Court, has granted a writ of mandamus requiring the Richmond Light & Railway Company and the Staten Island Midland Railway, Staten Island, New York City, to exchange transfers at three points in West New Brighton. Complaint had been made to the Public Service Commission of the First District of New York in the spring of 1909 by a committee of the Staten Island Chamber of Commerce. Commissioner McCarroll, to whom the matter had been referred, found that an exchange of transfers was required under the terms of an agreement between the two railroads and New Brighton. The joint use of the tracks was held to be an additional reason for requiring transfers under the terms of section 104 of the Railroad Law. On June 4, 1909, the commission adopted an order requiring an exchange of transfers. The companies having failed to obey the order, on Oct. 23, 1909, the counsel to the commission was instructed to appeal to the Supreme Court to secure compliance with the order.

Personal Mention

Mr. Norman E. Pilcher has been appointed general manager of the Sherbrooke (Que.) Street Railway.

Mr. H. C. Allen has resigned as general passenger agent of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y.

Mr. E. H. Clark has resigned as master mechanic of the Cleveland & Erie Railway to accept a similar position with the Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.

Mr. C. R. Pheneciee, electrical engineer of the Chicago & Milwaukee Electric Railroad, will, in addition to his present work, assume the duties of master mechanic. That position has been made vacant by the resignation of Mr. Walter Silvus.

Mr. J. H. Leary has been appointed assistant manager of the Central California Traction Company, Stockton, Cal. Mr. Leary was formerly chief train dispatcher of the Southern Pacific Railroad under Mr. J. D. Brennan, division superintendent.

Mr. Charles E. Fife has been appointed superintendent of the Pittsburg, McKeesport & Greensburg Railway, Greensburg, Pa., to succeed Mr. M. A. Coffey, who has been appointed superintendent of transportation of the West Penn Railways, Pittsburg, Pa.

Mr. J. P. Alexander, purchasing agent of the Wheeling (Va.) Traction Company, has retired from the company. His resignation was accepted with regret. Mr. Russell Poe has assumed the duties of purchasing agent to fill the vacancy caused by Mr. Alexander's resignation.

Mr. W. B. Wright has resigned as auditor of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., effective Aug. 1. Mr. Wright will enter newspaper work with his brother, Mr. N. Wright, publisher of the *Toledo Blade* and *Cleveland Leader.* Mr. Wright has been auditor of the Indianapolis & Cincinnati Traction Company since August, 1905, and previous to that he was connected with the *Indianapolis Journal.* Mr. F. T. Loftus, chief accountant of the Indianapolis & Cincinnati Traction Company, has been appointed acting auditor to succeed Mr. Wright.

Mr. Wayne Hendricks, superintendent of the railway department, Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., has been appointed assistant to Mr. E. H. Vivian, traffic manager of the Chicago & Milwaukee Electric Railroad, Highwood, Ill. Mr. Hendricks has been connected with the Sterling, Dixon & Eastern road for two years, and previous to that time was in the operating organization of the Wisconsin Electric Railway, Oshkosh, Wis.

Mr. Walter Silvus has been appointed master mechanic of the Michigan United Railways, with headquarters at Jackson, Mich. During the last year Mr. Silvus has been master mechanic of the Chicago & Milwaukee Electric Railroad. Mr. Silvus began his railroad career with the Baltimore & Ohio Railroad in 1893, remaining with that company for 10 years. He then accepted the position of shop foreman with the Chicago, Lake Shore & Eastern Railroad at Chicago. He resigned that position in January, 1904, to become general inspector of the Twin City Rapid Transit Company, Minneapolis, Minn., where he remained until the fall of 1909, when he went with the Chicago & Milwaukee Electric Railroad as master mechanic.

Mr. C. D. Phillipp, who was recently appointed trainmaster of the Oregon Electric Railway with headquarters at Portland, Ore., began railroad work in 1902 with the Chicago & Alton Railway at Bloomington, Ill., as operator, station agent and later as train dispatcher. Mr. Phillipp resigned this position a year later to become connected with the Peoria Railway Terminal Company, Peoria, Ill., as train dispatcher. In this capacity Mr. Phillipp served seven months when he was promoted to the position of chief dispatcher with the same company, a position he held until Jan. 1, 1907, when he was appointed trainmaster. Mr. Phillipp resigned that position in October, 1907, to become chief dispatcher of the Oregon Electric Railway, Portland, Ore.

Mr. J. W. Brown has resigned as superintendent of transportation of the West Penn Railways, Connellsville, Pa., to become connected in a similar capacity with the Aurora, Elgin & Chicago Railroad, with headquarters at Wheaton, Ill. The appointment goes into effect Aug. 10. Mr. Brown succeeds Mr. B. E. Merwin, who has been promoted to the position of general superintendent of the Aurora, Elgin & Chicago Railroad, a position just created. Mr. Brown entered the service of the McKeesport, Wilmerding & Duquesne Railway nearly 12 years ago, as night car inspector, also serving as electrician and later as power station engineer. When the Pittsburg, McKeesport & Connellsville Railway, Pittsburg, Pa., was formed, Mr. Brown was made master mechanic of the McKeesport division of that road, and later he was promoted to the position of division superintendent. Seven years ago, when a transportation department was formed, Mr. Brown was placed in charge.

Mr. Louis P. Baurhenn, formerly superintendent of the New Jersey & Hudson River Railway & Ferry Company, which has recently been acquired by the Public Service Railway, Newark, N. J., has been retained by that company in his former capacity, in charge of the Bergen division, as the new division will now be known. Mr. Frederick W. Bacon, who was general manager of the Hudson Company, has been assigned to special duty in the office of Mr. R. E. Danforth, general manager of the Public Service Railway, and Mr. William N. Barrows, third vice-president and treasurer of the old company, has been retained, with headquarters in Edgewater, to care for such matters as have been in his charge. Mr. Joseph McCarthy, auditor of the Hudson Company, has been assigned to the general auditor's office, and Mr. Louis Helm, superintendent of ferries, under the old management, is to take a new position. Mr. Edgar Van Name, now in charge of the Bergen Point ferry, will succeed Mr. Helm, and operate both ferries. Mr. George J. Porter, master mechanic of the old company, has been assigned to duty at the Plank Road shops.

Mr. William A. Heindle has been appointed manager of railways for the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, with headquarters at Wilmington, Del. Mr. Heindle was graduated from the Lehigh University, with the degree of civil engineer, in 1891. Following his graduation, Mr. Heindle was connected until 1894 with the engineering department of the Baltimore City Passenger Railway in the construction of cable and overhead trolley roads. During the next six years Mr. Heindle was engaged in the construction of conduit and overhead roads in Washington, D. C., and part of that time he served as operating superintendent and engineer of maintenance of way. In 1900 Mr. Heindle severed his connection in Washington to become associated with J. G. White & Company, Ltd., London, Eng., on engineering and construction contracts in Great Britain and Europe. From 1906 until he received his present appointment Mr. Heindle was supervising and street railway engineer with J. G. White & Company, Inc., New York, on the supervision of railway construction and equipment, especially for the Tri-City Railway & Light Company.

OBITUARY

James Heywood, superintendent of lines and cables of the Philadelphia Rapid Transit Company, died July 31 from complications following an unsuccessful operation. Mr. Heywood was born in Bolton, England, 35 years ago and came to this country at the age of five years. He was graduated in 1892 from the Central Manual Training School and immediately entered street railway work in Baltimore, Md. He returned to Philadelphia in 1893 to accept a position with the People's Traction Company, one of the companies later absorbed by the Philadelphia Rapid Transit Company. While very young, Mr. Heywood had been engaged in street railway work for 17 years. His department, lines and cables of the Philadelphia Rapid Transit Company, had been brought under him to a stage of efficiency which made it a model for other systems. Mr. Heywood was chairman this year and also last year of the committee on power distribution of the American Street & Interurban Railway Engineering Association, an associate member of the American Institute of Electrical Engineers and a member of the Railway Signal Association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Sterling-Moline Traction Company, Prophetstown, Ill.**—Incorporated in Illinois to build a railroad from Sterling to Prophetstown. Capital stock, $100,000. Principal office, Sterling. Among the directors are: Joseph Wright, Rockfalls; A. R. Lewis, Morrison; C. P. Sturtevant, Erie; W. McNeil, Prophetstown; Geo. A. Allen, J. W. Harpham and Augustus G. Van Petten, Sterling, Ill.

***Valley Park, St. Louis & Eastern Railway, Springfield, Ill.**—Incorporated in Illinois to build a railway starting on the Mississippi River, opposite St. Louis, and extending to a point on the Indiana line in Iroquois County. Capital stock, $100,000. Incorporators: William C. Plass and Armond R. Plass, St. Louis; Charles Neustadt and John Suess, East St. Louis, and Henry Schrader, Belleville.

Summit-McComb Motor Line Company, Summit, Miss.—Application for a charter has been made by this company to build a 6-mile railway to connect Summit, McComb and Godbold Mineral Wells. Capital stock, $40,000. Officers: T. Blackmore, president and treasurer; Dr. V. Simmons, vice-president; Clem V. Ratcliff, secretary and general manager. [E. R. J., June 18, '10.]

***Northwestern Traction Company, Erie, Pa.**—Application will be made on Aug. 29 by this company for a charter to build an electric railway in Pennsylvania. The definite route has not been announced. Incorporators: F. M. Wallace, Chas. E. Shenk, E. G. Germer, M. H. Taylor, Chas. S. Clarke, C. H. Strong, F. D. Schultz, Geo. R. Metcalf, R. W. Potter and S. C. Walker. James Burke, president.

FRANCHISES

Mason City, Ia.—The Mason City & Clear Lake Railway has been granted permission by the Commissioners of Cerro Gordo County to build an electric railway along and upon the highway extending north from Mason City.

Westminster, Md.—The Baltimore & Pennsylvania Railway & Power Company, Annapolis, has been granted the right of way by the County Commissioners of Carroll County to build its tracks along the Reistertown and Hanover turnpike. At Reistertown the line will connect with the Emory Grove line of the United Railways, and in Pennsylvania it will connect with the Hanover and York systems near Melrose. When this line is completed it will connect Washington, Baltimore, York and Hanover. J. Pierce Burns, president. [E. R. J., May 28, '10.]

Great Barrington, Mass.—The Berkshire Street Railway, Pittsfield, has asked the Council for a franchise to build a railway in Great Barrington. This will be part of a 4-mile extension of this railway from the end of the line in Great Barrington to South Egremont.

***St. Charles, Mo.**—O. J. Martin has asked the City Council for a franchise to build a 5-mile railway over certain streets in St. Charles.

Buffalo, N. Y.—The Buffalo & Lake Erie Traction Company has asked the Council for a franchise to double-track East Sixth Street, East Twelfth Street, and all the lines near East Park, in Buffalo, in order to serve the workers of the new plant of the General Electric Company.

***Niagara Falls, N. Y.**—The Frontier Electric Railway has been granted a franchise by the Common Council to build a railway over certain streets in Niagara Falls. A similar franchise is asked by this company in North Tonawanda.

Salina, N. Y. —The Syracuse & South Bay Electric Railroad, Syracuse, has asked the Town Board for a franchise to build a railway over certain streets in Salina.

Fostoria, Ohio.—The Fostoria & Fremont Electric Railway has been granted a 25-year franchise by the County Commissioners to build a 21-mile electric railway across the public highways connecting the Lake Shore Electric Railway and the Ohio Western Electric Railway. This is part of a plan to build a railway from Fostoria to Fremont via Havens, Burgoon, Kansas and Amsden. J. D. McDonel, secretary. [E. R. J., July 9, '10.]

Stratford, Ont.—The bylaw granting certain franchise privileges to the electric street railway about to be constructed and operated in Stratford and vicinity was carried on July 29 by a substantial majority. It is understood that the railway is backed by Canadian Pacific Railway capital, thus giving the city connections with that system.

Ashland, Ore.—John R. Allen, representing Southern Oregon Railway & Power Company, Albany, has asked the Council for a franchise to build an electric railway in Ashland. This projected railway will extend through the Rogue River Valley and Southern Oregon. [E. R. J., June 25, '10.]

Eugene, Ore.—The Oregon Electric Railway, Portland, has been granted a franchise by the Council to build an extension of its lines through Eugene.

***Erie, Pa.**—The Northwestern Traction Company has asked the Council for a franchise to build an electric railway in Erie. James Burke, president.

Philadelphia, Pa.—The Philadelphia Rapid Transit Company will apply to the Council for a franchise to extend its railway from Chester Avenue, Yeadon, to the Sixty-ninth Street terminal.

***Moose Jaw, Sask.**—A. A. Dion and Newton J. Ker have been granted a 20-year franchise to build a 6-mile railway in Moose Jaw. John B. McRae, Ottawa, Ont., and Hector A. Dion will supervise the construction of the line.

Columbia, S. C.—The Columbia Electric Street Railway Light & Power Company has asked the City Council for a franchise to double-track and extend some of its lines in Columbia.

Memphis, Tenn.—The Clarksdale, Covington & Collierville Interurban Railway has asked the Council for a franchise to build 9½ miles of track in Memphis.

Greenville, Tex.—S. A. Price, H. J. Meyers, Dayton, Ohio, and associates, have been granted a franchise to build a 5-mile electric railway in Greenville. [E. R. J., April 2, '10.]

Salt Lake City, Utah.—The Salt Lake & Ogden Railway has asked the Council for a franchise to operate steam and electric cars through Salt Lake City.

Bellingham, Wash.—The Bellingham-Skagit Railway has been granted a franchise by the Council to construct an electric railway over certain streets in Bellingham. It is the intention to build an interurban railway to connect towns in Bellingham and Skagit County. Chas. M. Drummond, president. [E. R. J., July 30, '10.]

Wheeling, W. Va.—The City & Elm Grove Railroad has been granted a 1-year extension of its franchise for building a loop around Park View.

Appleton, Wis.—The Milwaukee & Fox River Valley Railway, Fond-du-Lac, has been granted a certificate of convenience and necessity by the State Railroad Commission which assures Milwaukee of an electric railway from Appleton to Milwaukee, via Hamilton, Cedarburg, Newburg, Plymouth, Chilton, Stockbridge, Appleton, Kaukauna and Fond-du-Lac.

Madison, Wis.—The Chicago & Wisconsin Valley Railroad, Madison, will ask the City Council for a franchise to build an electric railway in Madison. This is part of a plan to build a railway to connect Janesville and Merrill via Friendship, Easton, Portage, Lodi, Middleton and Madison. Allen T. Russell, Chicago, general manager. [E. R. J., June 4, '10.]

Milwaukee, Wis.—The Milwaukee Western Electric Railway has asked the Aldermen for a franchise to build a railway in Milwaukee.

TRACK AND ROADWAY

Texarkana Gas & Electric Company, Texarkana, Ark.—This company expects to extend its Rose Hill line 1½ miles to the plant of the Union Glass Company.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company has just completed and put in operation its 5-mile extension to Chilliwack.

Northern Electric Railway, Chico, Cal.—This company is at work ballasting 20 miles of track from Alamos to Sacramento.

Hanford & Summit Lake Railway, Hanford, Cal.—This company has let a contract to Libby & Heins, Santa Cruz, for building 18 miles of track from Hanford, Grangeville

and Hardwick to Summit Lake. Work is to be started at once. Maximum grades will be 0.3 per cent and maximum curvature 3 deg. There will be 1500 ft. of pile trestle work. J. B. Rogers, Hanford, chief engineer. [E. R. J., July 16, '10.]

Los Angeles-Pacific Company, Los Angeles, Cal.—This company is said to be completing financial arrangements for the construction of the double track subway electric railway to connect Santa Monica, Ocean Park and Venice. The plans of the company are also said to include the building of a terminal and office building. [E. R. J., July 2, '10.]

Pacific Electric Railway, Los Angeles, Cal.—This company has started the construction of its 7-mile extension from Covina to San Dimas. Robert Sherer & Sons are the contractors. It has also nearly completed its four-track system from the Indian village to Oneonta Park, which will soon be ready for operation.

***Riverside, Cal.**—Press reports state that southern California capitalists are considering plans to build an electric railway to connect Chino, Riverside and Los Angeles and also construct a loop line which will connect Riverside with all the important towns of the county. A. C. Denman is said to be interested.

Middle Georgia Interurban Railway, Atlanta, Ga.—This company has been authorized by the Railroad Commission to issue $100,000 of stock and $50,000 of bonds for its projected 70-mile electric railway from Griffin to Social Circle via Jackson, Indian Springs and Monticello. [E. R. J., Mar. 5, '10.]

***Dalton, Ga.**—F. T. Reynolds and associates are said to be interested in promoting an interurban railway to connect Dalton and Chattanooga, Tenn.

***St. Anthony, Idaho.**—Mr. Sewel and associates are said to have taken preliminary steps for promoting a 40-mile railroad in Fremont County to connect St. Anthony, Sugar and Rexburg. Proposed plans contemplate a capitalization of $1,000,000.

Eastern Illinois Railway, Chicago, Ill.—This company, recently incorporated, has just been organized. It has filed a trust deed in favor of the First Trust and Savings Bank, trustee, to secure an issue of $5,000,000 in bonds. This 16-mile railway will connect West Hammond, Harvey and Riverdale. T. E. Mitten, president. [E. R. J., Mar. 19, '10.]

***Columbus, Ind.**—N. B. Brandenburg, Columbus, is promoting the formation of a company which is to build an electric line between Columbus and North Vernon, a distance of 14 miles. The abandoned roadbed of the Baltimore & Ohio Southwestern Railway, which is graded and ballasted, will be used.

Citizens' Railway & Light Company, Muscatine, Ia.—This company has been requested by the City Council to practically rebuild its entire line within the limits of brick paving in Muscatine.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company is considering plans for extending its line to Junction City. Surveys have been made on the reservation at Fort Riley, in order to apply to the War Department for a right of way.

Louisville (Ky.) Railway.—This company is said to have developed tentative plans for the extension of several of its lines. The Brook Street Line is to be extended farther south into a district which has inadequate facilities so as to provide a through east and west line in the southern part of Louisville. Work on the latter project is awaiting the completion of a viaduct being constructed by the railroads and the city.

***Canaan, Maine.**—It is reported that the citizens of Canaan are planning to build an electric railway to connect Hinckley and Canaan, a distance of 5 miles.

***Joplin, Mo.**—Franklin Smith, who is promoting a gasoline-motor line to connect Joplin, Mo., and Miami, Okla., is said to have let the contract for the construction of this railway to the Clarke Marshall Construction Company. Work will soon be started at Hattonville and proceed towards Joplin. This line will eventually reach Bartlesville.

St. Joseph & Savannah Railway, St. Joseph, Mo.—This company has awarded the contract to H. A. Klepper, Kansas City, for building the bridge across Dillon Creek. The structure will be 540 ft. long and 100 ft. above the creek bed. John H. Van Brunt, St. Joseph, president.

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—It is reported that this company will let contracts Oct. 1 to build its proposed 250-mile railway to connect St. Louis and Kansas City via Blue Springs, Oak Grove, Odessa, Higginsville, Marshall, Arrowrock, New Franklin and Columbia. The line is to be double tracked. Maximum curvature is to be 4 deg. D. C. Nevins, president. [E. R. J., July 30, '10.]

Jamestown, Chautauqua & Lake Erie Railroad, New York, N. Y.—This company, whose line extending from Westfield to Jamestown, N. Y., 37½ miles, is operated by the Buffalo & Lake Erie Traction Company, has applied to the Public Service Commission, Second District, for permission to electrify it. The road has been operated by steam and presumably the freight traffic will continue to be handled in this manner.

Rochester, Syracuse & Eastern Railway, Rochester, N. Y.—Press reports state that this company plans to build an extension from Geneva to Port Gibson via Oak Corners, Phelps and Clifton Springs. At Port Gibson it will connect with the main line. Surveys are now being made and construction will soon start.

Slippery Rock & Grove City Railway, Grove City, Pa.—A. E. De Mayo Company, which has the contract for the building of this line, have sublet 3 miles of grading on the Slippery Rock section, also the entire concrete construction work to W. D. Shaner, Beaver. W. J. Eury, Butler, has been awarded the contract to furnish 24,000 ties. All contracts have been let except for structural steel, ballasting and rolling stock. Nearly 4 miles of grading has been completed as far as Barrmore Lake, and this section is now ready for ties. The line will be 9 miles long and will connect Slippery Rock and Grove City. Four gasoline motor cars will be operated upon the completion of the line. James A. Joliffe, secretary. [E. R. J., July 30, '10.]

Philadelphia & Western Railway, Philadelphia, Pa.—It is reported that this company will soon build an extension from Villanova to North Wales via Norristown.

Tarentum, Pa.—Press reports state that an electric railway will be constructed from Tarentum to Saxonburg and to connect with the Butler & Harmony street railway lines at Mars. Surveys have already been made. Paul Rudert, Saxonburg, is one of the promotors.

York (Pa.) Railways.—This company will complete double tracking North Penn Street for which it has been granted a franchise and will also double track the curve at the northeast corner of Market Street and Penn Street as soon as it obtains a franchise from the Council.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has been granted an amended charter permitting it to build several new lines in Chattanooga and beyond the city limits.

Brownwood (Tex.) Southwestern Railway.—This company has completed surveys and has secured financial backing for its proposed 30-mile railway from Brownwood to Rockwood. It is said the company will build this railway itself. W. S. Walker, Granbury, is interested. [E. R. J., Sept. 19, '08.]

San Marcos, Tex.—O. E. Metcalfe has begun the preliminary survey of the street railway to be built in San Marcos. A franchise has recently been granted and it is expected to have the line in operation by Jan. 1. C. L. Hopkins, San Marcos, promotor. [E. R. J., Mar. 5, '10.]

Richmond & Henrico Railway, Richmond, Va.—This company has executed a trust deed securing an authorized issue of $2,500,000 of 5 per cent. gold bonds dated May 2, 1910, and due July 1, 1930, but redeemable at 105 on any interest day. The Union Trust Company, Ltd., Toronto, is trustee. W. S. Forbes, president. [E. R. J., June 18, '10.]

***Chehalis, Wash.**—C. Lewis Wilson and W. H. Allen, Chehalis, have secured right-of-way necessary to build an electric railway from Chehalis to Randle via Forest Ethel, Salkum, Silver Creek, Mossyrock and Riffe. It is said eastern capitalists will furnish $3,000,000 to build this line.

Chicago & Wisconsin Valley Railroad, Milwaukee, Wis.—This company has awarded the contract for building its Madison-Stevens Point section to Hornaday & Company

and the Western Indiana Construction Company, Indianapolis. Ultimately, according to plans, the road will be built from Jamestown to Madison and from Stevens Point to Merrill. It is said financial backing will be available as soon as franchises and rights-of-way are secured for this proposed 16-mile railway to connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Madison and Merrill. Allen T. Russell, manager. [E. R. J., June 4, '10.]

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company has recently completed a new depot at Thermalito, and work is progressing on a structure at Nicolaus. It will soon start the construction of a new station at Live Oak.

Cincinnati (Ohio) Traction Company.—This company reports that it expects to build car storage houses and repair shops on a 6-acre tract of land on Baltimore & Ohio Railroad and Mitchell Avenue, Cincinnati, Ohio. Walter A. Draper, Cincinnati, secretary.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company has started the construction of a new car house at Niles.

Oregon Electric Railway, Portland, Ore.—This company has purchased additional property between Clay Street and Montgomery Street at Portland, adjoining its present terminals, on which it will build new freight terminals.

Aberdeen (S. D.) Street Railway.—This company, it is reported, will at once begin the building of car houses in Aberdeen. Estimated cost is $100,000. Charles N. Herreid, Aberdeen, general manager.

POWER HOUSES AND SUBSTATIONS

Great Falls & Old Dominion Railway, Washington, D. C.—This company is said to be increasing the capacity of its plant at a cost of about $50,000.

United Railways & Electric Company, Baltimore, Md.—This company is increasing the capacity of its power plant by the installation of a 9000-kw turbo unit.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company reports that it expects to soon purchase stokers for a 3275-hp power house located at Elyria; also coal and ash handling apparatus. E. F. Schneider, Cleveland, general manager.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is building a new substation at Niles.

Johnstown & Altoona Railway, Johnstown, Pa.—This company, it is reported, will soon let contracts for building a power house. G. W. G. Holman, Johnstown, general manager.

Sherbrooke (Que.) Street Railway.—This company has awarded the contract to the Bishop Construction Company, Montreal, for the erection of a power house in Sherbrooke. The Jenckes Machine Company, Ltd., Sherbrooke, is supplying the hydraulic machinery and the Canadian General Electric Company will supply the electrical apparatus. In this project the first development will be about 2500 hp. Messrs. Ross & Holgate, Montreal, consulting electrical engineers.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—This company has begun the construction of its new power house located at Charlotte Street in Charleston.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has awarded the contract to L. B. Davidson, Knoxville, for building an addition to its power plant on Sixth Avenue, Knoxville. Work has already been started. Estimated cost is about $3,500.

Virginia Railway & Power Company, Richmond, Va.—This company is said to have begun a 5000-kw addition to the capacity of its power plant in Richmond. The cost is estimated to be nearly $200,000. [E. R. J., Feb. 5, '10.]

Fairmount & Clarksburg Traction Company, Fairmount, W. Va.—This company is said to be installing additional machinery at its power plant in Jayenne. A new building will soon be erected and four new generators will be installed.

Manufactures & Supplies

ROLLING STOCK

Oakland (Cal.) Traction Company will build 20 new cars at its own shops in Oakland.

Holyoke (Mass.) Street Railway has ordered four 30-ft. 8-in. cars from the Wason Manufacturing Company.

Clinton (Ia.) Street Railway has purchased six 20-ft. 8-in. semi-convertible cars from the American Car Company.

Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., is considering the purchase of an express car.

East St. Louis (Ill.) Railway has ordered six 28-ft. 8-in. pay-as-you-enter closed cars from the American Car Company.

Northampton Traction Company, Easton, Pa., has ordered two 30-ft. closed cars from the Wason Manufacturing Company.

Escanaba (Mich.) Traction Company expects to place orders during the next few weeks for a snow sweeper and two passenger and freight cars.

Belleville & Mascoutah Traction Company, Belleville, Ill., which is constructing a line between Belleville and Mascoutah, will purchase three cars.

United Railroads, San Francisco, Cal., have issued specifications through Ford, Bacon & Davis, New York, N. Y., for 80 new cars. The specifications call for double-truck, four-motor closed cars, 32 ft. long over corner posts and equipped with prepayment platforms.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., reported in the Electric Railway Journal of July 23, as having ordered 25 single-end closed cars from the Cincinnati Car Company, has specified the following details for these cars:

Bolster centers, length, 21 ft. 2½ in.	Curtain fixtures....Forsythe
Length of body..33 ft. 2½ in.	Curtain material ..Pantasote
Width over sills....8 ft. 4 in.	Hand brakes.....Peacock
Sill to trolley base.8 ft. 10 in.	Heating system, Peter Smith hot water
Height from top of rails to sills ..... 33¾ in.	Headlights .....Dayton
Body, wood and metal.	Motors .....2-West.
Interior trim.....cherry	Registers .....International
Underframe .....composite	Sanders....C. C. Co.'s hand
Air brakes ..... West.	Seats .....Long.
Axles .....4½ in.	Seating material.....rattan
Bolsters, body.built-up-steel	Trolley retrievers....Wilson
Brakeshoes ..A. B. S.&F. Co.	Trolley poles.....Shelby
Car trimmings polished bronze	Trolley base.....Union
Couplers ....C. C. Co. radial	Trucks,.....Standard 0-50
	Wheels.....34-in. steel

Twin City Light & Power Company, Centralia, Wash., noted in the Electric Railway Journal of April 23, 1910 as having ordered two closed suburban cars from the Niles Car & Manufacturing Company, has drawn the following specifications for these cars:

Seating capacity.....48	Bumpers ..... Niles
Weight (car body only), 17,500	Couplers ..... Tomlinson
Bolster centers, length, 21 ft. 4 in.	Curtain fixtures..... Pinch
Length of body..32 ft. 7¾ in.	Curtain material..Pantasote
Over vestibule...42 ft. 7¾ in.	Fenders ..... Consolidated
Width over sills...8 ft. 2 in.	Hand brakes ..... Peacock
Over posts at belt.8 ft. 5 in.	Heating system .....Consol.
Sill to trolley base..9 ft. 0 in.	Headlights ..... G. E.
Height from top of rails to sills .....38¼ in.	Journal boxes .. Symington
Body ..... wood	Motors ..... G. E.
Interior trim ..... bronze	Roofs ..... Monitor
Underframe .....composite	Sanders ... Nichols-Lintern
Axles .....Standard	Sash fixtures ..... Edwards
Bolsters, body.....Niles	Seats, style .....H. & K.
Bolsters, truck....cast steel	Seating material ..... rattan
	Trolley retrievers...Knutson
	Trucks ....Baldwin, 72-18A
	Wheels ..... cast iron

TRADE NOTES

Jeffrey Manufacturing Company, Columbus, Ohio, has moved its Denver office from 1711 Tremont Place to the First National Bank Building.

E. R. Hibbard, president of the Grip Nut Company, Chicago, Ill., accompanied by his wife and son, left Chicago, July 28, on a ten weeks' trip to the Orient.

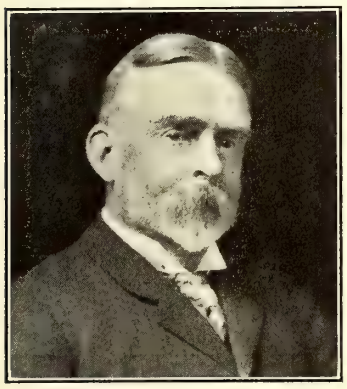
National Brake & Electric Company, Milwaukee, Wis., is building extensive additions to its machine shop and foundry which will practically double the capacity of its plant.

Whipple Supply Company, New York, N. Y., has established western offices in the First National Bank Building, Chicago, Ill., in charge of H. F. Keegan, western manager of sales.

T. H. Symington Company, Baltimore, Md., announces that E. H. Symington, formerly works sales manager, has been transferred to the Chicago office of the company, 316 Railway Exchange Building, with the title of mechanical expert.

Copper Roller Bearing Trolley Wheel Company, Coxsackie, N. Y., has been reorganized and its New York office has been moved to Coxsackie. Several improvements are being made to the company's plant at West Coxsackie. The officers are F. H. Sutherland, president; H. A. Jordan, vice-president; Edwin S. Anthony, secretary, treasurer and general manager. The directors include the officers, F. F. Bedell and G. M. Ranner.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., held its annual meeting in Pittsburgh on July 27, and the four directors whose terms of office had expired were re-elected. At a meeting of the directors held July 29, Edward F. Atkins was elected president to succeed George Westinghouse. The election of Mr. Atkins is considered to be the result of friction between Mr. Westinghouse and the financial interests controlling the company. The other officers of the company elected at the meeting of the directors were: Chairman, Robert Mather; vice-presidents, E. M. Herr, L. A. Osborne and Charles A. Terry; acting vice-presidents, G. W. Hebard and H. D. Shute; secretary, W. A. Esselstyn; treasurer and assistant secretary, T. W. Seimon; assistant treasurers, H. F. Baetz and E. St. John; auditor and comptroller, James C. Bennett; assistant auditors, F. E. Craig and W. B. Coville, Jr. Mr. Atkins is understood to have accepted the presidency of the company only on the understanding that he was to hold office simply until a permanent successor should be chosen. He is a member of the Boston firm of E. Atkins & Company, sugar importers and manufacturers. From 1889 to 1895 he was a director of the Union Pacific Railway Company, but most of his present corporate connections are in the sugar manufacturing line.



Edward F. Atkins

Archer & Westover, Kansas City, Mo., consulting engineers, have issued the following announcement: "The organization that was styled Archer, Rollins & Company has been dissolved, and two companies formed. These are entirely independent of one another and have no business in common whatsoever. Mr. Archer, of the above firm, can now be found at 426-27 Beals Building. Mr. Rollins and Mr. Westover, also of the above firm, are still to be found at the old address, namely, 534-35 Beals Building. It is the wish of all concerned that the previous friendly relations with the trade will be continued in the same satisfactory manner, and that no misunderstandings will arise over the change."

Ackley Brake Company, New York, N. Y., has appointed Frank L. Strong as its representative for the Philippine Islands in the sale of Ackley adjustable brakes. Mr. Strong is located at 34-40 Calle Exchague, Manila, and is one of the foremost dealers of American machinery and supplies in the Islands. Several orders for Ackley brakes have already been received by the New York office of the company for shipment to the Philippines. An agency has also been established in Australasia, in the firm of R. W. Cameron & Company, with offices at Sydney and Melbourne, and at Wellington, N. Z. An order for 50 Ackley brakes was recently sent in by this agency. The Ackley Brake Company now has, with its English branch, the British Ackley Brake Company, a chain of agencies and distributing stations taking in all the important centers of the Eastern Hemisphere—London, Paris, Berlin, Brussels, Zurich, Tokio, Shanghai, Manila and Sydney.

ADVERTISING LITERATURE

Arthur S. Partridge, St. Louis, Mo., has issued list No. 34 of second-hand electrical and steam equipment for May.

Detroit Stove Works, Detroit, Mich., is distributing a folder which describes and illustrates the Jewell street car heater, also heaters for car houses, stations and waiting rooms.

Conley Frog & Switch Company, Memphis, Tenn., has issued Catalog No. 2, which illustrates and describes its line of frogs, switches, crossings, switchstands, rail braces and track equipment.

George W. Lord Company, Philadelphia, Pa., has printed a revised and enlarged 1910 edition of a treatise on "Boiler Troubles and Their Treatment," by George W. Lord, founder of the company.

Gold Car Heating & Lighting Company, New York, N. Y., has issued a new catalog in which are listed and illustrated the various fittings and special devices used in connection with its systems of steam, vapor, hot-water and electric train heating. The catalog is 9 in. x 12 in., and contains 166 pages.

C. A. Wood Preserver Company, Austin, Tex., is mailing to the trade a small sample of wood preserved with its well-known compound. The statement accompanying the sample says: "After 40 years of exposure to rot, the substance still present in preserved ties was analyzed and found to be the same grade of oil as you will find on this very piece of wood, a pure coal-tar distillate."

Deming Company, Salem, Ohio, has printed a booklet entitled "A Generation of Progress," which outlines the many uses to which Deming pumps and appliances may be adapted. The company has also issued catalog H, in which are illustrated and described briefly its power pumps of the triplex, deep well and other types. The catalog contains 190 pages and supersedes catalog G.

The J. G. Brill Company, Philadelphia, Pa., prints in the *Brill Magazine* for July a biographical sketch of Albert H. Stanley, general manager of the Underground Electric Railways of London, Eng., and managing director of the London United Tramways. The sketch is accompanied with an excellent portrait of Mr. Stanley as a supplement. Among the feature articles of this issue are the following: "Conditions Which Govern the Type of Car for City Service—Tokyo, Japan," "Single-Truck Open Cars with Plain Arch Roofs for Clarksville, Tenn," "Some Successful Rules for Snow Fighting," "Open Pay-as-You-Enter Trail Cars for Wichita Falls, Tex.," "A Short Wheel Base Single Truck Equipment for the Chicago & Milwaukee Electric Railroad," "Twelve-Foot Horse Cars for Peru," "Express Car Equipment for Illinois," and "Trail Cars for Pay-as-You-Enter Operation for Northern Texas Traction Company."

NEW PUBLICATIONS

Trolley Trips Through New England and Hudson River Valley. The Trolley Press, Hartford, Conn.; 144 pages. Price 16 cents by mail.

This little publication really is a guide in more than one sense of the word, and for this reason can be said to have become an institution with that class of leisurely tourists to whom the trolley affords a means of reaching territory that otherwise would remain "unexplored" by them. The publication contains 50 maps. There is an index of cities and towns reached by electric railway and a combined index of trips and of the territory which the guide covers, divided as follows: Connecticut, Eastern Connecticut, Western Massachusetts, Middle Massachusetts, Rhode Island, Southeastern Massachusetts, Boston, Northern Massachusetts, New Hampshire, Maine and the Hudson River Valley.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., June '10	$221,673	$*123,125	$98,548	$43,375	$55,173
	1 " " '09	198,203	*107,976	90,227	44,245	45,982
	6 " " '10	1,087,335	*624,230	463,105	259,916	203,188
	6 " " '09	973,942	*553,365	420,577	263,320	157,257
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., May '10	8,937	6,127	2,810	1,938	871
	1 " " '09	8,193	6,657	1,536	1,932	395
	12 " " '10	105,176	69,302	35,875	22,890	12,985
	12 " " '09	93,740	66,631	27,109	.....	.....
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., May '10	35,404	19,143	16,261	8,370	7,891
	1 " " '09	30,607	18,105	12,503	8,074	4,429
	12 " " '10	418,364	237,584	180,779	101,778	79,602
	12 " " '09	373,555	217,953	155,602	101,804	53,798
CHAMPAIGN, ILL. Illinois Traction System.	1m., May '10	472,255	*295,637	176,618	3,086	173,532
	1 " " '09	423,616	*250,602	173,013	3,204	169,809
	5 " " '10	2,365,774	*1,415,782	949,992	19,950	930,041
	5 " " '09	2,101,518	*1,208,562	892,955	15,851	877,104
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad.	1m., May '10	142,644	82,338	60,306	33,662	26,644
	1 " " '09	138,029	71,356	61,673	28,549	33,123
	11 " " '10	1,444,926	809,097	635,829	340,928	294,901
	11 " " '09	1,316,430	724,796	591,635	308,794	282,840
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., June '10	33,261	*16,244	17,017	9,036	7,980
	1 " " '09	30,771	*14,221	16,550	9,044	7,506
	6 " " '10	153,579	*79,115	74,463	52,799	21,665
	6 " " '09	136,430	*71,754	64,675	50,169	14,506
Cleveland Southwestern & Columbus Ry.	1m., May '10	86,276	47,014	39,262	27,773	11,529
	1 " " '09	77,022	47,172	29,850	25,032	4,818
	5 " " '10	367,288	223,227	144,061	139,155	4,906
	5 " " '09	319,698	203,021	116,677	116,642	35
Lake Shore Electric Ry.	1m., June '10	103,533	*52,244	51,289	34,751	16,537
	1 " " '09	95,826	*48,784	47,041	34,479	12,563
	6 " " '10	526,728	*298,698	228,030	208,610	19,420
	6 " " '09	474,677	*278,376	196,301	206,650	†10,349
DALLAS, TEX. Dallas Electric Corporation.	1m., May '10	115,593	81,398	34,194	29,261	7,573
	1 " " '09	103,525	66,183	37,342	28,839	8,503
	12 " " '10	1,383,893	892,743	491,151	306,007	165,143
	12 " " '09	1,230,639	790,087	440,553	343,417	97,136
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., June '10	95,340	51,973	43,367	‡19,686	23,681
	1 " " '09	83,036	45,861	37,175	‡18,417	18,758
	6 " " '10	511,641	305,014	206,627	‡116,769	89,858
	6 " " '09	452,491	279,749	172,742	‡110,500	62,242
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., June '10	200,553	112,875	87,678	50,121	37,557
	1 " " '09	164,887	93,604	71,283	49,522	21,761
	6 " " '10	1,119,353	606,065	513,288	300,517	212,271
	6 " " '09	957,216	547,356	409,860	297,371	112,489
EL PASO, TEX. El Paso Elec. Co.	1m., May '10	51,148	30,918	20,230	8,218	12,013
	1 " " '09	47,510	28,681	18,829	7,900	10,929
	12 " " '10	628,482	361,564	266,918	100,917	166,001
	12 " " '09	552,237	374,729	177,508	90,739	86,769
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., June '10	50,993	18,255	32,738	12,611	20,127
	1 " " '09	42,122	12,946	29,176	12,310	16,866
	6 " " '10	269,711	101,043	168,668	75,295	93,373
	6 " " '09	212,293	76,886	135,407	73,874	61,533
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	1m., May '10	122,344	71,294	51,050	44,912	6,138
	1 " " '09	111,702	66,890	44,812	43,097	1,715
	5 " " '10	598,352	343,031	255,321	224,568	30,753
	5 " " '09	532,674	320,147	212,526	205,936	6,590
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., May '10	117,766	64,484	53,282	19,722	33,560
	1 " " '09	104,900	57,947	46,953	17,190	29,763
	12 " " '10	1,332,859	721,490	611,369	212,244	399,125
	12 " " '09	1,163,602	671,214	492,388	201,085	291,303
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., May '10	103,823	66,317	37,505	23,548	13,958
	1 " " '09	103,604	58,732	44,872	21,420	23,453
	12 " " '10	1,239,668	753,235	486,433	272,535	213,898
	12 " " '09	1,142,031	659,766	482,264	251,422	230,842
GRAND RAPIDS, MICH. Grand Rapids Ry. Co.	1m., June '10	99,952	47,677	52,275	19,745	32,520
	1 " " '09	91,764	42,838	48,926	19,137	29,779
	6 " " '10	530,823	264,537	266,286	119,055	147,231
	6 " " '09	479,809	233,758	246,051	113,711	132,340
HARRISBURG, PA. Central Penn. Trac. Co.	1m., June '10	73,952	51,111	22,841	.....	.....
	1 " " '09	67,257	51,578	15,679	.....	.....
	6 " " '10	393,747	288,132	105,615	.....	.....
	6 " " '09	358,107	272,356	85,751	.....	.....
HOUGHTON, MICH. Houghton County Trac. Co.	1m., May '10	25,472	15,100	10,373	6,317	4,056
	1 " " '09	25,964	13,953	12,011	6,242	5,770
	12 " " '10	321,633	168,764	152,869	76,083	76,786
	12 " " '09	290,184	160,568	129,616	64,718	64,898
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., May '10	46,721	25,530	21,191	9,307	11,884
	1 " " '09	39,656	23,181	16,475	9,281	7,194
	12 " " '10	528,100	277,921	250,179	112,321	137,858
	12 " " '09	451,825	260,973	190,852	111,004	79,849
LEWISTON, ME. Lewiston, Augusta & Waterville St. Ry.	1m., June '10	47,986	28,692	19,294	14,151	5,143
	1 " " '09	44,726	31,607	13,119	15,571	†452
	6 " " '10	526,206	308,538	217,668	177,926	39,742
	6 " " '09	466,277	285,010	181,267	160,890	20,377
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., June '10	403,874	273,903	129,971	45,050	84,921
	1 " " '09	350,412	223,314	127,098	47,601	79,496
	6 " " '10	2,283,217	1,625,656	657,561	278,386	379,175
	6 " " '09	2,038,506	1,357,256	681,250	281,351	399,900
Milwaukee Lt., Ht. & Traction Co.	1m., June '10	156,223	57,324	98,899	55,442	43,457
	1 " " '09	128,009	46,836	81,172	51,794	29,378
	6 " " '10	742,493	296,272	446,221	332,154	114,067
	6 " " '09	656,530	245,186	411,344	304,679	106,665
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., June '10	650,605	301,677	348,927	140,112	208,815
	1 " " '09	593,101	260,881	332,220	140,251	191,969
	6 " " '10	3,582,248	1,748,128	1,834,120	841,142	992,978
	6 " " '09	3,250,066	1,622,482	1,627,584	827,758	799,826
MONTREAL, CAN. Montreal St. Ry.	1m., June '10	384,564	198,849	185,715	59,053	126,662
	1 " " '09	354,918	187,320	167,597	51,134	116,463
	9 " " '10	3,091,800	1,806,292	1,285,508	377,603	907,904
	9 " " '09	2,791,973	1,688,603	1,105,370	335,691	767,679
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., June '10	157,427	91,576	65,851	33,637	32,214
	1 " " '09	144,461	81,946	62,515	33,486	29,029
	6 " " '10	887,954	516,589	371,365	202,087	169,278
	6 " " '09	831,704	493,616	338,088	196,213	141,875
NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1m., May '10	523,339	282,438	240,901	176,423	64,478
	1 " " '09	514,897	278,268	236,629	172,700	63,929
	5 " " '10	2,664,160	1,390,542	1,273,618	883,502	390,116
	5 " " '09	2,562,954	1,351,695	1,210,259	863,880	346,379
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., May '10	160,492	93,510	66,982	.....	.....
	1 " " '09	151,599	92,659	58,939	.....	.....
	6 " " '10	765,607	446,811	318,796	.....	.....
	6 " " '09	759,016	450,221	308,795	.....	.....
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., May '10	19,330	11,748	7,582	6,987	595
	1 " " '09	17,698	10,418	7,280	7,027	253
	12 " " '10	236,428	142,229	94,199	81,654	12,544
	12 " " '09	222,930	132,169	90,761	82,598	8,162
PENSACOLA, FLA. Pensacola Electric Co.	1m., May '10	21,806	13,632	8,174	4,998	3,176
	1 " " '09	20,172	10,902	9,271	4,342	4,928
	12 " " '10	256,079	148,662	107,456	55,313	52,143
	12 " " '09	228,046	139,199	88,846	52,013	36,834
PHILADELPHIA, PA. American Railways.	1m., June '10	339,113	.....	.....	.....	.....
	1 " " '09	319,103	.....	.....	.....	.....
	12 " " '10	3,402,542	.....	.....	.....	.....
	12 " " '09	3,166,625	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., May '10	9,524	7,526	1,998	1,765	234
	1 " " '09	12,088	7,923	4,166	1,716	2,450
	12 " " '10	127,228	93,281	33,947	20,920	13,027
	12 " " '09	125,866	85,682	40,183	24,705	15,478
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., June '10	478,879	199,990	278,889	137,212	141,677
	1 " " '09	430,743	194,692	236,051	124,877	111,174
	6 " " '10	2,645,612	1,129,767	1,515,845	796,775	719,072
	6 " " '09	2,272,777	1,072,425	1,200,352	734,040	466,314
ST. JOSEPH, Mo. St. Joseph Ry., Lt., Ht. & Power Co.	1m., June '10	85,401	46,638	38,763	23,184	15,579
	1 " " '09	80,781	40,517	40,264	21,759	18,505
	6 " " '10	494,015	273,902	220,113	134,543	85,570
	6 " " '09	458,605	245,788	212,817	126,627	86,590
SAVANNAH, GA. Savannah Elec. Co.	1m., May '10	52,379	34,307	18,072	18,020	52
	1 " " '09	50,275	32,624	17,651	17,375	276
	12 " " '10	610,360	396,749	213,611	211,779	1,832
	12 " " '09	603,848	373,147	230,701	209,357	21,344
SEATTLE, WASH. Seattle Electric Co.	1m., May '10	467,961	273,933	194,028	105,736	88,291
	1 " " '09	457,259	274,460	182,799	103,314	79,485
	12 " " '10	6,060,384	3,515,256	2,545,128	1,281,233	1,263,895
	12 " " '09	4,791,491	2,845,253	1,946,238	1,168,204	778,034
SYDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., May '10	21,576	12,379	9,196	5,038	4,158
	1 " " '09	18,745	11,671	7,073	5,036	2,037
	12 " " '10	257,588	144,939	112,649	60,637	52,011
	12 " " '09	237,920	141,285	96,635	59,704	36,931
TACOMA, WASH. Puget Sound Electric Ry.	1m., May '10	169,190	105,837	63,354	50,680	12,674
	1 " " '09	156,054	108,066	47,988	47,831	158
	12 " " '10	1,940,613	1,289,495	651,118	594,227	56,891
	12 " " '09	1,691,452	1,135,517	555,935	531,502	24,433
TAMPA, FLA. Tampa Elec. Co.	1m., May '10	50,421	30,724	19,697	4,534	15,164
	1 " " '09	47,821	27,162	20,658	4,759	15,900
	12 " " '10	611,925	350,384	261,541	55,474	206,067
	12 " " '09	572,553	358,284	214,269	51,995	162,274
TOLEDO, OHIO. Toledo Rys. & Lt. Co.	1m., June '10	216,345	129,075	87,270	70,917	16,353
	1 " " '09	242,023	157,620	84,403	76,216	8,187
	6 " " '10	1,302,586	750,185	552,401	425,569	126,832
	6 " " '09	1,462,344	887,937	574,407	456,126	118,280

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, AUGUST 13, 1910 No. 7

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 13, 1910.

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The Relation of Capital and Value

In its lengthy and studied destruction of the plan for reorganization of the Third Avenue Railroad System the New York Public Service Commission, First District gives the emphasis of italics to the following reformative dictum: "The commission believes the proposition to be sound that capitalization should have a direct relation to value." Fortunately for those who are endeavoring to perfect the reorganization of the property and therefore need to know the attitude of the commission the decision improves upon this non-committal and flexible conclusion. It appears to be the present physical value and capitalization which the commission would maintain near a parity. If the regulating body uses its vast power to cling so closely to the theory that experimentation and development are forever penalized the public which desires good service will be the greatest and the longest sufferer in the end.

Tight Gear Cases

The presence of sand and grit in the lubricating grease of railway motor gears is responsible for much of the wear that takes place on the face of the gear teeth. It would be surprising to some master mechanics to learn that the grease used in the gear cases of cars running on sandy roadbeds sometimes contains as much as 20 per cent of gritty matter. The movement of the gear teeth over one another, even with new gears, is a sliding movement and not a true rolling movement and under the heavy tooth pressures in common use the metal is cut away rapidly when the lubricant carries any appreciable quantity of abrasive foreign matter. In the manufacture of gear cases care is taken to make the two halves fit tight to prevent the entrance of dust and leakage of the grease but no dust guards are provided at the openings around the armature shaft and the axle. Dust guards to seal these openings are not more expensive or difficult to put in than are dust guards in the back of a journal box and if properly maintained they would keep out much of the foreign matter which finds its way into the lubricant. The process of burning the grease out of gear cases to clean them does not remove the grit and when new grease is put in it absorbs all of the objectionable residue and soon becomes as bad as the grease which was taken out. The most effective method of cleaning gear cases is to boil them thoroughly in a strong solution of potash. This removes the grit with the grease and has the great advantage of incurring no liability of warping or cracking the thin metal plates.

Electrify It

The recent accident in the Hoosac Tunnel which stalled a trainful of passengers therein for a couple of hours ought to point a moral; whether it will bear fruit needful for repentence,

as a revivalist says, is quite another matter, but we earnestly hope it will. The Hoosac Tunnel, as it was the earliest, is still one of the more important of the world's great tunnels, so far as length is concerned. The traffic through it is perhaps less than some. The problems of ventilation have been settled no more successfully than in later tunnel work and the air in the tunnel is undeniably very bad. The nature of the accident precluded getting out until the rescue train could be sent, and the passengers had to stand it as best they could, fortunately with no serious results, although the newspapers report that the air was almost nigh suffocating and intolerably hot. Fortunately the stop was near the central shaft of the tunnel, and everybody, so far as reported, escaped without material injury. Thanks to the care with which the ordinary trunk line is operated the stalling of a train in the tunnel is a rare accident. Its seriousness lies in the fact that if circumstances are against good ventilation the element of danger to the passengers cannot be neglected. At the present time when electric traction has been applied with great success to many of the world's long tunnels it seems most unfortunate that the first of its class, to which American engineers may well point with pride, has not yet been electrified. It is earnestly to be hoped that the lesson, albeit not a disastrous one, will be thoroughly learned and applied so that the next time a train gets caught in mid-mountain it can get out again without risk to the passengers.

Complimentary Tickets

It is questionable if any other courtesy creates as much good will in proportion to its cost than the presentation of complimentary car tickets or a pass in some form to a street railway man visiting a property outside his home territory. It is often the case that the actual amount of money saved the visitor is trifling, for at present rates one can patronize the average urban property for a good many hours before the total expense reaches $1. Nevertheless the feeling of hospitality which one experiences on being offered the "freedom of the system" is a lasting one, and indicates that the latch string is out in a way that nothing else can. The other side to this question is the abuse which easily tends to corrupt the issue and application of free tickets. This is so keenly felt that sometimes all but perhaps half a dozen of the employees of a company, outside of the uniformed force, are obliged by the rules of the company to pay cash fares for all trips on the system. An expense account then takes care of fares on company business, but such a plan plainly leaves no ready opening for hospitality in the direction of free transportation to accredited visitors. Each company obviously must decide its policy according to local conditions or statutes, bearing in mind that once a free list begins it is a herculean task to stop it. If the practice has advantages that outweigh its defects in the eyes of the management, it is still eminently proper to endeavor to prevent abuses by unauthorized persons by issuing such tickets in limited numbers under a single cover; by providing that they shall be non-transferable and that one shall be lifted on every car ridden upon. It is a plan of no little merit, also, to require the signature of the user agreeing to hold the company harmless for any accident or damages that may occur in the use of the free tickets. The tickets should be detached from the proper stub in the presence of the conductor, as this will tend to confine their use to the grantee, and they should be consecutively numbered as to the book or lot issued.

THE SMALL STEAM TURBINE

The steam turbine has now become so customary a form of equipment for large power stations that one almost instinctively thinks of it at the outset in laying out stations of even moderate capacity. One finds not infrequently turbo-generators of as low as 300 kw to 500 kw capacity used in small stations which have to supply power both for lighting and for railway purposes. For the latter work a converter has to be used, worked under very disadvantageous conditions. As is well known, the smaller turbines, while admirable machines from an operating standpoint, are not anywhere nearly so efficient as the big ones familiar in central-station operation. More than this, the efficiency of a turbine depends so completely upon the perfection of the condensing apparatus that in plants only ordinarily equipped in this respect the efficiency falls off still further. Exact figures on steam consumption are very hard to obtain from the small plants, tests being seldom made and less seldom published. It is very doubtful, however, whether under such conditions the turbines do themselves or the station full justice, even bearing in mind the fact that turbines as a class operate relatively well at light loads. They are, of course, easy to operate and take but little space, yet the average plant of say 500 kw capacity is not situated where ground space is particularly valuable and the smaller turbine units themselves are not relatively as cheap in first cost as are the larger ones. We would very much like to see some operating statistics on steam consumption per kw-hour from plants of the character to which we have been referring. It seems rather likely that the results would be no better than those which could be obtained by the reciprocating engine sets, which have often been replaced by the turbines.

Of course, in large plants the lessened labor of operation with the more modern units counts for a great deal, but where there is only one engineer this advantage is not important, since there is no chance of eliminating labor but merely utilizing five-eighths of a man, so to speak, instead of three-quarters. Even the guarantees on the small turbines do not show any material advantage, considering these things, over the reciprocating engine performances and unless the auxiliaries are thoroughly overhauled as to give the turbine its full vacuum the efficiency falls off in a way that is very discouraging. These small steam plants present indeed one of the toughest problems in electrical engineering when an attempt is made for really good efficiency. The load factors are almost universally bad and cannot be bettered except in fortunately situated cases where a considerable industrial load can be carried. Here, of course, there is a chance for improving the situation where railway service is undertaken from the same station, since the heavy railway load comes on with the cessation of industrial work. Considering the fact that there are many small plants for every big one the problem from the economic standpoint is really an important one. It would be an exceedingly good thing if something like systematic tests of the smaller generating units could be carried out, tests designed to show what could be done with a turbine plus a converter as compared with two generators or a single generator for both alternating and direct current worked by reciprocating engines.

The main thing in such stations is first to provide apparatus efficient from the standpoint of steam consumption, and second, to ensure as high a load factor as is practicable. Where there

is no industrial load to be had the conditions are extremely bad for as a rule the railway service itself calls for a very varying load. A goodly amount of small motor service, however, helps out admirably in steadying the load, and now and then one finds a small plant in which the day load is a very comfortable one and the time of difficulty comes with the lighting load. Data on performance of stations of this class are greatly to be desired, and we hope this comment may stir up engineers and superintendents to look into their operating conditions and make public the results for the benefit of those in like circumstances who need help and have no definite basis on which to base improvements.

GIVING TRANSFERS ON A COMMON ROUTE

Among the abuses of the free transfer system which has grown out of its extension to cover a maximum number of route combinations in a given district, the practice of giving free checks between cars operating on a common route is often a source of considerable loss. For instance, two cars leaving a down-town terminus *A* for suburban points *C* and *D* may share the same route as far as a junction point *B*. To enable a passenger to take any car in the general direction of his destination it is customary to issue him a free transfer, good at *B*, to the car bound for point *C* in case he boards a car headed for point *D*, and vice versa. Practically passengers will frequently let their own cars pass and take cars bound for other points in order to obtain the stop-over benefits of the transfer at the junction point. The tendency is to crowd the cars of the company with non-revenue passengers between the suburban terminals and the junction point, since a considerable proportion of the riding is on transfers. If the headway between the lines of cars occupying a common route as far as the junction point varies, the existence of too liberal transfer privileges tends to result in the crowding of certain cars while others are but partly filled. The general result of such a transfer system is to force the company to handle more or less traffic at a disadvantage. The fundamental cost of carrying a passenger to his destination in two cars is inevitably greater to the company than the expense of transporting him in a single car, especially when the two cars share a portion of their routes.

Where the service is of a fairly frequent character it would seem as though the transfer between cars on the same route might be discontinued without any serious inconvenience to the public. There is little to be gained by taking a journey in steps where through cars are run over the route at intervals of less than 10 minutes. It is to the advantage of the public to make its trips without change, and the company's interests are better served by confining riders as far as possible to their own particular cars. If this can be done, the volume of the service can be more closely fitted to the traffic requirements and the average loading of the cars improved. The withdrawal of transfer facilities between cars on common routes need not in any way affect the granting of such privileges between intersecting lines.

The primary and legitimate object of the free transfer, or even the transfer for which a nominal charge is made, is to provide for transportation between points not connected by through service and not to furnish facilities for step-by-step movement across a city when the territory in question is already provided with a frequent and satisfactory through service. In Boston a start has been made in this direction by the withdrawal of free transfers to Newton cars from the outward-bound Brookline Village-Oak Square service, on that part of the route which is already provided with frequent through service between the down-town terminus and Newton. There is no question that this is a line along which economies can be instituted by a company without any unreasonable hardship to the public.

A NOVEL ELECTRIC LOCOMOTIVE

A steam turbine electric locomotive has recently been undergoing preliminary trials on the Caledonian Railway in Scotland and has created much interest among British engineers on account of the novel combination of a steam locomotive type boiler, high speed condensing turbo-generator set supplying direct current at from 0 to 500 volts and air cooling coils for the condensing water. The idea of a self-contained generating outfit supply current to motors on the driving wheels is not new. As far back as 1893 J. J. Heilmann, of Paris, designed and built a 100-ton steam-electric locomotive which was given a trial on the Western Railway of France. It had a Lentz boiler with 1562 sq. ft. of heating surface, an opposed cylinder, horizontal compound, reciprocating engine capable of developing 1000 hp at 600 r.p.m. and a direct-current dynamo of equivalent output. Each of the eight pairs of driving wheels was revolved by an 80-hp gearless motor flexibly mounted on the axle. The steam consumption of the engine, which ran non-condensing, was 21 lb. per ihp-hour; the dynamo had an efficiency of 93 per cent, and the motors an efficiency of 85 per cent. After a few desultory trials this ingenious but impracticable machine was relegated to the scrap heap.

Since the failure of the Heilmann composite locomotive, the gasoline engine has been developed to a high degree of efficiency and reliability, and the Heilmann principle, except that a gasoline motor has taken the place of the steam engine, has been embodied in the number of gaso-electric cars which have been built during the past five years. This has led some people to consider that the Heilmann plan was justified, but the conditions, it seems to us, are entirely different. A gasoline engine has a thermal efficiency of over 20 per cent as compared with less than 15 per cent for the best stationary steam plants, and on this account its use as a prime mover in a self-contained motor car or locomotive is warranted. No figures of steam or coal consumption of the new steam turbine electric locomotive have been made public, but we cannot see where any appreciable saving will be effected over the ordinary steam locomotive which will produce an indicated horse-power on about 22 lb. of steam per hour. Stationary steam turbines of 600 hp, operating under favorable conditions with high vacuum, seldom require less than 21 lb. of steam per hp-hour. When the electrical losses are considered the gain in fuel consumption, if any, over the steam locomotive, would be very small. The turbine locomotive must weigh greatly in excess of a steam locomotive of equal power and it does not do away with smoke and dirt; it may have a slightly higher rate of acceleration and certainly will cost much more.

Altogether we believe it has few inherent advantages and some serious disadvantages. It is an interesting engineering freak and nothing more.

INSTRUCTION CAR OF THE BOSTON & NORTHERN STREET RAILWAY

Several electric railways have in the past few years conducted energetic campaigns for the improvement of car handling, and particular attention has been given to the instruction of both old and new motormen in improved methods. By establishing trainmen's schools at fixed points much good has been accomplished, and in recent years the plan of operating a specially equipped car for this purpose has found considerable favor. Among the latest companies to equip their lines with instruction cars are the Boston & Northern and the Old Colony Companies. This organization recently undertook the building of two instruction cars of unique characteristics, one for use on the lines north and the other on the lines south of Boston. The first of the two cars, which are practically identical in design and equipment, has now been completed and placed in service by the department of motive power and machinery. The work of instruction has been organized in a sub-department headed by Howard W. Irwin, who is responsible for the detailed design and arrangement of the instruction cars and their adaptation to the work in the various divisions of the northern and southern lines. Under the superintendent of instruction is a general instructor for each system. Under each instructor is a chief instructing motorman, who supervises this work at various car houses. On the two systems are about 1500 motormen, 875 being on the northern and 625 on the southern lines.

The car as shown in Fig. 1 is of the semi-convertible type, with a Brill "easy-access" body mounted on double trucks and equipped with four GE-80 motors. It is 45 ft. 10 in. long over all, with a body 33 ft. 11 in. long, carrying two trolleys. The car is fitted with sliding doors 3 ft. 2 in. wide at each side of each vestibule, the doors being operated by compressed air. The interior of the car has no fixed seats, although a few chairs are provided for the instructor and the class. The inside apparatus embraces type M and also the type K-28-J control systems, including a short-circuiting switch which gives the operator the use of the control in the "K" form when desired. Hand wheel and crank type brakes are provided, and the car is also fitted with the General Electric Company's straight-air brake equipment, with the CP-27 compressor.

The car has a hinged demonstration blackboard which can be swung across the vestibule when the class is in session. Diagrams are sketched on the board to show the path of the current from the positive pole of the generator in the power house, through the feeder and trolley lines to the car, and thence back to the station through the return circuit. Fig. 2 is the general view of the car interior, showing the equipment as a whole. The apparatus on the right consists of rheostats and a contactor switch in the control circuit of the car itself, followed by a bank of multiple unit contactors and reverser switch in circuit with the type M control wiring of the car. On the left is an air compressor piped to a demonstration braking system, followed by a GE-800 demonstration railway motor and controller. At the further end of the car are various other

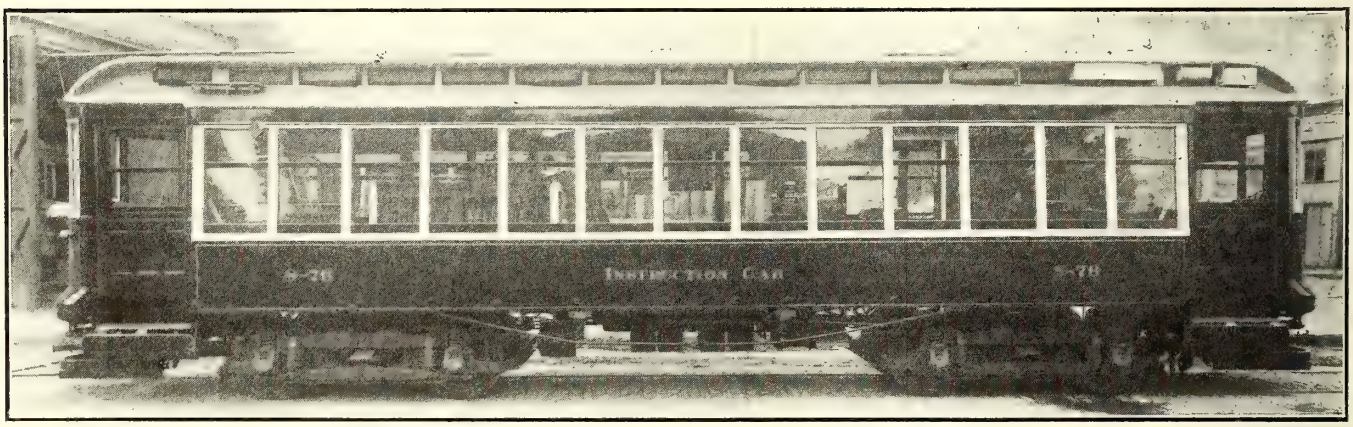


Fig. 1—Massachusetts Electric Instruction Car—Exterior View

The introductory work with the new car consists mainly in utilizing it as an instructing headquarters for the more experienced men at the different car houses, classes being held at each important operating center. At present five men at a time are taken into the car each morning and shown the apparatus, with short and pointed demonstratory talks, after which the effects of various methods of handling, occurrence of troubles and special equipment combinations are studied at first hand. In the afternoon the class is taken out on the lines of the local division in a so-called "school car," which is any regular passenger car withdrawn for experimental operation by the class. This work includes controller handling, location and remedying of troubles artificially produced, brake service, adjustments and examination of the effects of poor and good operation. The work in the instruction car in the morning is begun by a discussion of elementary electrical principles, followed by actual demonstration of the phenomena of the magnetic field, Ampere's law, magnetic blowout, current measurement, principles of car equipment design and operation, with the study of the effects of improper handling of the apparatus. The equipment of the instruction car is sufficient to enable the instructor to duplicate the characteristics of any car on the company's lines. The car itself may be operated by either hand or multiple unit control, and an ammeter and a voltmeter are provided to show the current and potential conditions in operation. In addition to the motive power equipment, much auxiliary apparatus is installed to facilitate closer study of the motorman's road work.

devices and a special board upon which any motor combination possible in a double or quadruple equipment can be reproduced.

Fig. 3 shows the demonstration motor, controller and resistances. Behind the frame carrying the resistances, but not shown in the photograph, is mounted a rectangular coil of 400 turns of No. 20 B & S wire, carrying 1 amp when switched into circuit. At the end of the blackboard talk the instructor cuts this coil into circuit, thus creating a magnetic field in its range of influence. The coil is mounted in a vertical plane and operated on pivots, so that when a bar of iron is brought near it the coil will move toward the iron and illustrate the fundamental principle of the electric motor. A permanent magnet is also available for this demonstration, so that the attraction of unlike poles and the repulsion of like poles can be clearly shown. From the demonstration of the magnetic field the instructor passes to the GE-800 motor on the floor and current is passed through the field coil shown in the view, with the case opened. A specially shaped bar of iron which fits the field pole faces as indicated is then set against the poles and the class is invited to pull it away. The magnetic flux is so strong when the current is flowing through the fields that the most muscular man in the class is unable to stir the bar. By this trial the students gain a wholesome appreciation of the power of the forces concerned in car movement. With the circuit broken, the magnetism disappears instantly. The latter experiment is thus most effective in showing what happens to a field coil in the on and off positions of the controller handle. The trial of strength

between the class and the pole pieces adds interest to the work by enlivening the instruction period.

An elementary description is then given of the principles of the magnetic field as applied to railway motors, and the different parts of the motor are named and their functions explained. Analogies are drawn between the simple magnetic field and exciting coil and the field coils of the commercial motor, and the parallel between the armature coil and core and an elementary magnetic circuit. The necessity of the commutator and brushes is also explained. The motor is fitted with a Prony brake for reproducing running conditions with a load upon the motor. The instructor shows the class the effect of a break in the armature circuit by raising a set of brushes off the commutator. This motor is also so connected that it can be used to explain the principle of the generator. The energy then employed electrically is absorbed by resistances and the incandescent lamp bank shown in Fig. 3. With this equipment emergency stop conditions can be illustrated, assuming that the trolley is off the wire and that the brakes fail to work. The emergency stop is made by throwing open the main line switch, reversing the controller and throwing the main operating handle into full multiple position. The motor then becomes a generator and the deceleration is well illustrated by the rapid slowing down of the armature and the lighting of the resistance lamps on the panel.



Figs. 2 and 3—Massachusetts Electric Instruction Car—General Interior and G.E-800 Demonstration Motor with Resistance and Controller

Near the demonstration motor is mounted a box containing a pair of arc lamp carbons set in a horizontal line movable by hand to form an arc. A magnetic coil below the carbons is equipped with a short-circuiting switch and core whose tip is brought within a few inches of the arc. This coil can be excited by opening the short-circuiting switch around its terminals, and the arc blown out, so illustrating in a simple but convincing manner the principle of the magnetic blowout. When the apparatus is in good adjustment the tendency of a collapsing magnetic field to extinguish an arc is as apparent as the blowing out properties of a developing field. The box has a window composed of two plates of glass of dark red and dark blue respectively, so that the behavior of the arc can be watched safely. The short-circuiting switch and box containing the blowout coil can be seen at the left of the lamp bank in Fig. 3. The demonstration motor is provided with a K-10 controller.

The demonstration air brake equipment of the car is illustrated in Fig. 4. It consists of a Christensen A-1 compressor with reservoir mounted on angle irons near the car floor, automatic governors of the Christensen and General Electric types, with switches permitting operation on either, floating levers, tie rods, and a brake cylinder equipment mounted about 5 ft. above the floor on a wrought-iron frame and connected to absorbing springs through appropriate levers and operated by an engineer's valve. All the piping which carries a continuous pressure of air is painted red and all other piping is painted black. When the brake equipment is operated, the horizontal spiral springs at the ends of the levers take up the thrust from the cylinder. The exhibit is provided with sectionalized engineer's valves, showing the port openings for the various operating positions in regular and emergency service. The air gages in the car vestibules have duplex pointers, a black hand indicating the pressure in the brake cylinder and a red hand the air pressure in the reservoir. With the exhibition air equipment the jarring of the car due to emergency operation can be well simulated, and all degrees of skill in brake manipulation shown, including graduation of the release, lap running, regular and emergency applications. A gage is provided with this apparatus, together with a standardized muffler of the same type inside the car. At one end of the car the panels ordinarily cutting off the view of the operating cylinder and levers for the pneumatically controlled sliding doors are omitted, so that the working of this mechanism can be studied at length.

In general the auxiliary iron work in the car is painted with aluminum coating and all working iron is coated black. The car heaters are installed on transite panels at the side of the car body, and the heating circuit is wired to an ammeter in the vestibule, so that the amount of current taken with different heater combinations can be readily measured. In one vestibule are mounted a Weston ammeter of 500-amp capacity, and a voltmeter of the same make with a maximum reading of 600 volts. These are used in operating the car on grades and level track, when the current consumption and effect of heavy power demands on the line are to be illustrated. If the controller is handled so that the motors are abused at electric track switches or other points these instruments are useful in showing up the conditions numerically, and the rise and fall of current as the motors pass through the various series-parallel combinations is registered on the ammeter in view of the instructor and the class. The vestibules of the car have double-throw knife

switches by which the car can be connected to either system of control, and the contactors of the type M control are mounted on a frame inside the car so that the entire process of automatic acceleration can be watched, as can any manipulation of the master controller in its effect upon the motor and rheostatic connections. In connection with the K-28-J hand controller equipment of the car the contactor switch, which is ordinarily located under the car floor, is mounted on a frame inside the car itself, and the cable connections for this switch are carried along the car in a wooden trough. A special knife switch is provided so that if desired the contactor of the hand-control circuit can be short-circuited and the breaking of the main motor circuit carried to the large controllers on the platforms. A ribbon fuse in a suitable box is also installed in the main circuit and located inside the car. Four four-pole double-throw knife switches are installed near the multiple unit contactors so that the motor armature leads can be thrown upon each type of control as desired. The reverser of the multiple unit system is equipped with a mechanical handle to facilitate throwing it back and forth in connection with the instruction. The car is also fitted up with three hand-operated block signals of the type

board. The fan motors and the lamps in the field and rheostatic circuits are connected with two controllers located at the right of the demonstration board, and in this way the result of every movement of either controller handle is reproduced in graphic form on the diagrams. Two tubular incandescent lamps are placed behind each armature disc, and the latter is screened by a red mica window in each case, so that whenever a fan motor is turning to represent the application of current to a genuine two or four-motor equipment, a red light shines from the corresponding disc.

With this equipment every combination of motors and resistances possible can be reproduced in miniature. As each step is taken in moving the controller handle for either equipment as drawn from point to point the lamps light in each part of the drawing which represents the part of the circuit made alive in the actual car. As the current is theoretically cut off from a resistance grid the corresponding lamp is extinguished, and as the current is thrown upon the motors the fans start and the speeds of the illuminated discs vary according to the theoretical connection as to resistances, series and multiple combinations, while the lamps in the motor-field diagrams are illuminated with



Figs. 4 and 5.—Massachusetts Electric Instruction Car—Demonstration Air Brake Equipment at Left and Vestibule Equipment

used generally by the Boston & Northern lines, so that the classes can be instructed in the manipulation of these when desirable. Fig 5 shows the equipment of the car vestibule. All wiring is in conduit.

The most novel and interesting feature of the car is the motor demonstration board, illustrated in Fig. 6. This is 8 ft. long, 4 ft. high and 8 in. deep, and is supported on hinged brackets which facilitate its use with varying sizes of classes in the car. Upon the face of the board are painted diagrams of the circuits of a two-motor and a four-motor equipment, with rheostatic connections as indicated. Incandescent lamps with clear white bulbs are inserted in the diagrams of the resistance grids, two 8-cp lamps being used in each resistance diagram for the two-motor equipment, and three 16-cp lamps in each resistance circuit as sketched for the four-motor service. At the top of the board, which has a facing of dull white galvanized sheet iron, are drawn the fields and poles of four railway motors, a 16-cp lamp being inserted in the drawing of each field coil, following the plan observed in the resistances below. In the center of the drawing for each motor is installed a disc operated by a 12-in. 110-volt direct-current fan motor located behind the

an intensity which varies as the theoretical voltage upon an actual car equipment.

The combinations of motors and resistances which can be illustrated on this board enable the instructor to show the classes precisely what results occur at every controller position, both in normal and emergency operation. In this way points which have long been obscure to motormen can be made plain in a few moments, and in addition artificial faults in the equipment can be produced and remedied in exactly the same manner that is necessary to eliminate trouble on a car in service. To illustrate the results of too fast feeding of the controller handle a relay is mechanically connected to the controller spindle and connected so that a too rapid acceleration lights a lamp above, while a current flow that would be produced by an extremely quick passage of the controller handle from the first to the last point results in the blowing of a small spring-held fuse in a box above the controller. With the instruction board any motor can be open-circuited by lifting the brushes—an arrangement having been planned for installation which will include projecting brushes and a representation of a commutator ring at each fan motor. The results of grounding any motor or resistance can

also be simulated, and the bad distribution of load when three motors of a four-motor equipment are run can be seen. The brilliancy of the lamps corresponds in each case to the amount of current which would be flowing through the car circuit with the controller in the corresponding position, and the speed of each fan motor and armature disc varies as does the impressed voltage. An improvement will shortly be added in the form of a set of arrows on the diagram showing the direction of the current with different positions of the controller handle. These arrows will be illuminated by candelabra lamps located behind the panel, so that the course of the current can be followed with still greater facility. The fan motors are reversed by the controller in just the same way that the motors of a car equipment are reversed. In the drawing the lines representing motor field leads are painted black, while the armature lines are painted green. A feature of the board is the facility with which the dropping out of one motor in transition from series to parallel is shown for a double equipment, or the dropping of two motors at this point in a four-motor equipment. Seven snap switches are installed at the side of the board to create artificial troubles. The heat radiated from the resistance lamps furnishes an excellent object lesson of the efficiency of operating on resistance

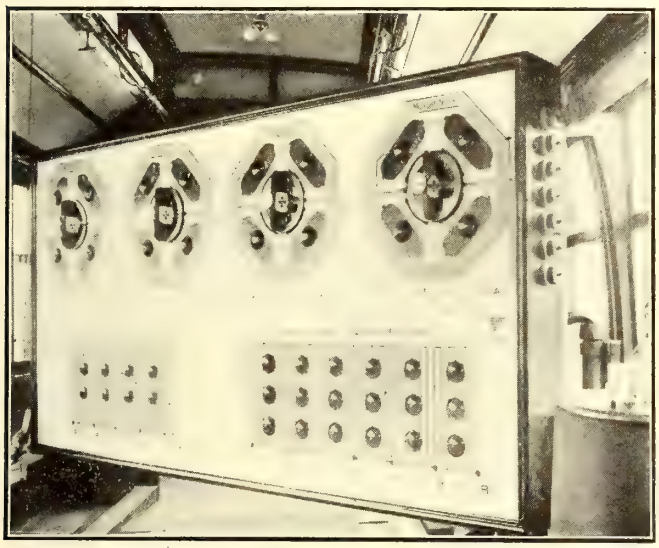


Fig. 6—Massachusetts Electric Instruction Car—Motor Demonstration Board

in the handling of the actual car equipment. One point which has long puzzled motormen is that of the number of motors which start turning on the first notch of the controller. A frequently held opinion is that all the motors do not start at once, but the fallacy of this is quickly shown by the apparatus, so long as the mechanical conditions are right. It is expected that this equipment will be helpful to the legal department of the company in reproducing controller combinations involved in accident cases, either for the benefit of the attorneys or the jury, as conditions require.

The exterior of the car is painted Merrimac green, and the interior lighting is accomplished by ten two-light clusters of frosted 16-cp lamps carried along on the under side of the monitor and in the center of the car roof, which is painted white with a tinge of green. The lamps are of the round bulb type, and there are 42 on the car as a whole. The car aisle is provided with rubber matting and the interior finish is of mahogany, no glossy surfaces being installed. A desk will shortly be added for the instructor's use.

The use of recording watt-meters on the cars of the South Shields, England, tramways, resulted during the past year in a reduction of current consumption per car mile from 1.36 watt-hours to 1.18 watt-hours. This has been largely responsible for a gain in net earnings for the year of $6,100. The use of car meters also enables the company to locate feeder losses easily.

MEETING OF THE COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIME TABLES

A meeting of the committee on construction of schedules and time tables of the American Street & Interurban Railway Transportation & Traffic Association was held at the Engineering Societies Building, New York, on Aug. 4. The following were present: N. W. Bolen, superintendent of transportation, Public Service Railway, Newark, N. J., chairman; Timothy Connell, time-table clerk, Boston Elevated Railway; William Siebert, superintendent of surface lines, Brooklyn Rapid Transit System, and H. C. Donecker, secretary of the association. The meeting was also attended by L. H. Palmer, superintendent of transportation, Metropolitan Street Railway, New York; Alexander Jackson, superintendent the Time-Table Department of the Public Service Railway, and Joseph Downs, chief clerk to N. W. Bolen. The meeting was held for the purpose of considering the answers to data sheet No. 58, upon which the committee will largely base its report to the convention at Atlantic City this fall. Full replies were received from the companies to whom the requests for information were sent. Inspection of the data sheets and the experiences of the members of the committee showed that the maximum number of cars operated at 11 o'clock in the morning was nearer the normal average figure of cars operated than the number in use at any other hour of the day, for at that hour all the extra cars have been eliminated from the schedule. As the committee has received in response to its inquiries figures showing the maximum number of cars operated during the morning and evening rush and at the hours of 11 a. m., 2 p. m. and 9 p. m. it was decided to chart the results reported at the various points and to show also the aggregate miles of single track on which the operation of the cars was based.

The answers to the questions as to the method used to ascertain the service required on new extensions, particularly in territory not already served by electric lines were considered by the committee. A brief summary of the method outlined by the various companies will be given in the report of the committee. The members of the committee mentioned the practice on their individual properties. The character of the section served by new extensions of existing systems was considered carefully and into the determination of the service required there entered a question as to the relative factory business or residential character of the district. Mr. Bolen said that before a new line was opened the extent of the initial service contemplated was decided and the actual development of the service was the factor which determined regulation subsequently.

The subject of determining running time on the lines and the method of checking was discussed. It was decided that the number of companies using different methods of determining the running time should be shown in the report of the committee. Franchise requirements, vehicular traffic, the number of stops, grade crossings, drawbridges and delays out of the ordinary determine the running time. Mr. Siebert expressed it as his opinion that the running time should be changed several times a day, although no fixed rule to govern time or the extent of the changes could be made. These changes would depend upon local conditions. On the Brooklyn Rapid Transit system changes are made at 6:30 a. m., 7:30 p. m., midnight and 6:30 a. m. The changes take place at the hour specified without relation to the position of cars on the lines, and motormen wherever they may be operating conform to the rules in this respect. The Boston Elevated Railway operates on the special time all day Sundays and holidays. On these days the Brooklyn Rapid Transit system has but two different rates of speed. Mr. Connell stated that on the Boston system the changes of running time are made on a different basis from that mentioned by Mr. Siebert. In a certain belt in the downtown district changes are made by time and outside of that belt they are made by location. To prevent undue interference with the time due to this system schedules are prepared so as to allow for the change.

In discussing the inquiry of the committee as to the method used to keep trainmen on schedule time, Mr. Bolen said that the only way was by inspection. Mr. Siebert said that in Brooklyn inspectors check their lines every day, but special inspectors are used from time to time, sometimes at junction points and at other times at other places where attention can be given to this feature as well as other questions of operation concerning which information is desired. Mr. Bolen said that on the Public Service Railway representatives of the transportation department were placed at terminal and intersecting points periodically to check the time of the different lines. Mr. Palmer said that daily reports were made up in his office from reports of the division offices. The total results of each line were computed in order to show how much the line was behind on the average. These reports were sent to the general manager. Time tests are made periodically to show whether there is any necessity for change. Before a change is made a reason, such as increasing congestion, is needed to show that real necessity for change in the running time exists. Changes in the running time on the Metropolitan lines are made at about 7 a. m., 7 p. m. and midnight, although different hours are used on different lines. The adjustments due to changes in running time are made on the schedules. As to the method used in keeping trainmen on scheduled time, it was stated that most companies indicated the use of starters at the end of the line. Mr. Bolen said that the usual practice was to depend upon general inspection by a uniformed man reporting to the division superintendent. The Boston Elevated Railway requires such inspection at all times. It was a part of the duty of the inspectors and should be done without waiting for complaint or special instructions. Mr. Bolen said that the principal necessity of the company in the operating department was to keep the cars on time. Good results were secured by having employees check the operation of different lines. Mr. Jackson said that an inspector should report any delay of 2 minutes on a car to the stationmaster or supervisor in charge of car house. If the man responsible was behind time on the following day he should be reported and discipline applied.

The committee decided upon the following tentative definitions for a straight run and a swing run:

A Straight Run: "One which works continuously through the entire period of run with the exception of the time when the crew is relieved for dinner or supper as the case may be."

A Swing Run: "One in which the time composing the run is divided into two or more periods, with intervals of two hours or more intervening."

The subject of allowing crews to pick runs was discussed. Mr. Bolen said that the custom on the Public Service Railway is to have runs picked about once in three months and that men who have been in the service were entitled to have choice of runs. Mr. Connell stated that the practice of the Boston Elevated Railway is to assign the runs and permit the men to change among themselves. Seniority is the basis of assignment.

A compilation will be made of the reports showing how many companies construct their time-table on the hourly basis and the number that use the trip basis.

Mr. Palmer suggested that descriptions of several representative methods of checking passenger counts on the various lines be given. Mr. Connell said that the Boston Elevated Railway requires its conductors to make a record on day card for each route for use of the auditor and also a trip sheet showing the results of every trip. Mr. Bolen said that the results of the Public Service Railway on the various lines were tabulated in order that the operations of the different divisions of the system might be watched. Mr. Palmer said that various forms were used on the Metropolitan lines and counts were taken whenever it was thought necessary. Some of the charts submitted, showing the results of passenger counts, will be presented in the report of the committee. Practically all the companies report that regular service was maintained during stormy weather. A tabulation will be made showing to what extent the Sunday or holiday schedules are under direct supervision of the local superintendent or supervisor.

The extent of the use of "patches" on standard tables to increase or decrease the service as conditions require will be shown in a tabulation.

A similar tabulation will be made regarding the allowance of lay-overs in the schedules at the end of lines. A summary of the methods used by various companies to ascertain the amount of lay-overs required will be given in the report of the committee. Replies on the average speed per trip, including the lay-over, and the average speed, excluding the lay-over, will be tabulated. Tabulations will be made showing the methods of working night-car crews.

One inquiry of the committee related to the use of block numbers, or run numbers, or both, and a tabulation of the responses will be made. Mr. Bolen thought this was a very interesting feature of the data sheet.

The methods of making time-tables will be described in detail by the committee.

MEETING OF THE COMMITTEE ON TRANSFERS

A meeting of the Committee on Transfers of the American Street & Interurban Railway Transportation & Traffic Association was held in New York on Friday afternoon, Aug. 5. Those present were: Chairman M. R. Boylan, general auditor, Public Service Railway Company, Newark; F. T. Wood, assistant to the general manager, Metropolitan Street Railway Company, New York, and T. C. Cherry, superintendent, Utica & Mohawk Valley Railway, Utica. Henry Bullen, Detroit; Alexander Rennick, Philadelphia, and R. E. Lee, Cincinnati, were unable to be present, but had written to the chairman making certain suggestions which were presented to the committee by Mr. Boylan at the meeting.

Mr. Boylan stated that about 100 replies had been received to the data sheet sent out by the committee, and the subjects were discussed in the order in which the questions appeared on the data sheet.

The first point considered was in regard to the method of dating the transfer. To this question 89 replies had been received, indicating a very wide diversity of practice, including punchings for the year, month and day of the month, printing the day of the month only on the transfer, printing the day of the week and of the month on the transfer, the use of a. m. and p. m. coupons, different colors for a. m. and p. m. transfers, printing a. m. and p. m. on the transfers, etc., with combinations of practically all of these methods.

Mr. Boylan showed samples of the present Public Service Railway's transfers, which are printed with the day of the week and month in red as "Wed. Aug. 4" with a p. m. coupon. On certain lines the company also has a North and South or East and West direction marking and transfers for different lines have distinctive colors. The only punchings required on this transfer are time and, when used, the direction. The company prints the estimated number of transfers required for each day and has about 12½ per cent waste. If there is so much riding that the supply of transfers printed for the day gets low the company issues emergency transfers on which the month and day of the month appear at the top of the transfer and are punched at the car house. Mr. Boylan stated that this transfer had proved very satisfactory, except where there was a possibility of belting; that is, where passengers could ride to the business district on one line and return to their original point on another. The arrangement of the Public Service Railway system was such that in some cases a general direction mark on the transfer could not be used to prevent this abuse. On routes of this kind the company plans to use a transfer which will indicate the point of origin of the passenger. These points of origin will be punched by the issuing conductor and this plan, Mr. Boylan thought, would eliminate this abuse. This transfer would be required on only 10 or 11 lines owned by the company.

Mr. Wood explained the system of transfers on the Metropolitan Street Railway, New York. This consists, briefly, in using three different colors for direction. Green, or northbound transfers, are issued to persons by conductors of north-

bound cars and are valid only in a general northerly direction. The transfers issued by conductors of south-bound cars are red in color and are valid only in a general southerly direction. The transfers issued by a cross-town conductor are printed on white paper and are good either northward or southward. Conductors of cross-town lines issue transfers only on the payment of a cash fare, while conductors of north-bound or south-bound Avenue cars, or those which extend longitudinally on Manhattan Island, issue a transfer to persons who have paid their fare either by cash or by another transfer. The name of the line issuing the transfer is printed at the top of the ticket and the ticket states the lines to which passengers can transfer and the points at which the transfers must be made. The date as "Monday August 8" is printed in black on the transfer. Each line has two sets of transfers, one for a. m. use with the a. m. hours printed on it in black on a white background; the other set is for p. m. use with the hours printed in white on a black background, with space at the bottom of the p. m. space for the early 1 a. m. to 4 a. m. hours. The only punch which the conductor has to make is the time limit.

Mr. Cherry showed samples of the transfers used on the Utica & Mohawk Valley Railway. On these the month is punched at the carhouse, but the day of the month as "19th day" is printed in red. Tickets of different colors are used for a. m. and p. m. transfers. The company also has an ingenious method of indicating the line to which the transfer is given and the transfer point by one punch. The face of the transfer bears the names of the connecting lines and the back of the transfer contains the junction points and each junction point is directly back of the proper connecting line, so that a punch mark through the connecting line also punches the transfer point.

Discussion developed the fact that even these elaborate precautions were not entire proof against attempted fraud on the part of passengers. Coupon transfers would be accepted during the evening rush hours, when the conductors did not have time to examine the transfers carefully, and it would be found later that an a. m. transfer had been used on which a p. m. coupon had been ingeniously pasted. Even transfers like those in New York in which the a. m. and p. m. designations are clearly printed on the face of the transfer were subject to abuse and Mr. Wood reported that transfers had been presented on the New York system in which the original time limit had been obliterated by pasting and a later hour punched in the transfer. These frauds were discovered, of course, when the transfers were checked. The only protection seemed to be rigorous prosecution of the guilty parties and publicity.

The members of the committee discussed at length the relative methods of indicating direction, time, etc., by different colors, coupons and printing on the transfers, and will offer valuable suggestions and recommendations on this subject in its report to be presented at Atlantic City.

In discussing the number of transfers in a pad the general practice was found to be 50, but on some lines with light traffic certain companies used pads of 25 transfers.

Mr. Boylan then gave an interesting account of the method of checking transfers on the Public Service Railway. In addition to checking the transfers a record is kept of the average receipts for each run and of the average number of transfers issued. When the new transfer showing the originating point is adopted a record will also be kept of this information which should be of great assistance to the transportation department in the preparation of its schedules. The transfers are turned in by the conductors on each half trip on the lines where such a plan is practicable. On other lines they are turned in at the end of a round trip. At the beginning of his run each conductor indicates on his day card the amount of change in his pocket and also puts on his day card the amount of change with which he concludes the day.

The subject of ejectments was also considered very carefully by the committee. Mr. Wood stated that on the Metropolitan Street Railway conductors were not allowed to eject passengers for any cause except when a passenger was dangerous or grossly offensive to other passengers. For any other cause which would seem to require ejectment, such as presentation of a transfer in which the time limit had expired and refusal to pay fare, the conductor is required to notify the first inspector or starter whom he passes and the inspector or starter then takes charge of the ejectment. In a case of this kind the company ejects promptly any passenger who presents a wrong transfer, but rarely if the only error in the transfer is that the time limit has passed.

Mr. Cherry was strongly of the opinion that all able-bodied passengers who presented wrong transfers should be ejected if they refused to pay their fares. He believed that such a position could be defended from every point of view and that it would raise the company in the estimate of the public. No trouble had followed from this practice in Utica. In only one case had a decision been rendered against the company for ejectments of this kind. In this instance a passenger had received an award of $125, not because the company was not justified in ejecting him, but because the jury considered that too great a force had been used in the ejectment. In the trial, which was in the Supreme Court, Judge Andrews held that the transfer, which was dated 5.30 p. m., was restricted on its face to use on the first connecting car passing the transfer point, or until about 5.33 p. m. Consequently at the time when the passenger attempted to use it, at a few minutes after 6 p. m., the transfer was void and the company had the right to eject the passenger but to use only such force as was necessary to remove him. The judge declined, therefore, to submit to the jury any other question than that whether unnecessary force had been used by the crew in making ejectment. The jury concluded that this had been the case and on this point only the award was made.

Other points discussed by the committee to be considered in the report to be presented at Atlantic City are: Questions of whether transfers should be registered, as on the Public Service Railway, or not registered, as in New York and on the Utica & Mohawk Valley Railway; whether the punch mark should indicate the beginning or the end of the time limit; whether transfers should be given at the first or last intersection; the time allowance to be permitted on transfers, and the legal rights of the company in regard to the issue and acceptance of transfers

HINTS FROM A CONDUCTOR

It is a common practice to use a stop sign on the span wire to indicate proximity to railroad crossings, dangerous street crossings, school houses and fire houses, but anything which is worth doing is worth doing well, and it would be a great convenience to the motormen if the sign should also indicate the reason for the stop. This could be accomplished by using before and after the word "Stop" F for fire house, S for school, R.R. for railroad crossing, etc. At present a motorman cannot distinguish a school stop from any other stop. Consequently, a good deal of time is lost in making stops at school streets after 4 p. m. and on holidays, when the children are at home. In this connection a notice could be posted on the bulletin board at every depot when the occasion warranted it, reading "No school to-day." Then no school stops would have to be made. Drivers of vehicles on cross streets leading to dangerous crossings might often be warned to advantage that they are approaching street railway tracks by attaching a warning sign to slow down on a post at a short distance before the crossing is reached.

The municipal authorities of Stockholm, Sweden, have granted a concession to a local company giving it the right to operate trackless trolley omnibuses through the main streets of that city. Petrol omnibuses were originally planned but trackless trolley buses were substituted in the terms of the agreement as they operate more quietly and are free from objectionable odors.

A tube railway has been proposed in London to extend from Victoria Embankment to the Crystal Palace, with a branch to the Elephant and Castle. The total length of route is 8¼ miles and the cost is estimated at £340,800 per mile.

VALUATIONS OF THE DETROIT UNITED RAILWAY

The Detroit United Railway is one of the important street railway properties of which valuations have been made recently. While the system of this company comprises both urban and interurban mileage, the valuations were confined to the property appertaining to the service within the city limits of Detroit. Two independent valuations have been made, one on behalf of the company and the other for the subcommittee on appraisal of the Committee of Fifty, appointed by Mayor Breitmeyer, of Detroit, to investigate the street railway situation and effect a settlement of the existing conditions. The following is in part a review of facts which have been related in the issues of the Electric Railway Journal.

In the organization of the Committee of Fifty various phases of the inquiry were assigned to subcommittees composed of several members. The "committee on appraisal" was assignel the duty of "ascertaining the value of the properties of the Detroit United Railway in the city of Detroit, both tangible and intangible." As the members of this committee were without practical experience in the work to which they were assigned, they decided to engage an engineer to assume direct charge. The question of the expense involved in this aspect of the inquiry and the features assigned to other subcommittees received early consideration, and in the negotiations with engineers respecting the appraisal estimates of the cost were requested.

The committee on appraisal selected Frederick T. Barcroft, an engineer of Detroit, to make the appraisal. A printed statement, bearing Mr. Bancroft's name, dated Feb. 5, 1909, contains the following suggestion of "a method of arriving at the actual cost of reproducing the physical properties of the street railway company":

"*Statement.*—Any system of obtaining information is just so good as the power back of it is competent and effective in having the system observed rigidly. A compilation of facts can only be obtained by a uniform method applied to every detail.

"*First*—Find out positively and definitely what there is to appraise. Do this by an examination of the various franchises or grants. Carefully study and compile the conditions covering the physical properties existing upon the expiration of the leases.

"*Second*—Appoint as head an official appraiser. He must be a man who has the technical knowledge necessary to guide the work by consultation and advice. He must be a man in whom the public will have confidence that the work will be honestly, thoroughly, fairly and conscientiously performed, free from every influence but the desire to present to your committee a report that will be backed up by facts, and facts only, not theories or ideas.

"If such a man found cannot without great compensation devote his entire time to the work, then pay him so much a day, or, what is better, a fee to act in an advisory capacity as matters demand throughout the entire work; $500 would probably cover this item.

"*Third*—Appoint as his assistant an executive manager, who will consult and advise with the appraiser to evolve and establish a system of operations. A fee of at least $500 will be necessary for this, as the work will be arduous. He will be under the general direction of the chief, and will be the medium through which the facts will be obtained, consolidated, condensed and put into shape, in clear detail so that anyone can see and understand upon what information the total has been reached. Let him get such assistance as the situation may demand.

"These two men, under the guidance and control of the appraisal committee, will handle the business arrangements necessary to accomplish the desired result.

"*Fourth*—The assistants must be men adapted to the work, who will feel keenly the responsibility resting upon them, be absolutely free from political influences, and be of proven competency and experience, loyal and thorough, able to work long hours, and not consider this work in the light of a job; must thoroughly appreciate the fact that it is not a lump sum to be obtained for the present value, but that a complete detailed report of each and every item of tangible property is necessary, as the summary sheet will probably represent the footings of 200 or 300 pages of report.

"By personal inspection, a report on every piece of physical property of the company has, its tracks, their construction, cars, freight, passenger and express, buildings, machinery, poles, wires, conduits, power houses, barns, repair sheds, and property improved and unimproved, etc. Reports to be made on blanks, signed and checked, that can be filed for future reference, the values to be placed upon these different items to be decided upon by fair averages extending over a period of years. The present value to be reached by the percentage of condition.

"*Fifth*—This work need not take a great length of time nor cost any large sum of money. The tangible property is all within the city limits and of easy access.

"Instead of hiring a great army of men, an extensive office force, a few men only are necessary. Maps and records of the street car company and of the city engineer's office can be obtained very cheaply. This system is based somewhat on experience gained from the appraisal of the railroads of the State, made in 1901 under the supervision of Prof. Mortimer E. Cooley, whose assistant I had the honor to be, and in the appraisal of other large properties.

"*Sixth—Synopsis of Probable Cost.*—Appraiser, $500; assistant or manager as an executive head, $500 plus; authorities on car equipment, power-house work, outside overhead installation, track work, buildings, etc., of quality mentioned in paragraph 4, say, $2,000 to $3,000. Total, $3,000 to $4,000. Time, four to eight weeks."

The time required for the appraisal and the expense involved appear to have proved to be greater than the preliminary estimate. Statements differ regarding the costs of the appraisal and of the other expenses of the Committee of Fifty and subcommittees. A report of the appraisal was completed on Nov. 4, 1909, and was accepted by the committee on appraisal. It was received without action by the full Committee of Fifty. The city of Detroit purchased the report on the appraisal from the Committee of Fifty for $17,500. To June 3, 1910, the city paid for compiling and printing $5,741.37. An expenditure of $492.80 by the city for printing other reports of the Committee of Fifty made the expense to the city on the date named $23,734.17, but claims for additional costs in connection with the entire work are understood to be still unsettled. E. A. Burch, a member of the appraisal committee, said that the cost of the appraisal itself was "in the neighborhood of $12,000." Mr. Barcroft says that he has not been reimbursed for the services and expenses of himself and the members of his staff and advisors, and in an interview published in the Detroit *News* of April 23, 1910, he quoted a letter from Frank W. Eddy, chairman of the Committee of Fifty, on Feb. 23, 1910, which said:

"Notwithstanding the fact that Mr. Barcroft has received nothing for his work, he has been loyal and steadfast to the committee and has its entire confidence."

In this interview Mr. Barcroft is reported to have said:

"Mr. Eddy says I promised to defend my appraisal in order to get the money that was due me. That is not true. As a matter of fact, I was involved very little—only a few minor bills that I had paid out of my own pocket. The facts were that the Committee of Fifty was out of money. The banks had refused them further credit. Mr. Eddy and Mayor Breitmeyer were involved several thousand dollars and they said I alone could get the money by promising to defend my report.

"I never got any money from the Committee of Fifty personally. The bills which were incurred in making the appraisal I gave to the appraisal committee, and they were transmitted to the Committee of Fifty as a whole. They were paid direct to the men who worked under me. I have not received 1 cent for my eight months' work from any source."

DIFFERENCES IN TWO APPRAISALS

While the work on the appraisal for the committee was under way the company proceeded with its plan to make an independent appraisal. This valuation was made by Robert B. Rifen-

berick, assisted by Bion J. Arnold and Horatio A. Foster as consulting engineers. Summaries of the totals of the two appraisals were made public at about the same time, and the figures of the company were about double those indicated in the Barcroft showing. The tables compare as follows:

	Company figures as of March 1, 1909.	Barcroft figures as of Oct. 1, 1909.
Real estate	$993,294.38	$513,547.55
Buildings	902,291.25	578,763.00
Power plants	2,651,137.19	1,219,050.88
Battery stations	429,068.45	200,487.69
Power distribution	2,010,739.50	1,088,062.96
Track	9,349,407.20	2,599,222.49
Rolling stock	5,129,954.00	2,861,403.09
Shops	984,116.94	308,719.06
Tools, etc	981,028.73	728,158.14
Overhead charges	.....	1,024,310.00
Paving	1,219,816.57	.....
Other items	25,327.54	.....
Totals	$24,676,181.75	$11,121,724.86

To the committee figures, as stated, the value of unexpired franchises, computed in accordance with the report of Prof. Henry C. Adams and based on the Barcroft physical valuation of the property, applied to car-mileage under operating conditions as they exist, would add $2,810,613. The company has not submitted an estimate of franchise values.

The subcommittee on appraisal supplemented its report by an analysis, in which it said:

FURTHER REDUCTIONS SUGGESTED

"This appraisal was made of the property of the Detroit United Railway as a going concern in its present condition, under the supposition that present traction relations are to continue. Should no settlement be arrived at satisfactory to the city of Detroit, then your committee submits that this appraisal be reduced in the following items and amounts, viz.:

"A. Section 1. Real estate in such amount as the land now occupied by its power plant shall bear to the whole amount.

"B. Section 3. Power plants, $1,219,050.88.

"In connection with this item your committee begs to state that power can now be and is purchased much cheaper from central power plants than it can possibly be produced by the Detroit United Railway, which is compelled to equip for the maximum load, with the result that during the greater portion of the 24 hours a part of the equipment is idle. Conditions are rapidly reaching a period when water-power companies will deliver power in this city at a minimum of the present cost to produce from coal.

"Again, the city has the electric lighting plant which could divert its power during certain portions of the day to the traction department at a very much reduced cost. We, therefore, unhesitatingly declare that this item should be eliminated. In proof of this statement the Detroit United Railway now finds it advantageous to purchase from the Edison Illuminating Company approximately 3500 hp daily.

"C. Section 9. Item $728,158.14, we believe, should be reduced in amount approximately $600,000. This item covers stock, supplies, materials and tools employed and used in the repair of the interurban cars and which our engineers were unable to separate from that used in the manufacture and repair of city cars and equipment.

"D. Section 10. Overhead charges, or cost of organization, $1,024,310. This item your committee agrees should also be eliminated in the event that no settlement is reached, inasmuch as this item naturally disappears with the expiration of franchises.

"E. Section 12. Franchises. The value placed upon the unexpired franchises was computed by Professor Adams under the operating relations as they now exist, viz., rates of fare, etc. Under this valuation it is obvious that certain portions of through routes are given a value which might disappear entirely if transportation on those outlying portions were estimated independently of their operating relations with operations upon streets on which the franchises have expired. Eliminating these portions would reduce the value of the franchises approximately $998,000. It is also apparent that this value would be further reduced by the credits, due to the city, upon the lines where franchises have already expired.

"In summary, your subcommittee feels that the Committee of Fifty should take into consideration all the facts in dealing with this question, which is of such interest to our citizens, and should it become necessary for the city to take over this property that the purchase be made on an equitable basis of value, which your committee believes has been accurately determined, and which is herewith respectfully submitted."

The report is signed by the following members of the appraisal committee: Joseph Boyer, chairman; Edwin A. Burch, Fred C. Hees, David W. Simons, William W. McMahon, Louis R. Geist and W. W. Hannan.

POSITION OF THE COMPANY

Immediately upon a preliminary publication of the figures of the Barcroft report dissent was taken by the company to the result. J. C. Hutchins, the president, wrote to F. W. Eddy, chairman of the committee, that the company had understood that it was to be the policy of the committee if differences should arise between the railway and the committee engineers, to have a hearing. It was the plan of the company to have Messrs. Arnold and Foster appear before the committee as its final representatives. While the Committee of Fifty received the report on the Barcroft appraisal without action and did not have a hearing on the subject, President Hutchins made public in addition to the statement of values given in the foregoing a letter in which he discussed the totals of the committee report. He showed that an appraisal of the Detroit city properties, 10 years previous, made under the direction of Hazen S. Pingree by Prof. M. E. Cooley, Prof. E. W. Bemis and others, indicated a physical value of $7,806,737 and a franchise value of $8,478,564, a total of $16,285,301. Since that time there had been expended on capital account $6,298,615. Mr. Hutchins stated in his letter that the values of materials had advanced 30 per cent.

In January, 1910, the City Council of Detroit passed a resolution requesting the Committee of Fifty to continue its organization and hold itself in readiness to take up for consideration any part of its report which might be disputed by the company; also to afford the company hearings, take evidence and report its findings to the Council. Later, in accordance with this request, the committee resolved to submit the entire matter to a board of arbitration.

PLAN FOR ARBITRATION

James O. Murfin, judge of the Wayne County Circuit Court, was named by the Committee of Fifty, and Claudius D. Grant, formerly justice of the Supreme Court of Michigan, by the company to be members of the board of arbitration. The two thus selected named Robert W. Tayler, judge of the United States Circuit Court at Cleveland, who had just arbitrated the differences between the Cleveland Railway and the city of Cleveland, as the third member. After a conference between the members of the board formal announcement was made that hearings would be commenced on June 25.

The board decided that the Barcroft appraisal should be used as a basis from which the work should be directed and that the company should be invited to present facts and figures concerning matters omitted, if any, and errors, if any, in that report.

A few days later, Mr. Barcroft made public a statement in which he outlined in detail the reasons why he declined to appear before the board of arbitration. This statement was a copy of a letter addressed by Mr. Barcroft to Chairman Eddy, of the committee, which stated, in part:

"The trouble we experienced last year in trying to accomplish a task without funds or without proper vigorous support warns one against a repetition of this method of procedure.

"For the future, therefore, I must consider among other things the financial question, proper regard for my own business and the purpose of your scheme.

"Your arbitration proposition would simply strengthen the hand of the company which we were supposed to 'investigate' by giving them every consideration possible, both by arrangement and by the apparent moral support of the Fifty.

"Mr. Hutchins stated that we were to have access to every

paper, voucher or record the company possessed. Every facility and assistance was to be given me in order that nothing would have to be surmized and that fairness and justice could be done to the city and the company. The arrangement was confirmed in every possible manner by many persons and in many public statements of the officers, so as to leave no doubt in the mind of the public that the utmost freedom and frankness was to be the policy of the company in assisting me to become familiar with its private affairs.

"And it may be said with simple truthfulness that these promises of the company were never kept.

"Information that was trivial, that which was public property, or which could be obtained without the company's assistance, their ideas of quantities and identification of property were given, but no detail or information divulging the company's records, vouchers, books or private business methods was disclosed.

"So far as the arbitration proposition, as at present contemplated is concerned, as Corporation Counsel Hally so aptly asks: 'What is there to arbitrate?'

"And to what purpose? It does not tie the railway company to anything, but is simply an opportunity to file another expression of what its hired outside advocates 'think' the company's property is worth. They do not bind themselves to abide by any conclusion.

"One side is open, the other is not committed to anything. How can you arbitrate on one side? Arbitration generally comes after the city has had a chance to see books and private papers, and the city then, if there is a dispute, will require some time to analyze the Detroit United Railway contention. How can the board arbitrate a 'difference' before there is any 'difference'? It surely is not the field of any arbitration board to create facts or to arrange the suit for the parties litigant; to prepare the case for the parties at issue. This is certainly an unusual way of proceeding. In addition to this the board of arbitration has no power to subpœna witnesses nor to enforce a demand for the production of papers.

"Any investigation and arbitration should be limited to the company's own men and it should be compelled to open up all private books, vouchers, contracts, etc. It does not need the services of outsiders to tell the 'cost' of its property. Such information is public property in Wisconsin, New York and Massachusetts, and should be at the service of the city. Any statement that the company makes should be subject to proof by my accountant, not only for last year, but for any previous year.

"The company is entitled to its fares and revenue returns during the life of the franchises. Is it entitled to anything more than the original costs of its property, less depreciation for condition at the present time now that the franchises have expired?

"It occurs to me that it would show some foresight to establish the following:

"1. Whether the Detroit United Railway will bind itself to whatever decision is reached by the board of arbitration if the proceedings are under official control?

"2. Will the Detroit United Railway fulfill the promise of its president to give me access to all papers, contracts and vouchers and a list of costs, and permit my accountant to verify same?

"3. Will the Detroit United Railway give me a statement of the original construction costs of the whole or any designated part of its property, subject to my accountant's verification?

"4. Will the city's case be arranged for, handled and guided by Corporation Counsel Hally, under the direction of the council?

"Surrounded by such official protection and authority as I have herein indicated, I can assure you that it will afford me great pleasure to represent the city through the Common Council and Corporation Counsel Hally in this most important matter, but not otherwise. The city's interests, from my experience in such matters, and from the experiences gained particularly with this company during the last year, are not properly safeguarded by the proceeding you suggest, and I must absolutely decline to be a party to it."

C. D. Joslyn, attorney for the company, filed with the board of arbitration on April 28, 1910, a bill of particulars relative to the value of the property. This bill contained the statement of values which is compared in the foregoing with the Barcroft figures. The language of the bill, with the exception of these figures, was published in the Electric Railway Journal of April 30, 1910, page 796. It was stated that the Barcroft appraisal did not include the entire property and items or disclose any method of ascertaining the value.

Formal approval of the board of arbitration by the City Council of Detroit was announced on April 26, 1910.

As Mr. Barcroft adhered to his determination not to appear before the board of arbitration as constituted, Frederick W. Walker, vice-president and chief engineer of the Milwaukee Northern Railway, was engaged by the committee to succeed Mr. Barcroft. After investigation of the subject it was concluded by Mr. Walker and Clyde I. Webster, general counsel for the Committee of Fifty, that the appraisal was in such form that an outside engineer not in possession of the details which Mr. Barcroft retained, would be unable to testify intelligently before the board of arbitration in defense of the appraisal. In a letter addressed by Messrs. Walker and Webster to Mayor Breitmeyer, it was stated:

REPORT OF F. W. WALKER AND C. I. WEBSTER

"This board of arbitration has announced that it will proceed judicially, the same as a court, and that it will confine itself to the evidence submitted and will reach its finding solely on the case made before it. About this position there cannot be the slightest doubt, for it has said: 'Your so-called Barcoft appraisement printed is, of course, no proof in any sense of the word.' * * * 'We need the evidence of experts, those who have knowledge of values, for, of course, we have to determine judicially the value of this property from the evidence submitted to us,' and further, 'our finding will be worthless for the purpose for which it was designed unless it is brought about through a careful procedure which will inspire confidence not alone in us, but in the public,' and still further, 'This is an adversary proceeding. Those who are experts, and those who are not—witnesses—should be examined rigidly by examination and cross-examination in order to elicit the truth for our benefit.'

"These plain statements of the character of the proceeding make it necessary for your committee to present its case in the most complete manner supported by witnesses whose competency is above question, in order to furnish the board evidence of record, beyond which it cannot go, upon which to base its finding and for which it has specifically asked.

"Furthermore, from a personal examination of the inventory prepared by the Detroit United Railway, we have come to the conclusion that it intends to present its case in great detail, with the greatest of care and will offer in support of its contentions the testimony of outside experts in addition to that from the experts within the ranks of its officers and employees.

"It is, therefore, absolutely necessary to be prepared to present your case with at least equal clearness and force, and it would be unjust to you and to the city of Detroit for any person or persons to undertake to proceed without the most careful and studied preparation. The company has been preparing its case for a long period of time and is familiar with its property in the minutest detail, and the men who present your case must of necessity prepare themselves similarly."

Subsequently the executive committee of the Committee of Fifty asked Mayor Breitmeyer and the City Council to relieve it of the obligation to give a hearing to the company on the Detroit United Railway appraisal. The report of the executive committee said, in part:

"Because of the unfortunate, deplorable and, to our mind, wholly inexcusable conduct of Mr. Barcroft, who made the appraisal for us and in whom we placed the fullest confidence at time of securing his services, and who we consider has violated this confidence and what we believe to be pledges and promises to defend his work, we have found it impossible to proceed with

the hearings and arbitration. The reports of Mr. Webster, our attorney, and Mr. Walker, our engineer, explain fully the circumstances and conditions that confront us. This book of Mr. Barcroft's, we find, is so arranged as to be valuable to no one except Mr. Barcroft.

"This report shows three plans which can be followed, and we recommend that one of these three methods be adopted and the work carried forward. These three plans are:

"Proceed with Mr. Barcroft with the hearing and arbitration of the appraisal made by him.

"A new appraisal made under an engineer who will turn over to the city complete details.

"A valuation board of three engineers to take a value on the property.

"We do not believe that the money paid by the city for the appraisal taken should be lost to the city and we do not feel warranted in spending the money that would be necessary for a new appraisal. We recommend that the Mayor and the Common Council proceed to give the Detroit United Railway a hearing with Mr. Barcroft in full charge of the engineering part of the work, and Corporation Counsel Hally in full charge of the legal part of the work before the present board of arbitration, if possible, in the members of which board we all have the utmost confidence, or before any other board of arbitration, or in any other manner satisfactory to Mr. Barcroft, Mr. Hally and yourself."

CRITICISM OF APPRAISAL

The report of Frederick W. Walker, engineer, and Clyde I. Webster, attorney, mentioned in the foregoing, says in part:

"A careful study of this appraisal and of the inventory of the property as prepared by the company has convinced us that in the form in which this appraisal was published it is impossible, with any reasonable degree of accuracy, to determine what property is included and what is not included in arriving at the values under the several sections which go to make up the total value placed upon the railway. We have come to the conclusion that except to Mr. Barcroft personally the appraisal in book form without the detail which has been withheld, which has cost about $17,000, is of no real value, and, therefore, a new appraisal is necessary unless Mr. Barcroft will appear, and produce the details and testify and explain.

"From an examination of letters which have passed between Mr. Barcroft and Mayor Breitmeyer and Frank W. Eddy, chairman of the Committee of Fifty, and the circular, telegram and letters sent to the assistant engineers by Mr. Barcroft relative to the situation, we have come to the conclusion that his present refusal to appear is largely based on personalities. His feelings toward the Mayor, Mr. Eddy, the Committee of Fifty itself, the board of arbitration, Mr. Webster and the company, are so extreme that as long as the arbitration is conducted directly or indirectly by the Committee of Fifty there appears to be not the slightest doubt of his continued refusal to testify and explain, and thus give a value to his work.

"In order to prevent personalities and personal feelings from interfering with a settlement of the street railway question in Detroit, both Mr. Eddy and Mr. Webster offered to resign, but to no effect. This is found in the record of the hearing before the board of arbitration. April 27, 1910.

"As the result of extended labors, we reluctantly reached the conclusion that the only portion of the appraisal which the Committee of Fifty has in its possession, the summary in book form, is of no value whatever as an appraisal and cannot even be used with safety to check against the inventory of the property to determine whether there have been omissions. The appraisal book does not purport to contain the reports of the assistant engineers on the various divisions of the work for which they were responsible, as drawn up and signed by them, and does not contain such reports. For any engineer to attempt to make use of this appraisal book, without the original reports and all the detail, would be unwise and very dangerous."

The report of Messrs. Walker and Webster contained the following resolution adopted at a meeting in Chicago of five engineers, not residents of Detroit, who assisted Mr. Barcroft in the appraisal work:

"Whereas, Frederick T. Barcroft has not at the present time agreed to appear before the board of arbitration and assume charge of the support of the appraisal made under his supervision as director of appraisal;

"Now, therefore, we the undersigned non-resident engineers who assisted him in his appraisal and who have agreed to appear in support of same will, unless he signifies in writing on or before May 20, 1910, his willingness to appear before said board of arbitration and support his appraisal, appear under the direction of F. W. Walker, engineer for the Committee of Fifty."

The failure of the board of arbitration plan was announced by Mayor Breitmeyer in a communication addressed to the Council on July 5. The City Council has under consideration the employment of an engineer to make a new appraisal at the expense of the company. The company has agreed to adopt the method of a board of valuation.

(To be continued.)

REDUCTION OF ACCIDENTS IN PHILADELPHIA

Some interesting statistics of accidents on the lines of the Philadelphia Rapid Transit Company are contained in the following statement which appeared in the *Philadelphia News Bureau*, Aug. 8:

"Pay-within cars in use by the Philadelphia Rapid Transit Company have more than fulfilled the expectations of the company in reducing certain classes of accidents. This is strikingly shown in the report on street railway accidents issued for 1909 by the Pennsylvania Railroad Commission, as well as by information furnished by the company as to the showing to be made in the annual report of the company for the fiscal year of 1910.

"The year 1909 witnessed the introduction of the pay-within cars and about 200 were put in use in that year, although the average number in service throughout the year was considerably less. Yet the reduction in the two classes of accidents which the pay-within cars are expected to affect, those resulting from falling or jumping from the car, was approximately 50 per cent. In 1908 the number of persons killed by falling or jumping was 16 and the number injured was 758. In 1909 these figures had been reduced to 8 killed and 435 injured. In 1908 the total killed in all classes of accidents was 79 and the injured 1588. In 1909 the total killed were 59 and the total injured 1187, showing that accidents other than those due to jumping or falling were also reduced, though not in the same proportion. This reduction in other classes of accidents is attributed by the company to the campaign of education it had inaugurated.

"In 1909 the expenses of the accident department of the company were 5.80 per cent. of the total receipts of $18,797,992, or $1,090,283. This compares with a ratio of 5.88 per cent. in 1908 and represents a saving of $36,054 over the accident expenses of that year. The company is not yet ready to furnish exact details of the accident account for 1910 which will appear in the annual report to be issued next month, but it is stated from an official source that the total expenses will considerably exceed those of 1909. No different result, of course has been expected in view of the large number of accidents occurring during the strike when the cars were of necessity operated in many cases by inexperienced hands.

"As far as the accidents resulting from falling or jumping from cars are concerned, it is stated that the number of killed and injured from these two sources will be decidedly less than in 1909, thus furnishing further verification of the efficacy of the pay-within cars, in preventing accidents of these two classes. There are now about 400 pay-within cars in operation in the city. Accidents of the various classes which are properly chargeable to public carelessness, and over which the company can exercise little or no direct control, have markedly decreased in the year just closed. This highly satisfactory condition is regarded as a result of the continuance of the company's campaign of public education on transit matters."

PLAN FOR REORGANIZATION OF THIRD AVENUE ROAD DISAPPROVED BY COMMISSION

The opinion in which the New York Public Service Commission for the First District disapproves the proposed plan for reorganization of the Third Avenue Railroad was written by Commissioner Milo R. Maltbie. It rejects the second application by the reorganization committee of holders of the 4 per cent consolidated mortgage bonds of the Third Avenue Railroad Company. The property has been purchased on behalf of the committee at foreclosure sale and the new corporation which was organized to acquire the property, the Third Avenue Railway Company, joined in the application to the commission for approval of the issue of securities.

The old company had outstanding a total of $58,560,000, par value of securities, as follows: First mortgage bonds, $5,000,000; consolidated mortgage bonds, $37,560,000; stock, $16,000,000. It was proposed that the new company should continue the first mortgage securing $5,000,000 bonds and in addition issue the following, making a total of $59,916,000: First refunding 4 per cent bonds, $15,790,000; adjustment mortgage, 50-year, 4 per cent income bonds, cumulative after three years with voting powers until full interest is paid for five consecutive years and redeemable at par and interest on three months' notice, $22,536,000; stock, $16,590,000. A brief statement of the proposed distribution of securities follows:

To holders of present consolidated bonds: $9,390,000, or 25 per cent, of which 10 per cent is for unpaid interest, in refunding bonds; $22,536,000, or 60 per cent, in adjustment income bonds; $9,390,000, or 25 per cent, in stock; total, $41,316,000, representing principal and 2½ years' interest. To present stockholders: On payment of $45 cash per share on present stock, $6,400,000 in refunding bonds and $7,200,000 in stock.

The cash derived from the assessment on stockholders was to be used as follows: Payment of receivers' certificates, $2,500,000; franchise taxes, $1,500,000; renewal of tracks, $1,000,000; reorganization expenses, $1,190,000; "other companies," $1,010,000; total, $7,200,000.

The opinion specifies three propositions submitted in the brief of the applicants upon which the application is based as a matter of law:

"(1) The applicants rely upon the reorganization statute, stock corporation law, sections 9 and 10, as entitling them to issue the proposed securities.

"(2) If Section 55 of the public service commissions law has established actual present value as the sole rule and standard of capitalization on a reorganization, the applicants assert that it would operate necessarily to repeal the reorganization statute and that there has been no such repeal.

"(3) It is fairly well settled, they maintain, as a general rule of law applicable to reorganizations that the reorganized company may issue securities at par for the old securities, although the property may not have an actual present value equal to par, and that such issues are not fictitious, or watered or fraudulent issues of stock or bonds."

The commission believes that Sections 9 and 10 of the consolidated stock corporation law are to be deemed in force, subject in case of conflict to the provisions of the public service commissions law. It holds that the re-enactment of the stock corporation law provisions in the consolidated laws of 1909 has not operated in any respect to change this conclusion. The opinion continues:

"It being distinctly provided by the provisions of the stock corporation law, Section 10, that the plan or agreement for reorganization must not be inconsistent with the laws of the State, any plan or agreement for reorganization in the case of such public service corporations must conform to the provisions of the public service commissions law. The commission * * * is not limited to a clerical check of the property to be acquired, but must determine whether the issue is reasonably required and is in respect of its amount such as ought to be allowed, and whether the purposes of the issue are reasonably chargeable to operating expenses or to income."

Apart from the interpretation of the law, the opinion states that other "statements clearly indicate that the applicants believe the petition should be granted for the following reasons:

"(1) Because the stock and bonds of the former Third Avenue Railroad Company were issued according to law and for the full value to bona fide investors;

"(2) Because the former company has expended upon the corporate property and assets an amount in excess of the proposed capitalization;

"(3) Because the estimated cost of reproduction of the whole system would fully equal 90 per cent of the par or face value of the securities it is proposed to issue;

"(4) Because the security holders during the past few years have not received an adequate return upon their actual cash investment."

Taking up these points the opinion says, in part:

"There seems to be no question but that the stocks and bonds of the old company were lawfully issued. It may be admitted for the sake of argument, although not decided, that the bonds were sold for their full value and that the stock was paid for at par. But does it follow that the holders of bonds of the defunct company are, therefore, entitled forever to bonds in any successor company having a par value or having interest equal to the old bonds? Does it follow that stockholders of the defunct company are entitled forever to stock in the successor company having a par value equal to the old stock? There is no legal basis for such a right, for when the property of a bankrupt company is sold to a new company the security holders have been deprived of their property and their rights are limited to the proceeds of such sale. Neither is there any moral basis for such theory, for the stockholder starts with the distinct understanding that if the company is mismanaged or if the results are not as expected, he may lose his investment.

"But the theory presented by the applicants is not that stock and bondholders of a defunct company have any rights, legal or moral, to equal shares in the securities of the new company, but rather that the purchasers of the property at foreclosure sale have a right to capitalize the new company, regardless of the value or cost of the property, at an amount equal to the *par value* of the securities foreclosed, because the persons who held them paid par or full value.

"A necessary corollary of this theory is that capitalization need have no relation to value.

APPROVAL OF RAILROAD COMMISSION

"The fact that the Railroad Commission approved the issuance of the bonds now being refunded does not alter the situation. It merely indicates at the most that the securities were properly issued, but no such certificate did or could guarantee the holders that they would perpetually have property to the full value of their investment."

Concerning the amount expended on the property, the opinion says that "the former company had bonds ($42,560,000) and stock ($16,000,000)—total $58,560,000. The bonds and stock were all issued, except $4,200 par value of stock. No evidence whatever has been presented to show what became of the money obtained from the sale of stock. No evidence was presented to show that the proceeds of the first mortgage bonds —face value, $5,000,000—actually went into the property, except the 'book' entries. But there is considerable evidence as to the disposition of the funds obtained from the sale of the consolidated bonds—face value, $37,560,000."

Marvyn Scudder, an accountant employed by the commission, was directed to ascertain how the proceeds of the sale of the consolidated bonds were used and the results are summarized as follows: "The bonds sold had a face value of $36,557,000 and netted the company $35,950,174.44. Certain additional receipts, interest on deposits, $164,496.20, and sundry items, amounted to $320,302.14. Deducting the balance on hand June 30, 1907, there remains to be accounted for the sum of $36,434,961.73." The opinion says that the disposition of this sum was, apparently, approximately as shown in Table I.

Certain of these items are further analyzed. The stocks and bonds purchased are shown to have a par value of $5,465,400.

The opinion declares: "One of the companies is in the hands of a receiver, and by sale under foreclosure decree the stock will be entirely wiped out. In another instance the stock is admitted to be worthless, and in still other cases the present earnings are not such as to warrant a payment of par." Some of the other items are also criticized.

TABLE I.—APPARENT DISPOSITION OF BOND PROCEEDS.

To purchase stocks and bonds of subsidiary companies, par value $5,465,400	$9,000,000
To pay notes, loans and accounts payable, and other items	8,600,000
To pay interest and coupons, including sundry minor expenses	1,900,000
To pay taxes, assessments, lawyers' fees, operating expenses, etc.	1,400,000
To advance to subsidiary companies	3,500,000
To pay for wages, materials, cars, machinery, contractors' claims and supplies	12,000,000
Total	$36,400,000

The conclusion is reached "that the evidence does not substantiate the assertion that the Third Avenue Railroad Company spent upon the corporate property and assets an amount equal to or in excess of the capitalization of the new company."

Discussing the question whether expenditure proves value the commission says:

"The mere fact of investment does not establish a perpetual value not only because a mistake in judgment may be made, but also because property may be allowed to deteriorate, because progress in the arts may make it obsolete, and because a change in economic conditions may decrease the use made of it by the public. The commission believes the proposition to be sound that capitalization should have a direct relation to value."

Regarding the value of the property the opinion says:

"The applicants submitted an estimate of an engineer—Henry Floy— of the 'cost of reproduction by a new company,' which, they assert, amply justifies the proposed plan of capitalization. E. G. Connette, transportation engineer of the commission, was asked to examine this estimate and inventory. In many instances the two engineers agree, but in several important cases they differ considerably. In the main Mr. Connette's appraisal has been accepted.

"Each engineer begins with the subcontractors' cost of labor and material, assuming there is to be a general contractor also. Mr. Floy estimated such cost to be $38,319,382, excluding the Mamaroneck line. Mr. Connette fixed $37,595,458 as the appraised cost of labor and materials.

"To the cost of labor and materials Mr. Floy added 10 per cent for contractors' profit upon all except five items. To the amounts thus obtained, he added 15 per cent on all except two items to cover engineers' and architects' fees, administration expenses during construction, incidentals, contingencies, etc. The total thus reached was $46,389,805, with the Mamaroneck line omitted.

"Mr. Connette did not add an allowance for contractors' profit or for engineering upon the cost of removing obstructions and of paving over obstructions. Mr. Connette also maintained that 5 per cent upon rolling stock, amounting to over $331,500, was ample for engineers' fees, administration expenses, etc. The applicants presented no evidence to show that 15 per cent, as estimated by Mr. Floy, or even 10 per cent of the cost was ever paid by the Third Avenue Railroad Company upon rolling stock for engineering or administration.

"Mr. Connette also testified that a 10 per cent allowance for the general expenses included under the heading of engineering, administration and incidentals computed upon seven items, is ample in this case.

"Mr. Connette estimates the total cost to reproduce anew the entire property of the Third Avenue system to be $42,907,816, or about $3,500,000 less than Mr. Floy's appraisal. Mr. Connette considers that the question is not whether a certain percentage somewhat arbitrarily selected shall be applied to every item, but whether $2,370,000 as a general contractor's profit and nearly $3,000,000 for engineers' fees and general administration expenses during construction are sufficiently liberal. He considers that these allowances are adequate to cover an estimated period of construction of two years, which period is agreed to by Mr. Floy." The estimates of Mr. Connette, showing cost to reproduce, depreciation and present value are given in Table II.

The value shown in Table II was changed by credit for deferred maintenance, made good since Sept. 1, 1909, and debit for depreciation down to Feb. 28, 1910. Mr. Connette testified that reduction in deferred maintenance had been $352,310 and that accrued depreciation amounted to $320,619, leaving a net increase in value of $31,691. This makes a total of approximately $31,600,000 as the present value of the physical property upon Feb. 28, 1910, omitting development charges.

TABLE II.—DEPRECIATION AND PRESENT VALUE, SEPT. 1, 1909—APPRAISAL OF THIRD AVENUE SYSTEM.

	Group.	Total cost to reproduce.	Scrap value.	Wearing value.	Obsolescence, inadequacy and age.	Deferred maintenance.	Wear and tear.	Total.	Remaining wear.	Present value.
1.	Buildings and structures	$6,758,733	$493,392	$6,265,341	$1,985,803	.....	.....	$1,985,803	$4,279,538	$4,772,930
2.	Track	9,643,728	579,272	9,064,456	201,484	$566,000	$3,104,628	3,872,112	5,192,344	5,771,616
3.	Paving	3,125,426	.....	3,125,426	.....	518,424	1,562,713	2,081,137	1,044,289	1,044,289
4.	Distribution system	2,833,728	944,595	1,889,133	389,951	.....	168,823	558,774	1,330,359	2,274,954
5.	Overhead distribution system	1,106,273	243,150	863,123	139,398	21,565	205,617	366,580	496,543	739,693
6.	Duct lines	1,902,058	.....	1,902,058	175,532	.....	38,559	214,091	1,687,967	1,687,967
7.	Power equipment	3,329,044	*253,438	2,938,890	956,490	.....	.....	956,490	1,982,400	2,372,554
8.	Rolling stock	6,962,406	255,600	6,706,806	1,621,694	.....	.....	1,621,694	5,085,112	5,340,712
9.	Removing obstructions	1,169,209	.....	1,169,209	.....	.....	.....	.....	1,169,209	1,169,209
10.	Paving over obstructions	1,098,052	.....	1,098,052	.....	.....	.....	.....	1,098,052	1,098,052
11.	Real estate	4,375,120	.....	4,375,120	.....	.....	.....	.....	4,375,120	4,375,120
12.	Tools, supplies and fixtures	541,343	.....	541,343	.....	.....	135,335	135,335	406,008	406,008
13.	Horses, harness and wagons	56,874	.....	56,874	.....	.....	14,219	14,219	42,655	42,655
14.	Salvage material and apparatus	5,822	.....	5,822	.....	.....	1,456	1,456	4,366	4,366
	Totals	$42,907,816	$2,769,447	$40,001,653	$5,470,352	$1,105,989	$5,231,350	$11,807,691	$28,193,962	$31,100,125

*A figure of $136,716, representing the Brook Avenue substation, is included in the power equipment group, and appears in the columns for cost to reproduce and present value, but does not appear in the other columns in the group. The apparent discrepancy will be avoided by subtracting this figure of $136,716 from the figure for cost to reproduce before making computations and then adding it to the result of the computations in order to obtain the present value. This figure was treated in this manner because a scrap value could not be obtained owing to the fact that an estimated value for the substation was used, although the substation was not complete at the time of appraisal.

Respecting the argument that as certain lines started as horse-car lines and a few were changed into cable roads and then into electric roads, the new company should be allowed to capitalize not only the present value of the property actually taken over, but the cost of the horse-car lines and the cable roads that have disappeared, the opinion says:

"There is no adequate information before the commission to show how extensive or costly these changes were. However, it is doubtless true that money was spent for horse-car lines and cable roads that have ceased to exist. The statement is made as to the Third Avenue Railroad Company, proper, that in the present book cost of road and equipment and in the liabilities which are outstanding, there is an amount of about $2,000,000 for horse-car lines and equipment and about $8,000,000 for cable roads. These figures have not been proved, but whatever may be the amounts, the question is whether the new company should be allowed to issue securities that do not represent any property to be acquired or necessary expenses connected with such property.

"During the period of horse-car operation the Third Avenue company declared dividends averaging about 13 per cent, ranging from 8½ per cent to 25 per cent. During this period the company could have amortized or accumulated by sinking fund a sufficient amount to have paid off the entire cost of the road and still have paid dividends of over 8 per cent and

founded a reserve fund besides. From 1891 to the time when electrification began, the average rate of dividend was somewhat less; and from 1900 to date the dividends have been very small. But the capitalization of the company represented not actual plant investment, but large premiums paid for stocks, interest charges and even operating expenses. If from the beginning a reasonable amount as depreciation had been set aside out of earnings to take care of the various changes which have taken place, if the company had been conservatively financed and expenditures carefully watched, it is probably true that dividends of 6 per cent, 7 per cent or 8 per cent could have been declared and yet a sufficient amount have been accumulated to write off the old horse-car and cable roads that have disappeared. However, it is the first duty of every company to see that its capital investment is kept intact.

"Companies that are soundly financed make ample provision for depreciation before dividends are paid, and the capitalization of replacements, repairs, etc., is only pardonable as a temporary makeshift to be avoided wherever possible."

DEVELOPMENT CHARGES

On the subject of development charges the opinion states:

"The applicants have asked that approval be granted to the issuance of securities to pay expenses connected with the organization and incorporation of the new company. Mr. Floy included in development charges an estimate of the expenses connected with the incorporation, organization and promotion of the old Third Avenue company. It is apparent that both cannot be granted. As a new corporation is to come into being, and as we are dealing with the issuance of securities for the new company, the estimated expenses connected with the establishment of the bankrupt company as a corporation should be omitted entirely from consideration.

"Mr. Floy considers discounts and promoters' profits, aggregating 15 per cent, or 60 per cent of the total development charges, as proper items to be included in the value of the property. This theory is wrong, for value does not depend upon the amount of discount or other inducements which a company must give in order to raise sufficient cash to pay for that property.

"It might be thought fair if a rate were being fixed to allow a company which had failed to earn a fair return upon its unimpaired investment during the early years of its existence to make up these deficiencies by larger earnings during the later years. But this principle is entirely different from the one enunciated by the applicants.

"The proper period for the capitalization of development expenses ends when operation actually begins. Securities ought not to be issued to cover operating expenses, fixed charges or dividends after that time, except possibly in a most unusual case when such procedure is absolutely necessary to preserve the undertaking. In such an abnormal case, repayment must be made sooner or later out of earnings.

"Interest during construction is undoubtedly a proper capital charge.

"If we begin with Mr. Floy's estimates for legal expenses, proceedings, consents, interest and taxes, and omit duplications, corporate expenses of the passing Third Avenue company and unearned dividends, reserving discounts, etc., for consideration elsewhere, the amount for development charges will be about $3,500,000. In view of the large amounts which the commission is asked to capitalize under the heading of reorganization expenses or expenses connected with the organization of the new company, the above amount seems adequate. Adding the above amount of $3,500,000 to $31,600,000, there is obtained as the total appraised value of the physical property upon Feb. 28, 1910, $35,100,000."

To this amount, say, $1,750,000 is added for current assets, making a total value of $36,850,000. The opinion estimates the current liabilities, including receivers' certificates and underlying securities (with the Tarrytown company omitted) at $18,710,744.

The commission is willing to allow "securities to be issued for all necessary expenses" in connection with the organization of the new company, but "if the total should be found to be unusually large, it may be necessary to require that a part be amortized out of earnings within a reasonable time." It states the cash requirements at practically $27,000,000, as follows: Net value of property to be acquired, $18,150,000; obligations to be refunded, estimated at $6,000,000; expenses of organization of new company, estimated, $800,000; improvement of plant, estimated, $2,000,000. The commission believes that the amount of capital represented by bonds should not be in excess of the amount upon which there is definite certainty that interest may be earned. It presents a statement for the year ended Sept. 30, 1909 (the Yonkers, Westchester and Tarrytown lines being omitted), which shows a surplus of $1,682,900. Deducting $382,900 for franchise taxes and depreciation leaves $1,300,000 as the estimated amount available for interest on the refunding and the income bonds and dividends on the stock, whereas it would require to pay 4 per cent on the refunding bonds, 5 per cent on the income bonds and 6 per cent on the stock, a total of $2,753,800. The commission concludes that such a statement would not justify a capitalization of $55,000,000.

Assuming that all provision for normal wear, depreciation, etc., on all property except buildings and structures, power plant equipment and rolling stock be made directly out of earnings, the commission figures that the amount which should be set aside annually for depreciation on these three divisions of property would be about, using the straight line method and the valuation of the applicants: Power-plant equipment, 5 per cent, $175,000; rolling stock, 5 per cent, $380,000; buildings and structures, 2 per cent, $145,000; total, $700,000. If allowance is made for compound interest instead of simple amortization and interest compounded semi-annually at the rate of 5 per cent per annum, the annual payments would be about: Power-plant equipment, 20 years, $105,000; rolling stock, 20 years, $230,000; buildings and structures, 50 years, $35,000; total, $370,000. The opinion states that it "would not be safe, however, to consider that the annual contribution could be reduced below $500,000, if the capitalization were to be that proposed by the applicants. Provision should also be made for other reserves. It need not be large, and a part of 1 per cent of the gross earnings would probably be ample."

Upon other estimates the commission concludes that if gross earnings were to reach $8,000,000 and operating expenses 60 per cent, and if taxes were to decline, reserves to be omitted and depreciation to be reduced, the net income might be made to reach $2,300,000. But before obtaining the amount available for interest on the $55,000,000 of proposed new securities, the commission adds that there has yet to be deducted the interest on the underlying securities, mortgages and notes payable of the subsidiary companies, which would be about $640,000.

In its final conclusion the commission says:

"Upon the record of the case the petition of the applicants could have been denied without any extended discussion of the issues involved. But the commission desires to facilitate an early reorganization of the Third Avenue system upon a sound and permanent basis, and has believed that a decision setting forth the attitude of the commission upon the questions presented in connection with this application would aid in this direction.

"Pending the submission of a revised plan, the issuance of a formal order will be held in abeyance, so that an opportunity may be given the applicants to amend their petition and to submit proof upon certain points upon which there is doubt. There are several other matters to be considered besides the issuance of securities, but that is so fundamental and so many others depend upon it that it is considered preferable to dispose finally of the question of capitalization before proceeding to take up the other matters.

"The rejection of the plan now before the commission does not necessarily involve a refusal to allow the stockholders of the old company to participate in the profits of the new company unless they make a generous contribution to pay an assessment."

REPORT ON FINANCIAL AND OPERATING RECORDS OF THE PITTSBURGH RAILWAYS

On July 28 Bion J. Arnold submitted to Mayor Magee of that city the following letter and report on the financial and operating records of the Pittsburgh Railways Company. The text is reproduced practically in toto, but several of the less important maps, diagrams and tables are omitted.

LETTER OF TRANSMISSAL

"Supplementing my previous discussion on Pittsburgh's Immediate Transit Needs, submitted to you July 19, the accompanying record of financial operations of the Pittsburgh Railways Company will be found to review the principal facts upon which it was before possible to touch only in a general way. The analysis of the operating results is purposely comprehensive, in order to meet different points of view. These data necessarily assume the form of extracts from the company's records, either direct or in indirect graphical form. I have used the graphical method extensively in order to show *relations* as well as absolute quantities. These records are presented largely as *findings of facts,* and hence are simply commented upon where necessary to emphasize essential points.

"The conclusions to be drawn from these facts will be found elsewhere in my report.

RECORD OF FINANCIAL RESULTS.

"The first table gives the income and expense accounts of the Pittsburgh Railways Company for the last eight fiscal years, or since the organization of the surface railways into one system. This information has been plotted graphically and a study of the table and accompanying diagrams will bring out the most important facts in the financial history of the system. The striking fact is that there has been a deficit for the last three years, increasing from $521,256 in 1908 to $1,321,453 in 1910 (for the fiscal years ending March 31).

"In seeking a cause for this deficit the falling off of earnings during the recent financial panic is at once noticeable. In 1906 the earnings increased $943,238 over the previous year, and in 1907 there was another increase of $720,004. If this rate of increase had not been disturbed, it is safe to say there would have been little or no deficit, which during the past three years has accumulated until it now reaches a total of $2,591,972. A decided effort was apparently made in 1909 to reduce expenses in order to counteract this drop in earnings. In this effort the car service was cut down, the expenditures for maintenance of way and equipment were curtailed to a very low limit and the amount of extraordinary maintenance, which had been started the previous year, was cut by two-thirds. The result was that although the earnings fell off $931,167 in the year ending March 31, 1909, as compared with the previous year, the deficit for the year was but $228,005 more than the year ending March 31, 1908. Apparently it was impossible to keep up these economies and with the return of earnings during the past year, the allowances for maintenance and service have increased to nearer the normal requirements.

"The result for the last fiscal year, or that ending March 31, 1910, is apparently a fair indication of what may be expected of the present property.

"A study of the percentage diagram shows that it will be impracticable to reduce the actual operating expense (in per cent of earnings) below the following amounts, which may be considered normal:

Maintenance of equipment	7.0 per cent
Maintenance of way	5.0 per cent
Transportation and power	35.0 per cent
General expenses	8.0 per cent
Bridge tolls	1.0 per cent
	56.0 per cent
Taxes	4.0 per cent
Total	60.0 per cent

"It will be noted that the above does not include any allowance for depreciation. The only items of this nature in the company's account is the expense for 'extraordinary maintenance which never has amounted to 4 per cent of earnings.

"This study, therefore, indicates that the deficit cannot be avoided by economy in operating expenses, and this fact focuses attention on the annual fixed charges, viz.:

"Rentals of leased property.

"Interest on funded debt of Pittsburgh Railways Company and leased companies.

"Miscellaneous interest and discount.

"These three items have been constantly increasing in amount since the organization of the company until last year when they amounted to over 45 per cent of the income.

TABLE I—INCOME ACCOUNT, PITTSBURGH RAILWAYS COMPANY, FOR FISCAL YEARS ENDING MARCH 31, 1910.

	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
Gross earnings from operations	$8,320,285	$8,699,106	$8,569,476	$9,512,615	$10,232,619	$10,144,102	$9,212,935	$9,922,015
Operating expenses:								
General expenses	$537,534	$607,735	$724,815	$774,108	$851,908	$880,202	$849,864	$969,676
Transportation and motive power	2,594,521	2,922,431	2,767,707	2,922,169	243,327	3,574,142	3,244,117	3,590,857
Maintenance of way and structures	319,179	405,393	561,967	629,871	511,057	454,365	328,235	541,176
Park and Duquesne Garden	149,462	60,612	37,101	49,977	132,237	.....	.....	.....
Maintenance of equipment	650,315	650,166	592,561	658,901	632,981	677,697	600,006	737,749
Total operating expenses	$4,251,012	$4,646,339	$4,684,252	$5,035,028	$5,371,513	$5,586,407	$5,022,225	$5,839,458
Bridge tolls	114,644	118,217	113,904	128,547	108,732	116,699	108,564	109,353
Taxes	436,966	422,325	352,487	364,426	291,711	408,430	397,721	418,126
Total operating expenses and taxes	$4,802,623	$5,186,881	$5,150,644	$5,528,002	$5,771,957	$6,111,538	$5,528,510	$6,366,939
Net earnings	$3,517,662	$3,512,224	$3,418,832	$3,984,613	$4,460,662	$4,032,564	$3,684,424	$3,555,076
Other income:								
Rent of buildings and real estate	$31,289	$65,310	$69,194	$53,758	$47,875	$54,215	$51,902	$46,950
Interest and discount	18,989	17,437	8,075	10,774	5,013	15,222	14,123	16,531
Miscellaneous	24,449	17,196	18,450	20,022	31,013	13,612	17,125	15,408
Total other income	$74,728	$99,944	$95,719	$84,555	$83,902	$83,050	$83,152	$78,954
Total income	$3,592,390	$3,612,169	$3,514,551	$4,069,169	$4,544,565	$4,115,615	$3,767,577	$3,634,030
Deductions from income:								
Rentals of leased property	$1,864,872	$1,997,883	$2,036,688	$2,136,306	$2,178,252	$2,201,597	$2,258,011	$2,278,869
Miscellaneous interest and discount	61,749	150,996	168,549	205,184	278,514	365,453	343,185	435,756
Tenement expenses	2,926	14,924	8,031	8,676	2,693	3,100	2,937	4,669
Total deductions from income	$1,929,547	$2,163,804	$2,213,269	$2,350,167	$2,459,460	$2,570,150	$2,604,134	$2,719,295
Net income	$1,662,843	$1,448,364	$1,301,281	$1,719,002	$2,085,104	$1,545,464	$1,163,442	$914,735
Fixed charges:								
Interest on funded debt of Pittsburgh Railways Company and leased companies	$1,380,592	$1,464,440	$1,582,833	$1,676,103	$1,734,199	$1,734,687	$1,792,064	$1,869,989
Surplus or deficit for year	$282,250	d $16,076	d $281,551	$42,898	$350,904	d $189,223	d $628,621	d $955,254
Extraordinary maintenance expenses:								
Way and structure	During the years ended March 31, 1903-1904,1905-1906, extraordinary maintenance expenses were included under operating expenses as maintenance of way and structures and maintenance of equipment.				$245,485	$271,640	$79,640	$324,993
Equipment					*94,645	*60,393	*41,000	*41,205
Total					$340,131	$332,033	$120,640	$336,198
Net surplus or deficit for year					$10,773	d $521,256	d $749,262	d $1,321,453

NOTE.—d = deficit. * Includes $40,000 car trust notes.

"If the operating expense cannot be reduced to less than 60 per cent of the earnings, and if depreciation requires an allowance equal to 10 per cent, making a total of 70 per cent, only 30 per cent of the earnings will be available for fixed charges. If these charges amount to 45 per cent instead of 30 per cent, there must be an annual deficit equal to 15 per cent of the earnings anticipated. On the other hand, if this is to be avoided

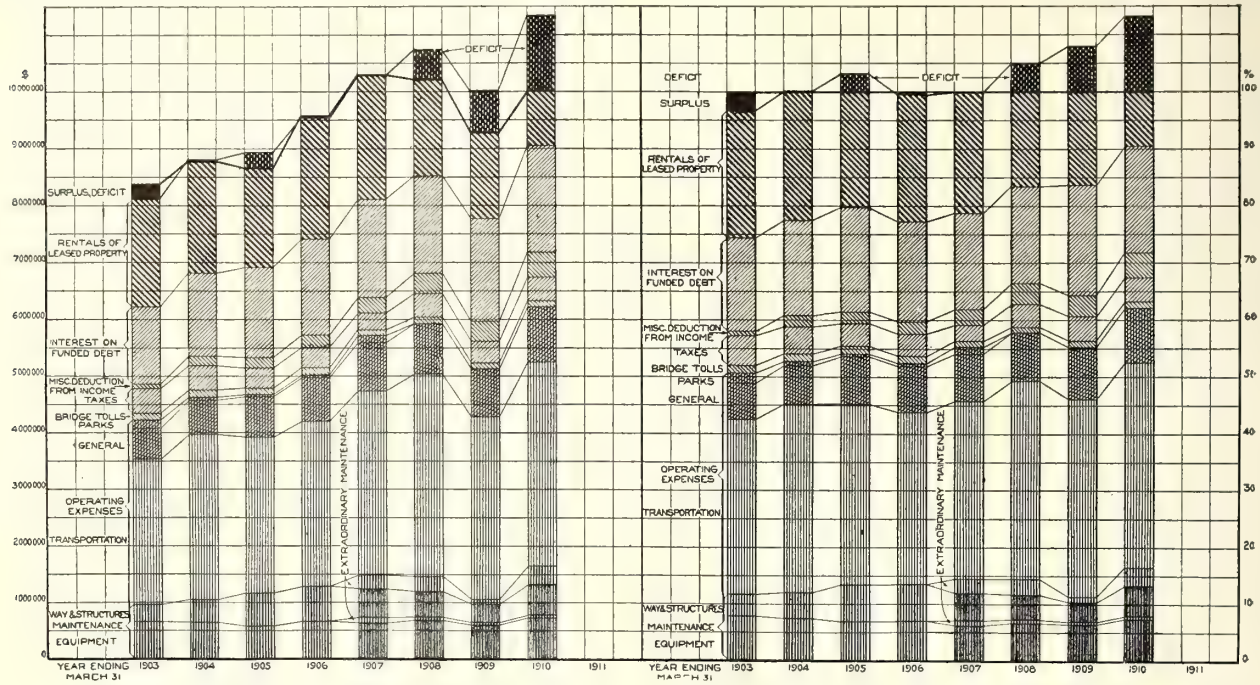


Fig. 1.—Pittsburgh Railways Report—Actual and Percentage Distribution of Expenditures

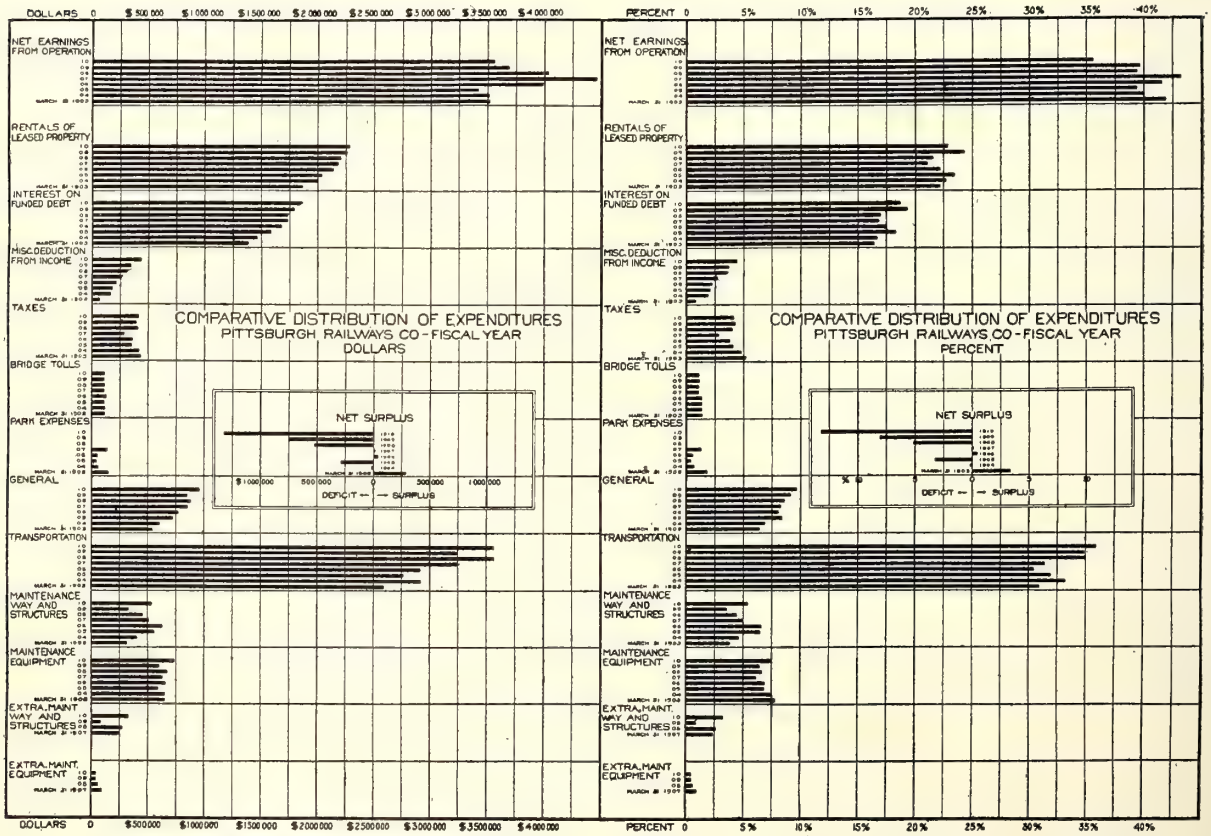


Fig. 2—Pittsburgh Railways Report—Comparative Actual and Percentage Distribution of Expenditures

the fixed charges must be reduced by one-third on the basis of the present earnings, or else the earnings must increase by 50 per cent, i.e., to about $15,000,000 per year, before the present fixed charges can be equitably earned without a deficit.

RECORD OF TRACK MILEAGE

"Curve, Fig. 3, is taken from the reports to the State Secretary of Internal Affairs and shows the total single-track mileage of all companies operating in the Pittsburgh district, and now constituting the system of the Pittsburgh Railways Company. It indicates nearly continuous growth from about 43 miles in 1886 to 581 miles in 1910.

"During the period of most rapid extension of the trackage, 1890 to 1896, the system increased from 63 miles to 337 miles, or at an average rate of 55 miles per year. The record was nearly 100 miles per year in 1895-6. Since 1897 track extensions have been maintained at an average rate of 20 miles per year, in fact, the lines of the Pittsburgh Railways Company have been extending at a slightly greater rate than the population.

RECORD OF YEARLY EARNINGS

"The important diagram, Fig. 4, records the annual earnings since 1881 of all companies comprising the present Pittsburgh Railways system, following in succession the various extensions of system and changes in motive power. The droops in the earnings curve indicate the results of financial stringencies in 1893, 1904 and 1908. In 1893-4 earnings fell approximately $900,000 below what they would have been, based on previous increase. In 1904 the earnings were affected $800,000 and in 1908 nearly $2,000,000 by the panic of that year. That these declines are directly traceable to financial conditions of the district is clearly evident by comparison with Pittsburgh bank clearings, where the same droops are in evidence. The

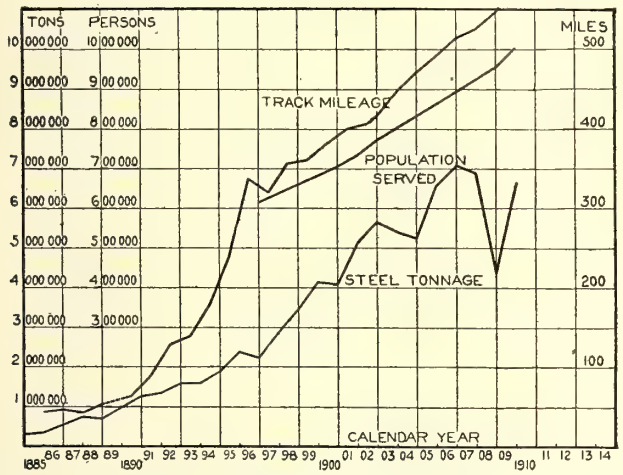


Fig. 3—Pittsburgh Railways Report—Miles of Track, Population and Output of Steel

net result of the two panics is that the earnings of last year were $3,000,000 less than might have been expected by estimating upon a rate of growth prevailing at the time the present system was organized. At that time (1902) the earnings were increasing at a greater rate than during any subsequent period.

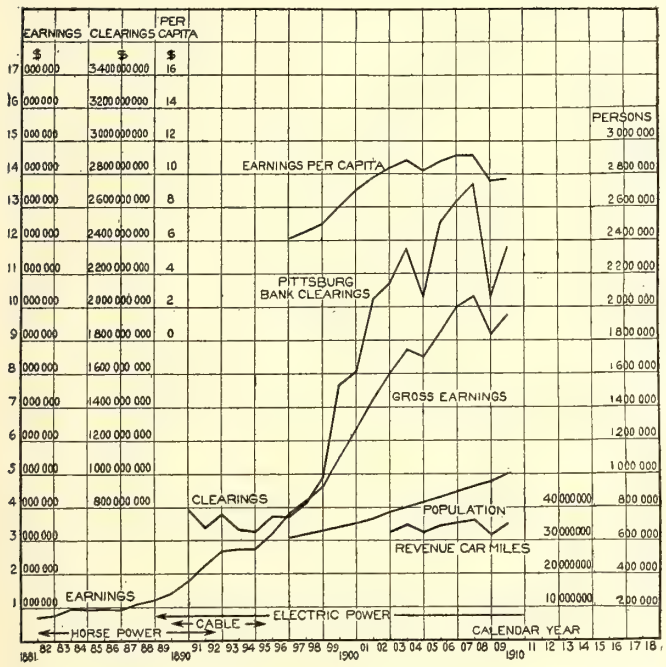


Fig. 4—Pittsburgh Railways Report—Growth of Population and Earnings

"The curve of population covers the entire traction district served by the present company and indicates a present population of over 1,000,000 people. In interurban territory, tributary population has been considered as lying within a strip 1½ miles on either side of the railway company's line.

"In times of normal business prosperity, earnings per capita should grow with the population. The record for Pittsburgh indicates that, at times, the growth has been at a much faster rate.

"Small depressions in the curve of revenue car-miles occur in 1904 and 1908, as in the case of earnings, showing that with the decrease in revenue, the service rendered was also decreased.

MONTHLY TRAFFIC RECORD

"Table II and Fig. 5 shows the varying riding habit of the passengers from season to season. It will be noted that con-

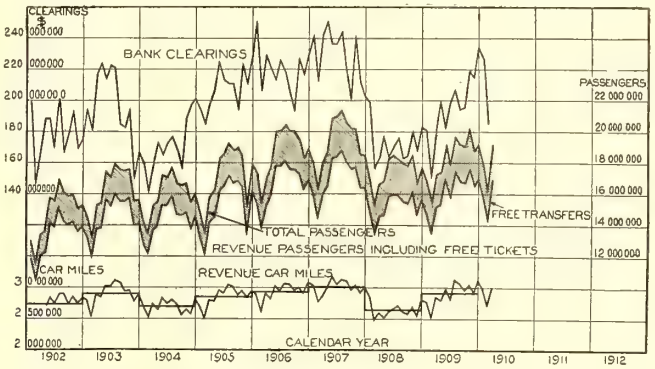


Fig. 5—Pittsburgh Railways Report—Monthly Record of Passengers, Car-Miles and Bank Clearings

siderably more passengers are carried in the summer than in the winter months, February being the lowest of the year, both on account of season and its being the shortest month. In general, July shows the largest traffic. Outside the monthly changes, a gradual increase in traffic is recorded from 1902 to 1908, with the exception of a slight drop in 1904. The depression of 1908 shows very plainly the effect of the panic commencing October, 1907. Since then a gradual improvement is recorded, and the first five months of 1910 would indicate that in this respect the number of passengers carried will exceed the record of the banner year, 1907. The record of revenue passengers includes the users of free tickets; but as free tickets are issued to employees of the company only, their effect is inappreciable.

TABLE II—REVENUE PASSENGERS (IN THOUSANDS) CARRIED BY MONTHS, PITTSBURGH RAILWAYS COMPANY.

	1902.	1904.	1906.	1908.	1910.
January	11,812	12,789	15,529	14,907	15,786
February	10,407	12,162	13,831	13,515	14,271
March	12,044	13,645	15,274	14,615	16,963
April	12,265	13,888	15,958	14,705	.....
May	14,198	15,281	17,828	15,916	.....
June	13,893	15,247	17,811	15,985	.....
First six months	74,621	83,041	96,235	89,646	.....
July	15,133	15,815	18,199	15,946	.....
August	14,284	14,773	17,602	15,519	.....
September	14,002	14,683	17,646	15,424	.....
October	14,271	14,826	17,290	16,145	.....
November	13,600	13,827	16,321	14,644	.....
December	13,878	14,533	16,944	15,629	.....
Second six months	85,169	88,460	104,005	93,309	.....
Total year	159,791	171,502	200,240	182,956	.....
Free transfers	18,910	21,653	25,494	26,759	.....
Total rides	178,702	193,156	225,734	209,715	.....

NOTE.—Free tickets included in revenue passengers. Data exclude passengers carried on Inclines and Pittsburg & Castle Shannon Railroad (except after July, 1909, electrification). Cash fares larger than 5 cents pro rated as excess passengers on a basis of 5 cents.

"The shaded section lying above the curve of revenue passengers in Fig. 5 indicates the number of free transfers issued. These varied from 10 per cent to 13 per cent in excess of revenue passengers, during the first year, 1902, or 13 per cent to 16 per cent during 1908, the greater percentage occurring during the summer months.

"Bank clearings for comparison are also plotted by months in Fig. 5. It will be noted that the fluctuations in clearings are closely reflected in the monthly passenger business of the Railways Company. It is also interesting to note that the bank clearings for the present year are again on the increase.

"Revenue car-miles vary with the season somewhat similar to passengers. The record shows that an effort is made to vary the car-miles to suit passenger traffic both by seasons and by years. Again the depression of 1908 is conspicuous, and to a

less degree in 1904. Note that the number of car-miles furnished during 1908 was less than any previous year shown. The years of 1903 and 1904 were practically equal in passengers carried, but car-miles averaged about 2,000,000 less, showing the effect of the policy of retrenchment prevailing. Again, the revenue passengers carried in 1908 was in excess of 1903, but the car-miles per month averaged about 250,000 less. That considerable improvement was made in the car service in 1909 is evidenced by the rising curve, and for the first five months of 1910 the car-miles furnished is greater than during any corresponding period in the company's history.

TABLE III—TOTAL PASSENGERS PER REVENUE CAR-MILE BY MONTHS, PITTSBURGH RAILWAYS COMPANY.

	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.
January	4.93	5.22	5.32	5.47	5.97	5.88	5.92	6.06	5.98
February	4.81	5.24	5.36	5.41	5.90	5.87	6.13	6.07	5.96
March	5.12	5.28	5.56	5.64	5.87	6.27	6.38	6.04	6.22
April	5.13	5.43	5.84	5.87	6.34	6.17	6.66	6.22	...
May	5.57	5.76	6.08	6.17	6.67	6.54	6.96	6.42	...
June	5.70	5.64	6.27	6.38	6.78	6.87	6.93	6.40	...
July	5.83	5.76	6.32	6.29	6.68	6.83	6.77	6.28	...
August	5.53	5.69	6.12	6.23	6.54	6.62	6.87	6.24	...
September	5.78	5.95	6.45	6.58	6.78	6.82	6.91	6.46	...
October	5.59	5.94	6.28	6.23	6.49	6.60	6.85	6.57	...
November	5.48	5.58	5.98	5.38	6.30	6.38	6.58	6.43	...
December	5.39	5.42	5.72	6.13	6.17	6.14	6.32	6.17	...
Average, year	5.43	5.59	5.97	6.06	6.38	6.43	6.60	6.28	...

OPERATING RESULTS PER REVENUE CAR-MILE

"Gross earnings per revenue car-mile increased steadily from an average of 24.1 cents in 1902 to a maximum of 28.3 cents in 1908, and on account of the increased number of car-miles in 1909 the earnings dropped to 27.4 cents per car-mile. The earnings per car-mile in the summer months are about 2 cents higher than the earnings per car-mile in the winter months, but during 1909 the difference between seasons was not so marked. These differences are shown in Fig. 6.

"Operating expenses per revenue car-mile increased from 12.1 cents in 1902 to 16.2 cents in 1907, while for the last three years the average has been practically 16 cents.

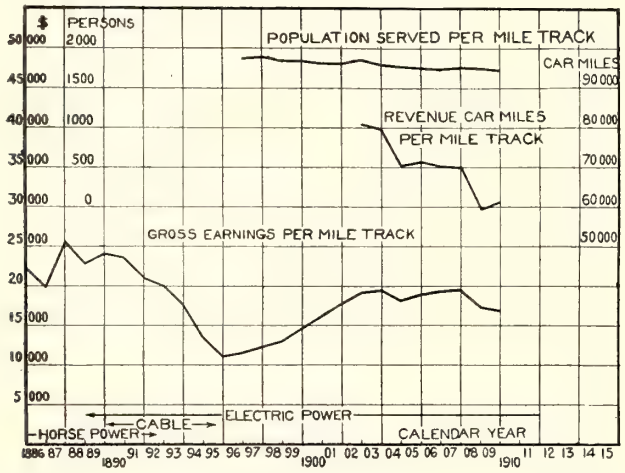


Fig. 6—Pittsburgh Railways Report—Earnings, Car-Miles and Population per Mile of Track

"The number of total passengers per revenue car-mile is the best measure of service from year to year, as this ratio takes into account the number of transfer passengers. According to this record, the standard of service furnished decreased from 1902 to 1908 with a considerable improvement in 1909.

RATIO—PER MILE OF SINGLE TRACK

"The slight droop in the upper curve showing the people served per mile of track, Fig. 6, indicates that the trackage of the system has increased at a faster rate than the population. In 1897 there were 1870 people served per mile. Although population since then has been constantly growing, the track has extended so much faster that in 1909 only 1727 people were served per mile.

"The number of car-miles per mile of track is a measure of the relative service rendered at different times in carrying capacity. Since 1902 a reduction from 80,000 to 60,000 has been made, although last year shows a slight increase. Outside the actual shrinkage in service rendered, part of this reduction may be due to expansion into suburban territory where less frequent service is demanded.

"The chief point of interest relative to earnings is the comparison between horse and cable lines and the present electric lines. Horse-car lines earned from $20,000 to $25,000 per mile, a record which has never been exceeded in Pittsburgh. The shrinkage in earnings to $12,000 per mile which followed the building of cable and electric lines was largely due to excessively rapid expansion. Since 1895 earnings per mile have steadily increased to nearly $20,000 per mile, although twice checked by business depressions. For the last year the earnings averaged nearly $17,000 per mile.

PER CAPITA RECORD

"One of the most important factors in studying the transportation system is the average riding habit of the population as measured by the earnings per capita, and the most encouraging aspect is the gradual increase in earnings per capita as the population increases. The actual relation varies in different cities, but, in general, it may be said to increase at a rate at least equal to the rate of increase in population.

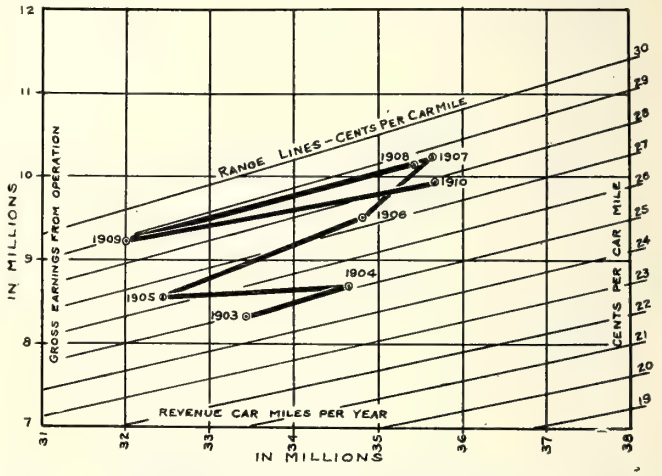


Fig. 7—Pittsburgh Railways Report—Diagram Showing Variation in Car-Mile Earnings

"Earnings per capita in Pittsburgh, as shown in Fig. 8, have increased within recent years from $6.19 in 1896 to a maximum of $11.15 in 1906-7, falling to $9.70 in 1909. At present the average is about $10. It is noticeable that the earnings per capita increased at a greater rate before the organization of the Pittsburgh Railways Company than since that date. The depressions of 1904 and 1908 are due to commercial conditions of the district, as elsewhere noted.

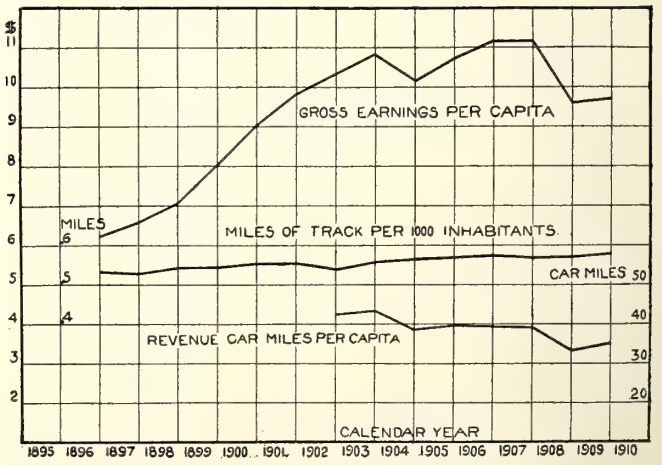


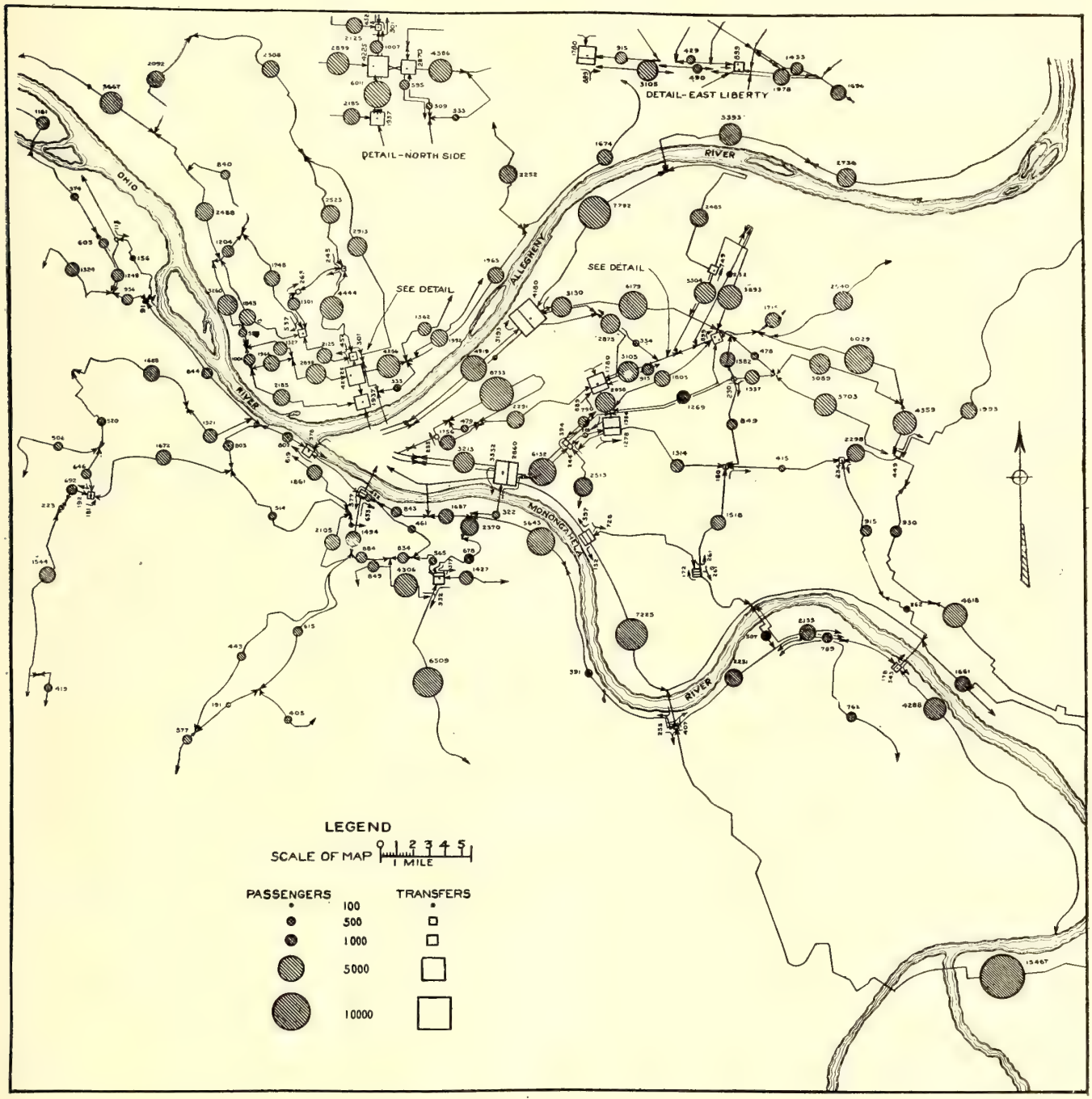
Fig. 8—Pittsburgh Railways Report—Car-Miles, Miles of Track and Gross Earnings Per Capita

"In miles of track per 1000 inhabitants, the system has grown since 1906 somewhat faster than the population served, from 0.535 to 0.578, or slightly over 8 per cent.

"The curve of revenue car-miles per capita covers the period of the present company. It shows a decrease from 42.6 in 1902 to a maximum of 33.2 in 1907, increasing to 35.0 in 1909, a net reduction since 1902 of 20 per cent. Note that both upper and lower curves fell to lower levels during the same period, but whether the reduced riding habit in earnings per capita was the result of decreased service or vice versa is a question. Probably the drop is not due entirely to lack of service, but to extensions of track into outlying territory.

mum of 59.2 per cent in 1907. These figures are for calendar years and do not include taxes.

"The run-off mileage of the system is a nearly constant factor, amounting to about 3 per cent of the total. This covers all the run-off and run-on, or so-called "dead" mileage of strictly revenue-earning cars between the car barns and point of service, and is a measure of the proper location of car barns with reference to routes served. This dead mileage is included in all calculations involving revenue car-miles.



Pittsburgh Railways Report—Outbound Passenger Movement in Pittsburgh and Vicinity for Typical Day

RATIOS

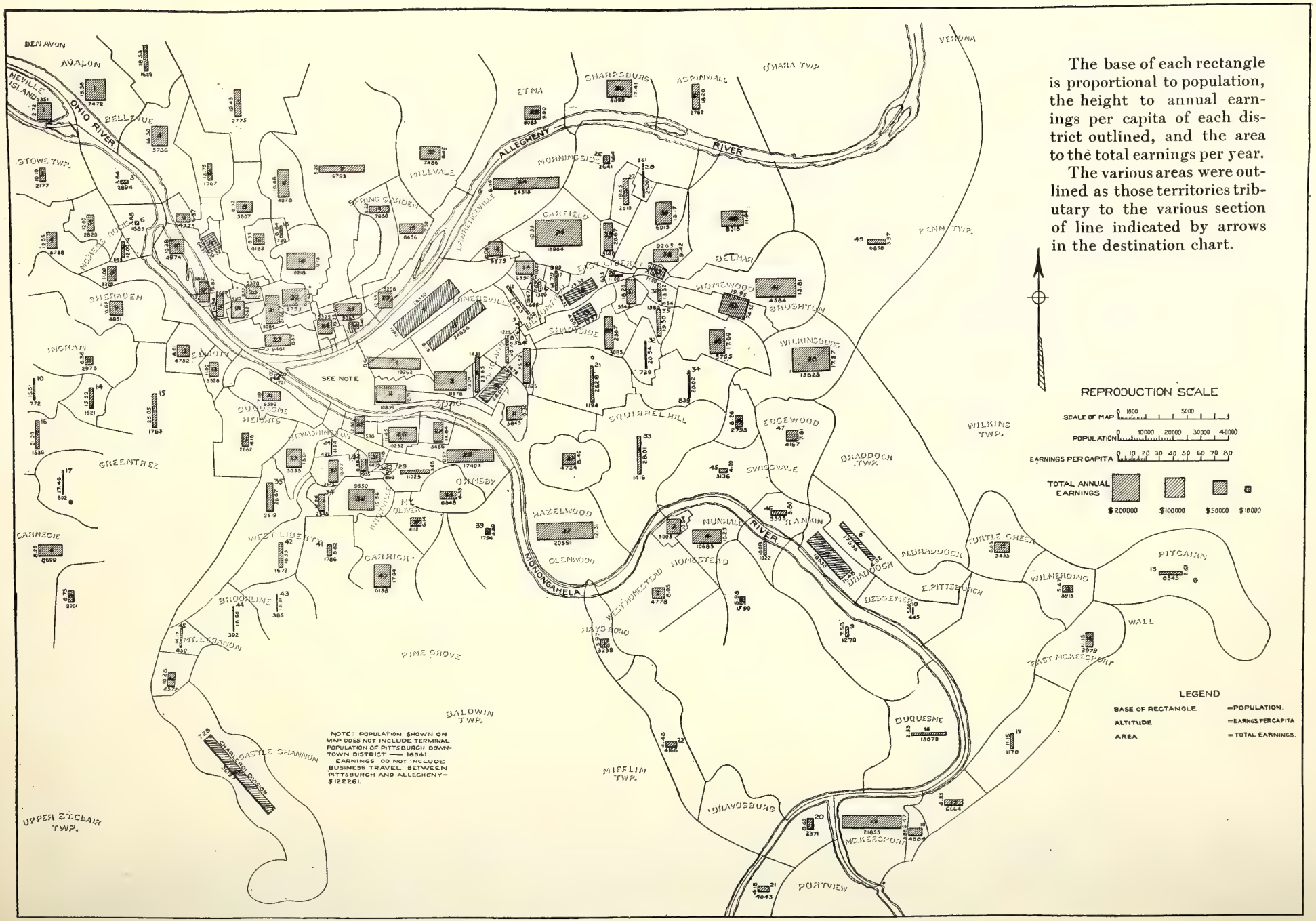
"Bank clearings are a fair index of trade conditions. The curve of bank clearances in Fig. 9 shows a reasonably uniform ratio; that for every $250 in clearings the railway company earns $1, or that earnings are equal to about four-tenths of 1 per cent of banking business done.

"The ratio of expenses to earnings from operation of the system is important in furnishing the measure of the company's policy in returning a certain part of the earnings to the system in various forms, such as car operation, maintenance, etc. This ratio has increased from 50.6 per cent in 1902 to a maxi-

COMPARATIVE YEARLY RECORD

"A curve has also been plotted [not reproduced] to show the relative effect of periods of prosperity and depression in the Pittsburgh district upon railway earnings, and upon other similar indices of commercial conditions, such as (1) bank clearings, (2) steel tonnage, (3) railroad freight tonnage, (4) telephone calls, (5) post-office receipts.

"The freight tonnage included all in and outbound freight handled within a district about 40 miles around Pittsburgh, not including freight in transit. Similarly, telephone calls were those within the suburban district served. Steel tonnage



Pittsburgh Railways Report—Distribution of Annual Passenger Earnings in Pittsburgh and Vicinity

embraced the output of all mills around Pittsburgh, as reported by the American Iron and Steel Association. Post-office receipts covered most of the suburban offices within a radius of 8 miles.

"No industry escaped the panic of 1908, but the recovery

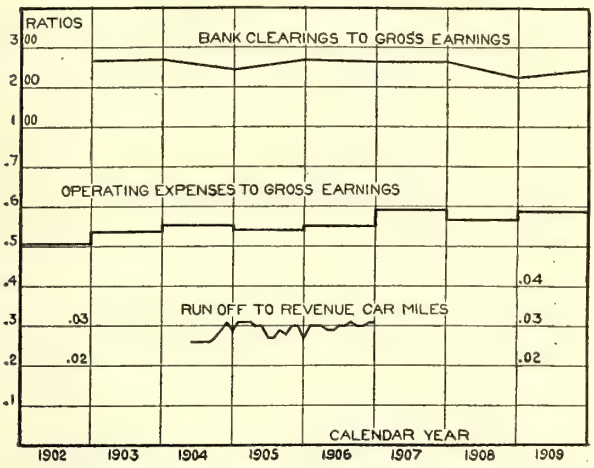


Fig. 9—Pittsburgh Railways Report—Ratios of Bank Clearings and Operating Expenses to Gross Earnings and of Run-off to Revenue Car-Miles

during 1909 indicates that the district is rapidly regaining the prosperity which it enjoyed during 1906-7. The post-office receipts and telephone calls were affected to a much less extent than bank clearings and steel tonnage.

COMPARATIVE FINANCIAL RESULTS

"In studying the results previously shown, it is instructive to compare Pittsburgh with other cities. This is accomplished graphically in Fig. 10, which resembles the first diagram discussed in this section of the report.

"The two important quantities shown here are (a) total operating expenses (not including depreciation, reserve or

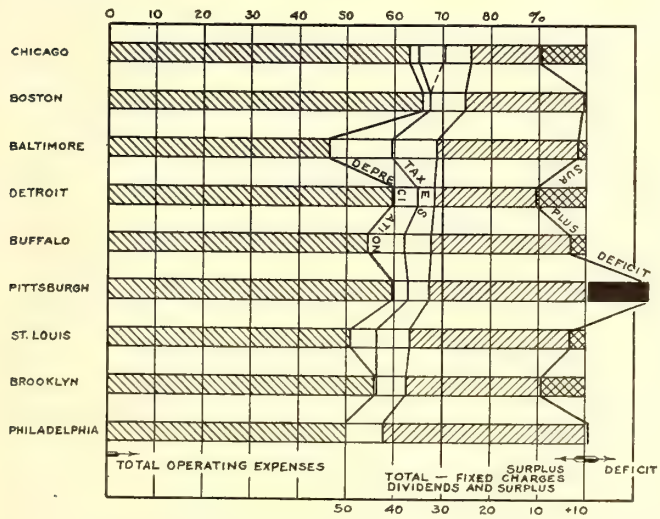


Fig. 10—Pittsburgh Railways Report—Comparative Financial Results of Urban Railway Systems in Per Cent of Total Income

taxes) and (b) total fixed charges, dividends and surplus (or deficit). The former represents the equivalent of service rendered, i.e., that per cent of income put back into the property. The latter represents the total amount retained by the company or its subsidiaries, i.e., the per cent of income taken out of the property.

"From the standpoint of the riding public, this diagram possesses an unusual interest, as it shows what proportion of the fare is retained by the operating company as returns from its investment. Whether or not the return is entirely adequate in each case involves a number of factors not shown here. For the present it suffices to draw attention simply to the relative cost *to the patrons* of the railway service in the various cities, and to facilitate comparison, the cities are arranged according to the relative return on the investment to the operating Company.

"The important thing to note is that if the fixed charges and dividends charged against the Pittsburgh system represent actual expenditures, then Pittsburgh pays for its traction service at a higher rate than any of the cities shown, i.e., over 46 per cent of the income, however, the deficit of 13 per cent shown reduces this charge to about 33 per cent, which is less than some of the cities show.

"It is instructive to note that in Chicago and in Boston the returns to the companies is relatively smaller than in any of the other cities. In Chicago the new traction ordinances fix the return on the investment, while in Boston the capitalization is regulated by the State Railroad Commission.

"The latest available fiscal returns are reported—all on a basis of per cent of total income."

Mr. Arnold's report was accompanied by the two maps reproduced herewith. One shows the outward passenger movement in Pittsburgh and vicinity for a typical day and represents in a relative measure the destination of the patrons of the railway system. In addition there was a cross-river "business transit" of 16,500 persons, not shown. Approximately the total travel per day, outbound and inbound, would be twice that indicated by the diagram. The results shown on this diagram were based upon a traffic count for one day during August, 1906, made by Ford, Bacon & Davis, consulting engineers, giving by actual count the number of passengers alighting from cars within the various sections designated by the arrows.

The other map gives the distribution of annual passenger earnings of the system as distributed by Ford, Bacon & Davis, according to a destination count made by them. This map indicates the importance of considering not only the population, but also the relative riding habit in studying the transportation facilities necessary for any district. On outlying lines all population within a distance of 1½ miles on either side of the line is considered tributary to them. The earnings per capita varied in 1906 from $2.33 to $28.01, and averaged approximately $11 for the entire district.

AMERICAN EQUIPMENT ON JAPANESE RAILWAYS

Four new trolley lines have been opened recently in the Kobe district of Japan. Four miles of the Kobe Electric Company's line, which will be 18 miles in length, have been opened for service. The generator, rails, poles and air brakes are American, the running gear and machinery of cars English, and the woodwork of cars and overhead wires Japanese make. The Minomo-Arima Electric Railway Company's 18-mile line to mountain summer resorts opened recently. The rails, generators, boilers and running gear and machinery of cars are American, the woodwork of cars and overhead wires Japanese make. The Keihan Electric Railway has opened a line 28 miles long, connecting the important cities of Osaka and Kyoto, and running through other large towns. Nearly all of the materials came from England, though the overhead wires came from the United States, while the woodwork of the cars was made in Japan. The Keishin Electric Railway, from Kyoto to Otsu, and the Uji Electric Railway, from Fushimi to Uji, now building, will connect with this line. The Hyogo Electric Railway has opened its first section—from Hyogo to Suma; it will extend 12 miles along the shore of the Inland Sea to Akashi. The material has come chiefly from the United States, the woodwork of the cars and the overhead wires being made in Japan.

The Interborough Rapid Transit Company, New York, has decided to install electric fans in all subway cars to improve the ventilation. A fan will be mounted under the upper deck at each end of the car.

EXHIBIT ARRANGEMENTS FOR THE ATLANTIC CITY CONVENTION

The committee on exhibits of the American Street and Interurban Railway Manufacturers' Association has made several important changes in the plan of exhibit spaces on Young's Million Dollar Pier at Atlantic City, where the display of electric railway apparatus and equipment will be made at the time of the convention, Oct. 10 to 14. The new plan is reproduced herewith. It provides approximately 78,000 sq. ft. of exhibit space, which is more than has been available in any previous year. In 1908, when the exhibits were first placed on the Million Dollar Pier, only 65,000 sq. ft. of floor space was used by about 200 exhibitors. Applications received up to Aug. 6 by the committee total 52,000 sq. ft.

The principal changes made in the original plan for this year are in Building No. 1. The main lobby has been enlarged by removing some of the spaces in the center of the building and adding spaces on each side to give a circular area near the main entrance. In Marine Hall the shape of the front of the booths has been modified so as to improve the general appearance. All of the spaces in this section have been renumbered from 600 to 690, inclusive. Since the 1908 convention the meeting room on the end of the pier has been moved and about 100 ft. and 22 extra spaces of large size have been added at the outer end of Building No. 3. These spaces may be used for heavy exhibits, such as trucks or machine tools. Altogether 394 separate booths have been planned, varying in size from 2024 sq. ft. down to 63 sq. ft.

The location of the registration booths and committee offices at the entrance to the pier from the boardwalk will be the same as in 1908. A booth for the registration of railway delegates and guests will be at the right of main entrance and a booth for the registration of members of the Manufacturers' Association will be on the left. The office of the secretary and executive committee of the Manufacturers' Association will be located back of the manufacturers' registration booth.

The committee on exhibits announces that the charges for carting and trucking exhibits from the railroad station to exhibit spaces in the pier has been reduced to $5 per ton. The charge for exhibit space, in addition to membership fees in the association, will be 30 cts. per sq. ft., which includes partitions of a uniform design, a sign, carpet and free use of steam, compressed air and electric power.

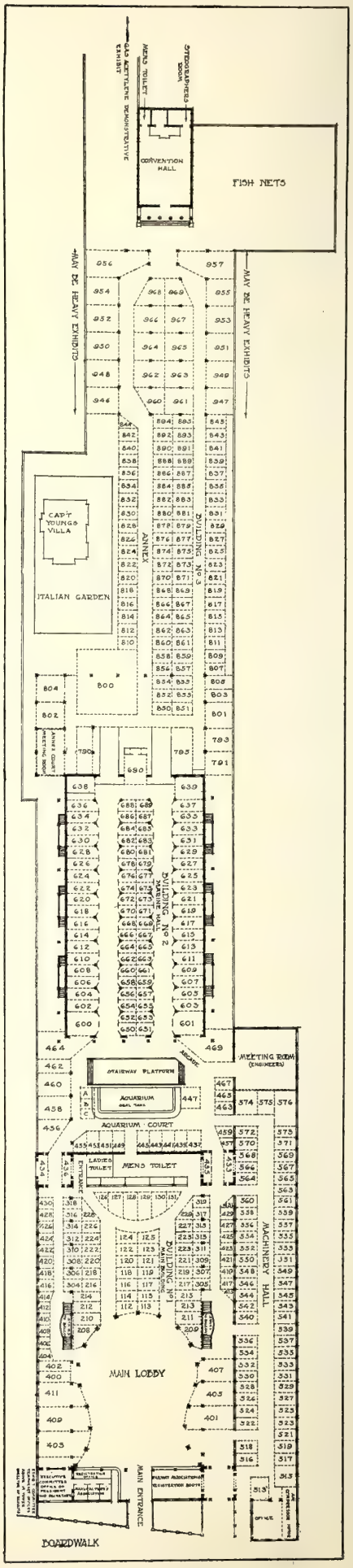
Exhibitors will install their own exhibits and may commence the installation on or about Oct. 1. All booths must be complete and in order by 8 a. m., Monday, Oct. 10. Arrangements may be made with P. E. Lam, contractor, Atlantic City, who will receive exhibit crates and boxes at the exhibitor's space, unpack and arrange the exhibits in the booth, prepare crates for storage and repack, ready for shipment at the close of the convention. The contractor will act for the exhibitor until his representative arrives and will arrange for bill of lading for return shipment after exhibit is repacked.

The weights allowed by the pier management are as follows: Main building 200-250 lb. per sq. ft.; Machinery Hall, 200-250 lb. per sq. ft.; Aquarium Court, 200 lb. per sq. ft. Building No. 2, 150 lb. per sq. ft. Building No. 3, 150-200 lb. per sq. ft. Concentrated loads of 10 tons or less will be permitted if placed directly over piles. A special bulletin regarding exhibits of cars on tracks near the pier will be issued by the committee at a later date.

A meeting of the committee on exhibits has been called for 11 a. m., Aug. 12, at the offices of the American Street and Interurban Railway Association, 29 West Thirty-ninth Street, New York City. At this meeting the committee will consider all applications for space received up to that time and equal preference will be given to all such applications in determining locations. If any objection is made by an exhibitor to the location assigned a hearing will be given by the committee. In order to avoid misunderstandings it would be well for all applicants for space to make sure that the revised numbers of spaces desired and not the original numbers as shown on the first plan prepared by the committee are assigned to them.

Additional information regarding exhibit arrangements may be had from K. D. Hequembourg, vice-president in charge of exhibits, Dunkirk, N. Y.; George Keegan, secretary of the Manufacturers' Association, 165 Broadway, New York City, or any of the following members of the committee on exhibits:

L. R. Ashurst, Jr., William Wharton, Jr. & Company, Philadelphia, Pa.; E. F. Chaffee, O. M. Edwards Company, Syracuse, N. Y.; F. J. Drake, Lorain Steel Company, Philadelphia, Pa.; F. H. Gale, General Electric Company, Schenectady, N. Y.; N. M. Hench, Carnegie Steel Company, Pittsburgh, Pa.; John C. Jay, Jr., Pennsylvania Steel Company, New York; J. A. Kucera, Electric Railway Journal, New York; C. N. Leet, National Brake & Electric Company, Chicago, Ill.; J. H. Milliken, McConway & Torley Company, Pittsburgh, Pa.; H. G. McConnaughy, Dearborn Drug & Chemical Works, New York; J. C. McQuiston, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; F. C. Randall, Allis-Chalmers Company, New York; Charles H. Thomas, Galena Signal Oil Company, New York; J. V. E. Titus, Electric Service Supplies Company,, Philadelphia, Pa.; W. T. Van Horn, Brady Brass Company, New York; A. L. Wilkinson, Ohio Brass Company, Mansfield, Ohio; S. M. Wilson, The J. G. Brill Company, Philadelphia.



Plan of Exhibit Hall

EFFORTS TOWARD SETTLEMENT OF COLUMBUS STRIKE

The latter part of last week was spent by business men of Columbus, Ohio, in an endeavor to fix some basis for negotiations for a settlement between the Columbus Railway & Light Company and its striking union employees that would be satisfactory to both sides, but all efforts resulted in failure. On Aug. 8 the strikers proposed that the whole matter be referred again to the State Board of Arbitration and that both the company and the men agree beforehand to abide by the decision.

Conditions are becoming intolerable for the merchants, as their business amounts to very little, but just what action they propose to take is not known.

As a result of several meetings of business men, Dr. W. O. Thompson, president of the Ohio State University, on Aug. 5 presented a plan of settlement to the company. This was refused, but the company made a proposition in writing to take all the striking men back, including those who were discharged for cause, allowing the men freedom to belong to the union or not, and guaranteeing that there would be no discrimination. The Rev. Washington Gladden took this proposition to the officials of the organization and it was refused without reference to the men.

Former Attorney-General Frank S. Monnett, representing the union men, has written a letter to Governor Harmon, asking that a special session of the Legislature be called and that a law be enacted that will enable the city to take over and operate the railway property, after it has been appraised by a jury or committee.

Mr. Monnett and other attorneys for the men have also been endeavoring to find some law that will allow the appointment of a receiver to operate the property until some settlement has been reached.

Since the morning of Aug. 4 the State troops have been leaving Columbus, until the first of this week but few remained. The presence of soldiers had a good effect, however, as all rioting had practically ceased. Occasionally a stone was hurled through a car window at night, but this did not occur often. The people gained confidence from this and the patronage of the cars rapidly increased. The most serious feature of the strike during the week was that dynamite torpedoes were placed on the tracks in two different places. They were found before the cars passed and accidents were avoided.

Many of the soldiers wore the buttons handed out or sold by the union men and the members of the Sixth Regiment, of Toledo, on their return home, contributed $500 in cash for the families of the strikers.

Mayor Marshall and Sheriff Sartain have had a difficult time securing men to act as deputies and police officials when all the troops were withdrawn. The police force will probably amount to 300 men, with the special officers. It is said that the business men have volunteered to aid in keeping order.

General Manager E. K. Stewart, of the company, states that as a last resort notices have been sent all over the State asking for young men who want permanent employment and that many applications are being made every day. He said that this action was delayed as long as possible in the hope that the old men would come back and take their runs. All the men who are given positions will keep them, he says, as the company cannot put them off after they have been engaged as permanent employees. He insists that the men may join the union or remain out, as they see fit, and that no distinction will be made by the company, but all will be treated with as individuals.

Formal complaints were filed against a number of patrolmen by the soldiers, who stated that they did not do their duty, but in most cases the soldiers failed to appear against the men at the time set for hearings.

STATEMENT FROM E. K. STEWART

E. K. Stewart, vice-president and general manager of the company, in a statement issued on Aug. 6 in reference to the finding of the board of arbitration, said:

"The daily papers have recently published something like a column coming from the strike leaders, criticising a statement from me and claiming that the arbitration board found that I had 'unjustly discharged men for the sole reason that they had joined a labor organization,' and intimating that the board had declared that the company had practised 'coercion and intimidation to prevent men from joining the union.' There was no such finding by the board of arbitration, and the evidence contained nothing to justify any such finding, and there is nothing to justify such a statement and therefore I emphatically deny the statement.

"The board's finding related to three points, namely:

"1. The application blanks.

"2. The discharge of men for shortages, fights and rear-end collisions, and

"3. The manner of the barn foremen and inspectors toward the men.

"First: The board found that in the application blanks used since May 3 there were certain questions which should have been eliminated, but it further found that the testimony showed that the failure to strike out these questions was unintentional, as the company had given orders to its clerks to strike them out, and that they were so stricken out except in a few instances.

"The blank forms used were old ones which the company had on hand. While the board found that these questions were objectionable, my view has always been that their use was not a violation of the contract, and I respectfully beg leave to differ with the board on this point.

"But, nevertheless, my instructions were to strike them out in order to remove any ambiguity on the subject, and the mere fact that in a few instances they remained in the blanks, by oversight, should not be held to be a discrimination in the face of the only testimony on the subject.

"The next finding of the board was on the discharge of men. Let us see what this is. To quote from the board's report, the language is this:

"'Second, discharging of men—The testimony shows that union men have been discharged since May 3, 1910, for alleged shortages, fights and for rear-end collisions.'

"'(a) The testimony produced shows that five union men have been discharged since May 3, 1910, for alleged shortages.

"'As to one of these five men, we are unable to decide from the testimony whether or not his discharge was just or otherwise.

"'As to two others of these five men, we are of opinion there was just cause for their discharge.

"'As to the remaining two, we are of opinion there was not just cause for their discharge.'

"Therefore, there were two men and only two men unjustly discharged for shortages, in the opinion of the board, neither member of which, so far as I know, ever had anything to do with the management of a street railway.

"Now as to the discharges for fighting. The board says:

"'(b) The testimony shows that since May 3, 1910, five fights have occurred, each between a union man and a non-union man. In each case the union man has been discharged.

"'As to one of these encounters we are unable to determine from the testimony whether the man was justly discharged.

"'As to the other four remaining men, we are of the opinion that there was not just cause for their discharge.'

"From the foregoing quotation it might be inferred that five men were discharged for fighting. In fact not a single man was discharged for fighting. There was no testimony to that effect, as the record conclusively shows. It is true that there were five fights. One of those grew out of a union man calling a non-union man a scab, and for that, and that alone, he was discharged.

"As to the other four fights between union and non-union men, the union men were not only not discharged for fighting, but they were not discharged at all, and when they left the service of the company they did so voluntarily when they went out on a strike.

"We have demanded in vain the names of those who are said

to have been discharged for fighting, but no one has attempted to furnish the names because it would be impossible.

"As to the rear-end collisions, the board found that the union men discharged for that cause were justly discharged.

"The third finding of the board is this:

"'Third—Also, it was claimed by the union employees that the barn foremen and inspectors of the company discriminated in various ways against union men in their general conduct toward and treatment of such union men. The board is of the opinion, however, on the basis of the testimony offered, that these charges are not sustained as to any rights of the men with respect to their runs, trips, hours or other conditions of their employment. But it does appear, in some instances, that these foremen and inspectors were more friendly with non-union men.'

"As an indictment against the company this is too trivial to deserve comment.

"As to the claim made 'that not a single union man has worked on a car since the strike was declared,' I have only to say that within the last few days a number of these men have reported for duty and returned to work. Whether they have abandoned the union I do not know and have not inquired.

"What the company is most interested in, and that which should interest every upright citizen, is the protection of property and the preservation of order. There has not been and there will not be any difficulty in operating the cars if that protection to which the company and every citizen is entitled at the hands of the authorities is properly extended. Plenty of men, anxious and willing to work, are at hand and there is no difficulty experienced on this score."

MR. STEWART'S POSITION TOWARDS UNIONS

Mr. Stewart has issued the following statement to the public regarding his attitude toward unions:

"Several times recently articles have been published concerning me, under the headline, 'This Man Hates Unions.'

"For the purpose of making my position on this subject clear to all classes of our citizens I submit the following statement:

"The statement above quoted is not true. On the contrary, I believe in the right of every man to take any lawful employment whenever and wherever he pleases, and to join or not to join a labor organization or any other organization as to him may seem best.

"That must be left to the individual choice and preference of each employee to be decided by himself. I do object, however, to men being coerced to join such organizations by intimidation, threats and violence, and I cannot admit, but on the contrary deny, that personal assaults, the wholesale destruction of property and the great public inconvenience are to be justified as arguments in favor of compelling men to join any organization against their will. If laws are to be enforced and personal rights protected without unjust discrimination, there can be no distinction between union men and non-union men.

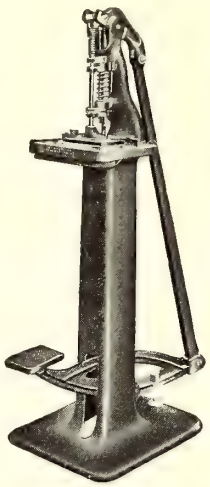
"Both must stand alike before the law and before the tribunal of public opinion. This is the position I have steadfastly maintained as an employee, as an employer and as a citizen. If any of my fellow-citizens take a different view of the relations which should exist between employer and employee, and between the employees themselves, I am quite willing to submit our differences of opinion to the judgment of all fair-minded men.

"Both before and since the strike in May last, I told the employees of the Columbus Railway & Light Company that they should feel perfectly free to join the union or not as they might prefer, and that is the position I expect to maintain."

The United States Vice-Consul-General at Constantinople has forwarded to the Department of Commerce and Labor specifications and conditions governing a concession to be granted by the Imperial Ottoman Government to the most favorable bidder for a system of electric tramways in Constantinople and suburbs. Bids for this concession will be received at the Ottoman Ministry of Public Works until Oct. 15, 1910.

MACHINE FOR PUNCHING TRANSFERS

The accompanying cut shows the American transfer punch made by the Southworth Machine Company, Portland, Maine, for punching out the day and month from pads of transfers before they are given to the conductor. The punch is provided with a self-climbing binder or indicator so that the pad of transfers is firmly held in the required position and the operator can see exactly what figure or month is to be punched. The die cuts onto a disk made of hard fibre, and by turning the knob at the back of the machine, this disk revolves so that a fresh cutting surface is presented as often as desired.



Transfer Punch

The die used in the American punch is conical or V-shaped. This provides a ready means of checking transfers, as they may be bunched and by looking along the edge the incorrectly punched transfers will be detected at once. The machine is operated by foot power and can punch several hundred pads in an hour. The shipping weight, including packing case is 160 lb.

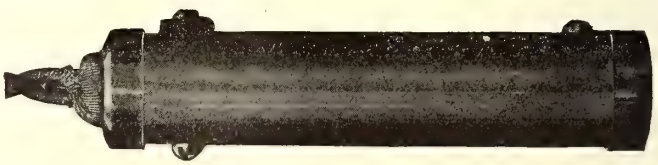
THERMOSTATIC CONTROL FOR FIRE PROTECTION AND ELECTRIC HEATER REGULATION

The Electrical Automatic Appliance Company, Denver, Col., is making an automatic fire protection system which depends for its operation upon a given rise of temperature. The system is set at any desired degree, say, 130 deg. Fahr. or about 40 deg.



Thermometer in Case

above the highest normal point. It is arranged to sound an alarm at an indicating annunciator in the office, ring a gong on the street and also notify the fire department of the location of the trouble. The principal part of the system is a thermometer the expansion of which causes a bar to move toward an electrical contact which on being touched closes the



Tubular Thermometer

alarm circuit. For fire protection purposes, the thermometer is connected to an automatic bell which turns in an alarm over any telephone or telegraph circuit. A very loud explosive signal or whistle attachment may also be used in towns where there is no fire-alarm wiring system. The thermometer of the principle described is, of course, applicable to a great many other situations where thermostatic control is possible. This one design may be used to cut out certain heater circuits at predetermined temperatures or to maintain a constant degree of heat.

The British Board of Trade recently made an investigation of wages and hours of labor of tramway and omnibus employees in Great Britain. The average number of hours per week was 58.7, and the average length of holidays allowed each year was six days. Motormen received on the average $7.36 per week and conductors $6.46. In London the corresponding rates of pay are motormen $7.76 and conductors $7.38.

News of Electric Railways

Transit Affairs in New York

The Public Service Commission has made public letters recently exchanged between William McCarroll, acting chairman of the commission, and Theodore P. Shonts, president of the Interborough Rapid Transit Company. Mr. McCarroll wrote that he had learned that there seemed to be a misunderstanding as to the matter of negotiations between the commission and the company relative to the third-tracking and extensions to the Manhattan Elevated Railway and also to the Steinway tunnel. He suggested that the company make more specific statements as to the manner of proposed construction and the terms to be made with the city. In answer Mr. Shonts said that under Section 24 of the Rapid Transit Act, additions to elevated railroads are clearly excepted from the provision requiring the franchise to pass to the city at the end of a fixed period. This would give the company a perpetual franchise for the third track just the same as the original franchise of the elevated railway. As to the extension of the elevated railway in the Bronx, he proposes that the franchise be coextensive with the term of the lease of the Manhattan Elevated Railway to the Interborough Rapid Transit Company, which is 999 years. He also proposes that the city purchase the Steinway tunnel at one-half of its cost and make it a part of the subway system under the original subway contract. The company has heretofore stated that the tunnel cost more than $7,000,000 and, with interest, one-half of the cost would probably be about $4,000,000.

The Public Service Commission has sent to Mayor Gaynor, Comptroller Prendergast and President Mitchell of the Board of Aldermen, composing the rapid transit committee of the Board of Estimate and Apportionment, a reply to the letter sent by that committee, dated June 17, 1910, with which was transmitted a report made by a committee of engineers criticising the forms of contract that had been prepared for the tri-borough subway system. The commission in its reply quotes from special reports made by its engineers and counsel upon the points discussed in the original communication. The criticisms of the engineers of the Board of Estimate are not approved. In answer to the inquiry from the engineers of the Board of Estimate regarding covered excavations, the commission's engineers admit that it is preferable to have an open excavation on the grounds of economy and convenience of work, but they hold that the experience of the city in the construction of the present subway shows that there is so much hardship to business men and property owners along the route that such a method should not be permitted in Manhattan. The engineers of the Board of Estimate also criticised the unit price system of bidding adopted by the commission and urged that the percentage system be substituted. It is pointed out by the commission that the cost of subway work is not sufficiently well established to make it desirable for the commission's engineers to suggest prices as stated.

Samuel Rea, vice-president of the Pennsylvania Railroad, has written a letter to Mayor Gaynor and Chairman Willcox of the Public Service Commission, advocating the construction by the city of extensions to the present subway, as proposed by the Interborough Rapid Transit Company, in preference to the tri-borough route. Mr. Rea contends that the construction of an independent subway which would parallel part of the existing road would be unjustified and that the municipal government would better serve the public convenience by spending the money for extensions to the present subway rather than for the construction of the tri-borough system. These extensions would mean the continuation of the Interborough subway itself under Seventh avenue to the Battery and north from Forty-second street under Lexington avenue or Madison avenue. Mr. Rea explains that his company has spent $125,000,000 in bringing the Pennsylvania Railroad into New York, and that for the distribution of the passengers which the company will handle the extensions to the present subway would give better facilities than the suggested tri-borough route.

Tentative Ordinance for Pittsburg Subway

The committee of the City Council of Pittsburg which is considering the subject of a subway, has invited applicants for a franchise to submit written propositions. Representatives of the Pittsburg Subways Company and the Rapid Transit Subway Company attended a meeting.

The form of ordinance prepared by Bion J. Arnold, Mayor Magee and the city law department was considered. The ordinance provides for the following route: A central loop, or circuit, under Virgin Alley, Ferry Street, Oliver Avenue, Liberty Avenue, Third Avenue and Grand Street, and extensions from the central loop to the intersection of Fifth Avenue and Keller Street in the East End, and a branch from the first branch to extend to Schenley Park. The exclusive use of electricity is stipulated. Within 21 months after acceptance of the ordinance by any company a board of three supervising engineers shall be appointed. The subway is to be completed within four years after the commencement of construction. Following are some of the provisions of the ordinance:

"The gross annual receipts of the company shall be expended in the following order and for the following purposes:

"Fifty per cent thereof to cover operating expenses, including administration, expenses, insurance, taxes, damages, maintenance, salaries and expenses of the board of supervising engineers, renewals, fund to offset the cost of financing and reserve fund for contingencies. Any surplus to be added to the sinking fund for purchase, improvement or extensions.

"The board of supervising engineers shall apportion said 50 per cent to the funds herein provided, provided always that no appropriations to any of the foregoing funds shall interfere with the prompt payment of interest on any bonds of the company, but this provision shall not prevent the failure to set aside the 50 per cent of the gross income for the purpose herein provided constituting a breaching of the conditions of this ordinance.

"Interest at the rate of 5 per cent per annum, cumulative, on 115 per cent of the capital account, said 15 per cent additional being added to cover cost of financing. Said 15 per cent to be returned from time to time by means of the fund to offset cost of financing. Whenever said fund is equal to 1 per cent of the capital account it shall be turned over to the company and applied to the reduction of the 15 per cent aforesaid, so that the company shall be entitled thereafter to receive 5 per cent on 114 per cent of said capital account, with like reductions, from time to time, until said 15 per cent is eliminated.

"One-half of 1 per cent per annum on the approved cost of construction to be placed in a sinking fund solely for one or both of the following purposes:

"For the purpose of purchasing the property of the company as herein provided.

"The building of extensions or imrovements at the option of the city.

"The balance of the income to go to the company for a period of 25 years after commencement of operation, after which, for a period of 25 years, it shall be divided between the city and the company in the proportion of 25 per cent to the city and 75 per cent to the company, and thereafter to be divided equally until the city or its assignee purchases."

The ordinance also provides that the city shall have the right at any time at the expiration of 20 years to purchase the entire works and equipment of the company or to assign its purchase right to any corporation capable of operating the subway. If the city's option is assigned, the assignee is to pay 10 per cent more than the city would be required to pay.

American Society of Engineer Draftsmen.—On June 18, 1910, the first steps were taken to form a permanent organization to be known as the American Society of Engineer Draftsmen, embracing every branch of the profession, in-

cluding mechanical, electrical, civil, architectural, marine, sanitary, automobile and aeronautical draftsmen. The first meeting of the society was held on July 27, 1910. The officers of the society are: E. Farrington Chandler, president; Wm. B. Harsel, vice-president; Henry L. Sloan, secretary and treasurer, 116 Nassau street, New York.

Traction Situation at Toledo.—City officials of Toledo have suggested to A. E. Lang, president of the Toledo Railways & Light Company, Toledo, Ohio, that a suit be brought to declare the franchise rights of the company on certain streets void, under the ordinance making the grant. City Solicitor Schrieber has stated that if this is done the street rights could then be leased to the company until new grants are made. On the evening of Aug. 3, 1910, the City Council directed the solicitor to prepare legislation demanding the payment of the amount due the city at once. The claim is made that the entire debt of the company when the work on Broadway is completed will be about $107,000.

Bonds for Municipal Line Sold in Part—Bids were opened in San Francisco on July 11, 1910, for the sale of $260,000 of bonds to provide for work on the Geary Street, Park & Ocean Railroad, which is to be owned by the city. Of the total issue only $139,000 was subscribed. The following is the proposed plan of procedure as suggested by the Board of Public Works and approved by the Mayor: (1). Immediately upon the sale of the bonds authorized Dec. 28, 1909, contracts to be let for the rails, fastenings and special steel work, and for the mechanical and electrical equipment of the road and power station; (2), the acquisition of the lands for the westerly terminal, power station and car barn; (3), as soon as the time of the delivery of the materials and equipment above specified shall be determined, the acquisition of the necessary rolling-stock should be undertaken; and (4), the construction of the tracks, terminal and power stations, car barns, etc., either by day's labor or by contract, as the Board of Public Works shall determine.

Electrical Exhibition in San Francisco.—Preliminary plans have been completed for the electrical exposition to be held at the Coliseum, San Francisco, Cal., from Aug. 20 to Aug. 27, 1910, under the auspices of the Pacific Coast Electrical Exposition, of which D. M. Moses, 34 Ellis Street, San Francisco, Cal., is general manager. Among the firms that will exhibit are the following: American Steel & Wire Company, Standard Underground Cable Company, H. W. Johns-Manville Company, National India Rubber Company, Electric Railway & Supply Company, Kellogg Switch Board & Supply Company, Dean Electrical Company, Crocker-Wheeler Company, Benjamin Electric Company, Holophane Electric Company, Babcock Electric Vehicle Company, Weston Electric Instrument Company, *Electrical World* and Electric Railway Journal, Holabird Reynolds Company, National Electric Lamp Association, Studebaker Brothers Electric Storage Battery Company, Burroughs Adding Machine Company, Southern Pacific Railway, Sprague Electric Company, General Electric Company, and Pierson, Roeding & Company.

Standard Classification of Accounts in New Jersey.—Thursday, Aug. 18., has been set by the Board of Public Utility Commissioners of New Jersey for the first of a series of meetings to discuss a uniform system of accounts for the street railway companies of the State. Commissioner Thomas J. Hillery will preside. All of the companies have been invited to send representatives, and the Interstate Commerce Commission will also be asked to send a representative. One of the principal duties with which the commission is charged is the investigation of complaints regarding service, etc. Thus far there have been very few complaints. The commmission has also decided that under the existing utility law its members are entitled to free transportation upon the steam railroads of the State, but not upon the electric railways. The board has divided its work under two heads: Railroad division, chief inspector, C. D. McKelvey, formerly superintendent of the New York, Susquehanna & Western Railroad; Utilities division, chief inspector, Philander Betts. The railroad division will continue to make its headquarters at Trenton. The utilities division will have its headquarters at 738 Broad Street, Scheur Building, Newark. The office in Newark was opened on Aug. 8, 1910.

Financial and Corporate

New York Stock and Money Market

August 9, 1910.

The betterment in market conditions was accelerated considerably by the favorable crop report issued by the Government on Monday. To-day there was considerable selling for profit, but the advances were consistent and the market closed at the highest levels of the day. The tractions have again carried their full share of the trading. Interborough and Brooklyn Rapid Transit, however, record substantial gains for the week.

Further importations of gold and additional engagements in London brought the movement up to $14,500,000 for the week ended Aug. 8. Quotations to-day were: Call, 1½ to 2 per cent; 60 days, 3¼ to 3½ per cent; 90 days, 4¾ to 4½ per cent.

Other Markets

The tone of the Philadelphia market is particularly encouraging. Headed by Lehigh Valley, practically all the active issues record substantial advances. Philadelphia Rapid Transit closed to-day at 19½ bid and Union Traction at 44½.

Offerings were freely absorbed in the Boston market, but while the market was generally active, tractions were not dealt in to any great extent. In Boston Elevated, West End Street Railway and Massachusetts Electric only slight advances were recorded.

As regards traction shares, the Chicago market records no material change over the previous week.

In Baltimore sales have been recorded of United Railways 4s at 81¼ and United Railways funding 5s at 82½. The prevailing price for United Railways stock was about 15¼.

Quotations of various traction securities as compared with last week follow:

	Aug. 2.	Aug. 9.
American Railways Company	a42	a42
Aurora, Elgin & Chicago Railroad (common)	*45	a50¼
Aurora, Elgin & Chicago Railroad (preferred)	*82	a90
Boston Elevated Railway	122	123
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a37	36½
Brooklyn Rapid Transit Company	74⅞	75¾
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	*80	82⅛
Capital Traction Company, Washington	a129	a129
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a65
Chicago Railways, ptcptg., ctf. 2	a16	a16½
Chicago Railways, ptcptg., 3	a10	a11
Chicago Railways, ptcptg., ctf. 4s	*5½	85½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a73	a72
Consolidated Traction of N. J., 5 per cent bonds	a103	a103
Detroit United Railway	*45	*45
General Electric Company	140½	143¼
Georgia Railway & Electric Company (common)	a107	107¾
Georgia Railway & Electric Company (preferred)	*86	a85
Interborough-Metropolitan Company (common)	16¼	17⅛
Interborough-Metropolitan Company (preferred)	46	47⅜
Interborough-Metropolitan Company (4½s)	77¾	78⅝
Kansas City Railway & Light Company (common)	*25½	a25½
Kansas City Railway & Light Company (preferred)	a79½	a79½
Manhattan Railway	128	*128
Massachusetts Electric Companies (common)	a14¾	a15½
Massachusetts Electric Companies (preferred)	a79	a82
Metropolitan West Side, Chicago (common)	22	a20
Metropolitan West Side, Chicago (preferred)	60	a60
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	67½	68
Northwestern Elevated Railroad (common)	a18	a21
Northwestern Elevated Railroad (preferred)	a60	a65
Philadelphia Company, Pittsburg (common)	a42⅝	a43½
Philadelphia Company, Pittsburg (preferred)	a42¼	a42¾
Philadelphia Rapid Transit Company	a18	a19⅝
Philadelphia Traction Company	83	a82½
Public Service Corporation, 5 per cent col. notes	a96	a96
Public Service Corporation, ctfs.	a99	a99
Seattle Electric Company (common)	a109	*109
Seattle Electric Company (preferred)	a98½	*98½
South Side Elevated Railroad (Chicago)	a63	a61
Third Avenue Railroad, New York	a10½	*10½
Toledo Railways & Light Company	6⅝	7
Twin City Rapid Transit, Minneapolis (common)	106½	*106½
Union Traction Company, Philadelphia	a43½	a44¾
United Rys. & Electric Company, Baltimore	a15¼	a14⅞
United Rys. Inv. Co. (common)	*27	27
United Rys. Inv. Co. (preferred)	54	*54
Washington Ry & Electric Company (common)	a32⅛	a33
Washington Ry & Electric Company (preferred)	a88	a87½
West End Street Railway, Boston (common)	a87½	a88
West End Street Railway, Boston (preferred)	a100	*100
Westinghouse Elec. & Mfg. Company	55⅛	61
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Boston (Mass.) Elevated Railway.—James L. Richards, president of the Boston Consolidated Gas Company, has been elected a director of the Boston Elevated Railway to fill a vacancy.

Central Pennsylvania Traction Company, Harrisburg, Pa.—The report of the Central Pennsylvania Traction Company for the year ended June 30, 1910, as presented at the annual meeting of the stockholders of the company, held on July 26, 1910, shows gross receipts of $790,127, operating expenses of $574,929, deductions for betterments of $121,752, leaving a balance of $93,446, from which cash dividends were paid which amount to $84,000, leaving a surplus of $9,446. The total number of passengers carried during the year ended June 30, 1910, was 19,334,074, an increase of 1,241,094 over the previous year, or 6.8 per cent. The car mileage for the year ended June 30, 1910, was 3,122,860, an increase of 258,975 or about 9 per cent.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—The Cleveland & Eastern Traction Company has made a mortgage to the Guardian Savings & Trust Company, Cleveland, Ohio, to secure an issue of $1,000,000 of first mortgage bonds, of which $764,000 will be issued in accordance with the plan outlined for the reorganization of the Eastern Ohio Traction Company. The remaining $236,000 of bonds will be reserved for extensions, additions, improvements or betterments. The bonds are dated July 1, 1910, and are due on July 1, 1932, but are redeemable on any interest day, in part or in full, at 103 and interest. The bonds will not begin to draw interest, however, until 1912.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—The Mercantile Trust Company, New York, N. Y., has received funds from the receiver of the Columbus, Delaware & Marion Railway to pay the coupon due on Feb. 1, 1910, on the first refunding mortgage 5 per cent bonds of the company, with interest at 6 per cent on the amount due.

Federal Light & Traction Company, New York, N. Y.—The Federal Light & Traction Company, the formation of which was noted in the ELECTRIC RAILWAY JOURNAL of June 11, 1910, page 1041, has organized as follows: James C. Colgate, Harrison Williams, Anson W. Burchard, Samuel McRoberts and Edwin N. Sanderson, executive committee; W. S. Iliff, president; Edwin N. Sanderson, vice-president; Craig Colgate, vice-president; H. H. Porter, secretary; H. N. Wadham, treasurer; A. Seaton Post, Jr., assistant treasurer; Richmond Talbot, assistant secretary; Charles K. Durbin, general manager; R. R. Colgate, Anson W. Burchard, Samuel McRoberts, Harrison Williams, M. D. Thatcher, P. W. Herrick, E. N. Sanderson, J. J. Bodell, J. C. Colgate, R. E. Breed, V. E. Macy, Craig Colgate, H. H. Porter, W. S. Iliff and Jerry Crary, directors.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—The Fonda, Johnstown & Gloversville Railroad has applied to the Public Service Commission of the Second District of New York for authority to issue $463,000 of its first consolidated general refunding bonds, dated 1902, in order to pay certain existing obligations other than bonds issued for construction and to meet the cost of double tracking.

Frankford, Tacony & Holmesburg Railway, Tacony, Pa.—The Frankford, Tacony & Holmesburg Railway Company has been incorporated with an authorized issue of $500,000 of capital stock and $500,000 of bonds to acquire the property of the Holmesburg, Tacony & Frankford Railway, sold at foreclosure sale to a syndicate headed by George B. Atlee & Company, Philadelphia, Pa. The holders of bonds represented by the committee headed by Jacob S. Disston, president of the Tacony Trust Company, will receive bond for bond and 25 per cent in stock. Holders not identified with this committee were offered by the syndicate the right to exchange bond for bond up to June 15. Notice has been given by the committee represented by W. L. Haehnlen, of Charles Fearon & Company, to holders of the receipts issued by the Fidelity Trust Company for the first mortgage bonds that upon production of the receipts they will be paid 80 per cent par value of their bonds in partial distribution. A further distribution will be made later. The officers of the new company are as follows: President, Meyer Schamberg, president of the West Chester Street Railway; vice-president, C. Bradford Fraley; secretary and treasurer, Jacob M. Vedges; assistant secretary and treasurer, William S. J. Wetherill. Directors: Jacob S. Disston, president of the Tacony Trust Company; William L. Allen, Wilson Woellper, of George B. Atlee & Company; C. Bradford Fraley, John Rapp, vice-president of the Tacony Trust Company, and Frederick F. Hallowell, comptroller of the Western Saving Fund.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—It is reported that representatives of both the McGowan-Schoepf interests and the McKinley interests, which control the Terre Haute, Indianapolis & Eastern Traction Company and the Illinois Traction System, respectively, will bid for the property of the Indianapolis, Crawfordsville & Western Traction Company, which will doubtless be offered for sale under the suit for foreclosure brought by the Marion Trust Company, Indianapolis, Ind., in the Federal Court at Indianapolis. By purchasing the property of the Indianapolis, Crawfordsville & Western Traction Company and building 42 miles of line to Danville, the McKinley interests could establish through line from Indianapolis to St. Louis. If the McGowan-Schoepf interests should purchase the property of the company they would probably abandon about 12 miles of the Lebanon branch of the Terre Haute, Indianapolis & Eastern Traction Company and build northwest to Attica, Williamsport and into Illinois.

Meadville & Cambridge Springs Street Railway, Meadville, Pa.—A committee consisting of James C. Chaplin, John M. Jamison, D. R. Hill and W. H. Parke has requested the holders of the $300,000 of first mortgage 5 per cent bonds of the Meadville & Cambridge Springs Street Railway to deposit their bonds with the Colonial Trust Company, Pittsburgh, Pa., as depositary.

Meridian Light & Railway Company, Meridian, Miss.—The Meridian Light & Railway Company has increased ferred stock, to $2,000,000 common stock, all of which is outstanding.

New York, Westchester & Boston Railway, New York, N. Y.—The New York, Westchester & Boston Railway has applied to the Public Service Commission of the Second District of New York for authority to issue $5,000,000 of 50-year first mortgage 5 per cent gold bonds to pay $953,446 advanced by the City & County Contract Company in connection with the construction of the branch line from Mount Vernon to White Plains, and to meet the cost, estimated at $4,294,549, of completing, electrifying and equipping this branch.

Ocean Shore Railway, San Francisco, Cal.—The committee of bondholders of the Ocean Shore Railway has announced the selection of G. C. Moore, A. C. Kains, R. D. Robbins, W. J. Dutton and Maurice Schweitzer, as a reorganization committee, with authority to bid in the property at the foreclosure sale, which is to be held on Sept. 1, 1910.

Philadelphia (Pa.) Rapid Transit Company.—The stockholders of the Union Traction Company will vote on Sept. 1, 1910, to increase the indebtedness of the company from $1,500,000 to $3,000,000. A statement issued by the company says that the increase is the guaranty of the rentals of the equipment lease of the Philadelphia Rapid Transit Company, which lease has been made the basis of an issue of car trust certificates, and that the increase is merely a formal ratification of the action already authorized at the special meeting of the stockholders of the company held on June 20, 1910.

Pittsburgh & Allegheny Valley Traction Company, Leechburg, Pa.—Reorganization under this title of the property of the Pittsburgh & Allegheny Valley Railway Company, sold at foreclosure sale on March 21, 1910, has been completed. The officers are O. W. Kennedy, president; George M. Hosack, vice-president; Frank W. Jackson, treasurer, and E. B. Hartman, Jr., secretary. The officers of the Pittsburgh & Allegheny Valley Traction Company and the directors are the same.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—The Wilmington & Philadelphia Traction Company has elected directors as follows: Alfred I. du Pont, Henry P. Scott, George R. Webb, Charles C. Kurtz, J. H. Pardee, J. G. White and Oscar T. Crosby.

Traffic and Transportation

Fare Complaint Against Albany Company Dismissed

The Public Service Commission of the Second District of New York has dismissed the complaint of William S. Lodge against the United Traction Company about the fares charged between Albany and Troy. The commission holds that under the company's tariff as in force at the time of the hearing on June 1, 1910, the complaint was sustained, but that under the tariff made effective since the hearing the complaint should be dismissed. The company's tariff as in force at the time of the complaint and hearing did not deprive the continuous rider from paying a new fare as a new passenger on leaving the fare-break point and receiving a transfer thereon although he had used a transfer on the first 5-cent fare paid, but the tariff filed and made effective since the hearing does prohibit a second transfer to the continuous rider on payment of the second 5-cent fare. The opinion, written by Commissioner Decker, states:

"Respondent's fares are 5 cents for a ride within Albany or within Troy; 5 cents from any part of Troy, with or without a transfer in Troy, to Garbrance Lane, near the Albany line; 5 cents from Garbrance Lane to Albany, and to any part of Albany if no transfer has been used in Troy; 5 cents from any part of Albany to Schuyler's Bridge (two miles from the Troy line), if no transfer in Albany has been used. If a transfer in Albany has been used then the fare of 5 cents applies only to Cemetery, about midway between Schuyler's Bridge and Garbrance Lane. When a transfer is used in Albany and the passenger desires to go beyond a transfer point in Troy the total fare between such distant locations in Albany and distant locations in Troy is 15 cents, and the same applies in the reverse direction. All other riding between the two cities is under a fare of 10 cents. Notwithstanding such fare of 15 cents for a through or continuous ride, the passenger having used a transfer under a fare of 5 cents paid in Albany, can get off the car at Cemetery and boarding the car following pay a fare of 5 cents, which will entitle him to have a transfer and reach any part of Troy on respondent's lines, thus traveling by riding in separate cars for 10 cents over the same haul and distance that under respondent's tariff he must pay 15 cents for if he continues riding in the same car past Cemetery, the intermediate or fare-break point.

"Complainant alleges that this through or total charge higher than the sum of local fares is unlawful. No claim or showing is made that the fare of 15 cents is unreasonable. The extreme distance over these lines between parts of Albany and parts of Troy approximates 20 miles. Respondent is required by the Railroad Law to charge 5 cents for all riding within either city, but for compulsory traffic reasons it has extended the limits of the 5-cent fare for a considerable distance beyond the boundary of each city and this constitutes a valuable public privilege and advantage which ought to be preserved.

"It is held that no unjust discrimination results against the through passenger riding continuously in the same car past the fare-break point and paying the higher fare of 15 cents in favor of a passenger who changes cars at the intermediate or fare-break point and thereby obtains service under the lower combination of locals amounting to 10 cents for the same haul and distance involved. It is further held that under respondent's tariff as in force at the time of hearing the complaint was sustained, but that under the tariff made effective since the hearing the complaint should be dismissed."

In disposing of this case the commission announced the following general rulings:

"1. That through rates or fares greater than the sum of local rates or fares to and from an intermediate point are prima facie unlawful and are seldom capable of justification. In this connection reference is made to several decisions of the Interstate Commerce Commission upholding higher interstate charges fixed by two adjoining States. The commission says that such determinations are based plainly upon the view that local conditions or requirements applying in different States, while material upon the question of the reasonableness of a through interstate charge, are not necessarily controlling; that this follows for the same reason that State authority cannot be controlled by a through interstate rate or fare or assignable part thereof in fixing a rate or fare within the State. The two regulating functions are exercised in wholly independent jurisdictions and applied to distinct subject matters.

"2. When through fares do exceed the sum of local fares the passenger is entitled to use the local fares by purchase of tickets or payment of cash fares to and from the intermediate point and conforming otherwise to conditions governing the transportation.

"3. When a carrier by interurban electric railway has established a tariff fixing a passenger fare between two points which is greater than the sum of the stated local fares to and from an intermediate point, and provided a regulation in the tariff that the passenger continuing to ride through in the same car must pay the higher through fare, the carrier is required by the law to adhere to its tariff rate and regulation during the time such fare and regulation are permitted to remain in force, and the passenger in exercising any right he may have to combine and use the lower local fares cannot claim the co-operation of the railroad company to the extent of defeating application of the through fare and regulation specified in the published tariff."

Metropolitan Street Railway, New York, Ordered to Exchange Transfers with Segregated Line

On Aug. 3, 1910, the Public Service Commission of the First District of New York served a final order on the receivers of the Metropolitan Street Railway, New York, N. Y., and the officers of the Central Park, North & East River Railroad directing them to enter into negotiations for the restoration of transfers between the cars of the companies at intersecting points. The order was issued under the recent amendment to the public service commissions law, under which the commission now claims authority to prescribe joint rates and through routes. A similar order by the commission, issued more than a year ago, was not complied with, and the question of the authority of the commission to issue such an order under the act creating that body is before the courts for settlement. The order of the commission as issued on Aug. 3, 1910, follows:

"Ordered, that the Central Park, North & East River Railroad and Adrian H. Joline and Douglas Robinson, as receivers of the Metropolitan Street Railway, be and they hereby are required to establish on or before Sept. 1, 1910, and thereafter maintain in operation for a period of not less than six months through routes for the transportation of passengers between the points and upon the lines specified in the following schedule, in each direction; and be and hereby are required on or before said date to establish and put in force a joint rate of fare for each such passenger by the use of a transfer slip, coupon ticket or other sufficient token delivered to each passenger and to apply said rate of fare to the transportation of passengers between the points and over the routes specified in the said schedule in each direction for and during the time aforesaid unless modified in accordance with the provisions of the public service commissions law.

"The Fifty-ninth Street line of the Central Park, North & East River Railroad means, in this schedule, the line on Fifty-ninth Street between the east side of First Avenue and the west side of Tenth Avenue.

"(a) From any point on the Fifty-ninth Street line of the Central Park, North & East River Railroad to any line operated by the said receivers across or to Fifty-ninth Street, and thence north or south on such receivers' line to its terminus.

"(b) From any point on any line operated by said receivers across or to Fifty-ninth Street, and thence east or west on said Fifty-ninth Street line of the Central Park, North & East River Railroad to its terminus.

"(c) From any point on any line operated by said receivers across or to Fifty-ninth Street, thence east or west on said Fifty-ninth Street line of the Central Park, North & East River Railroad to any other line operated by said

receivers across or to Fifty-ninth Street, and thence along said last named receivers' line in the original direction to its terminus. And it is

"Further Ordered, that this order take effect immediately and continue in force until changed or abrogated by the commission. And it is

"Further Ordered, that the said Central Park, North & East River Railroad and the said Adrian H. Joline and Douglas Robinson, as receivers, notify the Public Service Commission for the First District on or before Aug. 31, 1910, whether the terms of this order are accepted and will be obeyed."

Interference with Collection of Double Fares on Tacoma Line Enjoined

C. H. Hanford, judge of the United States Circuit Court of Tacoma, Wash., has rendered a decision granting the petition of the Tacoma Railway & Power Company for a temporary restraining order enjoining certain residents of Fern Hill from interfering with the collection of two fares. Passengers are to be given a receipt entitling them to the return of the extra fare if its collection shall be finally determined to be illegal. The decision of Judge Hanford follows:

"By initiating this lawsuit the city of Tacoma invoked judicial authority to settle a disputed question whether the annexation of new territory by the city had the effect, ipso facto, to obligate the Tacoma Railway & Power Company to reduce fare collectable on its line to the Fern Hill district within the annexed territory. The defendant has come into court showing a willing disposition to have the controversy judicially determined. Therefore, it is the right of both parties to have the question so determined without being vexed and unnecessarily burdened, by public clamor or hostile demonstration, interfering with efficient operation of the car service." It is an interference with the operation of a railway for passengers and bystanders to engage in angry disputes with trainmen on duty, because one of the difficulties in rendering good service is in securing and retaining the services of efficient men and one of the reasons why good men dislike the service is the heavy tax upon the nervous system, to have to be polite and pay strict attention to the details of the running of passenger cars, while smarting under the jeers and insults of persons inflamed by prejudice and encouraged by agitators. By such means the defendant is being interfered with in the operation of its Fern Hill line, and the police force of the city of Tacoma, insofar as it has taken a hand, restrains the employees of the defendant company from the use of such force as is necessary to eject passengers who refuse to pay the fare exacted.

"In practical effect the executive department of the city of Tacoma has reduced the fare on the Fern Hill line while litigation for the determination of the controversy as to the legal rate which the defendant may exact is pending at this time.

"To preserve the rights of all parties and for the sake of peace, the court grants the injunction prayed for, on condition that the defendants shall issue to each passenger from whom two fares shall be collected for a single continuous trip to any destination within the city or to Point Defiance Park, a ticket or receipt to be redeemed by refunding the extra fare if the exaction thereof shall be fully determined to be illegal, and file the usual injunction bond with an additional condition for the redemption of all such tickets if the court shall so order, and the court fixes the amount of the penalty of the bond at $20,000."

Freight Rights Granted in North Adams—The Council of North Adams, Mass., has granted the Berkshire Street Railway, Pittsfield, Mass., permission to carry freight in North Adams.

New Jersey Company Adopts New Rule Regarding Stops—The Morris County Traction Company, Morristown, N. J., has decided to stop its cars only at street corners, road crossings and previously designated stations.

Pay for Extra Men in Brooklyn—The Brooklyn (N. Y.) Rapid Transit Company has announced that motormen and conductors who are designated as "extras" and are not assigned to regular trips will hereafter receive $1.50 per day by reporting each day to the depots of the different divisions to which they are assigned.

Complaint Against Fare on West Penn Railways—Complaint has been made to the Railroad Commission of Pennsylvania about the fare charged by the West Penn Railways, Pittsburgh, Pa. It is alleged particularly that the fare charged between Uniontown and Brownsville is greater than that charged between Uniontown and Connellsville.

Accidents in Chicago in July—Three hundred and twenty-six persons were injured and five killed in 308 street car accidents in Chicago in July, according to a report made by City Attorney Caverly. The following were the causes of the accidents: Crossing streets, 57; getting on or off cars, 110; riding on steps or platforms, 41; vehicle collisions, 41; car collisions, 16; other causes, 47.

Increase in Wages for Employees of Joliet & Southern Traction Company—Effective on Aug. 1, 1910, the Joliet & Southern Traction Company, Joliet, Ill., increased the wages of its employees as follows: First year, 21 cents an hour instead of 20 cents; second year, 22 cents an hour instead of 21 cents; third year, 23 cents an hour instead of 22 cents; fourth year, 24 cents an hour instead of 22 cents; fifth year and thereafter, 25 cents an hour instead of 23 cents.

Complaint Against Fishkill Electric Railway—The Public Service Commission of the Second District of New York has received a complaint in behalf of the residents of Glenham, Dutchess County, and vicinity against the Fishkill Electric Railway, Fishkill-on-Hudson, N. Y., regarding the service afforded by the company in Glenham. The complainant claims that the cars do not run often enough to accommodate the public, that there is no waiting room at the terminus, and also that the cars are much too crowded for comfort. An order of the commission was sent to the company on July 26, 1910.

Complaint About Fare Between Baltimore and Sparrows Point—The Public Service Commission of Maryland is investigating the complaint that the fare of 15 cents charged by the United Railways & Electric Company, Baltimore, Md., between Baltimore and Sparrows Point is excessive. The complainants contend that the fare should be 10 cents, one zone to extend from Baltimore to Dundalk and the second from Dundalk to Sparrows Point. Under the present plan one fare is charged from Baltimore to the Highlandtown car house, the second from the car house to Dundalk and the third from Dundalk to Sparrows Point.

Some Old Time Brooklyn Cars—This is the title of a little booklet issued by the Brooklyn (N. Y.) Rapid Transit Company somewhat after the style of Elbert Hubbard's "Little Journeys" and not a whit less artistic typographically. As the title of the publication indicates, the text tells the story of early types of cars in Brooklyn, particularly a prepayment car operated very much after the style of the present pay-as-you-enter cars. This car was resurrected by the company two years ago, mounted upon a truck and accorded a place of honor in the parade to celebrate the completion of the first subway under the East River. A half-tone of this car as it appeared in service is used as a frontispiece to the publication.

Newspaper Vending Machines in Louisville—The Louisville (Ky.) Railway has been experimenting for several months on two of its lines with the newspaper vending machines manufactured by the Louisville Automatic News Distributing Company. The results secured have been favorable and it is probable that the machines will ultimately be used on all the cars of the company. One machine is in the front of each car and another at the rear. The machine has a change-returning device, so that if a 5 cent piece is dropped in the slot, a two-cent newspaper and three cents drop out at the bottom. Patrons of the company who reside in the suburbs are said particularly to desire the extension of the machines to other lines.

Continuance of Transfer Withdrawal Requested—The Middlesex & Boston Street Railway, Newtonville, Mass., through Carl A. Sylvester, general manager, has petitioned the Massachusetts Railroad Commission to continue fur-

ther the withdrawal of free transfers. The company's petition states that by an order dated Aug. 4, 1909, the Commission approved a continuance of the withdrawal of free transfers by the company for a period of one year, so that a charge of 1 cent could be made for each transfer issued, and further points out "that the earnings do not warrant the restoration of said free transfers upon lines formerly operated by the Newton Street Railway as required by order of your board dated July 31, 1908, but that in order to secure, with least burden upon the public, a proper and just return upon capital actually invested, it is necessary to continue to make said charge of 6 cents as during the past year."

Special Transfers for Baseball Crowds in Louisville—The Louisville (Ky.) Railway has found it very successful to issue a special transfer slip to passengers from the grounds of the Louisville Baseball Club of the American Association. The regular transfer in use in Louisville has to be punched both as to time and the line to which it refers. To do this in the case of the baseball crowds would cause delay and so the special slip was devised to be handed to the passenger by the conductor without being punched. The special transfer can be used on any of the intersecting lines, the names of which are printed on the slip. Special colors are used to identify the baseball transfer, and the import of the slip is indicated in large type on the face of the slip. As the baseball park is some distance from the central part of the city, the conductor has time to collect the fares and return through the car and issue transfers.

Complaint About Fare on The Fonda, Johnstown & Gloversville Railroad—The residents and property owners of Hagaman have complained to the Public Service Commission of the Second District of New York that the 10-cent fare charged by the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., from Hagaman to Amsterdam is unjust and unreasonable and have asked that an order be made requiring a 5-cent fare between these points. It is stated that the distance from the Hagaman terminus of the Fonda, Johnstown & Gloversville Railroad to the waiting room of the company in Amsterdam is covered by two fare limits. There is a 5-cent fare from Hagaman to a point in Hanover, and an additional 5-cent fare from Hanover to Amsterdam. Passengers from Akin or Cranesville, suburbs of Amsterdam, may travel to Hanover, a distance of 5 or 6 miles, for a 5-cent fare, for which distance a passenger from Hagaman must pay an additional 5 cents. One of the zones for which a 5-cent fare is charged is said to be only 1 1/5 miles long. It is stated that the 10-cent fare operates against Hagaman, and that school children are not given equal privileges with the children of other villages. The complaint has been served upon the company.

Elevated Train Derailed in Boston—On Aug. 4, 1910, an empty train of four cars of the Boston (Mass.) Elevated Railway in charge of a single motorman was derailed near Tower F, Washington and Dudley Streets, Boston. The motorman was making a yard movement with the train when in some unaccountable manner it got beyond his control in the Guild Street yard, ran to the reverse curve at the tower at high speed, and was immediately derailed. Two of the cars fell into the street and the elevated structure was damaged somewhat. The motorman died without regaining consciousness and the cars were so badly wrecked that the cause of the accident is not known. All the controllers of the elevated cars in Boston are equipped with the so-called "dead man's handle," which returns to the off position unless held on the running points. The accident happened at 1.09 a. m., and no one but the motorman was seriously injured. President Bancroft, Vice-President Sergeant, Chief Engineer Kimball and other officials of the company reached the scene of the wreck soon after the accident and took active measures to clear the tracks so as to resume traffic. For a few hours Brookline and Jamaica Plain traffic to the Dudley Street terminal was diverted to the Tremont street subway, and during the early morning hours service between Dudley Street and Forest Hill via the elevated lines was suspended, surface car service taking its place. At 10.30 a. m. the elevated service was re-established, with the exception of the Dudley Street terminal loop, which was closed temporarily for repairs.

Personal Mention

Mr. C. S. Colony has been appointed trainmaster of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed Mr. Walter A. Wolfe, who has resigned. The position of inspector at Wilkes-Barre is abolished.

Mr. J. H. Rider has resigned as chief electrical engineer of the London (Eng.) County Council Tramways, to take effect on Aug. 31, to accept the appointment as chief electrical engineer for one of the mining companies in South Africa.

Mr. E. C. Johnson has been appointed chief engineer of the Los Angeles-Pacific Company, Los Angeles, Cal. Mr. Johnson was formerly assistant engineer in charge of construction on the Arizona Eastern Railroad in the Gila Canyon.

Mr. William M. Coleman has been authorized by Judge Lacombe in the United States Circuit Court to act as one of the receivers of the Metropolitan Street Railway, New York, N. Y., during the absence of Mr. Adrian H. Joline in Europe.

Mr. J. M. Gorman has been appointed assistant general manager of the Philadelphia (Pa.) Rapid Transit Company, to succeed Mr. Alexander Rennick, who has been appointed general manager of the company in addition to his office as vice-president of the company.

Mr. E. W. Olds has not resigned as superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, as reported in other papers. Mr. Olds has not been in good physical health for some time past and is simply contemplating a trip to the Pacific Coast to regain his health.

Mr. Julian Griggs, formerly chief engineer of the Scioto Valley Traction Company, Columbus, Ohio, has been appointed chief engineer of the Lancaster Traction & Power Company, Lancaster, Ohio, for which he has acted in a consulting capacity for three years. Mr. Griggs also acts in an independent consulting capacity.

Mr. L. C. F. Bellamy has resigned as assistant manager of the Rangoon Electric Tramway & Supply Company, Burma. Mr. Bellamy had been connected with the Rangoon company for three years and during this time the system, which consists of 25 miles of track, has been electrically equipped. Mr. Bellamy is the son of the late C. R. Bellamy, for many years manager of the Liverpool Corporation Tramways.

Mr. Alexander Rennick, second vice-president and assistant general manager of the Philadelphia (Pa.) Rapid Transit Company, has been appointed general manager of the company, to succeed Mr. Charles O. Kruger, president and general manager of the company. Mr. Kruger has gradually relinquished the duties of the office of general manager to Mr. Rennick and will hereafter give his entire attention to the executive problems of management as president of the company.

Mr. H. W. Protzeller has been appointed general manager of the International Transit Company, which operates the street railway in Sault Ste. Marie, Mich., and Sault Ste. Marie, Ont., and the ferry which connects the two cities. For more than two years Mr. Protzeller was assistant superintendent of the Twin City Rapid Transit Company at St. Paul, Minn. Before becoming connected with the Twin City Rapid Transit Company Mr. Protzeller was in the employ of the General Electric Company, Schenectady, N. Y.

Mr. H. B. Nichols, who has been appointed chief engineer of the Philadelphia (Pa.) Rapid Transit Company, began his business career in 1885, in the City Surveyor's office, Boston, Mass. In the following year he became connected with several private engineering firms in the same city, principally on hydraulic work. In 1887 Mr. Nichols joined the engineering department of the New York & New England Railway, and during the next two years he was employed by Aspinwall & Lincoln, Boston, Mass., engineers. In 1900 he accepted a position as assistant engineer for the New England Telephone & Telegraph Company. During 1902 and a portion of 1903 Mr. Nichols was assistant engineer in charge of railway reconstruction work in New York.

In 1903 he entered the service of the People's Traction Company, Philadelphia, and in 1905 was appointed engineer of way of the Union Traction Company. Mr. Nichols served in that capacity with the Philadelphia (Pa.) Rapid Transit Company until he was appointed to his present position.

Mr. B. E. Merwin, superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has been appointed general superintendent of the company, a position created recently. Mr. Merwin was connected with the Lake Street Elevated Railroad, Chicago, Ill., from the spring of 1893 until the spring of 1899, as train dispatcher and assistant superintendent under Mr. Frank Hedley, now vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y. In 1899 Mr. Merwin was appointed trainmaster of the Northwestern Elevated Railroad, Chicago, Ill., and on Jan. 1, 1900, was appointed superintendent of the Lake Street Elevated Railroad, which has been succeeded by the Chicago & Oak Park Elevated Railroad. On June 1, 1902, he resigned as superintendent of the Lake Street Elevated Railroad and accepted a position as general superintendent of the Interurban Railway & Terminal Company, Cincinnati, Ohio. On Nov. 1, 1907, Mr. Merwin accepted the position of superintendent of transportation of the Aurora, Elgin & Chicago Railroad.

Mr. A. R. Gould, president and general manager of the Aroostook Valley Railroad, Presque Isle, Maine, which was placed in operation early in July, 1910, is manager and contracting agent of the Maine & New Brunswick Electric Light & Power Company, Presque Isle, Maine. He has been identified with the development in Presque Isle for 23 years. He first engaged in business in Bangor. After two years, Mr. Gould went into the wholesale tobacco business in Presque Isle, and later bought the C. F. A. Johnson mill property at Presque Isle, which is now operated by the Aroostook Lumber Company, of which Mr. Gould is president. Subsequently he bought the municipal electric lighting plant of Presque Isle, and later he acquired the brick-making business and undertook to supply the business section of the city with exhaust steam from his mill plant. In order to facilitate the handling of products for his mill, Mr. Gould proposed the construction of an electric railway as early as 1902 to tap the timber resources of the Aroostook River. Surveys were made and other preliminaries arranged, but the construction of the road was delayed until Mr. Gould had financed a plan to develop the power of the Aroostook Falls.

OBITUARY

C. L. Bretz, president of the Cumberland & Westernport Electric Railway, Cumberland, Md., is dead. Mr. Bretz began his railroad career as a telegraph operator with the Pennsylvania Railroad at Newport, Pa.

George Flett, managing director of Dick, Kerr & Company, Ltd., England, was fatally injured in an automobile accident at Saltley, England, on July 27. He was returning from a meeting of the directors of the Metropolitan Railway, Carriage & Wagon Company, of which he is a member, when the car in which he was riding overturned in an effort of the chauffeur to avoid running over a child in the road. Before the development of electric traction, Dick, Kerr & Company occupied a very important position in England as contractors for engineering works and manufacturers of cable railway machinery. Early in the development of electric traction work Mr. Flett foresaw its future and after a careful study by him of the situation in this country and abroad, the company decided to engage in the manufacture of electric railway apparatus on a large scale. The late Prof. Sidney H. Short, who had recently resigned from the Walker Manufacturing Company, Cleveland, Ohio, was invited to supervise the construction of the new and extensive electrical shops at Preston, England, and afterwards became technical director of the works. Soon after a large factory for the construction of car bodies was built at Preston by the same interests. Dick, Kerr & Company have also been contractors for a large number of electric railways in Great Britain and other countries. Mr. Flett was an extensive traveler and paid a number of visits to this country. He was also an enthusiastic yachtsman. His age at the time of his death was 55 years.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***St. Louis & Eastern Traction Company, East St. Louis, Ill.**—Incorporated in Illinois to build an electric railway to extend from Granite City, through Collinsville, Troy, St. Jacob, Highland, Pierron, Pocahontas, to Greenville. It will be a feeder to the Illinois Traction System and the East St. Louis & Suburban lines. Nominal capital stock, $2,500. Incorporators and first board of directors are: A. W. Crawford, J. J. Frey, and A. M. Crawford, Hillsboro; C. C. Hoiles, Greenville, and C. C. Terry, Girard.

Coos Bay Rapid Transit Company, North Bend, Ore.—Incorporated in Oregon to build an electric railway from Coos Bay and extending to some transcontinental line in the same state. Capital stock, $1,000,000. Incorporators: Fred Hollister, North Bend; George F. Averill, Marshfield; George M. Perrine, N. B. Campbell and R. P. Farding, San Francisco. [E. R. J., May 14, '10.]

***Park Gate Street Railway, Beaver, Pa.**—Application will be made on Aug. 31 by W. J. Coursin, H. L. Tucker, J. W. Humphrey, R. A. Todd and Fred C. Johnston for the charter of an intended corporation to be called the Park Gate Street Railway. J. W. Humphrey and J. Sharp Wilson are solicitors.

***Badger Railway & Light Company, Milwaukee, Wis.**—Chartered to build an electric railway from Whitewater to Lake Geneva. Capital stock, $10,000. Incorporators: Harry B. Kamschulte, Gustav Pickhardt, Charles Zingsheim, Victor Lachmund and Chas. H. Franz, Jr.

FRANCHISES

Sacramento, Cal.—The Northern Electric Company, Chico, has applied to the Board of Trustees for a franchise on Nineteenth Street from C Street to K Street.

Galesburg, Ill.—The City Council has granted the Peoria & Galesburg Railway a nine-months' extension to its franchise in which to begin the construction of its line. [E. R. J., July 23, '10.]

Frederick, Md.—The Frederick Railroad has asked the Board of Aldermen for a franchise for a line over North Market Street, from Fifth Street, to connect with the tracks of the company on Patrick Street.

Syracuse, N. Y.—The Common Council has granted the Syracuse Rapid Transit Company an extension to its franchise so that it may lay double tracks and operate cars through East Willow Street, between Townsend and Lodi Streets.

***Charlotte, N. C.**—The Board of Aldermen has granted to Paul Chatham, Charlotte, a franchise to operate a street railway in Charlotte.

Ashland, Ore.—At a special election recently held in Ashland, John R. Allen, representing the Southern Oregon Railway & Power Company, Albany, was voted a street railway franchise. [E. R. J., Aug. 6, '10.]

Harrisburg, Pa.—The Common Council has passed the ordinance authorizing an extension within the city of the lines of the Harrisburg City Passenger Railway, operated by the Central Pennsylvania Traction Company, from Seneca Street to Division Street.

McKeesport, Pa.—The Jefferson & Wilson Street Railway has withdrawn its ordinance asking for a franchise to operate cars over the lines of the Pittsburgh Railways from Dravosburg Bridge to Market Street.

***Corpus Christi, Tex.**—H. H. Read and associates have applied to the City Council for a franchise for a street railway in Corpus Christi.

***Dallas, Tex.**—George Works and associates have applied to the Board of Municipal Commissioners for a franchise to construct and operate a street railway on Ross Avenue and Henderson Avenue. The line as proposed will extend from a connection with the Bryan Street line of the Dallas Consolidated Electric Street Railway at Garrett and Ross

Avenues eastward over Ross Avenue 900 ft. to Henderson Avenue and north on Henderson Avenue 700 ft. to the city limits.

TRACK AND ROADWAY

Phoenix, Ariz.—It is reported that surveyors are running a line for an electric railway from Mesa City to the Chandler ranch, a distance of 14 miles, to connect with a line from Phoenix to Mesa. Dr. A. J. Chandler, Mesa, is said to be interested in this project. [E. R. J., June 19, '09.]

Citizens' Light & Traction Company, Pine Bluff, Ark.—Press reports state that this company is considering plans for rebuilding its line in Pine Bluff.

San Joaquin Valley Electric Railway, Stockton, Cal.—Ground was broken on Aug. 1 by this company, near French Camp, south of Stockton. It is the intention to put on at least 200 men at once, and to have all of the grading completed in 90 days. Practically all of the rights of way have been secured. The line will be 44 miles long, and will extend from Stockton to Modesto. [E. R. J., April 30, '10.]

Vallejo & Northern Electric Railway, Vallejo, Cal.—The board of directors of this company have voted to increase the capital stock from $2,500,000 to $10,000,000. It was also decided to begin work at once. The line will connect Vallejo and Sacramento. [E. R. J., June 11, '10.]

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—This company is said to have completed most of the preliminary details of the construction of its proposed interurban railway. The layout has been practically finished, and most of the options needed for rights of way procured. Construction operations will begin at the Hartford end of the line next month, and it is expected that 10 miles of the road will be finished before the first of the year. Later in the summer work will be undertaken on the eastern section between Norwich and Colchester. Several important freight contracts have been made, and the promoters anticipate considerable revenue from freight traffic. [E. R. J., April 16, '10.]

Waterbury & Milldale Tramway, Waterbury, Conn.—At the annual meeting of the stockholders of this company, which proposes to build an electric railway between Waterbury and Milldale, it was voted to issue preferred stock to the amount of $150,000, 7 per cent accumulative. The par value of the stock will be $100 a share. Practically all the necessary rights of way have been secured and a complete survey of the proposed line of 9 miles has been made. The following officers were elected: Charles H. Clark, president, Milldale; Edwin S. Todd, treasurer, Milldale; John H. Cassidy, Waterbury, secretary. [E. R. J., Jan. 9, '09.]

***Rexburg, Idaho**—A movement is said to be under way in Fremont County for the construction of an electric railway that will encircle a large farming area. The proposed line will be 40 miles long, and would pass through Rexburg, Salem, Sugar City, Teton, Wilford, St. Anthony to Park, Egin, Plain Hibbard, Burton and back to Rexburg. The proposition made by Mr. Sewell, a capitalist of New York, is to form a company capitalized at $1,000,000, Fremont County business men and farmers to subscribe $100,000. The Rexburg Commercial Club has endorsed the movement.

***Illinois Western Interurban Railway, Quincy, Ill.**—It is reported that this company is being formed by A. J. Whitman to construct a gasoline motor railway to connect Quincy, Mt. Sterling, Ripley, Rushville, Littleton, Macomb and Bushnell. Eighty-nine per cent of the right of way has been secured from Quincy to Macomb. Plans and specifications for depots have been drawn with estimated cost of same. It is said that the line will be financed by New York capitalists.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company announces that it will award contracts this week for the grading of its line between Waukegan and Rockford, a distance of 12 miles. Nearly $100,000 has been raised to build it and the right of way has for the most part, it is reported, been donated. [E. R. J., July 9, '10.]

Ft. Wayne & Winona Traction Company, Ft. Wayne, Ind.—Engineers employed by this company, which propose to build an interurban railway between Ft. Wayne and Warsaw, have reported that it will cost $1,054,290 to construct and equip the line. It will be 40 miles in length. J. A. Barry, Ft. Wayne, president and treasurer. [E. R. J., June 25, '10.]

***Nashville, Ind.**—J. A. Johnson, Indianapolis, and associates, are promoting an electric railway to connect Nashville and Fruitdale, a distance of 16 miles. Work is to begin in 30 days. Financial backing is said to have been secured. A tunnel will be cut through Bear Wallow Hill, this being the most expensive work on the line.

***Emporia, Kan.**—It is stated that J. H. Dyer, Dayton, Ohio, is promoting a plan to establish a street railway and power plant in Emporia.

Wichita Railroad & Light Company, Wichita, Kan.—This company is said to be considering plans for improving its system in Wichita. The new work is to include the extension of the West Douglas Avenue line, the Pattie Avenue line to Linwood Park and the looping of the Riverside lines.

Louisville & Eastern Railroad, Louisville, Ky.—It is reported that this company will begin a survey of two routes to Eminence. It is proposed to build a branch line from Eminence to connect with the main line between Shelbyville and Simpsonville.

Aroostook Valley Railroad, Presque Isle, Me.—This company is said to have begun preliminary surveys for an extension through Woodland and Perham, as far as Madawaska Lake, about 19 miles.

Boston, Mass.—Bids will be received by the Boston Transit Commission until Aug. 30 for building Section 2, Beaver Hill tunnel, for the Cambridge connection, including a three-platform station located under a portion of the existing Park Street subway station and Boston Common.

Billings, Mont.—Press reports state that John A. Connolly, Muskogee, Okla., is taking preliminary steps in the construction of a street railway in Billings. At a special election, held June 20, a franchise was granted to Mr. Connolly for this line. He also holds a franchise for a line in Anaconda. [E. R. J., May 28, '10.]

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—This company has applied to the Public Service Commission of the Second District for permission to exercise a franchise for the building of a double track along East Main Street in Amsterdam, and an extension of a single track line to the Eighth Ward.

Second Avenue Railroad, New York, N. Y.—The Public Service Commission of the First District has approved an application of this company for the electrification of its line from Chatham Square to Broadway, through Worth Street.

***Oregon City, Ore.**—G. Clarence Fields is reported to be interested in a proposition to construct an electric railway from Oregon City through the Molalla Valley. The line, if constructed, will cover the same territory surveyed by F. M. Swift, who has for the last three years been promoting the Clackamas Southern Railway.

Phoenixville, Valley Forge & Stafford Street Railway, Phoenixville, Pa.—It is stated that Philadelphia capitalists interested in Montgomery County electric railways have made a satisfactory proposition to the promoters of the Phoenixville, Valley Forge & Stafford Electric Railway, now under construction, and that negotiations will be closed upon the return of H. H. Gilkyson, treasurer of the company, for building the line. Grading has proceeded to a point near Valley Forge, and a number of culverts built. [E. R. J., May 28, '10.]

Pittsburgh, Steubenville & Wheeling Railway, Pittsburgh, Pa.—This company has nearly completed the survey of the preliminary line between Mount Lebanon and Bridgeville, and most of the right of way between the two boroughs secured. Construction on this section is to begin within the next few weeks. F. W. Ritchey will be in charge of field operation, and James Bryan will be the consulting engineer and contractor. Among the incorporators of the company are W. E. Hildebrand, Pittsburgh, and A. H. Kerr, Burgettstown. [E. R. J., Feb. 27, '09.]

West Penn Railways, Pittsburgh, Pa.—It is stated that this company is planning to double track its line between Uniontown and Brownsville Junction.

Cleburne, Tex.—The committee elected by the stockholders of the street railway recently met Daniel Hewitt and signed up the contract for the building of the street railway in Cleburne. [E. R. J., July 2, '10.]

Texas Traction Company, Dallas, Tex.—It is announced that this company plans to construct a line in Sherman extending to West Hill, also a line in McKinney. The Sherman line is to be completed by April 30, 1911, and the McKinney line by July 1, 1911.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is said to be considering a plan to erect car shops at some point on the lower mainland where sufficient cars may be built to supply the growing demands of the system. It is estimated that car shops giving employment to 1000 men will be required to fill the program of car construction for which the company is now planning for the next few years. The plans for the new freight sheds at New Westminster are now being completed and it is expected that construction will be commenced within a week. Two months will be required to build the sheds. The work of erecting the new passenger station at New Westminster will be started at once.

Los Angeles (Cal.) Railway—This company has awarded a contract to the Standard Construction Company for the construction of galvanized-iron lumber shed, 94 ft. by 192 ft., on Fifty-fourth Street, near Park Place, in Los Angeles.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—J. Levering Jones, president, is said to have announced that this company is ready to erect interurban terminals, car houses and repair shops in Ft. Wayne if the city will abandon commercial lighting from its municipal lighting plant.

Wichita Railroad & Light Company, Wichita, Kan.—This company is contemplating the construction of a car house at Wichita, Kan. The cost is estimated to be about $50,000.

Louisville (Ky.) Railway—This company has purchased property adjoining its car house on Pearl Avenue and will erect a freight and express depot on the site for the use of its interurban lines.

Paducah (Ky.) Traction Company—It is announced that this company plans the expenditure of $50,000 on a new car house.

Wilkes-Barre & Hazleton Railroad, Hazleton, Pa.—This company, it is said, has decided to erect a new station at Ashley.

POWER HOUSES AND SUBSTATIONS

Southern Pacific Railroad, San Francisco, Cal.—This company has placed an order with the General Electric Company for one 300- and six 500-kw motor-generator sets.

Los Angeles (Cal.) Railway—A contract has been awarded by this company to the Alta Planing Mill Company for the erection of substation south of Agricultural Park.

Frederick (Md.) Railroad—Emory L. Coblentz, president of this company, is quoted as saying that arrangements have been made with the Hagerstown Railway for the erection of a joint power plant to furnish current to both companies. The plant is to be located either near Frederick, on the Monocacy River, or near Hagerstown, on the Antietam River. The plan is to form a company to be incorporated under the name of the Union Power Company, the stock of which will be held jointly by the Frederick Railroad and its allied interests and the Hagerstown Railway and its allied interests, and which shall sell current to both companies at the same rate. It is expected to have the plant in operation by May 1, 1911.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has let the contract to the Burns Contracting Company, Syracuse, for the construction of a transformer station south of Ellen Street, Oswego.

Lewisburg, Milton & Watsontown Electric Railway, Milton, Pa.—The power plant of this company at Milton was destroyed by fire on Aug. 2, entailing a loss of about $30,000. The company has now in course of erection a new power station at Milton, which it expects to complete by Sept. 1.

Manufactures & Supplies

ROLLING STOCK

Nashville Railway & Light Company, Nashville, Tenn., is building 12 single-truck cars in its own shops at Nashville.

Southern Pacific Railroad, San Francisco, Cal., has placed an order with the General Electric Company for 12 four-motor 75-hp equipments.

Philadelphia (Pa.) Rapid Transit Company has placed an order with the General Electric Company for 20 two-motor 125-hp equipments.

Enid Interurban Traction Company, North Enid, Okla., which is constructing a 3-mile railway from Enid to North Enid, is considering the purchase of three storage battery or gasoline motor cars. H. M. Spalding, North Enid, president.

Worcester (Mass.) Consolidated Street Railway, reported in the ELECTRIC RAILWAY JOURNAL of July 2, 1910, as contemplating the purchase of 12 closed cars, has placed an order with the Osgood-Bradley Car Works for 20 closed cars.

San Diego, El Cajon & Escondido Electric Railway, San Diego, Cal., which has under construction a 55-mile railway between the points named, will purchase 35 cars. The line will be operated partly by steam and partly by electricity.

Fairview & Oklahoma City Railway, Fairview, Okla., which proposes to build a 4½-mile line from Fairview to Rusk, will soon be in the market for cars, either new or second-hand. W. B. Noble, Box 447, Fairview, general manager.

Jacksonville (Fla.) Electric Company, noted in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, as having ordered 10 cars from the Cincinnati Car Company, will equip these cars, which will be of the semi-steel type, with maximum traction trucks made by the Standard Motor Truck Company, G. E. two-motor No. 219 equipments with K-36 controllers and G. E. air brakes.

Interborough Rapid Transit Company, New York, N. Y., reported in the ELECTRIC RAILWAY JOURNAL of June 4, 1910, as having ordered 40 elevated cars from the Jewett Car Company, has specified the following details for these cars:

Seating capacity 48	Interior trim.....mahogany
Bolster centers, length, 33 ft. 2 in.	Underframe .....wood
	Air brakes.....West.
Length of body....39 ft. 8 in.	Bumpers.Hedley anti-climber
Over vestibule....47 ft. ½ in.	Car trimmings .....bronze
Width over sills....8 ft. 6 in.	Couplers ..... Van Dorn
Over posts, including belt, 8 ft. 9 in.	Curtain fixtures....C. S. Co.
	Curtain material...pantasote
Sill to trolley base.....10 ft.	Sash fixtures.....Forsythe
Height from top of rail to sills .....40⅛ in.	Seats .....Heywood
	Seating material.....rattan
Body.....wood, metal posts	Treads .....Universal

TRADE NOTES

Vaughn Rail Support Company, Chicago, Ill., has been incorporated with a capital stock of $5,000. Incorporators are: Garrie L. French, David R. Jones and James E. Turner.

North American Railway Specialties Company, Chicago, Ill., has been incorporated with a capital stock of $50,000. The incorporators are S. J. Cotsworth, S. P. McGough and E. M. Fry.

T. H. Symington Company, Baltimore, Md., reports orders to furnish ball-bearing center plates for 1400 cars for the Chicago Railways Company and 25 cars for the Metropolitan Street Railway, Kansas City, Mo.

C. H. Hughes & Co., engineers, New York, advise that owing to increasing business in making reports on public service corporations and investigating mechanical and electrical devices, they have moved to larger offices at 64 Wall Street.

Railway Brake & Shoe Company, Moundsville, W. Va., will erect a plant at Moundsville for the manufacture of brake shoes. The building will be 80 ft. x 300 ft., and, it is

estimated, will cost $10,000. Nearly $20,000 worth of equipment will be installed.

Strohmeyer Brake Shoe Company, Camden, N. J., has been incorporated with a capital stock of $100,000 to engage in the manufacture and sale of brake shoes. The incorporators are: Julius Strohmeyer, C. A. Harris, Jr., H. S. Peddle and William W. Morton.

E. P. Morris Company, Elizabethtown, Pa., has just completed its new factory for the manufacture of electrical supplies. Mr. Morris reports that the shop is 100 per cent larger than his old one and that the company has sufficient orders to keep it busy for some time.

Shepherd Automatic Switch Company, Montgomery, Ala., has been organized with a capital stock of $700,000 to manufacture railway switches opened or locked from the locomotive or an electric railway car. The officers are M. L. Shepherd, president; Nathan Lohman, vice-president; G. E. Kyser, secretary, and T. E. Lovejoy, treasurer.

American Rolled Gold Leaf Company, Providence, R. I., has engaged the services of Charles H. Bowers and T. J. Lawler. Mr. Bowers has been connected with the W. H. Coe Manufacturing Company, Providence, R. I., for the past ten years. His title will be railway sales manager. Mr. Lawler was, for about eight years, with Berry Brothers, Detroit, Mich.

Dossert & Company, New York, N. Y., have opened an office at 617 West Jackson Boulevard, Chicago, Ill., with George W. Armstrong, as western manager, for the territory included in the States of Minnesota, Wisconsin, Iowa, Indiana, Illinois, Missouri and Michigan. A large stock of standard sizes of the Dossert solderless connectors will be maintained at the Chicago branch.

American Ship Windlass Company, Providence, R. I., has received an order from the General Electric Company for six Taylor gravity underfeed retort stokers, to be used under two 225-hp Stirling boilers, in its plant at Pittsfield, Mass. The American Ship Windlass Company also reports an order from the Dayton (Ohio) Lighting Company for three Taylor gravity underfeed stokers.

C. C. Lockwood, Rockford, Ill., who deals in car advertising, has issued and copyrighted a new "getting off" sign, in which the proper methods are illustrated by large halftone engravings, showing a lady getting on and off a pay-as-you-enter car. The instructions state that it is desirable to grasp the grab-handle with the right hand when boarding and with the left hand when leaving a car.

Whipple Supply Company, New York, N. Y., calls attention to the fact that in a collision between two street cars in Newark, N. J., on Aug. 5, one car which was equipped with the Hedley anti-climber was only slightly damaged while the platform of the other car, which was not so equipped, was completely demolished. In all accidents to cars equipped with anti-climbers which have been observed so far, these devices have demonstrated that they effectually prevent serious damage to the cars.

Stone & Webster Engineering Corporation, Boston, Mass., has been engaged by the Boston & Maine Railroad for the design and construction of a 1200-kw water-power plant at Franklin, N. H. Double transmission lines along the right of way of the railroad will carry the current at 22,000 volts to three substations. The power will be used for the railroad shops and for lighting the yards and station. Current will also be supplied to the Concord and Manchester branch, and to the Concord Street Railway and Contoocook Park.

ADVERTISING LITERATURE

Arthur S. Partridge, St. Louis, Mo., has issued list No. 34 of second-hand electrical and steam equipment for July.

Nachod Signal Company, Philadelphia, Pa., is distributing a bulletin containing a reprint of a paper read by Carl P. Nachod before the Engineers' Club of Philadelphia, entitled "An Automatic Signal for Electric Railways."

Norvell-Shapleigh Hardware Company, St. Louis, Mo., has recently published a mammoth catalog covering all of its products, among which are the following railway supplies: Linemen's tools, ticket punches, track drills, jacks, shovels and shovel handles, chain hoists, babbitt metal, lanterns, etc.

NEW PUBLICATION

Municipal Franchises, by Delos F. Wilcox, Ph. D., Vol. I, introductory, pipe and wire franchises. Engineering News Book Department, New York; 710 pages, price $5.

The present volume, which will be followed by another next year, contains 21 chapters, of which the first five discuss the general situation under the titles of "How Franchise Rights Are Acquired," "What a Franchise Signifies," "Monopoly Profits, and Ways of Limiting Them," "Injuries to Individuals, and Ways of Preventing Them," and "Temptations to Public Wrong, and Ways of Overcoming Them." Then follow special chapters on franchises for electric light and power, telephone, telegraph, messenger water, sewer, heating, refrigerating, gas, and other public utilities. Railway franchises will be taken up in the second volume. The purpose of the book, as explained on page 24, is to simplify the fundamental conceptions as to the nature and purpose of franchise grants; to state the conditions which should be imposed with various classes of franchises; to describe the best types of those actually in force, and to discuss the principles involved in the regulation of public service utilities by means of taxation, rate regulation, public service commissions, referendum and municipal ownership.

Briefly, Dr. Wilcox believes in a franchise which grants a monopoly, but one in which the public retains the right to regulate the rates and service, as well as the complete control over the highway. He considers that the idea of getting good service by encouraging competition is fallacious because the inevitable tendency of an individual franchise is to seek the warm bosom of monopoly. A better plan is to admit the monopoly, but pull its sting by such regulation as will insure "adequate and humble" service at reasonable rates. Dr. Wilcox speaks favorably of the indeterminate franchise, but recognizes that it has serious objections unless coupled with the proviso that the city should pay the franchise holder the value of the operating plant in case of revocation. If franchises are sold he believes the principle of percentage of the gross receipts the most desirable, but owing to the complications involved when extensions are built, especially when the demand for extensions first comes from the public, the plan of limiting the profits of a franchise by its sale is generally unsatisfactory. The establishment of permanent rates in a franchise grant involves the possibility, indeed the probability, with changed conditions, of inequitable conditions for either consumer or producer, so that a provision for the periodic readjustment of rates is desirable from the standpoint of both the company and the public. Legislative regulation of rates, however, in order not to be confiscatory, must permit a reasonable rate of return on the investment, and thus the question of rate regulation must finally come for adjudication to the Federal Courts. Dr. Wilcox regrets that the Consolidated Gas decision of the Supreme Court was not absolutely conclusive as to the authority of a State legislature to wipe out the value of a franchise by the regulation of the rates charged by the owner, but in a matter so momentous as this to all cities and public utility companies he considers that on the whole it is not surprising that the court hesitated to go further than it did. A desirable form of franchise, if not the most desirable, in the author's opinion, is one in which the service is given at cost, including in cost a sufficient amount for operating expenses, maintenance, depreciation and a fair return upon the amount of capital actually invested. Under such conditions there would be no franchise taxes to be paid except possibly in unusually prosperous years. This, of course, would mean that the utilities would be operated not for the relief of the taxpayers, but for the benefit of the consumers.

The discussion of the general principles of franchises, which has here been reviewed, occupies about one-fifth of the book. The detailed discussion of individual franchises for the various classes of public utilities already mentioned follows. There are about 50 pages of index and references to authorities. The author, who is chief of the bureau of franchises of the Public Service Commission, First District, New York, dedicates the book to George E. Hooker, Milo R. Maltbie, George C. Sikes, Robert H. Whitten and Stiles P. Jones, "conspicuous representatives of the group of men who are devoting their brains and their energy to the establishment of a principle that 'a public franchise is a public trust.'"

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, AUGUST 20, 1910 No. 8

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 20, 1910.

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The Columbus Riot

The scenes, which have culminated in the week of riot and anarchism just passed in Columbus, should bring a blush of shame to the cheek of every citizen in the State. No community can be considered as law-abiding where such acts are permitted. It is difficult to conceive how an official like the Mayor of Columbus, sworn to maintain peace and the rule of the law within his city, can reconcile his oath of office with the events which have transpired during the present strike. His proclamation of Monday reminds us of the candidate in Lowell's Bigelow Papers, who, if he had been placed in a similar position, would doubtless have said: "I believe in the maintenance of law and order; that is, I kind o' do; that is, I would if those on strike should say they wish me to." Fortunately, the Governor has at last awakened to the gravity of the situation and has ordered a return to Columbus of the State troops, excluding—we hope—those who showed their sympathy with the disorder of last week by making a donation to the cause of the strikers after leaving the city. Napoleon once said that it was far more merciful for a military commander when dealing with rioters to use stern measures at first rather than to attempt to intimidate them by ordering his soldiers to fire over the heads of the crowd. It will probably be more difficult to secure order in Columbus now than if the undertaking had been begun at the outbreak of the disorder, but the sooner the work is accomplished, the better for the city and its citizens. After that there will be ample time to take up the merits of the controversy between the railway company and its late employees.

Weaknesses in Democratic Government

Some of the early critics of the American form of government expressed apprehension that it would fail because in times of popular excitement the passions of the mob would triumph over the desires of the orderly portion of the community and scenes of excess similar to those which characterized the French Revolution would be committed. The events to which we have just referred, with other recent and unpunished acts of disorder which have occurred in the same State during the past few months, lend force to this fear, although to those who have a stronger faith in American democracy and a more accurate conception of its inherent strength, they indicate only criminal weaknesses on the part of the authorities. The real trouble with our popular form of government is that it affords too easy access to positions of responsibility of men who are mere political trimmers. They are so used to trying to placate this faction and humor that one, that they have not sufficient strength of character to take a decided stand when a crisis occurs. Those who arise to the exigencies of a situation of this kind, however, as did Grover Cleveland at the time of the Debs riots, find that the vast majority of American citizens support them and approve of their course.

Saving Power at Electric Track Switches

Recent observation of the handling of cars at electric track switches leads to the conclusion that unless motormen are carefully instructed in this particular work considerable power is liable to be wasted, motors, car wiring and rheostats overheated, and the service delayed at points on the system where money has been specially invested to facilitate rapid transit. On a system with a few hundred cars in operation and having a dozen or more electric track switches there are a good many opportunities daily for multiplied losses and delays which are none the less expensive for being more or less intangible. It is a common habit of motormen inexperienced in operating over electric track switches to put on the power and apply the brake while current is flowing in the motors, in order to take the switch at the speed and with the current necessary to throw it, instead of cutting off power, coasting to the proper point and then throwing on but one or two notches at the outside. With improper handling energy is always wasted, and frequently the equipment is so badly overloaded that a fuse blows or a motor flashes over, so that a line of short interval cars may be held up, with subsequent excessive demands for current from the local feeder system instead of the normal requirements of a fairly steady schedule. Again, where motormen cut off power, drift to the switch and then apply current it is often the case that the controller handle at once is thrown to full series or perhaps to full parallel, with much the same results at the motors and fuse as in the former case. Close and frequent inspection of the track switches is also well worth while, because apparatus of this kind, subjected to severe changes of weather and temperature, cannot safely be left too long to itself.

The Reasonableness of a Transfer Charge

Experience with a charge of 1 cent for each transfer issued in connection with a regular 5-cent fare on the lines of the Middlesex & Boston Street Railway Company in Newton, Mass., shows continued acceptance by the public of a situation proved two years ago to be incapable of being met by the ordinary nickel tariff. For two years past the Massachusetts Railroad Commission has received an annual petition from the company requesting that the transfer charge may be continued on account of the absence of earnings sufficient to enable free transfers to be given on the lines formerly operated by the Newton Street Railway Company. At the public hearings given by the commission this year and in 1909 no opposition appeared to the continuance of the transfer charge, although no little hostility to the 6-cent fare idea was in evidence in Massachusetts when the movement began two or three years ago. The ready acceptance of such a charge by the public and the absence of petitions requesting the reopening of hearings in connection with increased fares or restricted service facilities for a given expenditure points to the wisdom of making the public fully acquainted with the state of corporate earnings and expenses no less than it demonstrates the confidence of the community in the investigations and decisions of the reviewing tribunal. The Newton lines did much to clinch their case with the public two years ago by sending financial statements to all registered voters in the territory, as described in the exhaustive articles which were published in this journal at the time on the Six-Cent Fare Movement in Massachusetts. While it is true that the public served by this system represents perhaps the more intelligent classes rather than the cosmopolitan population found in many other parts of the Boston suburban district, the good results of taking the people into the confidence of the company are not confined to any particular locality.

ELECTRIFICATION AT THE BERNE RAILWAY CONGRESS

The presentation at the Berne International Railway Congress of four papers on the electrical equipment of trunk lines necessarily suggests a consideration of the progress made in this subject since the last International Railway Congress, held in Washington in 1905. In some respects, the record is disappointing. It is true that during the past five years the New York Central installation has been completed, the New Haven single-phase equipment has been selected and installed, and the Pennsylvania terminal electrification has been undertaken. There have been several other important installations besides, notably that of the West Jersey & Seashore division of the Pennsylvania Railroad; the Long Island Railroad equipment was well under way in 1905. But four of the most important of these undertakings were obligatory because of tunnel conditions, and while this cannot be said of all of the work done during the past half decade, there has not been that wholesale invasion of the steam railway field in this country by the electric motor which was expected five years ago by the more sanguine.

Nevertheless, the four papers presented at the Berne conference do not afford ground for a pessimistic view of the situation. Mr. Gibbs' report, which was published in abstract in our issue of March 26, gives a tabulation of the operating results of the Long Island and West Jersey & Seashore systems by no means unfavorable to electric traction. Statistics of this kind were non-existent in 1905 and are most conclusive evidence of the substantial progress made in this country so far as actual installations are concerned. The papers presented by the three foreign engineers, Drs. Gleichmann, Hruschka and Wyssling, contained no such record of accomplishments. But they do testify not only to the study given to electrical systems by the Government railroad authorities in the leading Continental countries of Europe, but as well to an established intention to undertake the early equipment of a number of roads, in a comprehensive way and along standard lines, so as to assure harmonious development in the future.

Owing probably to the extent of its railway system, the greatest actual progress among the Continental countries seems to have been made in Germany, where electricity has been adopted for several suburban lines near Berlin and Hamburg. An experimental line has also been especially constructed at Oranienburg for trial purposes. Almost as rapid progress in electrical equipment has been made in Austria-Hungary, according to Dr. Hruschka, while Dr. Wyssling reported that, like the other Continental countries mentioned, Switzerland has had a commission for several years carefully studying the situation. The progress in other countries, particularly Italy, Sweden and England, was also mentioned at the meeting, although there were no papers especially devoted to the work being done there.

Two points stand out with particular emphasis in all of the three papers presented at the meeting by foreign engineers. One of these is the extent to which the authorities in the different countries expect to utilize water-powers for the operation of their railways. This, of course, is particularly true in

Switzerland, but Austria-Hungary, Italy and Sweden are also rich in water-powers, as are parts of Germany, so that this fact gives an emphasis to the advantages of electrification. The other point is the practically universal preference shown by these representative foreign engineers for the single-phase system at about 10,000 volts pressure. Whatever may be thought of this position by readers of this paper, it at least is indicative of the changes which have occurred in the art because in the conclusions adopted by the congress at Washington in 1905 no attempt was made to draw a comparison of the advantages of the different systems. At its Berlin conference, in 1915, we hope that the congress will be able clearly to define the provinces of each in general railroad work, assuming that all three of the present leading systems will remain candidates for serious consideration at that time.

IMPROVING CAR DETAILS

In the admirable work which has lately been accomplished in the broad field of car design lies the danger that the full benefits of such activities will be lost unless the minor details of car fittings are given perhaps a disproportionate share of attention. Only a trained operating man can realize the intimate connection which the design of such small car parts as door catches, grab-handle screws, register rod attachments, window-frame buffers, lighting fixtures, window guards, and similar details has with the punctuality and comfort of the service. The public cares no more about whether the commutators of the motors are undercut or not than a Somali chieftain yearns for Corot landscapes, but it is intimately concerned with the question of a dress torn by a projecting screw head or a finger pinched in a sliding door. It is profitable now and then for a master mechanic to spend a couple of hours on defects occurring with minor car fittings, and to bring home to the shop and car house forces the necessity of constant vigilance in forestalling such troubles.

The number of such difficulties which will come to light on even a well-operated system is surprising. Breakage of glass, losses of incandescent headlights by theft and by careless swinging of trolley catchers at the end of the rope when changing ends, loosening of sign-light sockets on account of poorly cut threads, excessive wear of bell and register cords and misalignment of fittings through hasty installation or improper adaptation to different car interiors, use of too short spouts on sand boxes, so that the sand is directed off instead of on the rails, fuse-box troubles on account of poorly fitting screws—these and numerous other defects in operation or design tend to interfere with the best service even where they are of insufficient individual consequence to cause an interruption to traffic. There is room for improvement in many details of car fittings, for the saving of weight without undue sacrifice of strength, and for the better adaptation of designs to the convenience of employees and the public. In the design and construction of a power plant the minor fittings can almost always be disposed to reasonable advantage, even if space is not set aside for them until after the erection of the building is completed. The conditions are so much more restricted on a car and so little free space is available on modern rolling stock that it pays to determine in advance many points of location and fitting that in earlier days could be left to cut and try methods.

SINGLE-END VS. DOUBLE-END CARS

The general adoption of prepayment type cars and the interest which is being shown in the subject of reduction of car weights suggest at this time some new arguments in favor of single-end car operation. Single-end cars are particularly suitable for prepayment operation as the rear entrance and front exit platforms can be designed and built to suit the different purposes for which they are intended. The length of the front platform can be reduced to a minimum, while still leaving space for the motorman and a car heater, if used, while the rear platform can be arranged to provide protection for the conductor in bad weather without enclosing it completely; none of the floor space is occupied by a controller or other operating apparatus. Two sets of troublesome and expensive doors on the left-hand side of the platforms are dispensed with and a better seating arrangement inside of the car is possible. Fixed cross-seats, which cost less and require less maintenance than reversible seats, can be used. Other items of special equipment of which the first cost is cut in half include controllers, hood switch, brake handles or valves, alarm gongs, headlights, destination signs, fenders, fare registers, air brakes on long, double-truck cars, trolley bases and poles.

The weight of all the parts supplied in duplicate on double-end cars also is worth considering. The total is probably not far from 700 lb., not including the excess weight of a long front platform and the extra doors and windows required on the rear platform. A conservative estimate of the difference in weight in favor of a single-end prepayment car would be 1500 lb. At 5 cents per pound per year this would represent a saving in operating expenses of $75 per car. Add to this the interest on the investment in the duplicate apparatus, its cost of maintenance and the depreciation on it and the yearly charges against the double-end car mount up rapidly.

The strongest argument in favor of double-end cars has been that in case of blockades or delays the cars could be switched at cross-overs and kept on time. In some cities with very congested streets double-end cars may be considered absolutely necessary for this reason. Single-end cars, however, are successfully operated in Philadelphia, Cleveland, Detroit, Indianapolis and in a host of smaller cities, many of which have badly congested districts. Rochester, N. Y., has operated double-end cars for a long time and frequent cross-overs have been built on all the lines. It has been the practice to permit cars to turn back whenever they were running late and thus preserve the schedule at the expense of the service in the outlying districts. Recently the Main Street line, which traverses the city from east to west and carries very heavy traffic, was equipped with new single-end prepayment cars as an experiment. No trouble has been experienced in keeping these cars on their schedule times. The crews and the street inspectors know that they cannot make up lost time by turning the cars back at convenient cross-overs and they make a special effort to avoid all needless delays.

The operation of single-end cars requires the construction of loops or wyes at the terminals, but the first cost of the extra track and special work is little, if any, more than the cost of the duplicate car equipment required for double-end operation. The saving in operating expenses due to less weight is a net gain.

BROOKLYN LINE DEPARTMENT—CONSTRUCTION, MAINTENANCE AND EMERGENCY CREWS

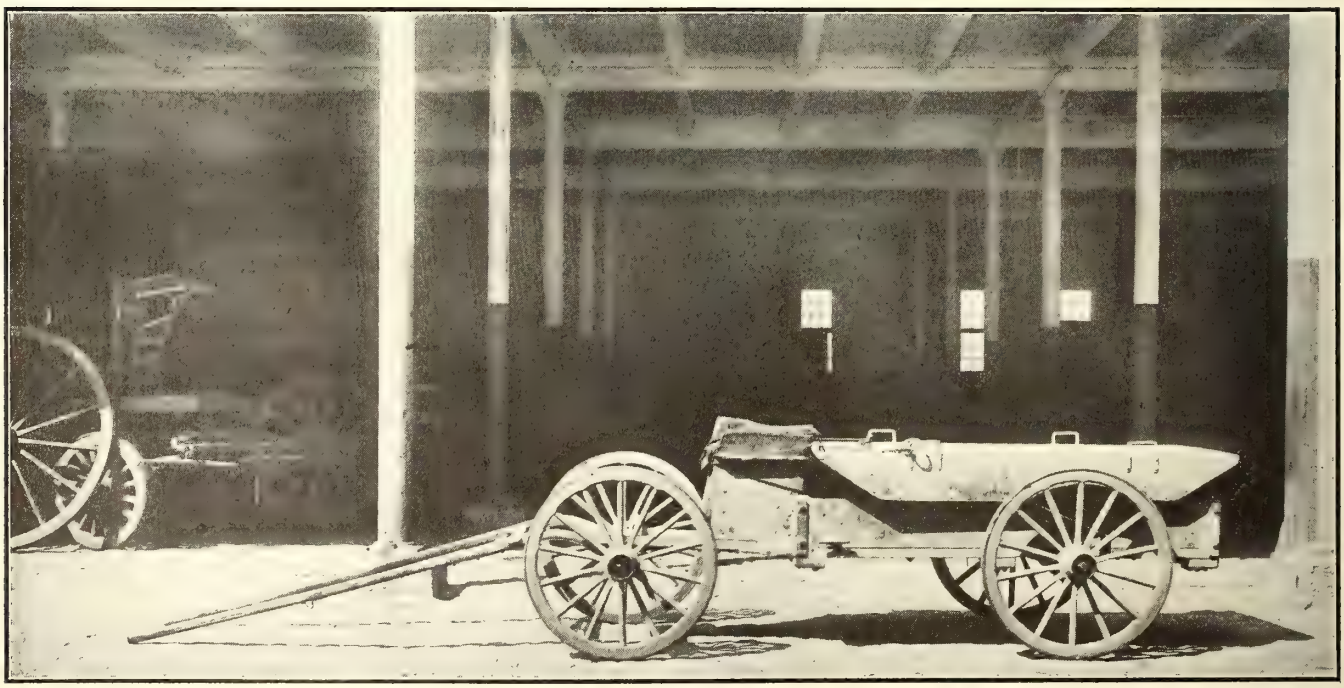
The regular construction and maintenance of the line department of the Brooklyn Rapid Transit Company is cared for by five crews having a total of 31 men. These crews report in the morning to the line department headquarters to secure their stock. It has been found preferable to start them from headquarters daily so that the men will be available in case of emergencies, but in the afternoon the crews stop work wherever they may happen to be located. Each crew has a tower wagon for running trolley and is also provided with a four-motor double-truck car having a tower and swinging leaf. At the Nostrand avenue headquarters there is also stored a pair of trucks of adjustable length used for hauling poles. A great deal of care is given to maintaining all of the vehicles in the best possible condition. When the line department headquarters were designed, it was arranged with commendable foresight that there should be a wagon shelter under the stable floor. In consequence of this provision, the wagons are always kept dry and free from snow. They are always available for immediate service, giving no delays whatever from snow, sleet or stiffness of the wheels as are sure to occur where the wagons are kept constantly in the open air.



Brooklyn Line Department—An Emergency Crew in Transit to Repair a Break-Down



Brooklyn Line Department—Running Trolley Wire from a Car in a Suburban Town

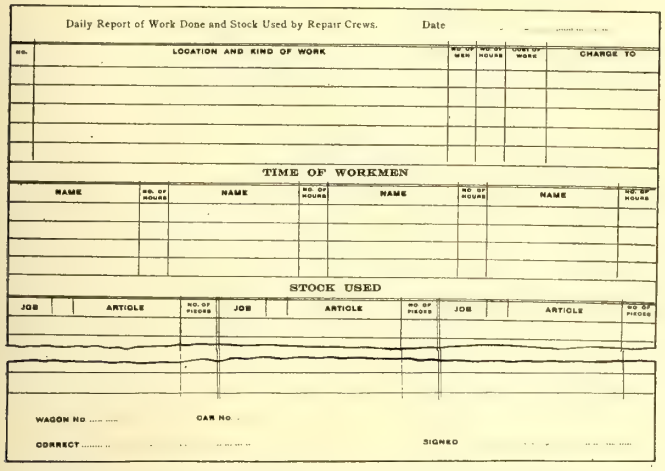


Brooklyn Line Department—Wagon Shelter at Nostrand Avenue Headquarters

REGULAR LINE CREWS

Each crew is required to keep a certain amount of stock on hand, the assistant superintendent of the line department being the judge as to the amount. The construction crew materials

are checked up at night at headquarters by the line department storekeeper and these records are afterwards compared with the material taken out and used. The construction crews draw their material on form N.S.-838, which is made out in quadruplicate, and approved either by the general foreman or certain


Daily Report of Work Done and Stock Used by Repair Crews. Date

NO.	LOCATION AND KIND OF WORK	NO. OF MEN	NO. OF HOURS	UNIT OF WORK	CHARGE TO

TIME OF WORKMEN

NAME	NO. OF HOURS	NAME	NO. OF HOURS	NAME	NO. OF HOURS	NAME	NO. OF HOURS

STOCK USED

JOB	ARTICLE	NO. OF PIECES	JOB	ARTICLE	NO. OF PIECES	JOB	ARTICLE	NO. OF PIECES

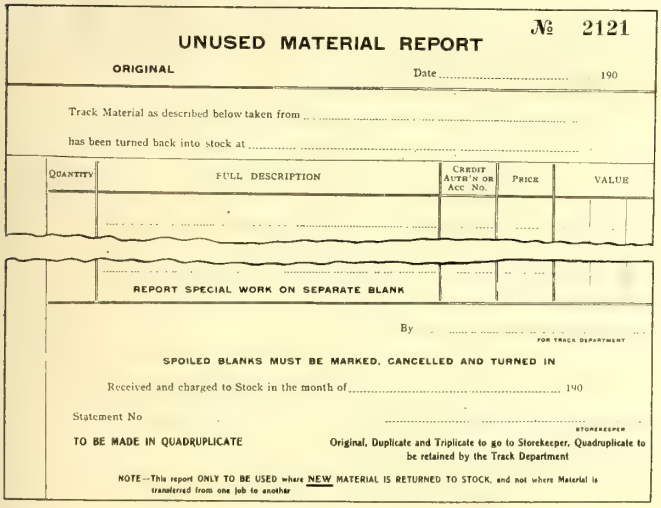
WAGON NO. CAR NO.

CORRECT SIGNED

Brooklyn Line Department—Daily Labor and Stock Report of Repair Crew (No. 134)

others designated to sign storeroom orders. The first three copies of the order are sent to the general storeroom where the prices are inserted. The triplicate is returned to the line department as a record of what was called for. The second copy is kept by the storekeeper and the first copy goes to the controller. The fourth copy is kept as a memorandum in the line department until the priced triplicate has been received. The daily report of the construction crews showing the labor distribution, the location, the material used, etc., is made out on N.S.-134 and is reproduced herewith. There is also reproduced part of the daily report showing the daily location and work of all crews. After the crew has completed certain work, a checker is sent out to verify the amount of trolley wire run and the material used and to compare it with the report turned in by the foreman.

If any old material has been displaced, the foreman marks the report No. 03650 "old material" with a rubber stamp. In this event he files the "old material" form No. 503, which con-


№ 2121

UNUSED MATERIAL REPORT

ORIGINAL Date 190

Track Material as described below taken from

has been turned back into stock at

QUANTITY	FULL DESCRIPTION	CREDIT AUTH'N OR ACC. NO.	PRICE	VALUE

REPORT SPECIAL WORK ON SEPARATE BLANK

By FOR TRACK DEPARTMENT

SPOILED BLANKS MUST BE MARKED, CANCELLED AND TURNED IN

Received and charged to Stock in the month of 190

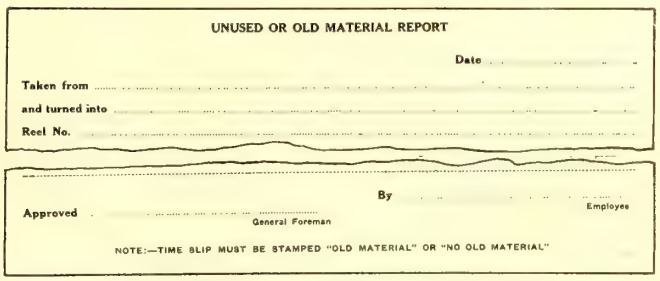
Statement No STOREKEEPER

TO BE MADE IN QUADRUPLICATE Original, Duplicate and Triplicate to go to Storekeeper, Quadruplicate to be retained by the Track Department

NOTE—This report ONLY TO BE USED where NEW MATERIAL IS RETURNED TO STOCK, and not where Material is transferred from one job to another

Brooklyn Line Department—Report on Material Not Used and Returned to Stock (No. 565)

tains the amount of the material and the description of the same as removed from the job. If no old material is displaced, he stamps his timeslip "no old material." A clerk is assigned to check up any articles returned and see that they are actually delivered to the scrap room. This clerk also attends to the weighing and measuring of material and to the placing of proper credits, etc. Credits for such scrap are given against the proper authorization number covering the job. If the material is not new, but nevertheless good for further use, it is turned in on N.S.-503, the assistant line superintendent assigning its proper credit value. Old material is divided into the following


UNUSED OR OLD MATERIAL REPORT

Date

Taken from

and turned into

Reel No.

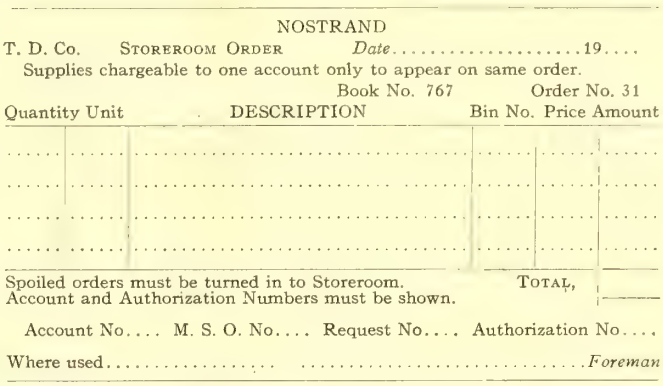
By Employee

Approved General Foreman

NOTE:—TIME SLIP MUST BE STAMPED "OLD MATERIAL" OR "NO OLD MATERIAL"

Brooklyn Line Department—Unused or Old Material Report (No. 03650)

classes: Composition, including old brass and copper; rubber-covered wire; taped or braided wire; lead and paper-covered cable, and composition and insulation together. New material


NOSTRAND

T. D. Co. STOREROOM ORDER *Date*.....19....

Supplies chargeable to one account only to appear on same order.

Book No. 767 Order No. 31

Quantity	Unit	DESCRIPTION	Bin No.	Price	Amount

Spoiled orders must be turned in to Storeroom. Account and Authorization Numbers must be shown. TOTAL,

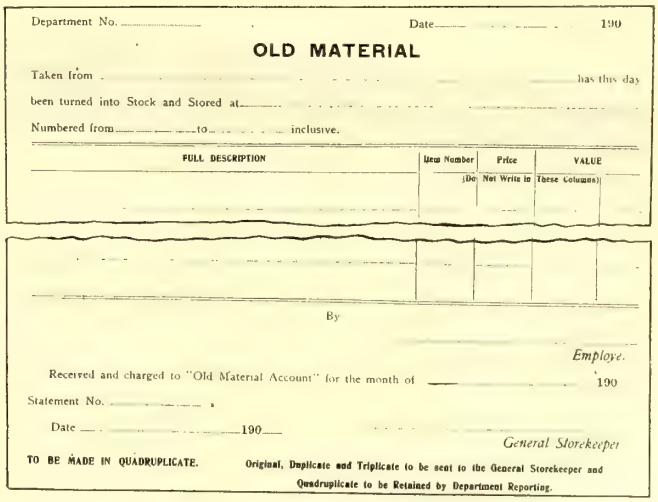
Account No.... M. S. O. No.... Request No.... Authorization No....

Where used..... *Foreman*

Brooklyn Line Department—Form N. S. 838, Used for Drawing Out Material

which is drawn out, but not used by the crew, is returned on N.S.-565 and credited at the full price.

Among the equipment furnished to every crew is a portable charcoal furnace of the type shown in the accompanying draw-


Department No. Date 190

OLD MATERIAL

Taken from has this day been turned into Stock and Stored at

Numbered from to inclusive.

FULL DESCRIPTION	Item Number	Price	VALUE
	(Do Not Write in These Columns)		

By

Employe.

Received and charged to "Old Material Account" for the month of 190

Statement No.

Date 190

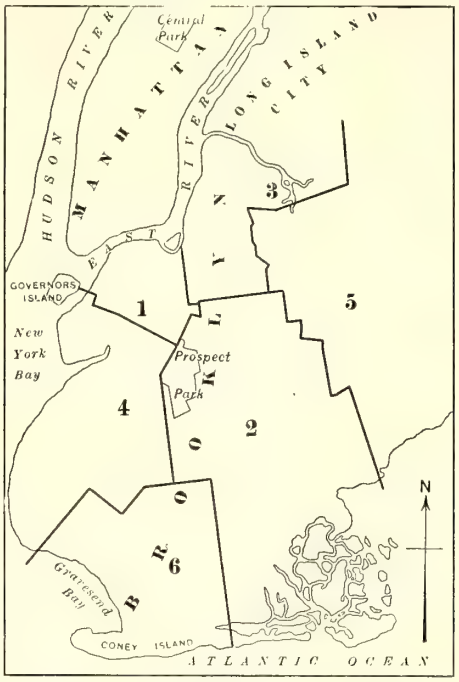
General Storekeeper

TO BE MADE IN QUADRUPLICATE. Original, Duplicate and Triplicate to be sent to the General Storekeeper and Quadruplicate to be Retained by Department Reporting.

Brooklyn Line Department—Record of Old Material Returned to Stock (No. 503)

ing. An interesting feature of the furnace is its substantial construction and the use of a cast-iron grate and draft door which makes the furnace a very economical user of fuel. This furnace has been found especially desirable for heavy work, as, for example when it is necessary to heat large pots of solder in cold weather to solder jumper wires. It has been

found better to provide the men with a manufactured furnace of this kind rather than to have them use for the same purpose such wasteful makeshifts as old milk cans. Owing to the use of the bar-iron overhead construction described in the article of June 11, 1910, each crew is also furnished with a special tool for punching holes in the bar-iron conductors. The punch is actuated by a screw toggle system which permits the bars to be punched while in place in the trough.



Brooklyn Line Department—Emergency Crew Districts

EMERGENCY CREW WORK

The emergency work of the line department is divided into six districts as shown on the accompanying map. These are not divided strictly according to mileage, but in accordance with the class of service and the amount of long distance travel necessary. To each district there is assigned a crew of four men, consisting of two linemen, a driver and a foreman. An emergency man is also placed both at the Williamsburg Bridge and at the Brooklyn Bridge. Each crew has one tower wagon and one emergency wagon, but at the Coney Island, Ridgewood and Thirty-sixth Street quarters there is also installed a small tower car for use on the suburban lines. Each tower car has two reels of trolley wire to run in case of heavy breaks. The crews without the tower cars keep two reels of wire in stock for the same purpose. At the High Street quarters, near the Brooklyn Bridge, there is maintained a wagon with wrecking tools for handling broken axles, derailed cars, etc., more expeditiously than can be done with the car of the shop wrecking crews.

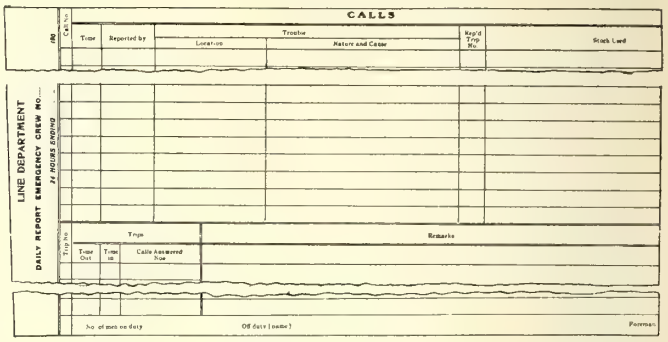
The several emergency crew headquarters are provided with sitting and sleeping rooms, shower baths, etc. One of the accompanying illustrations shows the dormitory of the crew at the Nostrand Avenue headquarters. It will be seen that a sliding pole is provided, to permit quick access to the stable floor beneath, just as in a city fire house. With one exception, apartments are also provided for the family of each foreman.

Experience has shown that the four-men emergency crews are large enough for the conditions of the overhead line service in the Brooklyn system. As the calls to be answered from 10 p. m. to 6 a. m. are not numerous, the men usually have ample time for rest. Three hours is given daily for meals, the men going in rotation so that three are always on hand for an emergency call. In the summer leave of absence is not granted for Friday, Saturday or Sunday, as

March 19, 1910.

Foreman.	Number of men.	Location and Description	Charge.	Caror horses.
Kayser	5	Myrtle Ave.—feeder inspection.....	224	2
Rathjen	5	Lexington Ave.—iron workers.....	04942	2
Moran	5	Lexington & B'way—general repairs.	528	1
Torrens	1	Brooklyn Bridge.....	..	..
Gallagher	1	36th Street.....	..	..
Mally	1	East New York.....	..	..

Brooklyn Line Department—Daily Report of Location of Crews (N. S. 150)



Brooklyn Line Department—Daily Report Blank Used by an Emergency Crew

TELEPHONE CALL SHEET, FOR TROUBLES ON CARS, FEEDER AND TROLLEY

WEATHER..... A. M. ..... P. M. ..... DATE..... 19....

No	LOCATION	NATURE OF TROUBLE	CALLED BY	CREW No.	TIME REC'D	TIME OUT	TIME IN	REMARKS	BREAKS
1									
2									
3									
4									
5									

Brooklyn Line Department—Record of Emergency Calls Kept at the Line Department Headquarters (N. S. 680)

2

CREW STOCK REPORT

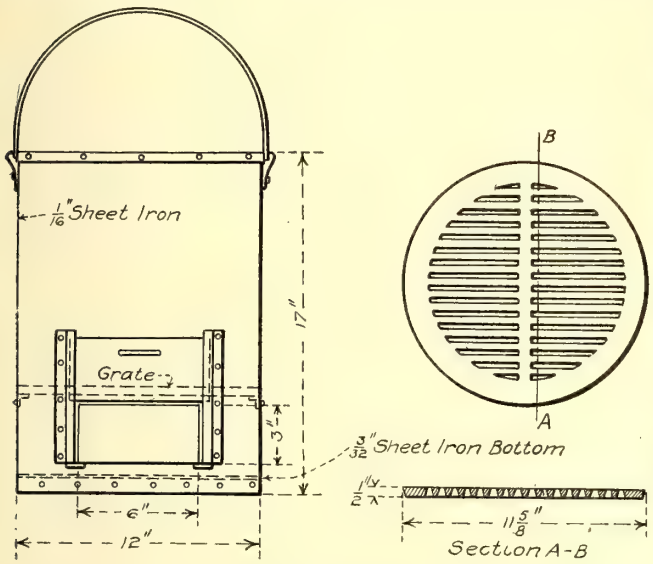
Date.....

	On Hand	Required	Used	Balance	Over or Short		On Hand	Required	Used	Balance	Over or Short
Ears, BH No. 11, 1/0						Insulators, sidefeed, with Brooklyn					
" BH No. 21, 2/0						" wood strain					
" 4/0 15"						" globe "					
" 2/0, stub, L-390-1						" small Brooklyn strain					
" 3/0, " "						" large " "					
" 3/0, 12"						" frog pull-off					
" 4/0, grooved						" G.E. sectional					
" type 'N,' 1/0, splice						" automatic switch					

Brooklyn Line Department—Part of Second Page of Crew Stock Report

these are the days of the heaviest traffic. The care of the four horses assigned to every crew is divided among the men, but the foreman is held responsible for their condition.

The calls for an emergency crew are written on form N.S.-680 and are received by the telephone operator at the line department headquarters. The telephone operator assigns the proper crew to answer the call, but if the crew wanted is out on the line, he calls up the nearest one available. Form N.S.-150 shows a report made out by the emergency crew foreman to over 24 hours' work. This report gives the location, nature, cause of the trouble, the stock used and the number of calls answered. All work of importance is checked up by a special inspector from headquarters in the same manner as in the case of the construction crews.



Brooklyn Line Department—Charcoal Furnace Used by the Line Crews

Among the accompanying illustrations are views of the High Street and Fourth Avenue buildings, together with their crews and tower wagons. The Nostrand Avenue emergency crew uses a modern automobile tower wagon. The body and tower of this wagon were built by the company and the wagon has been in service for one and a half years. It has been found that after the men become accustomed to the automobile they prefer it to horse-drawn wagons. It is not practicable to compare the cost of the gasoline service with horses owing to a number of changes made in the equipment and other causes. The main question, however, seems to be that of obtaining the proper size and type of automobile rather than of making a choice between horse-drawn and motor-propelled vehicles. The advantages of the storage battery wagon have been considered, but the company has not yet reached any definite conclusions on this type for emergency work. It has also been considered for use by construction crews, owing to its inherent capacity for being started and stopped quickly and accurately. This feature would permit more work to be done in streets where frequent interruptions to the work are caused by cars and other traffic. In this class of work horses are not so quick and reliable and they also occupy valuable space in the streets.



Brooklyn Line Department—Nostrand Avenue Emergency Crew Room with Sliding Pole



Brooklyn Line Department—Tower Wagon and Emergency Crew at High Street



Brooklyn Line Department—Emergency Crew Quarters at Fourth Avenue and Thirty-eighth Street

ANOTHER PITTSBURGH REPORT

On Aug. 11 B. J. Arnold submitted to Mayor Magee, of Pittsburgh, another report on the subject of transportation in the Pittsburgh district. The first part of this report gives a history of the city as a center of transportation, dating from the time when the trip from Philadelphia to Pittsburgh by stage coach took 20 days. The Pennsylvania Railroad reached Pittsburgh from Philadelphia in 1854 and a steam railroad to Chicago was opened in 1859, the same year that a horse-car line was constructed in that city. The city was one of the first to introduce the horse car and the cable system and was a real pioneer in building electric railways.

According to Mr. Arnold, a study of the local transportation system in Pittsburgh should not be confined to the city limits, but should include the district of Pittsburgh. Of the 581 miles of track comprising the present system of the Pittsburgh Railways Company, only 260.35 are within the city limits. Of the 1,000,000 people served by the system only one-half are found within the city proper. Although there are some competing electric railways in some of the various cities, such as Homestead and McKeesport, nearly the entire population of the district depends for street railway service upon the Pittsburgh Railways Company. The striking feature of the locality from a transportation standpoint is the scattered way in which the district has been settled. One important reason for this is that the industrial enterprises have sought the few level factory sites along the river edges and in the valleys contiguous to the railroads, whereas the residents have built their homes on the hilltops in an effort to get away from the smoke. European cities are much more densely built up. Up to a critical point, depending on the locality, the greater the population per acre, the cheaper the public utilities such as gas, water, electric light and transit may be supplied. Continuing, Mr. Arnold said:

"The Pittsburgh District has already been very completely outlined by its local transportation system; now the building up of the vacant spaces must take place. This can best be accomplished by limiting further advancement into outlying territory to *actual necessities* and by furnishing better service over the track already provided.

"What is needed in the Pittsburgh District at the present time is a 'get together' movement. The division lines between the different parts of the district must be more completely broken down and the various communities must grow out to meet one another, and become massed into one community. In bringing about this desirable result, the lines of the local surface transportation system will play the most important part.

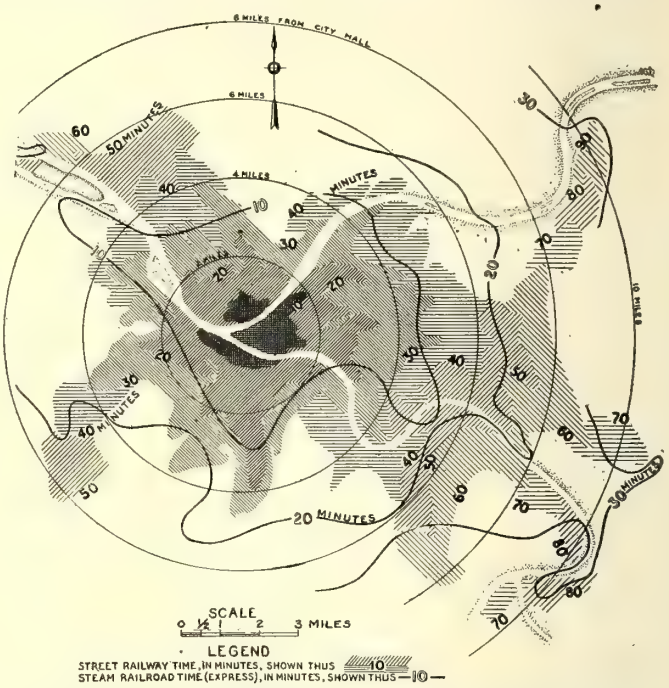
DIFFICULTIES THAT MAY BE TURNED INTO ADVANTAGES

"It has often been pointed out that the rugged topography consisting of steep hills, deep ravines and only a few level spots, the narrow streets, the concentration of business into a section of 300 acres, the division of the city by its rivers into three parts, the isolated outlying communities and the lack of continuous street systems, are a unique combination of disadvantages which make it difficult to secure ideal or even good transportation. However, it is very possible that a little study may turn many of these disadvantages into benefits. For instance, the fact that the city grew up without a definite plan resulted in many "cross cut" thoroughfares between the different centers. This is really an advantage over those cities having a right angle street plan without diagonal avenues. The development of the district, primarily by local communities, will be a distinct benefit to traction developments in the future, as the scattering of the shopping and amusement districts throughout a city means considerable short haul business, which will get on and off the through cars, thus utilizing them in the most profitable way. The more passengers that may be accommodated by each seat on a single one-way trip, the more efficient is the use of each car, and to secure this result, the more scattered the centers which attract riders, whether for business or pleasure, the better the service that may be given with the same equipment.

"The fact that it is impracticable to run large cars up into the hills, where narrow and crooked streets with excessive grades exist, may be turned to good account toward securing better service by allowing this disadvantage to dictate the use of a transfer system, using the small hill climbers on through routes from one hill section to another, connecting by means of a convenient transfer station to the main line of larger cars, which will carry passengers through the business district to other transfer centers on opposite sides of the city. A similar transfer system has been worked out in Boston with notable success.

"The entire situation, therefore, is by no means hopeless and does not demand radical changes in design or method of operation. A transportation system should really keep ahead of the development of the district which it serves, and fortunately the records of other cities show that increased business follows immediately after improved facilities.

"It appears quite probable that the poor business during the past several years has been the result, to a certain extent, of poor service, and that the curtailment of equipment was not



Time-Zone Map of Pittsburgh, Showing Relative Running Time of Trolley Cars and Steam Trains

justified entirely by the falling off in receipts. At any rate, with returning prosperity, the service should be considerably improved, and good business will no doubt be the natural result.

ONE DISTRICT, ONE SYSTEM

"The most striking feature of the transportation developments in the Pittsburgh District is that its surface electric railway utilities have been combined into one system. Unification of operation is a result which may or may not be an advantage. At the present time there are some points of disadvantage, resulting largely from the fact that the future of the system was too heavily capitalized at the time the combinations were made.

"There can be little doubt as to the many benefits to be secured by the operation under one management of a large system such as is now controlled by the Pittsburgh Railways Company, but unless the public gets some of the advantages of the combination, there can accrue to the system itself no lasting benefits. The interests of the district and of the company are so inseparable that eventually the sentiment must prevail that the benefits should be divided share and share alike.

"Every effort should be put forth to conserve the progress that has been made toward a combined district served by a single trolley system, but this will be impossible if the company endeavors to collect toll too far in advance or if the citizens of the district fail to recognize that the building up of the system has required faith, enterprise and a large investment which in course of time should have its reward."

The report is accompanied by the time-zone map, reproduced herewith, showing the relative running time of the trolley system and steam railroads. In this map the successive shaded zones indicate the distance the trolley cars travel in 10-minute periods, and the "contour" lines, the corresponding distance for the steam railroad suburban express service. To the steam road time must be added the time of walking to and from the depot at each end so that the advantage of the steam road in point of time is not as great as shown. Mr. Arnold thinks that eventually "electrification" will make possible a frequent service and a downtown terminal for many of the suburban steam railroads, but the speed of the "rapid transit" trains will probably not be much greater than the present express steam service. However, the greater cleanliness, convenience and frequency of the electric trains would greatly increase the present suburban traffic, which even now is growing rapidly.

TRACKLESS TROLLEY SYSTEMS ABROAD

Considerable interest has been excited recently in England on the subject of trackless trolley systems. Two applications have been made to Parliament by cities which have municipal tramway systems to install trackless trolley systems as extensions to their present tramway lines. One of these is from Leeds, the other from Bradford. The report of the committee sent by the latter city to investigate the operation of these systems on the Continent has recently been made public in pamphlet form, and a paper upon trackless trolley systems in general was presented at the last meeting of the Tramways and Light Railway Association by H. England, general manager, Wakefield & District Light Railway. From this paper the following general statement can be made on the operation of trackless trolley systems on the Continent of Europe.

Three methods are employed. The Filovia in use on seven different lines in Italy, aggregating about 42 miles in length, with one of about 10 miles in course of construction; the Mercedes-Stoll, in use in Austria-Hungary on six lines with two in course of construction, and the Schiemann system in use in France and Germany on eight lines.

Briefly, the main features of each system are as follows: With the Filovia system there are two 12-hp motors mounted on the chassis and connected by spur gearing and chain drive to the rear wheels, which are run independently of each other. Rubber tires are employed and current is taken from a two-wire overhead line by an under-running four-wheeled trolley, carried on a pole similar to the ordinary trolley pole. According to the Bradford committee the Italian government grants a subsidy of $300 for each mile of track equipped with the trackless trolley system in districts not provided with railway or tramway service.

In the Mercedes-Stoll system gearless motors are fitted to the hubs of each of the rear wheels of the car. An over-running trolley is employed with flexible cable to connect it to the car. Where two cars pass each other the trolley and cable are exchanged between the cars or else four overhead wires are used.

In the Schiemann system one motor is used and is geared to the front axle. An under-running sliding contact with two overhead wires and two shoes is employed.

In addition to these three systems, the Railless Electric Traction Company is placing on the British market a modification of the Schiemann system, of whose British patent the Railless company is the owner. The chief features in which the Railless Electric Traction Company's system differs from the Schiemann system are in the use of two motors geared to the rear axle and three overhead wires with a three-wheel trolley. The two outer wheels and wires are positive and the inner wheel and wire are negative, and the steel frame and metallic parts of the car are connected through the negative trolley wheel to the negative wire. This construction prevents the danger of reversal of current, but, of course, necessitates the use of three wires instead of two or else six instead of four. The company has also an alternative design employing positive and negative trolley wheels and using two wires only with an arrangement to give audible warning should the polarity of the wires be reversed through any cause.

Mr. England considers the under-running system more desirable than the over-running system: (1) because standard overhead trolley material can be used; (2) because the cars can be turned at the termini without loops, and (3) because the trackless trolley cars can use the tracks and overhead system of trolley cars if necessary. This is an important point in case the trackless trolley system is owned by an electric railway. It enables the trackless cars to be run to the electric railway repair shop for overhauling and repairs. He considers the disadvantages of gearless motors more than outweigh their advantages, even if a chain drive has to be employed with the geared machines. The motor or motors should always drive the rear wheels to make steering easy. He estimates the cost of overhead construction complete at $7,500 per mile, the cost of motor cars $3,000 each and trail cars $1,250 each. Car maintenance should be 3 cents per car-mile and the amount of power required would be about 1 kw-hour per car-mile.

In the discussion which followed the presentation of this paper the author's figures on maintenance and power were considered by some speakers as too low.

Mr. England said that the field of the trackless trolley system was for those routes where the traffic was too light to support an ordinary trolley system, which could hardly be made to pay on a longer schedule than 10 minutes' headway.

ELECTRIC TRUNK LINE RAILWAYS IN AUSTRIA-HUNGARY

In a paper presented at the Berne International Railway Congress, Arthur Hruschka, of the Government Railway Engineering Department, presented statistics on electric traction developments in Austria-Hungary. According to him the following electric trunk line railways were in operation at the end of 1909:

Line.	System and voltage.	Length in miles.	Opened in.
Tabor-Bechyn	Three-wire d.c. 700 volts	14.50	1903
Innsbruck-Fulpmes	Single-phase, 2500 volts	11.35	1904
Bludenz-Schruns	d.c. 500 volts	8.06	1905
Vienna-Baden	Single-phase & 55 volts d.c.	17.95	1907
Bruneck-Sand in the Tyrol	d.c., 500 volts	9.52	1908
Neumarkt-Waizenkirchen	" " "	10.06	1908
Trient-Malé	" 800 "	37.25	1909
Total		108.69	

In addition there are some 16 extended electric tramways and mountain railways aggregating about 94 miles in length.

Two additional trunk lines are under construction by electricity aggregating 87.6 miles viz. Vácz-Rákospalota, 31 miles, being equipped with 15 cycles single-phase and 10,000 volts and St. Pölten-Mariazell-Gusswerk, 50 miles, 2-ft. 6-in. gage, being equipped with 25 cycles, single-phase and 6000 volts.

In 1906 a branch of the Austrian Government State Railways was formed to study the subject of the electrical equipment of different lines. An examination of the available water powers was made and 11 schemes with an aggregate capacity of 140,000 hp were worked out. Calculations were also made of the application of this power to 2722 miles of track. An official report on the results will appear shortly. Those lines to which especial attention has been given are in the neighborhood of Trieste and Innsbruck. While no official decision has been rendered in the selection of system the speaker favored the single-phase. In this conection he stated that the only other system worth serious consideration was the three-phase, whose principal advantage was the smaller weight of car for the same output. Plans have already been prepared by the Austrian Government engineers for the equipment of certain of its railway lines with the single-phase system at 15 to 16⅔ cycles and 10,000 volts.

The Hungarian Government has also considered electrification. It has plans prepared for the equipment of one line with three-phase equipment and has decided to use single-phase on another but has not definitely settled upon any standard system.

The appendix to the paper contains detailed technical descriptions of the lines mentioned by the author including those under construction and projected.

VALUATIONS OF THE DETROIT UNITED RAILWAY—II

In the issue of the Electric Railway Journal for Aug. 13, 1910, an account was presented of some of the events leading up to the present complicated situation with regard to the renewal of certain franchises of the Detroit United Railway. The conflict between the city and the railway company goes back to the early part of 1909 when the Committee of Fifty was appointed by Mayor Breitmeyer to investigate the entire situation. A sub-committee on appraisal selected Frederick T. Barcroft to make the appraisal of the company's property. The present article includes a statement of the position of the company regarding the Barcroft appraisal, a brief abstract of the Barcroft appraisal and a statement by R. B. Rifenberick.

PUBLICITY DESIRED BY THE COMPANY

The position of the company regarding the Barcroft appraisal is shown by a letter addressed by J. C. Hutchins, president, to Mayor Breitmeyer on June 14:

"I am in receipt of your communication asking if the Detroit United Railway will accept the so-called Webster ordinance now in the hands of the Common Council, having written into it the valuation of our property made by Mr. Barcroft.

"I believe it is well known, certainly to the Committee of Fifty, that we cannot accept the ordinance with such valuation.

"We assured the committee, as we assure you, that, to enable the committee to develop any plan of settlement of our differences with the city, we would co-operate with and give them all the information concerning the affairs of the railway that we had in our possession, with the distinct understanding that all investigation of values and all proceedings relating to an appraisal should be public; in fact, the only condition we attached was that we should, when any points of difference arose, be given a public hearing. We knew then, as we know now, that the people of this city will never vote for any settlement based upon a valuation about which they have no authentic information. The first necessary step, therefore, was to lay authentic information before them in such a way that all who so desired might know the truth. The plan outlined by the Committee of Fifty promised us an opportunity that we have never before had to inform it and the public of the actual value of our property devoted to the transportation of the people of the city of Detroit, and so we very gladly went to great expense in making a complete inventory.

"Mr. Barcroft assured us that his work would be conducted fairly and openly, and that we would be given full opportunity to meet and discuss such points of difference as might arise. With this assurance we commenced our work, and agreed that as fast as the schedules were completed they should be turned over to Mr. Barcroft. On March 5, 1909, we furnished him with a complete set of blue prints of the real estate maps of the Detroit United Railway, and later furnished him duplicate copies as well as drawings of the same. On March 31, 1909, we furnished him a complete inventory of power station A, pipe shop of the power department, battery station K, battery station L, city revenue cars and equipment, and all the different departments of our Monroe shops. On the first list sent him we did not place our own appraisal value, and he requested that we should do so at once. From that time forward we furnished a complete schedule of all our property with our own valuations attached. Contrary to promise given, we were neither consulted nor informed as to what was subsequently done with them by Mr. Barcroft and his corps of appraisers. From time to time we expressed a desire to know what was going on and to learn what was being done with our data, but received no information whatever, but always a promise that at the proper time we should be given a hearing. It is sufficient to say that from the first to last we never were given a hearing and never were permitted to know what was going on until the book called 'The Barcroft Appraisal' appeared in print. The total of the figures appearing therein is astoundingly at variance with our own.

"From as careful an examination as we have been able to make of this so-called appraisal, we are able to state that it has omitted bodily from consideration at all millions of dollars of our property used in the city service. It gives no method of procedure nor does it furnish any means whatever of ascertaining how the appraisement was made, nor does it give the reports of his assistants from which to check up Mr. Barcroft's own conclusions. Neither does it point out any errors or mistakes of our own appraisal. All we do know is that the total stated by Mr. Barcroft is a gross undervaluation of our property, and, if the board of directors of the Detroit United Railway should accept it as a basis of an ordinance, they would betray the trust imposed upon them. I am, therefore, obliged to say that for these reasons, among others, neither the Barcroft figures nor an ordinance with those figures written into it can be accepted.

"When the committee developed an ordinance based upon the principle of giving a stated and certain return to the capital invested in the railway properties, it appealed to us as eminently just to all, and when that committee was informed by General Manager Brooks that the valuation by Mr. Barcroft could not be accepted under any circumstances, the committee proposed an arbitration of values, which proposition was at once accepted by us. A high court of arbitration was appointed, composed of men whose integrity, ability and fairness was beyond criticism or question, and at its first meeting, when it asked our representative if its findings would be accepted by us as final, it was unhesitatingly assured that they would be. We felt then, as we do now, that the proposed arbitration by men of such character would furnish the people of Detroit the best information to be had concerning the value of our property.

"While we approve the cardinal principle of the ordinance, we desire to state that we are averse to making any contract for a long period of years, and that we are not seeking such a contract. But we do believe that we are under obligations to meet every reasonable proposition toward a fair adustment.

"It is my belief that the ideal relation between a street railway company and a municipality would be that there should be no fixed-term franchise at all. One main reason for this was well stated by Judge Tayler in his remarks before the Board of Commerce, when he said: 'No man can foretell what the cost of transportation will be in the future; it may be halved or it may be doubled.' This fact alone renders a long-term franchise undesirable to either party. Both the railway and the municipality should have the right at any time when conditions have changed to appeal to some competent tribunal to change the rate of fare in accordance with the changed conditions. Arbitrary, fixed fares for a long period of years may do injustice to one side or the other.

"The street railways in our city, subject to such inconsequential changes as the Common Council may find necessary, are in the streets permanently, and there are only two questions to be solved, which are: Who shall operate the street railway system, and how shall it be operated? On these two questions the Detroit United Railway stands ready at all times to meet the people or their representatives in efforts to solve these questions fairly for both parties.

"The average rates of fare now charged on any of the lines in this city are below those in effect elsewhere in the world. And so it would seem, in fact, we all know, that the immediate necessity which confronts us all in this rapidly growing city is the extension of railway lines into those portions of the city not now served, and the construction of such tracks and loops as will sensibly relieve much of the present congestion of traffic."

BARCROFT APPRAISAL, DETROIT UNITED RAILWAY

The report of the appraisal, a book of 237 pages, includes photographs of the members of the appraisal committee of the Committee of Fifty, of Frank W. Eddy, chairman of the Committee of Fifty; Mayor Breitmeyer, of Detroit; Frederick T. Barcroft, director of the appraisal, and of various engineers and assistants who took part in the work. Illustrations of various units and of other parts of the property of the company are also included in the book. An abstract follows:

The introduction states that the system within the city limits includes 170.41 miles of track, over which are operated, in ad-

dition to the interurban traffic, 998 revenue cars. Two generating plants develop 13,500 kw, and the company also purchases 3100 kw from the Detroit Edison Company. The company owns 81 buildings, including those which are used for railway purposes and those utilized as dwellings and for commercial purposes.

The land used for street railway purposes within the city limits amounts of 68.23 acres. It is stated that the Detroit United Railway is the successor to 50 corporations that have been organized or have engaged in the transportation business in Detroit and suburbs subsequently annexed to the city. The introduction states that among those engaged on the work were the following:

William D. Ray, Chicago; Frank E. Johnson, Chicago; Walter H. Evans, Buffalo, N. Y.; Fred H. Froehlich, Toledo, Ohio; Fred G. Simmons, Milwaukee, Wis.; Albert H. Sisson, Chicago; William E. Richards, Toledo, Ohio; H. D. Sanderson, Toledo, Ohio; Edward C. Dunbar, Detroit; Herbert L. Russell, Detroit; Henry D. Miles, Buffalo, N. Y.; Frank W. Hall, Detroit; Daniel M. Deininger, Chicago; George D. Mason, Detroit; John H. Tigchon, Detroit; Edward I. Stimson, Detroit; Charles Kotting, Detroit; Claude M. Harmon, Detroit; James B. McKay, Detroit, and Holmer Warren, Detroit.

The property is divided into 10 sections as follows: 1, Real estate; 2, buildings except power stations and battery stations; 3, power plants, including buildings; 4, battery stations, including buildings; 5, power distribution, including overhead feed wires and telephone system; 6, track; 7, rolling stock, including equipments; 8, shops; 9, tools, materials, supplies, furniture, etc.; 10, overhead charges.

REAL ESTATE

The real estate of the company was investigated and valued by a committee of the Detroit real estate board. The company owns 68.39 acres of land used in the operation of its city lines. Of this amount 50.021 acres are in actual use for railroad purposes and 18.374 acres are not in use for railway purposes. The appraisal considers the land only and does not include any of the buildings. The entire property was divided into 40 items, 26 used for railway purposes and 14 not so used. The real estate is valued as follows: Total real estate, $685,320; not used for railway purposes, $121,772; land used for railway purposes, $513,548; electric depot property, $50,000.

BUILDINGS

Comment is made on the buildings as follows: "With but a single exception, uniform ugliness is the particular characteristic of these buildings, and this applies not only to the older structures, but to those which have been built within comparatively recent years. No depreciation has been applied, except for condition. Many of the buildings are located on prominent avenues and streets, but instead of adding to the beauty of the city, they are a blot on the landscape. The majority of the buildings are of common brick, and no other thought than utility seems to have entered into their design or construction. However, they have been valued only as buildings, and no analysis or distinctions have been made as to whether they are the best for the purposes for which they are employed. Nor has any analysis been made to determine what proportion of cost should be charged against city operation and what against interurban." The total values of the buildings are stated as follows: Total value of buildings owned by company, $602,808; not used for railway purposes, $24,045; used for railway purposes, cost, $654,884, and present value, $578,763. The values of the buildings not used for railway purposes are stated as follows: Cost, $64,084; present value, $24,045.

POWER STATIONS, INCLUDING BUILDINGS

Regarding this part of the property, the report states: "The power-house buildings are of brick with stone and concrete base construction and are considered to be in good condition. Each power house has one extension to accommodate the growth of the system and the greater demand for current." It is also stated that power-house costs "have decreased considerably since stations 'A' and 'B' were built. If these two stations were combined under one roof the cost of generating electrical energy would be decreased. The future points to the ultimate shutting down of the power house and the renting of electrical energy elsewhere because of the cheaper cost and the desirability of permitting the central-station company in supplying power to carry the power-house investment and fixed charges rather than the railway company." The power plant has been appraised on the basis of what it is doing and not as a mere element of material and machinery. The sole purpose of such a station being to produce certain power, the usefulness of the building necessarily follows the machinery.

The recapitulation of values placed on stations "A" and "B" is as follows: Power station "A," cost, $626,248; present value, $502,681. Power station "B," cost, $855,080; present value, $716,370. Totals, cost, $1,481,328; present value, $1,219,051.

BATTERY STATIONS

The value of two battery stations are stated as follows: Battery station "K," cost, $126,021; present value, $110,575. Battery station "L," cost, $102,231; present value, $89,912. Totals, cost, $228,252; present value, $200,487.

POWER DISTRIBUTION

The appraisal of the overhead system of the company included the following: Poles, span wires, trolley wires, overhead positive feeder wires, underground positive feeder wires, overhead negative feeder wires, underground negative feeder wires, special feeder and trestle construction, overhead special work, underground system, line equipment, miscellaneous copper.

The report states that every line in the city was inspected and that from 10 to 15 poles per mile were uncovered at the ground line. This was done on both wood and iron poles. It is stated that, as a general rule, the iron poles are well set and in good condition and that the life of the majority could be increased by painting. The wood poles examined, it is stated, bore out the knowledge of average conditions of life affecting property of this character. The report adds:

"The pole fixtures, such as iron brackets and cross-arms, are in good condition, but need additional painting. The switch pans, crossings and section insulators are in fair condition. Practically all of the trolley is 2/0 round hard-drawn copper. In general, this was found to be in good condition." Practically 90 per cent of the feed-wire material was found to be in good condition.

The report says that the distribution and oversight of all wires in the city should be under the arbitrary control of the city electrician.

Iron poles were valued at $2.75 per 100 lb., and the labor of erecting was computed at $9.78; 30-ft. to 45-ft. cedar poles were valued at from $5.50 to $12.50, and the labor of erecting at $4; 50-ft. to 60-ft. Idaho poles were valued at $14.25 to $21, and the labor of erecting at $5.35; 30-ft. to 40-ft. octagon pile poles were valued at $7.50 to $12.50, and the labor of erecting at $4. The cable was valued at 17 cents per pound. The total number of poles was as follows: Iron, 7498; cedar, 2409; Idaho, 113; octagon Northern pine, 201. Iron cross-arms were valued at $2.20 to $3.50, and the cost of labor for erecting 1244 was computed at $1 apiece. Maple cross-arms were valued at 30 cents to 60 cents apiece, and the cost of labor for erecting 2212 was valued at 50 cents apiece. For 266.99 miles of positive feeder lines, aggregating 2,710,459 lb., values were assumed as follows: Cost, $486,314; present value, $461,998. A total of 211.95 miles of No. 00 trolley wire was valued at $85,050 cost and $68,040 present value. In computing the distances 1 per cent was allowed for sag. Following is a recapitulation of the values placed on the overhead line materials: Total of items, cost, $1,154,187; present value, $1,037,279. Contingencies, cost, $57,709; present value, $50,784. Totals, cost, $1,211,896; present value, $1,088,063.

TRACK

In valuing the track six elements of constructive value and two destructive factors were considered, the constructive elements being as follows:

1. Substructure, foundation, kind, drainage.

2. Ties, kinds, quality, treated or untreated.
3. Railway, type.
4. General alignment, gage and grades, representing the condition of above.
5. Age of all these units and their effect on each other.
6. Adequacy, present, future.

The destructive factors, both positive and continuous, were stated as follows:

First, the element which is subjected to mechanical wear and when worn out by mechanical destruction carries with it destruction and consequent disturbance of all the other elements that are allied with it.

Second, the element of age. If the age of track, as a complete unit existing under uniform conditions for a period long enough to establish its life, can be obtained, as a fact, it would simplify the problem very much, but no such records exist.

Depreciation of the trackage was determined by consideration of the following factors: The condition of the rails, rail joints and flanges, the weight of the rails, substructure of ties and the foundation under the ties and drainage. It was found that there were 21 types of rails used in Detroit and 204 types of construction, including paving.

The value of the rails, so far as present scrap value was concerned, was determined by measuring and the life of the rails was determined by taking into consideration "that it is only one factor in the track construction."

The introduction to this feature of the report states: "The company has no records of its track construction or replacement work, and it was impossible to get information concerning existing conditions beneath the pavement without an unwarrantable amount of labor and effort. This was finally accomplished after a fashion by consultation and investigation with the company's track men. The various types of rail in use are explained by the fact that the present company is a consolidation of various other companies."

The report adds that the company objected to the proposed method of valuing track by life and depreciation. The types of rails generally used are said to be exceptionally poor types of grooved girder. The report adds that the welding on the T-rail is somewhat better than on the grooved girder, and that the work done this year is an improvement over that done last year. It is stated that, in determining the value of track special work, each lay-out was considered, listed and estimated upon the cost required for this work, ties, joints, ballast, excavations, labor required to install it. All the items entering into track work are purchased directly by the company. The company requested that $12,000 be added for rail inspection at the mills. Some of the bases of cost computed in connection with the straight track construction were as follows: White oak ties, 75c to $1.18; cedar and pine ties, 60 cents to 65 cents each; track foundation, earth filling, 22 cents per cubic yard, gravel $1.80 per cubic yard, crushed stone $1.95 per cubic yard, concrete $4.50 per cubic yard; rails, "T," $31.75 to $33.75 per ton; girder groove, plain girder and tram, $40 per ton. A summary of the straight track mileage is as follows:

Single track, 167.4891 miles; special Ys, turn-outs, etc,, 2.92199 miles; total, 170.41109 miles; car station yards, etc., 12.93 miles; grand total, 183.34109 miles.

The cost value of straight track mileage, exclusive of special work, etc., was placed at $2,534,565, and the present value at $1,821,922. Track in the car station yards and power houses was valued at $115,262 cost and $80,684 present value. Track in the electric depot yards was valued at $1,424 cost and $1,096 present value. The special track work was valued as follows: Cost value, $708,894; present value, $473,169. The grand summary of the track totals was as follows: Cost value, $3,601,-336; present value, $2,599,222.

ROLLING STOCK

The car equipment was classified as follows: Revenue cars: 518 closed car bodies, single trucks; 230 closed car bodies, double trucks; 230 open car bodies, single trucks; 20 open car bodies, double trucks; 3 miscellaneous, double trucks; total of 748 single-truck cars and 253 double-truck cars.

Non-revenue cars: 3 special cars; 106 miscellaneous work cars.

In the appraisal the cars of the company were considered as part of the equipment of a going concern and they were not valued "at their forced sale or scrap value, except when the material was obviously fit for scrap only." The cars were divided into groups, each group representing the cars purchased or built under the same contract or specification. One, and usually two cars selected at random from each group were carefully checked with the specifications and examined in detail. Every car was examined for general condition. There are fewer sets of trucks than cars.

"An average amount for each of the elements of value for each group has been determined by examining all of the cars in the same group for condition and type of trucks, taking the average cost per car in its present form from each group, and deducting from the same the amount necessary to make it as good as new in that particular type. Car bodies were examined and considered at what it would cost to produce them new in their present type, and condition was placed on them. They were further considered for depreciation due to obsolescence of type and age and size. The later double-truck closed cars are not depreciated except for general repairing and condition and age.

Sixteen-ft. to 25 ft. single-truck closed cars, body only, f.o.b. Detroit, were valued at $1,130 to $1,582; 28-ft. to 29-ft. double-truck closed car bodies were valued, f.o.b. Detroit, at $1,950 to $2,125. Single-truck double-end open-car bodies were valued, f.o.b. Detroit, at $1,032 to $1,182. Double-truck single-end open-car bodies were valued, f.o.b. Detroit, at $1,490. These prices included various items.

A summary of the total values placed on the cars is as follows:

	Cost.	Present value.
518 closed single-truck cars	$1,095,603	$765,768
230 closed double-truck cars	745,705	662,071
230 open single-truck cars	374,569	188,800
20 open double-truck cars	48,420	43,234
3 miscellaneous revenue cars	14,046	13,456
Total	$2,278,343	$1,673,329
2 non-revenue special cars	3,703	3,583
104 non-revenue work cars	97,691	97,087
Total	$2,379,737	$1,773,999
Old cars and miscellaneous car fittings	14,125	14,125
Grand total	$2,393,862	$1,788,124

The equipments were valued as follows:

	Cost.	Present value.
Revenue car equipments	$1,186,427	$998,747
Special car equipments	2,276	1,643
Work car equipments	93,532	72,890
Grand total	$1,282,235	$1,073,280

GRAND SUMMARY ROLLING STOCK.

	Cost.	Present value.
Car bodies and trucks	$2,393,862	$1,788,124
Car equipments	1,282,235	1,073,279

MECHANICAL DEPARTMENT

The report criticises one of the two repair shops on the ground that it was designed originally for an entirely different purpose and was simply re-arranged for present requirements and, therefore, cannot be said to be ideal either in location or in general arrangement for repairing equipment. The company requested that the appraisal include $34,000 for money invested in patterns, but this was not done. It is stated that the location of the division car stations are convenient for economical operation of the lines. Summaries of the values placed on the shops are as follows: Monroe shops, $170,074; Harper shops, $24,578; air-compressor outfits, $71,298; car inspectors' outfits, $38,769; total, $308,719.

TOOLS, MATERIALS, SUPPLIES, FURNITURE, ETC.

This section covers the equipment at the emergency stations, the furniture, fixtures and stationery at car stations, and the furniture, fixtures, supplies, etc., at the general offices. The present value is stated at $728,158.

OVERHEAD CHARGES

The discussion on this subject is followed by the text of the

capital accounts prescribed by the New York Public Service Commission, Second District. The discussion is, in part, as follows:

"No objection can be raised to corporation fees, legal expenses, transfer and registrar fees, for the reason that such charges are local and must be met with in every case. They are incidental and preliminary and cannot be avoided.

"The amounts per year as compensation for executive and other officers and incidental expenses in connection therewith, also are reasonable and cannot be criticized.

"Question of salary is always one of wide range. It is a purely local one and depends upon what the majority of the owners of the stock deem reasonable.

"Engineering instruments, office furniture, adding machines, automobiles, etc., are all an asset and properly a capital charge, and the salvage value of these items should be credited to the final overhead expense.

"The item of contingencies, as applied to the various classifications of construction, covers elements of incidental expense and losses of time and material, and all other items not possible to tabulate in a precise manner, or charge a specific sum against them. On parts of the work this is somewhat greater than on others. The buildings can be contracted for and construction contracts are drawn to cover every contingency. The risk is assumed by the contractor.

"Overhead charges should be depreciated in the same proportion as the present condition of the physical property bears to its cost, and this charge, when added to the physical elements depreciated, represents the net depreciated physical and overhead value of the property.

"If it is not necessary to maintain the property in the same condition as when new, then the amount now depreciated on physical elements could have been established as an initial saving in the first place by buying second-hand materials, partially worn cars and power houses, in fact, everything of the same type as now exists after a use of from 2 to 15 years, and so save that per cent of original capital charge.

"All property, unless possible to maintain in the same condition as when first established and constructed, should carry a depreciation fund sufficient to equal the replacements demanded by new types in the near future, and which may be impossible to take care of in short periods of time.

"It is a poor criterion that overhead charges should remain at 100 per cent when their whole function has been one of constructing physical properties, which at the same instant are much below that percentage of condition.

"Administration charges can only continue to exist where administration is a fact. On lines where franchises have expired, it is a question for disposal whether or not these charges exist after the expiration of the rights of the company."

The total overhead charges were placed at $1,024,310.

PAVING

Paving was not considered an asset of the company in the preparation of the appraisal. The question as to whether the paving was to be considered as an asset or tax was submitted to P. J. M. Hally, corporation counsel of Detroit, and it was his opinion that the legal title to the pavement was in the city of Detroit and not in the company. The report adds:

"The paving can have a value to the company when it was all new and laid at one time, and then only in the sense that they have prepaid their taxes up to the point of the first renewal. Thereafter the repairs and renewal become an annual maintenance charge or tax.

"If the company has charged the maintenance of this paving to capital account, it is not justified in so doing, and has done so because it has not provided for the renewal of any physical property by a depreciation reserve, and if it has charged this to operation or maintenance under those circumstances, the result is a tax, by whatever name it has labeled it.

"The company should have been compelled to charge the cost of original paving to 'cost of initial paving account,' which would be automatically wiped out in eight years, assuming, for example, that this is the life of the paving, by being credited with one-eighth of the cost of the paving annually. The maintenance and repairs after the above date should be charged to operating account 'paving.'"

STATEMENT BY MR. RIFENBERICK

A copy of a long letter addressed by Robert B. Rifenberick to the editor of *Engineering-Contracting* has been sent to the ELECTRIC RAILWAY JOURNAL. In his letter to the ELECTRIC RAILWAY JOURNAL Mr. Rifenberick states that "the article is a true statement of facts concerning the 'Barcroft Appraisal' of the property of the Detroit United Railway lines in the city of Detroit." In his letter to *Engineering-Contracting* Mr. Rifenberick states that as the committee was embarrassed for lack of funds to carry on its work, Mr. Hutchins, president of the Detroit United Railway, agreed, at the request of the committee, to have made for its use an inventory of the property of the company that would be as thorough, complete and exhaustive as it was possible to make it so that any competent engineer with proper assistance familiar with this line of work could readily check the figures in a few weeks' time. With this end in view the Detroit United Railway employed Mr. Rifenberick to assist its department heads and a large number of its employees in compiling this inventory. Mr. Rifenberick adds that the first schedule of this inventory was completed and given to Mr. Barcroft on or about March 31, 1909, and that the other principal schedules followed in rapid succession. To get out the inventory in the shortest possible time, Mr. Rifenberick states that a force of over 150 employees of the company worked. He adds: "It is the work of these employees for which you have so earnestly and perhaps without knowledge, and therefore unintentionally, given Mr. Barcroft the credit, as this 'Barcroft Appraisal' is a copy verbatim of the work of the employees of this company, excepting omissions and arbitrary reductions and confusions of the items and prices turned in to him by his own appraisers. Naturally, working as we did, with a large force, and at it so continuously, there were several other schedules of inventory turned in to Mr. Barcroft before Mr. Brooks ordered the placing of the appraisal prices on same. This order necessitated the putting at work of a large additional number of men to comply therewith, but it was immediately done, and every schedule of inventory from the first to the last was handed Mr. Barcroft in detail with every detail item from a tin cup to a turbine unit priced and thus, before Mr. Barcroft or his appraisers had done any of the work of their appraisal, he had as complete and as exhaustive an inventory of the various schedules of this property as we were able to furnish him, together with what we believed to be the reproduction price of same. This cost the company many tens of thousands of dollars.

"Mr. Barcroft, during the interim, from his appointment on this work in February, 1909, to April, 1910, when this 'Barcroft Appraisal' was published, endeavored to impress the public with the idea that the company was interfering with it and refusing him necessary information, and that this 'appraisal' is the result of his most strenuous labors, despite this claimed handicap. Nowhere in this 'Barcroft Appraisal' can it be found wherein this company has been given credit for furnishing him any information at all, or of having given him the least assistance in connection with his work.

"Right here I state as emphatically as words can express it that the work published as the 'Barcroft Appraisal' is a copy, practically verbatim, of the information furnished him by the company in accordance with the promise of Mr. Hutchins to the Committee of Fifty, and that I have in my offices, ready for the inspection of anyone, the original of everything pertaining to the property of this company that appears in this 'Barcroft Appraisal.'

"It was understood that the appraisal of this property was to be made as of a going concern for street railway purposes, and that the condition and usefulness of this physical property, at the time this appraisal was to be made, would readily be shown by an actual personal examination of the items appraised, and that any engineer or appraiser familiar with the

construction and use of the things he was appraising would put such value on same as he found it to be worth in the actual operating condition it showed when examined. Therefore, any competent appraiser would have no need of knowing the age of the article or item, for this knowledge would only have tended to have warped and interfered with his judgment of its value. If this is the kind of parlor appraisal that was to be made, any intermediate school boy, if given the original cost, the age and a fixed rate of depreciation, could have ascertained the present value of this physical property as easily and accurately as the most trained engineer."

DISCUSSION ON HEAVY ELECTRIC TRACTION AT MECHANICAL ENGINEERS' MEETING

In connection with the joint meeting of the American Society of Mechanical Engineers and the British Institution of Mechanical Engineers, held last month in London and Birmingham, five papers on "Heavy Electric Traction" were read at the session of July 29. The authors were George Westinghouse, W. B. Potter, L. R. Pomeroy, H. M. Hobart and F. W. Carter. Abstracts of the papers of Messrs. Westinghouse and Potter were published in the Electric Railway Journal for July 2 and 9. Mr. Pomeroy's paper dwelt on the superiority of electric traction over steam locomotives, especially for very heavy trunk line service and congested suburban traffic.

Mr. Carter expressed the opinion that there appeared to be little prospect at the present time of general electrification of railways in Great Britain. His investigations had convinced him that the commercial advantages of electric traction could be demonstrated in general only in the case of very heavy suburban service and even here the margin in favor of electrification by no means was overwhelming. The case of entirely new railways was much more favorable to electric operation.

Mr. Hobart presented a comparison of existing single-phase and direct-current suburban installations in Great Britain. His conclusions based on what purported to be accurate data were that the cost of current plus the interest on the investment in rolling stock (leaving out of consideration any difference in cost of generating and distributing systems), was 6 cents per train mile higher for single-phase than for direct current in moderate service and might be as much higher as 12 cents per train mile in the case of very severe service. The advantages of direct current over single-phase current were more apparent the higher the schedule speed and the shorter the distance between stops.

The discussion on the papers was opened by H. F. Parshall. He said that both the New York Central and the New Haven roads were handling a class of traffic by electricity that could not be handled by steam locomotives. He did not regard the New Haven road as a good example of a single-phase system because many of the safeguards as to reliable operation had been omitted. The British Board of Trade would not give its approval to an installation constructed as the New Haven system had been built. In England the cost of a transmission system for an electric railway was about 15 per cent of the total as against 45 per cent for cars and locomotives and 35 per cent. for generating stations. The cost of the transmission system was only one-third that of the locomotives and in his opinion the economy of direct-current locomotives over single-phase locomotives both as to first cost and operating expense would quickly wipe out any saving in the comparatively small item of the transmission system. Distance was only a factor in so far as the transmission system was concerned and the transmission system of a single-phase system was heavily handicapped. Owing to the compensating properties of the rotary converter, its existence was fully justified in a direct-current system because of the material economy effected by having a power factor of unity in the transmission system. In conclusion Mr. Parshall said that the direct-current system was the only one known in the present state of the art that could compete with steam in the situations where electric operation was generally applicable, namely for dense urban and suburban traffic.

J. Dalziel, Midland Railway, believed that main line operation by electricity was not only commercially possible in Great Britain but was comparatively imminent. The selection of a system applicable to all conditions was the most important problem of the day. The results of tests made by him showed that the single-phase system was burdened by few of the disadvantages attributed to it and that it was the best system for general use. This opinion advanced by Mr. Westinghouse was shared also by Continental engineers who have almost universally adopted single-phase. The trend of opinion expressed at the recent International Railway Congress was in favor of single-phase. Mr. Dalziel did not see how the subject of electrification could be narrowed down to consideration of separate sections and districts. Railways in general during the last few years had expended enormous sums in double-tracking and in yard improvements in order to increase their carrying capacity. An equal or greater increase in capacity could have been obtained at less cost by adopting electric traction. To ignore electric traction for main lines was to incur the risk of insurmountable complications in the future and retard development. Single-phase in suburban work must have very serious disadvantages to warrant its being discarded when its many advantages for main line operation were admitted. Much of the trouble with single-phase apparatus referred to in Mr. Potter's paper undoubtedly was due to the complications involved by attempting to operate single-phase motors on direct-current sections. As demonstrating the reliability of single-phase equipment the speaker said that only four electrical failures had been noted in the 2½ years of operation of the Midland Railway's single-phase Heysham line. With regard to efficiency he cited comparative figures to prove that the single-phase motors on the Heysham line consumed 20 per cent less current than direct-current motors on the Liverpool-Southport line when running at the same schedule speed. Mr. Dalziel strongly objected to the data on the Midland single-phase equipment given in Mr. Hobart's paper and said that the errors introduced by these incorrect data entirely vitiated Mr. Hobart's argument and conclusions respecting the superior efficiency of direct current.

Sidney Stone called attention to the fact that the wear on the track of the electrified railways in Great Britain was excessive, more particularly on those using multiple-unit equipment. On the District Railway where long trains with only three motor cars were used the rails were badly worn at intervals of about 40 ft. He thought the cause of the wear was due to the fact that when a motor car was operated at each end of a train the forward car on entering a curve encountered an excess of side friction on the rail. The rear motor car did not meet with the same resistance and consequently its power was expended in pushing the entire train around the curve. This threw the intermediate cars out of their normal tangential position and caused the trucks to dig into the rails. He thought that the forward motor car of a multiple-unit train should always have more motor capacity than the rear cars so that the couplings between cars at all times would be in tension.

C. F. Scott made some general comparisons between single-phase and direct current. Single-phase motive power equipment cost more and the transmission and distributing lines cost less than a direct-current installation. The losses in the direct-current system were greater between the power house and the car. In general, the amount of current generated for a direct-current system would be 25 per cent greater than for a single-phase system for each kilowatt-hour delivered to the cars. The cost of power on the New York Central had been given as 2.6 cents per kw-hour, of which only 40 per cent was charged to the power station and 60 per cent to the transmission line and substations. Taking the substation and transmission cost for alternating current as one-fourth that of direct current the cost of direct-current power could be shown to be 50 or 60 per cent more than for single-phase. Very slight differences in assumptions such as Mr. Hobart made in his paper might lead to very different conclusions. Referring to Mr. Potter's paper, Mr. Scott questioned the assumed cost of electrical maintenance for

alternating-current equipment which was given as 1.5 cents per car mile. The cost of maintenance on the Indianapolis & Cincinnati Traction Company's lines had averaged less than 1 cent per car mile for the last three years. The cost of car equipment assumed by Mr. Potter, he also criticized. Ten single-phase cars at $17,000 each and ten 1200-volt, direct-current cars at $10,000 would fulfill the assumed schedule service and on this basis the total cost of the two systems would be about equal. In comparing two systems as Mr. Potter had done, due consideration should be given to the relation between car equipment and line capacity. It would be unfair to assume three times as many cars required as could be operated with the assumed line capacity or to assume a line capacity so small that not more than the scheduled number of cars could be operated at one time. In conclusion Mr. Scott thought it was significant that the New Haven was the only electrified steam road in the United States which was actively proposing to extend its present electric zone for trunk line service.

Philip Dawson sent a telegram to the meeting regretting his unavoidable absence and calling attention to a number of errors in the fundamental data on the South London Elevated trains which appeared in Mr. Hobart's paper. The correct data would completely change Mr. Hobart's conclusions.

Angus Sinclair did not believe there was the least indication of the probable extension of electric traction for handling through freight trains.

J. G. Wilson agreed with Mr. Westinghouse that a uniform system of electric traction might be very desirable for many reasons but he thought it was impracticable and not absolutely necessary. He compared two railways entering London. The Great Eastern had the heaviest suburban traffic in Great Britain while the Great Northern had only a small suburban traffic but handled an enormous mineral traffic on its main line. The Great Eastern could use direct current to the best advantage for its heavy suburban service and single-phase might prove to be the most economical for the Great Northern to adopt. If one of these roads for the sake of promoting interchange of equipment had to give way to the other which system should be adopted and what inducements could be held out to the railway which relinquished its advantage? He did not believe that it was economically sound to delay the adoption of electric traction until a uniform system could be decided upon because the advantages of uniformity were remote and problematical while the advantages to individual companies which in the meantime are being foregone are large and self-evident.

H. H. Barnes, Jr., referred to Mr. Scott's criticism of the number of cars assumed by Mr. Potter in his comparison of the single-phase and the 1200-volt, direct-current systems for an interurban line. The speaker had made some calculations to show that even with half the number of cars the difference in favor of 1200-volt direct current was $20,000 per year instead of $32,000 a year. The brush maintenance of alternating current apparatus was much higher than direct-current apparatus. Mr. Barnes thought that just as many men were employed on an alternating-current road as on a direct-current road, the substation employees being offset by men needed in other departments. Particular attention had to be paid to the maintenance of the rail bonds of an alternating-current system for economical operation.

J. A. F. Aspinall, Lancashire & Yorkshire Railway said that he discovered soon after the opening of the Liverpool-Southport line that if the cost of repairs to motors and trucks was to be kept down it would be necessary to revert to the use of larger bearings such as were employed on steam locomotives. Low center of gravity and excessive non-spring borne weight in his opinion were responsible for much of the excessive rail wear observed on electrically operated roads. As the general manager of a large railway system he expressed the belief that no railway company could afford to disregard the possibilities of electric operation. The utilization of the equipment to its fullest capacity was an important point in favor of electric operation. A steam locomotive is engaged in doing useful work less than 28 per cent of the time.

ELECTRIC RAILWAY LEGISLATION IN MASSACHUSETTS IN 1910

Matters of interest to public utility corporations occupied a prominent place in the recent session of the Massachusetts Legislature. Of the total number of bills considered 84 were of direct interest to electric railways.

One of the most important bills passed was that permitting the New York, New Haven & Hartford Railroad to acquire the stock of the Berkshire Street Railway. A feature of the act is the requirement that various extensions and improvements shall be made in the electric railway system serving the country between Springfield, Pittsfield and North Adams. Facilities are to be given to communities at present without adequate transportation and gaps in existing through lines are to be filled. An expenditure of about $2,000,000 in electric railway improvements is contemplated under the act. An extension is to be made from Great Barrington to the Connecticut boundary, and another from Huntington to the Berkshire Street Railway. The Railroad Commission has full supervision over the security issues and sales and it is provided that fares shall not be increased or service decreased as a result of the transfer of control. The railroad company is required to offer minority stockholders the price paid by it for a majority control.

By Chapter 536 the Legislature defined and extended the authority of the Railroad Commission to supervise the issue of bonds by street railways. The board may prescribe the minimum price at which such bonds shall be sold, and may modify the price from time to time. Whenever the board authorizes or has approved the issue or sale of bonds of a face value in excess of the amount determined by it to have been properly expended or to be properly required, it may, in its order of approval, or at any time thereafter, require the company issuing such bonds to establish a sinking fund, estimated to realize at the maturity of the bonds a sum equal to the difference between the amount or amounts for which such bonds were authorized and the face value of the bonds, and may designate some Massachusetts trust company as trustee and custodian of the fund, and may from time to time change the trustee. The provisions of any agreement made relative to the sinking fund between the railway company and the trust company are to be submitted to the board and are not valid until approved by the latter.

Among the labor laws passed was Chapter 445, providing that if an employer, during the continuance of a strike among his employees, or during the continuance of a lock-out or other labor trouble among his forces, publicly advertises or solicits persons to work for him to fill the places of strikers, he shall plainly mention that a labor disturbance exists.

Chapter 518 provides that the several boards and commissions authorized to grant locations to street railways may grant temporary locations on public or private land, or public streets, for the purpose of enabling the company to maintain uninterrupted service. The Railroad Commission is permitted to approve such locations without a hearing.

The termination of the fiscal year for electric railways was made June 30 instead of Sept. 30 by Chapter 558.

The Boston & Eastern Electric Railroad was authorized to construct a tunnel under Boston Harbor by Chapter 630. The law provides that the Railroad Commission and the Boston Transit Commission, sitting as a joint board, shall determine the general character, size, design and location of the tunnel, and on agreement it may be connected with the subway system of the Boston Elevated Railway. The issue of securities to pay for the construction is placed under the jurisdiction of the joint board. The company is authorized to take land for the construction by right of eminent domain, and the tunnel is to be built without cost to the city. Upon the completion of the tunnel and before it is opened for use, the company is required to convey it by deed to the city free from all incumbrances, and in return obtains the use of the tunnel for 40 years. The company is to maintain the tunnel, light it, and

so far as necessary in the opinion of the board, ventilate it. Any railroad company may use the tunnel subject to conditions determined by the board. The act expressly declares that nothing in it shall be held to be a declaration that public necessity and convenience require the construction of the tunnel.

The transit bonds of the city of Boston were exempted from the provisions of the law relative to city loans by Chapter 437. By Chapter 579 the Boston Transit Commission was authorized to relocate the westerly terminus of the Riverbank subway, subject to the approval of the Boston Elevated Railway, bringing the tracks to the surface at a point about one-quarter mile west of the terminus originally fixed near the Charlesgate East.

In Chapter 355 railroad corporations were authorized to operate their lines by electricity or such other power as the Railroad Commission may approve, and Chapter 629 provides that the Board of Gas & Electric Light Commissioners be directed to investigate the transmission of electricity and the laws bearing upon it in Massachusetts, with particular reference to the carrying of energy in bulk through several towns, and the location, construction and maintenance of transmission lines.

By Chapter 567 it was provided that the rates of fare charged by street or elevated railways for the transportation of pupils of industrial day or evening schools shall not exceed one-half the regular fare charged by the companies for the transportation of other passengers between those points. Tickets are to be sold to such pupils in lots of 10 each.

Chapter 443 provides that a street railway company incorporated under the laws of the State may purchase from a foreign company that part of its property that lies within the State, when the line of the foreign company connects, intersects, or forms a continuous line with that of the purchasing company, provided that the facilities for travel be not diminished or fares increased. The Railroad Commission is to approve the terms of such a purchase.

It was provided by Chapter 453 that no street railway company shall require passengers whom it permits to ride upon the platform to do so at their own risk, and no such passenger shall be prevented from recovering compensation in damages for any injury by reason of the fact that he is so riding.

One of the most important matters considered by the Legislature was the electrification of the steam railroads in the Boston district. Chapter 134 directs the railroad corporations operating within the metropolitan district of Boston to prosecute studies with reference to the electrification of their passenger service in the district, and to present the results of such studies by Nov. 1 to the Joint Board on Metropolitan Improvements created by the Legislature of 1909. The joint board is directed to continue the investigation of the subject and to report upon it to the Legislature of 1911, with the draft of an act which shall provide for the electrification of all railroads of standard gage in the district within a stated time, and which shall empower the proper board or boards to determine the manner in which the work shall be prosecuted.

Chapter 596 provides that a street railway, with the consent of a railroad corporation owning tracks, may, to such an extent and subject to such terms and regulations as the Railroad Commission may approve or prescribe, operate cars upon such tracks as are equipped for electric operation and the tracks of the street railway may be connected with those of the railroad system by approval of the board.

Chapter 587 provides that if an electric railroad does not begin the construction of its road and expend thereon at least 10 per cent of the amount of its original capital stock within two years after date of its certificate of incorporation, and does not complete and open its railroad for use within four years of that date, its corporate powers shall cease, unless the Railroad Commission, after a public hearing, shall extend the time. A similar provision is made in the case of extensions of electric railroads.

Several important questions were referred to the State commissions by the Legislature for consideration and report to the Legislature of 1911. Besides the resolve relating to electrification, the joint Commission on Metropolitan Improvements is required to hold public hearings on the advisability of constructing a tunnel between the north and south stations in Boston; on the question of ownership of such a tunnel, the terms upon which it should be built, and to submit a bill providing for the construction of the tunnel or the layout of its route by a proper board. The Railroad Commission is required to consider whether any legislation making it compulsory under certain conditions for street railways to receive and convey over their tracks traffic or cars tendered by connecting street railways is desirable.

Chapter 139 provides for an investigation by the Railroad Commission and Boston Transit Commission, jointly, as to whether it is in the public interest: First, To provide for the acquisition by the Boston Elevated Railway of stocks and bonds of other street railways, or for the acquisition of the property and rights of other street railways in any other way; second, to provide for extensions before expiration of the existing contracts for the use of the Tremont Street subway, the Washington Street tunnel and the East Boston tunnel, and third, to determine by what method the advantages of a single control of the systems of the Boston Elevated Railway and the West End Street Railway may be continued. The joint board is also required to investigate and report upon the Codman bills for the construction of a subway loop in the West End of Boston, in connection with the existing subway under Tremont Street, and to investigate the cost of construction of a subway from Park Street to the South Station in Boston, and the need of subways to South Boston and Dorchester, from Park Street.

ELECTRIFICATION PLANS OF CANADIAN PACIFIC RAILWAY

The Canadian Pacific Railway Company is said to be considering plans for the electrification of a portion of its old steam line to Prescott and the formation of an electric railway belt line around the city in connection with the Hull Electric Railway controlled by the Canadian Pacific Railway, for the purpose of creating at Ottawa a large industrial area for manufacturing sites.

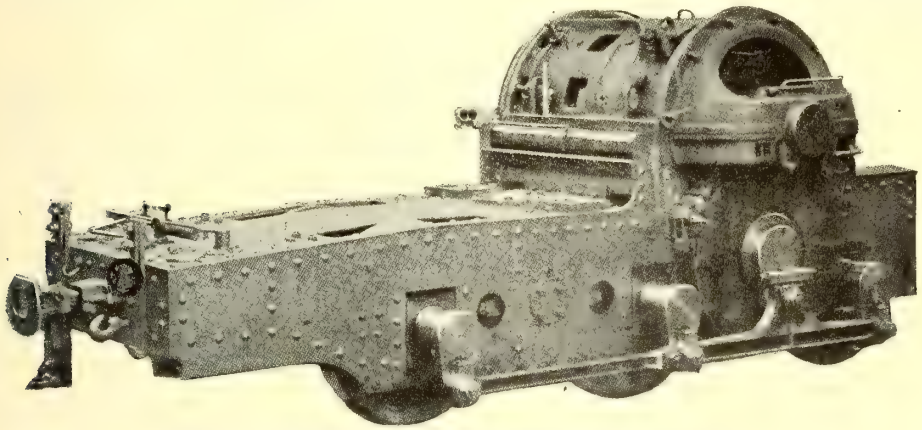
Briefly the plans include the electrification of the old Prescott line from the Union Station to the Sussex Street station, connecting the Sussex Street station with the mouth of the proposed tunnel by a surface electric line, connecting the Hull electric line with the line thus formed, which would create an electric belt line giving access to a large area of suburban residential property, and create an industrial district along the old Prescott line from Hurdman's bridge into the city, along the banks of the Rideau Canal.

In an interview, N. Cauchon, consulting engineer of the Canadian Pacific Railway Company, at Ottawa, on Aug. 8, is reported as saying that the electrification of the Prescott line through the city of Ottawa is being considered because the company realizes the great industrial possibilities of Ottawa, and is anxious to develop them. At the present time manufacturers on the Sussex Street line are at a great disadvantage in getting cars in and out. The freight yards are located on the flats and there is a haul of 11 miles around to Sussex Street. In connection with the development of the district is a proposal from the Ottawa & Morrisburg Electric Railway which has been made to the Canadian Pacific Railway, which contemplates turning over the Prescott line from Ridgemount, near the Chaudiere Junction, to the electric traction company, thus providing it with an entrance into the city.

Should the scheme with the Morrisburg Company fail to materialize a plan has been suggested to the Canadian Pacific Railway to connect the Sussex Street branch with the proposed tunnel from the Central station, and, with the electrification of the tunnel and the Prescott line, to form an electric belt line around the city from the Union station to the Cenral station, then to the Sussex Street station, and around to the Union station by way of the Prescott line. The old Prescott line is the original railway entrance to the city of Ottawa. At the present time its traffic consists of freight trains at infrequent intervals.

GEARED SIDE ROD LOCOMOTIVE FOR AUSTRIAN SINGLE-PHASE RAILWAY

The *Bulletin* of the International Railway Congress for June, 1910, contains a report on electric traction in Austria and Hungary by Arthur Hruschka. Included in the report is a description of a novel geared side rod locomotive for the St. Pölten-Mariazell-Gusswerk Railway in lower Austria. This is a single-phase railway 66.5 miles long and having a track gage of 2 ft. 6 in. Current at 6000 volts and 25 cycles is supplied from an overhead catenary conductor. The line has but one track and traverses the Austrian Alps, with numerous steep grades and sharp curves. Electric traction was decided upon because the traffic had increased beyond the capacity of steam operation; the maximum speed with steam locomotives was 18.6 m.p.h. while with electric locomotives the maximum speed will be increased to 30 m.p.h.



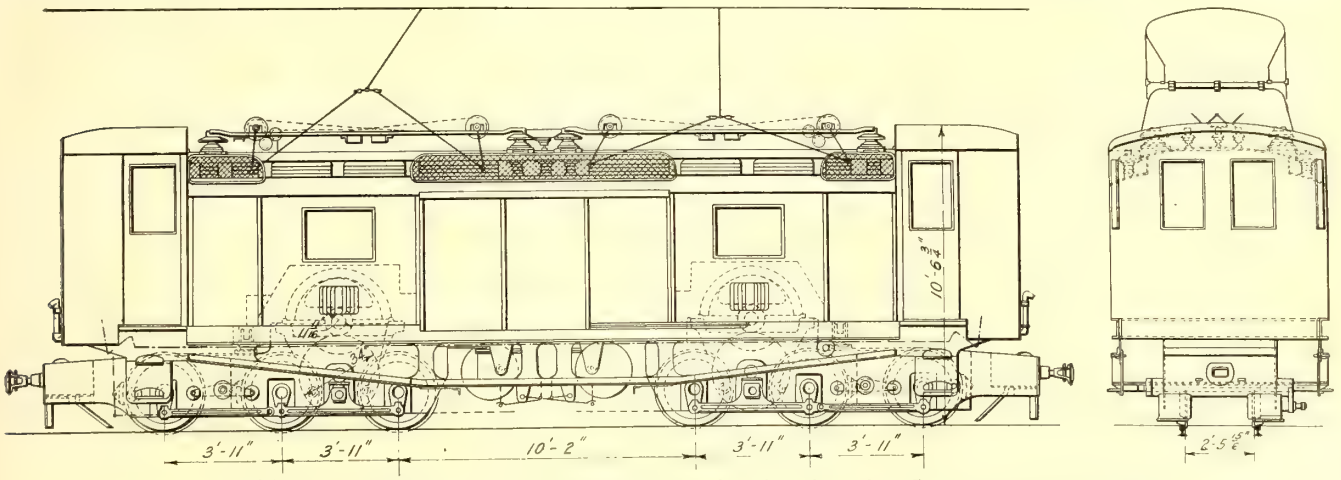
Truck and Motor of Geared Side Rod Locomotive

Seventeen electric locomotives have been ordered from the Linzer Locomotive Works, the electrical equipment being supplied by the Austrian Siemens-Schuckert Works. Two locomotives will be operated with multiple-unit control when hauling heavy passenger or freight trains. The accompanying engravings illustrate the principal features of construction. The locomotives consist of two six-wheel swiveling trucks on which a long cab is mounted. The drawbars are attached to the outside end frames of the trucks but the draft of the forward truck is transmitted through its center plate and the cab underframe to the center plate of the rear truck. The trucks have plate frames built outside of the wheels on account of the narrow track gage. Each truck carries a 250-hp single-phase series motor with commutating poles mounted above the truck frame and between the middle and the inside driving axle. A feature of the design which it is claimed reduces the danger from derailment on curves is the location of the truck center plate in front of the middle driving axle. When rounding a curve the centrifugal force acting on the large mass of the motor tends to revolve the truck and relieve the pressure of the forward or guiding wheels of the front truck on the outside rail.

Each of the two motors weighs 4400 lb. As shown in the engraving from a photograph the armature bearings are on the extreme ends of the shaft. A pinion is mounted on each end of the shaft inside the bearings and meshes with a gear on the end of a jack shaft passing through the truck frame between the middle and rear driving axles. The gears are outside of the truck frames and are enclosed in dust-proof gear cases. A gear ratio of 2.9 is employed. On the end of the jack shaft outside of the gear a crank arm and pin is pressed on and this pin is connected to the driving wheel crank pins by a T-shaped parallel rod. The forward driving wheel is connected to the middle wheel by a side rod with a knuckle joint. The cranks on opposite ends of the jack shafts are quartered so that a uniform torque is obtained at the driving wheels. This arrangement permits the use of a wide motor entirely supported by springs and gives the locomotive a high center of gravity. The upper half of the motor can be removed for inspection or repairs.

Each of the two motors is supplied with current at 250 volts. A motor-driven blast fan is used for cooling the fields, armatures and commutators. Each motor is supplied with current from its own transformer. Speed regulation is obtained by changing the secondary transformer voltage in seven steps through step-by-step switches and relays. The transformers are placed in the center of the locomotive and are mounted on rollers. They can be removed by opening the wide side doors in the cab. High-tension current is collected by two bow collectors on top of the cab. The collector frames are raised and lowered by a hand winch and are designed for variations in the height of the trolley wire from 12 ft. to 18 ft. The flexible bows automatically reverse their position when the direction of motion is reversed.

The locomotives weight complete 99,180 lb., divided as follows: mechanical parts, 46,284 lb.; motors and gears, 26,448 lb.; transformers, 15,428 lb.; control apparatus, 8816 lb.; current collectors, 2204 lb. The maximum speed is 31 m.p.h. and the maximum tractive effort, 15,400 lb.



Narrow-Gage Geared Side Rod Locomotive for Austrian Single-Phase Railway

A tube railway has been proposed in London, Eng., to extend from Victoria embankment to the Crystal Palace, with a branch to the Elephant and the Castle. The total length of the route is 8¼ miles, and the cost will be $1,700,000 per mile.

ONE-MAN PREPAYMENT CAR

BY JUDSON H. BOUGHTON.

In the smaller cities, of from 40,000 to 50,000 inhabitants, or less, the traffic and earnings of a street railway system are not sufficient in many instances to justify the employment of conductors on the cars. There are, however, numerous objections to operating street cars in the usual way with only one man. When unaided by a conductor the motorman is required not only to watch the track and operate the car, but to watch the entrance and exit of passengers and to see that their fares are collected and that the necessary transfers are issued. Under these conditions the service can hardly be made rapid or satisfactory, fares are missed in abnormally large numbers and legitimate and other claims on account of accidents accumulate at a rapid rate. Exceptional opportunities are offered to the unprincipled to manufacture claims on account of alleged injuries, and it is difficult for the company to successfully defend these claims in the absence of a conductor, or other witness, to disprove the statements made by the claimant. The accident and legal accounts of small roads operated in this manner are usually excessively high.

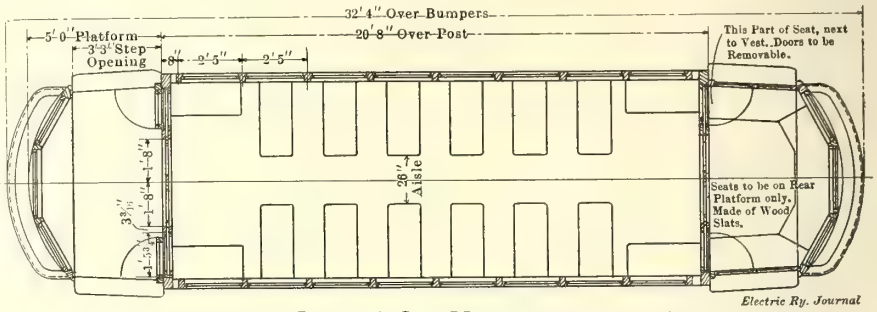
In some instances a compromise plan has been tried by having conductors on the cars during the hours of heaviest traffic. This involves maintaining a force of extra men at considerable expense. These extra men seldom are thoroughly trained, and are not as efficient as regular conductors. With conductors on the cars at certain hours of the day and not at other times the public has another cause for complaint and criticism.



Front Platform of One-Man Prepayment Car

To meet these conditions, which are common to the street railway systems of small cities, a special type of car, designed for one-man, pay-as-you-enter operation, has been developed and put in service with marked satisfaction and success by the Citizens' Railway Company of Waco, Tex., a city of 30,000 inhabitants.

A floor plan of the car, which is of the semi-convertible type, is shown herewith. The car is entered through the right-hand door on the front platform, where the fare is deposited by the passenger in a fare box, change being furnished by the motorman. The body of the car, which is particularly roomy adjoining the doors, is used in the regular way, provision being made for negroes on the rear seats in the main portion of the car, when it is to be used in the Southern States. The steps of the rear platform are entirely removed, and the doors are closed and locked. A shield protects the rear bumper, leaving no overhanging parts on which boys or others may sit or hang. In addition to the regular sash on the doors and windows of the rear vestibule, which can be opened or closed at will, there are screens to prevent entrance or exit through these openings. A semi-circular bench, seating from eight to ten persons, is a part of the regular equipment of the rear platform, which is utilized as a smoking compartment. This feature increases the seating capacity of the car considerably, and has proven to be very popular. The passengers leave by way of the front platform, passing out the right-hand door, under ordinary conditions, although on single tracks and in times of heavy traffic the left-hand front door is available as an exit. Transfers are issued when desired as the passengers leave the car, a transfer-issuing machine being employed for this purpose.



Floor Plan of One-Man Prepayment Car

Under this system of front-end entrance and exit the cars are stopped on the near instead of the far crossing. This method requires somewhat more current in starting cars on curves at street corners, but tends to prevent the injury of passengers who might attempt to leave the car as it runs at reduced speed around the curve. The pay-as-you-enter system which is used and which is now well established is not objectionable in any way, and it insures the collection of the fares much more completely than was possible under the usual system of one-man operation. With the natural tendency on the part of passengers to congregate on the rear platform this method assists materially in distributing the passengers evenly throughout the car and in utilizing the car to its full capacity without causing passengers to suffer discomfort from crowding. The issuance of transfers as the passengers leave has not been found to delay their exit perceptibly, and has proven satisfactory in every particular. With only one entrance and exit to watch, and with that close at hand, and with the burden removed of collecting fares and issuing transfers, under the old system, the motorman is able to devote his whole attention, while the car is in motion, to its operation. Average speeds 25 per cent greater than those permissible under the old system are made possible, thus improving the service to a marked degree. The accident claims have been reduced by at least one-half.

The better facilities for collecting all of the fares, the better service and larger capacity of the cars, the elimination of any expense for conductors and the material reduction in accident and legal expenses have caused a material improvement in both the gross and net receipts from operation. Thus far no serious objections to the use of this type of car operated in the manner described have developed. Three cars of this type, built by the American Car Company, are in service in Waco and the number is to be increased to 20.

THE COLUMBUS STRIKE

On the evening of Aug. 9, 1910, the City Council of Columbus, Ohio, appropriated $25,000 to pay extra expenses of the police department, incurred on account of the strike of the employees of the Columbus Railway & Light Company and adopted a resolution which provides that no money shall be allowed for this purpose until both sides have agreed to submit their differences to arbitration. In his remarks at the meeting Councilman Sherman said that the extra protection is taking money from the taxpayers to humor the whim of one man.

J. C. Pretzman, president of the Chamber of Commerce and members of that body tried on Aug. 9 to induce the strikers to recede from some of their demands, but the officers insisted that the differences should all be submitted to arbitration, which they know the company opposes. The last of the State troops left the city on Aug. 9. Some of the men arrested for disorder have received very light sentences.

On Aug. 9, 1910, it was reported that 30 union men had returned to work at the South High Street car house.

Some discussion has taken place regarding the disposition of the cases of those who have been arrested for rioting, stoning cars and other crimes, and the advisability is being considered of calling a special grand jury to consider the cases. The *Ohio State Journal,* Aug. 11, 1910, said that the rioters should be speedily and summarily dealt with; that the police department should be more vigilant in its protection of people and property, and that the mob spirit which has infested the city should be done away with by force. The opinion is expressed that if long terms of imprisonment were meted out to those who are guilty of rioting trouble would speedily subside.

On Aug. 11, 1910, the directors of the Chamber of Commerce announced that they would not insist upon arbitration until the police department had restored order. On the same day the directors discussed the situation with Mayor Marshall and Safety Director McCune. The plan of placing policemen on cars in the districts which have been most affected by rioting was considered. The directors of the Chamber of Commerce favored this, as they believed that it would result in averting much trouble, but Mayor Marshall objected.

On the night of Aug. 11 a motorman on the Mt. Vernon Avenue line was shot in the leg while his car was in the western section of the city. On the preceding evening muriatic acid was thrown in the face of a non-union motorman on the Oak Street line. This man is at a hospital and may lose his sight.

As a result of a police revolt the work of the rioters was more dastardly on the evening of Aug. 12, 1910, than at any time since the strike was declared. Three persons were shot and nine employees of the company and three policemen were injured. Mayor Marshall ordered the patrolmen to ride on the cars with the motormen on certain lines to protect the crews and the passengers. Thirty-two of the men refused to do duty on the cars and the news soon spread. Emboldened by the idea that the cars would not be protected the rioters made the most of the opportunity. Many arrests were made.

The company announced during the week which ended on Aug. 13, 1910, that all former employees who did not return to work by Aug. 15, 1910, would never be re-employed.

On the evening of Aug. 13, 20 men employed as special policemen refused to obey Mayor Mashall's order to do duty on the cars. This served still further to incite the disorderly element and 10 or 12 persons were injured and a number of cars damaged.

The South Side Business Men's Association adopted a resolution on Aug. 13 asking for the suspension of Mayor Marshall on the ground that he has lost control of the situation. The call of the Mayor for volunteers to aid the police department after the special men had mutinied did not result in a single response.

A story has been published to the effect that the Mayor advised the railway men to organize and that he promised not to put officers on the cars in case of a strike. The story goes that under pressure from the people, he had to break his promise and put policemen on the cars.

The men now in the employ of the company have been authorized to carry arms to protect themselves and their passengers.

On Aug. 15, 1910, Governor Harmon undertook to stop the rioting by ordering out the First Regiment, National Guard, of Cincinnati, and Troop B and Battery C, of Columbus. The local militiamen were on duty within an hour after receiving the order, and the Cincinnati men arrived at 10 o'clock. These forces number 800 men, and sufficient companies of the Third Regiment to bring the number up to 1000 will be added. Governor Harmon issued his orders without consulting Mayor Marshall after a conference with Adjutant-General Weybrecht and the president of the Columbus Chamber of Commerce. He issued this proclamation:

"I have ordered a portion of the National Guard to report for duty at Columbus forthwith. I have done this on my own motion under my authority as Governor. The police force of the city, which is entirely too small at best, has been reduced and demoralized by the open mutiny of many of its members. It has shown itself incapable, without help, of maintaining order. A continuance of this condition would disgrace the State and inflict grievous injuries on its capital city.

"Wherever the blame rests, for it surely rests somewhere, the menace of the situation is beyond question, and I am unwilling to let lawless violence run unchecked for lack of sufficient force to put it down, while the police of the city is being recruited and reorganized and the sheriff is summoning the men of the county to uphold the public authority. It does not mend matters to say the local authorities should have taken these steps sooner, though this is true. Let them be taken now without delay. Meanwhile the troops will render whatever assistance is needed.

"The State expects every citizen promptly to show his colors and lend his aid, so that the emergency which the guard is summoned to meet may speedily be brought to an end and Columbus and Franklin County prove themselves worthy of the right of self-government by meeting their responsibilities. The public interest now wholly overshadows the private controversy which is the occasion of the grave danger that if permitted to continue would threaten the foundation of the government, and the first care of all citizens must be to maintain law and order, because otherwise no man can enjoy his individual rights, whatever they may be."

The 32 policemen who refused to ride on the cars to protect the employees of the company and the passengers have been dismissed from the force. The mayor says that as the troops are in the city he will not be responsible for the operation of cars at night until the force is strengthened.

PROPOSED CHANGES IN THE ELECTRIC RAILWAY SYSTEM OF BUCHAREST

The city of Bucharest, Roumania, covers an area of about 25 sq. miles. There is at present one street railway system operating about 32 miles of double-track lines, of which 3½ miles are electric and 28½ miles are horse-car lines. Upon these, 138 horse cars and 10 electric cars are in service, and the company has 6 electric cars in reserve. All of the cars are small and of inferior pattern. The concession of the present company expires in six years, and unless an extension is obtained its assets revert to the municipality of Bucharest. A new company, 25 per cent of whose capital is owned by the city, has lately obtained a charter, and expects in the near future to build and equip 14 miles of electric lines, six of which, it is stated, will be built in the present year. The old company is attempting to obtain an extension of its concession, but whether it obtains such an extension or its properties revert to the city, a consolidation of the two companies will probably shortly be effected, and the electrification of the entire system will then be undertaken.

COMMUNICATIONS

THE ARNOLD PITTSBURGH REPORT

Pittsburgh Railways Company,
Pittsburgh, Pa., Aug. 16, 1910.

To the Editors:

We have just received the Aug. 13 number of the Electric Railway Journal containing an installment of the report of Bion J. Arnold to the Mayor of Pittsburgh on the Pittsburgh traction situation.

Various curves and tabulations are shown analyzing the service given, on the basis of car-miles operated each year and the statement is flatly made that "according to this record the standard of service furnished decreased from 1902 to 1908 with a considerable improvement in 1909."

Mr. Arnold has failed absolutely to take into consideration either in his calculations or in his discussion of the subject a fact well known to every Pittsburgher—viz., the gradual increase in seating capacity of new cars purchased until the latest car seating 56 people is just twice as large as those in use in 1902. The facts are that of the 600 cars purchased since 1902 all but 100 trail cars are larger than the old car bodies and the average seats per car of all winter car bodies (including motor and trail cars) have increased from 27.3 seats in 1902 to 32.9 seats on April 1, 1910, or 20 per cent.

Correct all of Mr. Arnold's curves and tabulations by allowing for the increased seating capacity of cars operated and you will find even the service during the panic of 1908 as good as that of 1902 and the present service much better.

We do not care at this time to enter into a discussion of other inferences he has drawn from his data but in justice to the railways company the erroneous impression regarding the service furnished should be corrected at once.

Will you please publish this letter, and oblige,

J. H. Reed, Vice-President.

THE DETROIT APPRAISAL

Detroit, Mich., Aug. 12, 1910.

To the Editors:

I notice in your edition of July 9 reference is made to the Detroit situation and certain extracts made from a letter of mine to the Mayor under date of June 25.

You did not publish that letter in full, though it was all equally essential. The paragraphs that are numbered are merely questions to be answered, but the others illuminate the analysis of the situation.

You constantly make the statement that I have "refused to defend my figures." I object to this most emphatically as being an absurd untruth. The procedure suggested was wholly improper and wrong, and could lead to no good result, hence we refused to become a party to it. This was done under the advice of a great many business men, leading attorneys, the gentlemen who employed me and to whom my work was satisfactory, in every particular, approved and adopted by them, and last, but not least, the Corporation Counsel of the city of Detroit, not only advised against it, but absolutely refused to have anything to do with it himself.

Inasmuch as we are all in this solely for the interests of the city, the safeguarding of our client's rights is a responsibility that cannot be ignored, and our actions have been taken with a very careful comprehension and knowledge of the situation as it exists.

We were never able to get into the company's books and until the promise of the company is kept, we would certainly be paying ourselves a poor compliment by meeting the company on any proposed scheme.

The statement which I have made constantly is that I will be very pleased to take a hand in defending the city at any time possible under proper arrangements, in which I have a hand, leading to a definite result, authorized and agreed to by the city and the company ahead of time, and always with access to the company's books.

You must be aware that since this appraisal was made the situation has been further complicated by the expiration of franchises on all the important streets, and the precise application of the values to these particular portions cannot be the same as they were as a going concern. These are legal matters for the city of Detroit to establish.

The actions of certain members of councils are much the same in every town, and it seems strange that in printing the statement of Alderman Harpfer you likewise did not print the statement of Alderman Gutman, assuming that daily expressions of members of the council are essential to the knowledge of the rest of the United States, as reached by your magazine.

I am entitled to simple truth in these notices, just exactly the same as I would be if I had been retained in the same professional capacity for the car company, and was looking after their interests instead of the city's.

Frederick T. Barcroft.

[We are sorry that Mr. Barcroft considers we have done him an injustice, so are glad to publish his letter. We assume that by "the gentleman who employed me" he refers to the committee on appraisal of the Committee of Fifty. But we understand that the procedure criticised by Mr. Barcroft was regarded as a just one by the mayor representing the city which paid for the report and by the executive committee of the Committee of Fifty, of which the committee on appraisal was a sub-committee. Nor have we heard any criticism of the character and ability of the three men selected to act on the board of arbitration. There is also a decided difference of opinion as to some of the other points mentioned by Mr. Barcroft, such as whether the company has fulfilled its promises and whether the railway franchises on all of the important streets have expired.—Eds.]

PROGRAMS OF ENGINEERING AND ACCOUNTANTS' ASSOCIATIONS

The programs for the conventions of the Transportation & Traffic, Engineering and Accountants' Associations at Atlantic City next October have just been made public and are published below.

CONVENTION PROGRAM FOR ENGINEERING ASSOCIATION.

MONDAY, OCT. 10—2:00 P.M.—5:00 P.M.

Registration and badges.

TUESDAY, OCT. 11—9:30 A.M.—12:30 P.M.

Convention called to order.
Address of acting president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Appointment of convention committees.
Report of committee on way matters.

TUESDAY, OCT. 11—2:00 P.M.—5:00 P.M.

Report of joint committee on shop accounting.
(Joint meeting with Accountants' Association.)
Report of committee on power generation.

WEDNESDAY, OCT. 12—9:30 A.M.—12:30 P.M.

Appointment of nominating committee.
Report of committee on equipment.
Report of committee on heavy electric traction.
Convention photograph. Directly after this session. (Place to be announced.)

WEDNESDAY, OCT. 12—2:00 P.M.—5:00 P.M.

Report of committee on heavy electric traction (continued).
Report of committee on power distribution.

THURSDAY, OCT. 13—9:30 A.M.—12:30 P.M.

Inspection of exhibits.

THURSDAY, OCT. 13—2:00 P.M.—5:00 P.M.

Inspection of exhibits.

FRIDAY, OCT. 14—9:30 A.M.—12:30 P.M.

Report of committee on buildings and structures.
Report of committee on standards.

FRIDAY, OCT. 14—2:00 P.M.—5:00 P.M.

Question box.
General business.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

CONVENTION PROGRAM FOR ACCOUNTANTS' ASSOCIATION.

MONDAY, OCT. 10—2:00 P.M. TO 5:00 P.M.

Registration and badges.

TUESDAY, OCT. 11—9:30 A.M. TO 12:30 P.M.

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Address, "The Census and Electric Railway Statistics," by W. M. Steuart, chief statistician for manufactures, Bureau of Census, Washington, D. C.
Paper, "Freight and Express Accounting," by L. T. Hixson, auditor, Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

Report of the committee on interline accounting.
Appointment of convention committees.
Appointment of nominating committee.
New business.

TUESDAY, OCT. 11—1:00 P.M.

"Get-together" luncheon, Marlborough-Blenheim.

TUESDAY, OCT. 11—2:30 P.M.

Report of the joint committee on shop accounting.
(Joint meeting with Engineering Association.)

WEDNESDAY, OCT. 12—9:30 A.M.—12:30 P.M.

Paper, "Method of Determining Overhead Charges," by Henry J. Davies, secretary, Cleveland Railway Co., Cleveland, Ohio.
Address, "Overhead Charges," by Dean M. E. Cooley, of the University of Michigan.
Paper, "Pay Rolls and Invoices," by N. E. Stubbs, auditor, United Railways & Electric Company of Baltimore, Baltimore, Md.

THURSDAY, OCT. 13—9:30 A.M.—12:30 P.M.

Paper, "Collection and Auditing of Receipts of Pre-payment Cars," by M. R. Boylan, general auditor, Public Service Railway Co., Newark, N. J.
Paper, "Detail Records, Their Use and Value," by J. H. Neal, general auditor, Boston Elevated Railway Company, Boston, Mass.
Report of the committee on a standard classification of accounts.
Reports of convention committees.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

CONVENTION PROGRAM OF TRANSPORTATION AND TRAFFIC ASSOCIATION

MONDAY, OCT. 10—9:30 A.M.—12:30 P.M.

Registration and badges.

MONDAY, OCT. 10—2:00 P.M.—5:00 P.M.

Convention called to order.
Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees.
Reports of special committees.
Report of committee on passenger traffic.

TUESDAY, OCT. 11—9:30 A.M.—12:30 P.M.

Report of committee on interurban rules.
Paper, "Excess Fare on Limited Trains," speaker to be announced later.
Report of committee on express and freight traffic.

WEDNESDAY, OCT. 12—9:30 A.M.—12:30 P.M.

Appointment of committee on nominations.
Report of committee on city rules.
Paper, "Use of Metal Tickets," by George L. Radcliffe, superintendent of transportation, Cleveland Railway, Cleveland, Ohio.
Report of committee on transfers and transfer information.
Paper, "Transfer Laws and Suggested Changes," by L. S. Hoffman, general solicitor, Public Service Railway, Newark, N. J.

THURSDAY, OCT. 13—9:30 A.M.—12:30 P.M.

Report of committee on training of transportation employees.
Report of committee on construction of schedules and timetables.
General business.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

CHANGE IN THE CONVENTION HEADQUARTERS OF THE ENGINEERING ASSOCIATION

Owing to important additions which have been decided upon for the Dennis Hotel, the management of that hotel has decided to close before the opening of the convention. This hotel was selected for the headquarters of the Engineering Association. The executive committee of the Engineering Association is now considering the selection of another hotel as headquarters. The announcement as to the name of the hotel will be made within a few days.

SOCIAL PROGRAM OF THE INTERNATIONAL STREET RAILWAY CONVENTION

P. t'Serstevens, secretary of the International Street & Interurban Railway Association, has just issued another bulletin in regard to the convention of the association at Brussels, Sept. 5 to 10. All meetings will be held in the grand hall of the Palais des Académies. The following social program has been arranged:

Sept. 5, 9 p. m., reception in the Salle des Fêtes. Registration.

Sept. 6, 9:30 a. m., first business session; 7:30 p. m., theater party at the Royal Theater.

Sept. 7, excursion to Antwerp with reception at the Antwerp City Hall, lunch tendered by the Antwerp Tramway Company and reception in the evening at the zoological gardens.

Sept. 8, 9 a. m., second business session of the congress; 2 p. m., third business session of the congress; 7 p. m., banquet tendered by the Belgian Government in the Salle des Fêtes.

Sept. 9, 9 a. m., fourth and closing business session of the association. In the afternoon visits to the Exposition and the power station and shops of the Brussels Tramways Company. In the evening, reception at the city hall. Sept. 10 there will be a trip to Ostend in charge of the local railways.

MEETING OF THE EXHIBIT COMMITTEE OF THE MANUFACTURERS' ASSOCIATION

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association held a meeting at the office of the American Street & Interurban Railway Association, 29 West Thirty-ninth Street, New York, on Friday, Aug. 12, for the purpose of assigning space to exhibitors at the Atlantic City convention to be held in October. The meeting was called to order by K. D. Hequembourg, vice-president in charge of exhibits, at 11:15 a. m. The following officers, members of the exhibit committee and representatives of exhibitors were present:

President J. R. Ellicott, Westinghouse Traction Brake Company; Vice-President K. D. Hequembourg, Walker & Bennet Manufacturing Company; Vice-President, Charles C. Castle, U. S. Metal & Manufacturing Company; L. R. Ashurst, Jr., William Wharton, Jr., & Company, Inc.; C. W. Laskay, representing H. T. Bigelow, Hale & Kilburn Manufacturing Company; F. J. Drake, Lorain Steel Company; J. R. Dickey, Baldwin Locomotive Works; F. H. Gale, General Electric Company; John C. Jay, Jr., Pennsylvania Steel Company; J. A. Kucera, ELECTRIC RAILWAY JOURNAL; J. H. Milliken, McConway & Torley Company; Mr. Stone, representing H. G. McConnaughy, Dearborn Drug & Chemical Works; J. C. McQuiston, Westinghouse Electric & Manufacturing Company; F. C. Randall, Allis-Chalmers Company; Charles H. Thomas, Galena Signal Oil Company; J. V. E. Titus, Electric Service Supplies Company; N. M. Garland, representing A. L. Wilkinson, Ohio Brass Company; S. M. Wilson, J. G. Brill Company. There were also present representatives of the following member companies: The Pantasote Company, New York, N. Y.; Whipple Supply Company, New York, N. Y.; Grip Nut Company, Chicago, Ill.; National Car Advertising Company, Chicago, Ill.; Consolidated Car Heating Company, Albany, N. Y.; Duff Manufacturing Company, Pittsburgh, Pa.; *Electric Traction Weekly*, Chicago, Ill.; Midvale Steel Company, Philadelphia, Pa.; National Carbon Company, Cleveland, Ohio; Sterling Varnish Company, Pittsburgh, Pa.

J. R. Ellicott, president of the Manufacturers' Association, complimented the exhibit committee on the work which it had done up to the time of the meeting. The large attendance at the meeting was evidence of the interest which the members of the committee were taking in their work. While he realized the difficulties confronting the committee in allotting exhibit space and was aware that some exhibitors would probably be disappointed in not receiving their exact choice of space, he had full confidence in the committee and was sure that the best assignments possible will be made under the conditions.

K. D. Hequembourg, vice-president in charge of exhibits, said that in appointing the exhibit committee, it had been his endeavor to divide the representation equally between member companies using a large amount of exhibit space and companies using smaller spaces. He called attention to the fact that 75 per cent of the available space had been applied for up to the time of the meeting. The space for which applications had been received already was nearly equal in amount to the total space available for exhibits at the 1908 convention. Of the space applied for, more than one-third had been requested by 11 of the larger companies, each of which wished to use more than 1000 sq. ft. It was to be regretted that the companies wishing to exhibit heavy and bulky devices were restricted in their choice of space to comparatively small areas on the pier, but this could not be avoided because the construction of the pier was such that concentrated loads could not be placed on the floor except over certain areas. Mr. Hequembourg expressed the hope that a building better suited to the requirements of such a large and comprehensive exhibit would soon be available. In such a building, heavy and bulky exhibits could be distributed equally through the exhibit area and the smaller exhibits could be grouped around them. At the present time, the large exhibits must be grouped in one or two locations. He called attention to a change in the general arrangement of

exhibit space, particularly in Buildings Nos. II and III. In these two buildings, all of the delegates in going to and from the meetings at the outer end of the pier must pass through two aisles, whereas in the main building next to the board walk there are five aisles.

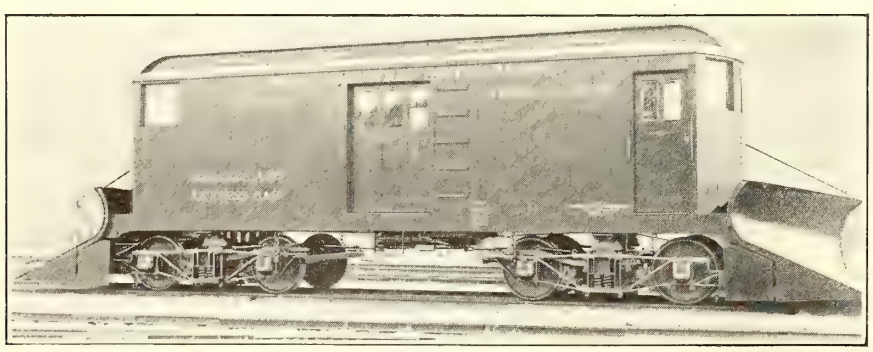
A list showing the names of all applicants for space, the date of application, the aproximate weight of the exhibit, the number of square feet required, the location desired and the requirements as to head room was then distributed to the members of the committee. A diagram which had been prepared to show the conflicts in choice of space was also shown to the members of the committee. This diagram indicated that 53 exhibitors had requested allotments of space in Building No. I. These requests totalled more than 35,000 sq. ft., while there is only 13,000 sq. ft. available in the entire building. A number of letters from exhibitors were read in which reasons were given for requesting particular locations for their exhibits.

After a long discussion, a motion was made and carried, without a dissenting vote, that space should be assigned to all those who had made application prior to the meeting in the order of the amount of space requested by the applicants. The committee then proceeded to assign locations to the largest exhibitors. Good progress was made up to the time of the adjournment at 5 p. m. Assignment of the balance of the exhibit space was left to the vice-president in charge of exhibits. Mr. Hequembourg stated that the clerical work of tabulating, checking and issuing notifications of assignments of space was very great, but that he would endeavor to complete it at the earliest possible moment. It is expected that notices will be mailed to all those who had made application for space prior to Aug. 12 not later than Aug. 20. The complete list of assignments will be made public about Sept. 1.

COMBINATION SNOW-PLOW AND EXPRESS CAR

The Russell Car & Snow-Plow Company, Ridgway, Pa., has brought out for the 1910-1911 season an improved combination baggage and express car and snow-plow illustrated herewith. The car is very substantially built, with steel channels and yellow pine underframe, and has a monitor roof, which imparts to the car a substantial appearance. The car body has a motorman's compartment in each end with outside doors and a passage through car. Large doors are provided at the center of both sides of the car for handling baggage or freight. Russell steel trucks are used with type of brake desired.

The noses are designed for either single or double-track



Combination Snow Plow and Express Car

service, and are all steel and operated by air. They are designed to remove with ease snow to a depth of 5 ft. and can be set either to slide on the rail or to be carried at any point 4 in. above the rail. They are also provided with wings at the rear of nose, which, when opened, will increase by 2 ft. the path of snow removed. These noses can be readily detached, and as the car is provided with M. C. B. automatic couplers it can be used as a locomotive or freight car.

Flangers may be added if desired for the removal of snow and ice to a depth of 2½ in. between the rails. These flangers like the noses, are operated by air under control of the motorman. Levelers may also be attached to sides if desired.

NEW HYDROELECTRIC POWER STATION IN TENNESSEE

J. G. White & Company, Inc., of New York, have been awarded the contract for the complete engineering and construction of a hydroelectric power plant for the Eastern Tennessee Power Company on the Ocoee River at Parksville, Polk County, Tenn. The dam will be of masonry and about 780 ft. long on the crest. The overflow portion will be about 110 ft. above mean water stage and will be of the usual ogee section. The non-overflow portion will be about 13 ft. higher.

The power house will be located on the downstream side of the non-overflow portion of the dam and will be an integral part of it. The substructure will be of concrete and will consist mainly of piers and arches below the dam. The turbines will be located at the elevation of the main floor and will discharge into the tail-race under the arches. The superstructure will consist of brick or stone walls with enclosed steel columns.

The power equipment will consist of four tandem-horizontal turbines with three-phase generators of 3000 kw, with the necessary step-up transformers and switching equipment for the control of the apparatus. Each generator will have mounted on its shaft an exciter having a capacity sufficient for its excitation. The estimated cost of the installation is approximately $2,000,000.

LONDON, BRIGHTON AND SOUTH COAST RAILWAY ELECTRIFICATION

At the half-yearly meeting of the London, Brighton and South Coast Railway Company, held in London last month, the Earl of Bessborough, the chairman, referred to the experience obtained with single-phase electric traction on the company's South London line, and to the extensions of that system to the Crystal Palace lines. He said that there had been continued success with the electrical train services on the South London line, and a further portion of the suburban railways was now in course of equipment for electrical working. The large increase in the number of passengers which took place even at the early stage of the South London services had been uninterrupted, while there was still nothing but praise for the system from the mechanical point of view. It was a little early to say much about the comparative cost of electrical and steam working, but they had made a beneficial arrangement with regard to the very important item of current, and so far as could be foreseen there was nothing else likely to throw any extraordinary expense upon them. In these circumstances the board felt sure the proprietors would endorse its decision to extend the system.

The present scheme consists of the equipment of the railway from Peckham Rye, where a junction was made with the South London Railway, through Tulse Hill to the Crystal Palace, and from Battersea Park, where the South London Railway was joined again, through Clapham Junction, Balham, and Streatham Hill to West Norwood, where the first-mentioned line was met. These lines formed a very important part of the company's suburban system, and served some of its most populous districts, most of which were intersected by the London County Council tramways. The improved services which electrification would make possible could not fail not only to bring back to the railway some of the traffic which had gone to the trams, but to be of general benefit to the districts, and in all probability to produce entirely new business. Moreover, the scheme would be of considerable advantage to the Crystal Palace, and the board had special regard to it at this moment because of urgent representations for improved services which had been made by the promoters of the Imperial Pageant. It was proposed to produce an Imperial Pageant at the Crystal Palace in the spring of next year, and the contracts for the railway works were fixed to be completed by that time.

News of Electric Railways

Opinion of New York Commission on Application of Manhattan Bridge Three-Cent Line

The Public Service Commission of the First District of New York has made public the opinion of Edward M. Bassett, of the commission, on which the decision of the commission to grant a certificate of public convenience and necessity to the Manhattan Bridge Three-Cent Line was based. The application was granted on July 12, 1910, as noted in the Electric Railway Journal of July 16, 1910, page 123. The hearings before the commission on the application of the company resulted in a large amount of testimony being introduced, and a summary of this testimony with particular reference to the cost of electric railwas construction and operation was published in the Electric Railway Journal of April 16, 1910, page 705. In his opinion Commissioner Bassett said in part:

"There is no surface car operation at present through the route mentioned. The new route would, however, include streets where other street surface railroads have franchises and are operated, although a large part of the new route, extending from the corner of Fulton Street and Flatbush Avenue extension to and across the Manhattan Bridge, is to-day entirely free both from tracks and from street surface car franchises.

"The cars of the Brooklyn Rapid Transit Company and of the Coney Island & Brooklyn Railroad operate from many outlying points in Brooklyn to the Manhattan terminals of the Brooklyn and Williamsburg Bridges and they have both applied for extension franchises that will permit them to operate from the general locality of the Flatbush Avenue station of the Long Island Railroad to the Manhattan terminal of the Manhattan Bridge, thus expressing their willingness to undertake this street surface operation. If they could obtain rights for this operation they would carry passengers from the outlying parts of Brooklyn to the Manhattan terminal of the Manhattan Bridge at a 5-cent fare. The applicant company will carry passengers a shorter distance, but will carry them to the North River at a fare presumably under 5 cents. If the Brooklyn Rapid Transit Company and Coney Island & Brooklyn Railroad would carry their street surface car operations to the Hudson River at a 5-cent fare, it would seem right to let them have the use of the thoroughfares sufficient for adequate service, but no willingness has thus far been expressed. To-day persons going from Flatbush Avenue station to Canal Street must pay two fares or else take the subway, which for a single fare will carry them to the corner of Canal and Lafayette Streets. This is a single point, however, on Canal Street, and to go east or west from it involves another fare or a considerable walk. The great convenience of the operation proposed by the applicant company is that passengers will be carried from downtown Brooklyn across Manhattan Bridge and across the Borough of Manhattan from east to west at a fare presumably less than 5 cents. No present line or lines furnish this facility.

"If the operation of the applicant company would monopolize the surface car operation of the bridge, it would be doubtful whether the applicant should be granted this certificate, inasmuch as its lines will not extend to the outlying parts of Brooklyn. The two tracks on which these cars will run will be capable of carrying surface cars of other lines, and moreover there are two pairs of tracks available for surface operation. The proposed line can, therefore, carry on its operations across this bridge without appreciably affecting the capacity of the bridge for other lines, whether surface, elevated or subway.

"A large amount of evidence was presented to the commission by existing companies which seek to prevent the granting of a certificate of convenience and a necessity for the purpose of proving that the cost of constructing and operating the proposed line will be so large that the fare will need to be greater than 3 cents. Without analyzing at this time these facts and figures which have been exhaustively considered, it is sufficient to say that the conclusion arrived at is that the cost of construction and equipment will be such that adequate operation of the same will be possible at a rate not exceeding 5 cents. Although this company is called the Manhattan Bridge Three-Cent Line, and although it proposes to operate at a 3-cent fare, it does not follow that the commission cannot, if the road is built, prescribe a lower fare if a lower fare is reasonable, or allow a higher fare in case operation at 3 cents is found unprofitable. The legislature has prescribed that the fare of a street surface railroad operating within the city shall not be more than 5 cents, but what is a reasonable rate within that limit is by law left to determination under the provisions of the Public Service Commissions Law. Anything that the commission should now determine regarding the proposed fare of the applicant company would not affect the power or duty of the commission to prescribe a reasonable rate hereafter."

After referring to the fact that the Three-Cent Line may be unable to secure the consent of property owners to the construction of its line and the right to operate on streets already occupied by other companies, Mr. Bassett says:

"It should be made emphatic that the public convenience and necessity are deemed to exist for the entire line from the Flatbush Avenue station of the Long Island Railroad in the Borough of Brooklyn to the Hudson River in the Borough of Manhattan, and that if the company should fail for any reason to secure operating rights for the whole route, it should not be allowed to operate a part. For instance, if it fails to secure operating rights to carry its passengers further west than the plaza of the Manhattan Bridge it should not be allowed to construct and operate its road to that point only. This would be accomplishing by indirection what the commission would refuse if applied for directly, because it would be even less for the public interest that the applicant company should stop its operation at the Manhattan terminal of the Manhattan Bridge than that the Brooklyn Rapid Transit system of Coney Island & Brooklyn Railroad could stop at that point, inasmuch as the two last named companies would at a fare not exceeding 5 cents carry passengers from many outlying parts of Brooklyn.

"After the applicant has obtained its franchise from the city, the consents of abutting property owners arranged for, its entrance into streets and parts of streets now occupied by other railroads for more than 1,000 feet assured, it will need to come to the commission for a certificate of permission and approval under the Public Service Commissions Law before construction and operation can begin. At that time the commission will make inquiries regarding the accomplishment of the requisite preliminaries."

Transit Affairs in New York

In an interview which he gave before he sailed for Europe recently, Adrian H. Joline, one of the receivers of the Metropolitan Street Railway, New York, N. Y., is reported to have said:

"I am taking this opportunity for a few weeks' vacation because my business here in connection with the Metropolitan Street Railway is practically at a standstill owing to the absence from the city of some of the members of the Public Service Commission and the lawyers for the receivers. The Metropolitan Street Railway is in excellent shape and everything is running smoothly. During the term of the receivership, which is now nearly three years, there have been fewer accidents than ever before, proportionately to the population and the number of people carried, and as a consequence fewer damage suits. A great saving has been effected in this way.

"I do not believe that there is any known system that can be installed whereby conductors cannot 'knock down' a certain amount of money handled or collected, but the stealings of the conductors are infinitesimal in comparison to the stealings of the public. The pay-as-you-enter cars have overcome this public stealing to a great extent, but

not altogether. It is impossible for conductors to attend to their duties and at the same time arrest and eject every person who enters a car and takes a place well forward without having paid his fare. When the new cars were put on the Lexington Avenue line, some months ago, the public rushed to patronize them and many entered without depositing their fare. These are, however, minor details which will eventually be rectified to a great extent. At present the street railways in New York are in better shape than ever before, and with honesty on the part of the traveling public there is scarcely a line that would not pay well."

William R. Willcox, chairman of the Public Service Commission, has returned from Europe.

Judge Lacombe, in the United States Circuit Court, has denied the motion to compel Messrs. Joline and Robinson, receivers of the Metropolitan Street Railway, to pay the expenses and disbursements incurred by the Broadway & Seventh Avenue Railway, the Forty-second Street & Grand Street Railroad and the Thirty-fourth Street Crosstown Railroad in the suits to compel the Metropolitan Street Railway to pay all tax franchises and assessments. After referring to the decision in the case of the Harlem Railroad and the Fourth & Madison Avenue lines, in which it was held that these taxes should be paid by the lessee and not by the lessor, Judge Lacombe says that if the receivers are not bound to pay the taxes, they are certainly not bound to pay the costs in the proceedings.

Meeting of the Central Electric Railway Association—The next meeting of the Central Electric Railway Association will be held at the Claypool Hotel, Indianapolis, Ind., on Sept. 22, 1910.

Strike of Substation Employees.—A strike of the employees in the substations of the Northern Electric Railway, Chico, Cal., caused the company to suspend service temporarily. The employees demanded an increase in wages and a reduction in the working day.

Toledo Company Asked to Pay Paving Bills.—On the evening of Aug. 11, 1910, the City Council of Toledo, Ohio, adopted a resolution, directing the Toledo Railways & Light Company to pay the city paving bills, which amount to $41,908.92, immediately upon service of the resolution and its legal publication. It is said that if the company does not settle the bills action will be taken to declare certain franchises void.

Electrical Exhibition in San Francisco Postponed.—The date of the opening of the electrical exposition in the Coliseum, San Francisco, Cal., of which mention was made in the Electric Railway Journal of Aug. 13, 1910, page 276, has been postponed from Aug. 20, 1910, to Sept. 17, 1910. The exhibition will be held under the auspices of the Pacific Coast Electrical Exposition and will remain open eight days. D. M. Moses, 34 Ellis Street, San Francisco, Cal., is general manager of the exhibition.

Fans in New York Subway Cars—On Aug. 10, 1910, Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., exhibited a subway car equipped with overhead fans. Within the next few weeks the company will have about 50 cars equipped with fans in use, and if the public approves of their use, all of the cars in the subway will be so equipped before next summer at a total cost of about $120,000. Mr. Hedley said that, of course, fans do not reduce the temperature, but by assisting the evaporation of perspiration, they do materially lower the apparent temperature, especially of persons standing beneath them.

August Outing of the New England Street Railway Club.—The August outing of the New England Street Railway Club will be held on Aug. 25, 1910. The start will be made in special cars from Brattle Street, Boston, Mass., near Adams Square, at 9:30 a. m. At 10:45 the party is due at the plant of the Fore River Shipbuilding Company, Quincy. At noon the special cars will be boarded for Nantasket, and at 1:30 p. m. a shore dinner will be served at Palm Garden, Paragon Park, Nantasket. The return to Boston will be made by steamers, leaving Nantasket at 2:40 p. m., 3:40 p. m., 4:40 p. m., 5:40 p. m., 6:40 p. m., 7:40 p. m. and 9:40 p. m. At Quincy those in attendance at the outing will be permitted to inspect the works of the Fore River Shipbuilding Company. Tickets for the outing, which include a return ticket to Boston by steamer, are $2 each. Members of the club are requested to notify John J. Lane, 12 Pearl Street, Boston, Mass., the secretary of the club, of their intention to attend the outing as soon as possible.

Five Reasons Why Claim Agents Should Attend the Convention at Atlantic City.—E. C. Carpenter, president of the American Street & Interurban Railway Claim Agents' Association is mailing a card 10 inches long and 7 inches wide, on which the following five reasons are given why claim agents should attend the meeting of the association at Atlantic City, N. J., in October: "(1) Seven 'live-wire' subjects, full of interest to you, are on the program. (2) The best kind of tact is contact. Get in touch with fellows who do something. (3) The broadening of your acquaintance among progressive men will alone be worth more than the cost of the trip. (4) If you are a man of ideas and willing to express them the convention wants you to bring your ideas and help the other fellow as well as yourself. (5) Another reason why we want you is because we know that you are not one of those who are ready to be superannuated and feel that they know everything about every phase of claim work, and have reached a point where an exchange of ideas will not benefit them."

Street Railway Ordinances in Milwaukee—At the meeting of the joint committees on judiciary and railroads of the Common Council of Milwaukee, Wis., on Aug. 5, 1910, the ordinance requiring that cars be equipped with lifting jacks by Sept. 1, 1910, was recommended for passage. John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company, said that 300 cars are provided with the jacks and that he had sufficiently anticipated the ordinance. The jacks weigh 100 pounds and are dead weight. The company is having four motor car wrecking outfits constructed of 3 tons each and when the auto cars are in operation there will be no need for lifting jacks on all cars. The ordinance providing for the more efficient and frequent cleaning of cars also was recommended, with an amendment that all cars must be swept at the end of each route. Mr. Beggs said that cars are disinfected every night, and that the company employs 54 men and 33 women who do nothing else than clean cars. It costs from 22 cents to 30 cents to clean each car in daily operation.

Hearing on Proposed Elevated Railway in Philadelphia.—A public hearing was given by Mayor Reyburn, of Philadelphia, on Aug. 11, 1910, at which the plans of the Philadelphia & Suburban Railroad for the construction of its proposed elevated and subway lines were considered. S. S. Neff, president; Robert Kelso Cassatt, Russell Thayer and Judge Beitler, represented the company; E. P. Gallagher represented business and labor organizations of the northeastern section of the city, and W. F. Dixon and John J. Foran represented the Roxborough Business Men's Association. Mr. Thayer said that the ordinance which was submitted to the Council was drawn largely by the syndicate which has agreed to finance the company, and that the money to construct the road would be available if the grant as submitted was not emasculated in passage. In urging the plans of the company Mr. Neff said: "While the building of a subway on North Broad Street will be expensive, it presents no engineering problems which cannot be solved. The questions of probable outlay and income have been carefully analyzed by a syndicate of bankers, and the money to build the subway and elevated structures is secure if the ordinance passed is fair and reasonable. The elevated lines have been estimated on a basis of $500,000 per mile, and subway construction at the rate of $2,000,000 per mile, adding to this, of course, additional amounts for stations, terminals, property damages, engineering expenses, powerhouse and auxiliaries, equipment, car barn and shops and other necessaries essential to the operation of a system of the size proposed. The construction and operation of our system would also benefit the steam railroads. It would not be unreasonable to predict that upon the completion of the proposed road that the steam railroads handling suburban traffic in the Frankford, Wayne Junction, Chestnut Hill and Germantown districts would be willing to turn all of this business over to us."

Financial and Corporate

New York Stock and Money Market

August 16, 1910.

The improvement in prices and in the market movement generally which was noted last week continued until the latter part of the week. Then depression set in and continued until Tuesday. During the closing hours on Tuesday, however, a vigorous and general advance in prices began. There was no special news to which the changes in the market could be attributed. Fractional advances are recorded for the week in Brooklyn Rapid Transit and Interborough, but there has been nothing significant in the movement of the tractions.

Quotations in the money market were: Call, 1¼ to 1¾ per cent; 60 days, 2¾ to 3 per cent; 90 days, 3½ to 3¾ per cent.

Other Markets

In Philadelphia interest lags in tractions. On Monday small fractional losses were sustained by both Rapid Transit and Union Traction, and for the week the market for these issues closed 2/8 up and 1¼ up, respectively.

A gain of several points for the week is recorded in Boston Elevated, but aside from this there is no significant movement in tractions. The other traction issues remain practically constant.

In Chicago there has recently been a moderate demand for Chicago Railways Series 2, inspired by prospects of a consolidation with the Chicago Consolidated Traction on favorable terms.

In Baltimore, perhaps the most important sale in tractions has been 3000 Knoxville Traction 5s at 102½. United Railways issues remain practically unchanged with only small sales recorded.

Quotations of various traction securities as compared with last week follow:

	Aug. 9.	Aug. 16.
American Railways Company	a42	a43½
Aurora, Elgin & Chicago Railroad (common)	a50¼	*50¼
Aurora, Elgin & Chicago Railroad (preferred)	a90	*90
Boston Elevated Railway	123	126¼
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	36½	36
Brooklyn Rapid Transit Company	75¾	77¾
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82⅞	82¾
Capital Traction Company, Washington	a129	*129
Chicago City Railway	a195	a185
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a65	a75
Chicago Railways, ptcptg., ctf. 2	a16½	a16¾
Chicago Railways, ptcptg., 3	a11	a12
Chicago Railways, ptcptg., ctf. 4s	a5½	a6
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a72	*72
Consolidated Traction of N. J., 5 per cent bonds	a103	*103
Detroit United Railways	*45	*45
General Electric Company	143¼	145
Georgia Railway & Electric Company (common)	107¾	106¼
Georgia Railway & Electric Company (preferred)	a85	a86
Interborough-Metropolitan Company (common)	17⅛	17½
Interborough-Metropolitan Company (preferred)	47⅜	48½
Interborough-Metropolitan Company (4½s)	78⅝	78¾
Kansas City Railway & Light Company (common)	a25½	a25
Kansas City Railway & Light Company (preferred)	a79½	*79½
Manhattan Railway	*128	130⅛
Massachusetts Electric Companies (common)	a15½	a17½
Massachusetts Electric Companies (preferred)	a82	81
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a60	a65
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68	69½
Northwestern Elevated Railroad (common)	a21	a18
Northwestern Elevated Railroad (preferred)	a65	a60
Philadelphia Company, Pittsburg (common)	a43½	a45
Philadelphia Company, Pittsburg (preferred)	a42¾	a42
Philadelphia Rapid Transit Company	a19⅝	a19⅞
Philadelphia Traction Company	a82½	a83
Public Service Corporation, 5 per cent col. notes	a96	*96
Public Service Corporation, ctfs	a99	*99
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a65	a60
Third Avenue Railroad, New York	*10½	8½
Toledo Railways & Light Company	7	*7
Twin City Rapid Transit, Minneapolis (common)	*106½	*106½
Union Traction Company, Philadelphia	a44¾	a45¼
United Rys. & Electric Company, Baltimore	a14⅞	14½
United Rys. Inv. Co. (common)	27	31
United Rys. Inv. Co. (preferred)	*54	59½
Washington Ry. & Electric Company (common)	a33	*33
Washington Ry. & Electric Company (preferred)	a87½	*87½
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*100	*100
Westinghouse Elec. & Mfg. Company	61	60½
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Value of Property of the Chicago Consolidated Traction Company

At the meeting of the local transportation committee of the City Council of Chicago, Ill., on Aug. 12, 1910, the following letter from Bion J. Arnold and George Weston, the traction valuation commission, was read giving the valuation of the property of the Chicago Consolidated Traction Company as found by them:

"Accepting the legal construction put on the franchises of the Consolidated Traction Company by Walter L. Fisher, special traction counsel, and Howard W. Hayes, assistant corporation counsel of Chicago, we find the values of the Consolidated Traction Company's property to be as hereinafter shown. These values are based upon the same general premises established by the valuation commission which valued the properties of the Chicago Union Traction Company and the Chicago City Railway in 1906, of which commission we were members.

"We have, however, found the property in such physical condition that we found it necessary to make certain deductions for deferred maintenance in arriving at our physical valuation. The figures follow:

	With paving	Without paving
Value of physical property as a going concern	$4,078,057.69	$3,446,549.88
Value of intangible property as a going concern	751,325.77	751,325.77
Total value of physical and intangible property as a going concern	$4,829,383.46	$4,197,875.65
Deductions due to ordinance requirements:		
(a) Robey street on account of isolation of tracks due to prior expiration of ordinance	3,277.68	
(b) Removal of tracks from streets at expiration of ordinances as required	91,063.00	94,340.68
Total values after deductions	$4,735,042.78	$4,103,534.97

"At the request of Mr. Fisher we have valued the property of the Consolidated Traction Company, eliminating all franchise and paving values, and including only such property as could be utilized in the rehabilitation of the property, and find this value to be $3,037,818.56.

"Since the completion of our valuations representatives of the Chicago Railways have made contentions which, if they are found legally sound by the city's attorneys, will somewhat increase the above-mentioned intangible values. These contentions are now being considered and the results, if they affect the valuations, will be given you shortly."

Between this estimate of the value of the property of the company and one made by A. L. Drum, one of the receivers of the company, there was a difference of more than $1,200,000. Mr. Drum said that $868,629 should be added to the value of the intangible property of the company and that $350,000 should be added to the value of the tangible property. Mr. Arnold declared that, even granting all of Mr. Drum's contentions, the only increase in valuations would be $203,800 in the physical values and $257,846 in the intangible properties.

Taking their estimate of $3,037,818.56 as the value of the tangible property, Messrs. Arnold and Weston added about $400,000 for paving and more than $500,000 to the value of the tracks and equipment, bringing the total to $3,957,454. This valuation was accepted by W. W. Gurley on behalf of the reorganization committee of the Chicago Consolidated Traction Company at a meeting of the subcommittee of the local transportation committee on Aug. 15, 1910. On Aug. 29, 1910, there will be a meeting of the City Council to pass the Consolidated Traction ordinance. With the acceptance of this ordinance the Chicago Railways will bind itself to take over the property of the Chicago Consolidated Traction Company, rehabilitate the property of the company and establish through routes over the lines of both railway companies.

New Jersey Commission Disapproves Bond Issue for the Burlington County Traction Company

The application of the Burlington County Traction Company, Mt. Holly, N. J., the successor of the Burlington County Railway, which was sold under foreclosure recently, to issue $166,250 of bonds was denied on Aug. 8, 1910, by the Public Utility Commission of New Jersey. The Burlington County Railway having been sold under foreclosure for $120,000, the commission held that it would be contrary to law to issue bonds for more than that sum.

Ardmore (Okla.) Traction Company.—The court has signed an order authorizing the sale of the property of the Ardmore Traction Company by C. L. Byrne, receiver, to H. S. Pattison and C. D. Moore, El Reno, Okla., and Geo. S. Cravens, Milton, Ia., for $50,000. The minimum price fixed by the court for the property at the sale on May 2, 1910, was $60,000.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway reports earnings as follows for the year ended June 30, 1910, as compared with the previous year: Gross receipts for 1910, $2,981,617, as compared with $2,298,778 for 1909; expenses, renewals and maintenance for 1910, $1,741,778, as compared with $1,027,116 for 1909; net earnings for 1910, $1,239,839, as compared with $1,027,116.

Meadville & Cambridge Springs Street Railway, Meadville, Pa.—J. C. Chaplin, D. R. Hill and W. H. Parke, who recently requested the holders of the $300,000 of first mortgage 5 per cent bonds of the Meadville & Cambridge Springs Street Railway to deposit their bonds with the Colonial Trust Company, Pittsburgh, Pa., as depositary, have issued a statement in which they say: "The property is in danger of foreclosure, and there are certain suits now pending and other suits which have been instituted by which the security of the aforesaid bonds may be impaired." Interest on the bonds of this company was defaulted on Dec. 1, 1909.

Philadelphia (Pa.) Rapid Transit Company.—There have been called for payment at 105 and interest on Aug. 15, 1910, at the office of the Pennsylvania Company for Insurances on Lives and Granting Annuities, Philadelphia, Pa., $26,000 of the 4 per cent collateral trust bonds of 1917, issued by the Philadelphia Traction Company.

Philadelphia & Western Railway, Philadelphia, Pa.—A mortgage for $4,000,000 by the Philadelphia & Western Railway to the Philadelphia Trust, Safe Deposit & Insurance Company, trustee, has been recorded in Philadelphia, Westchester, Media and Norristown. At the same time a mortgage for $20,000,000 to the Trust Company of America, trustee, was canceled. The bonds secured by the mortgage are first mortgage 5 per cent gold bonds, dated July 1, 1910, and due July 1, 1960. There are to be issued presently $2,000,000 which have been purchased by Edward B. Smith & Company, Philadelphia. Proceeds of the sale of the bonds will be used to build an extension to Norristown.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—Twenty $1,000 first mortgage 5 per cent 10-year gold bonds of the Portsmouth Street Railroad & Light Company, dated 1906, have been called for payment at par and interest at the office of the Bankers' Trust Company, New York, N. Y., on Oct. 1, 1910. The authorized issue of bonds under the mortgage is $250,000. Of this amount $175,000 is outstanding.

United Railways Investment Company, San Francisco, Cal.—The principal and interest of the $200,000 of Series D 6 per cent notes of the United Railways Investment Company of 1908 maturing on Aug. 15, 1910, will be paid on and after that date at the office of the New York Trust Company, New York, N. Y., or at the office of the United Railroads of San Francisco, San Francisco, Cal., on the presentation and surrender of such notes and of the collateral accompanying the same.

West Penn Traction Company, Pittsburgh, Pa.—The report of the West Penn Traction Company for the year ended June 30, 1910, follows: Gross receipts, $1,069,288; operating expenses and taxes, $640,452; net earnings, $428,835; fixed charges and amount required to pay 5 per cent per annum on preferred stock of West Penn Railways for six months ended June 30, 1910, $299,293; net income, $129,542; amount required to pay 6 per cent per annum on $1,625,000 of 6 per cent cumulative preferred stock of the West Penn Traction Company for the six months ended June 30, 1910, $48,750; surplus, $80,792.

Worcester (Mass.) Consolidated Street Railway.—The new $5,000,000 mortgage of the Worcester Consolidated Street Railway, given in favor of the Old Colony Trust Company, Boston, Mass., as trustee, to secure an issue of 4½ per cent first and refunding mortgage bonds has been filed for record.

Traffic and Transportation

Pittsburgh Railways Will Comply with Recommendations of the Railroad Commission

The Pittsburgh (Pa.) Railways has notified the Railroad Commission of Pennsylvania that it will comply with the recommendations of the commission looking toward improved service insofar as it can. It complains, however, that the obstructive attitude of the municipal authorities of Pittsburgh prevents it from complying with all of the recommendations. The recommendations of the commission were published in the Electric Railway Journal of July 2, 1910, page 56. The reply of the company to the commission, made public by that body on Aug. 11, 1910, follows in part:

"This company is proceeding as rapidly as possible to follow out and conform to the recommendations of the commission, and, early in June, contracted for 50 double-truck trail cars, seating 60 passengers each, for delivery in October. It will be impossible to secure in time for service during the latter part of this year the recommended 50 additional closed motor cars and their equipment, but the company will proceed to contract for the same and place them in service promptly upon their completion.

"The company is using every endeavor to distribute the cars on the routes according to the amount of travel throughout the entire day and has a department giving the amount of travel on the various routes constant study and attention.

"The company will make annual additions to its rolling stock as recommended, and would state that nearly 600 cars have been added to its equipment during the past eight years. The company considers it to its advantage to replace as rapidly as possible and where conditions permit the old 28-seat type of cars with a larger and more capacious car.

"The results from the operation of short runs have been far from satisfactory. The company will, however, as recommended, experiment with them. Applications have been made to the several municipalities for consent to changes required in the tracks for the operation of short routes and larger cars, and in some instances consent has been given, in others postponed and a few withheld; but continuous progress is being made in this direction.

"All cars are regularly and thoroughly cleaned every day and are disinfected at such times as are deemed necessary, depending upon the weather, the season of the year and the routes over which they are operated.

"The company has commenced the erection of a large addition to its shops, to be completed during the early fall, and is making additions to its power plants and to its substations for increasing its power facilities and as necessitated by the continual addition to the equipment.

"In the congested portion of the city the standing of automobiles on the sides of some of the principal streets adds materially to the difficulty of prompt passage through such streets, both by all other vehicles as well as by the trolley cars.

"Application has been made to various municipalities for additional franchises, but the company has been given to understand that Pittsburgh will grant no additional franchises until such time as the city has its report from experts employed on transportation matters. Thus far the company has not been able to secure from the city authorities the approval of its plans for change of routes, or tracks, or matters deemed by the company necessary for the improvement of its service. The company has, however, a request from the Mayor for a conference between the representatives of the city and the company with reference to perfecting plans for the routing and re-routing of cars of the company.

"The company is willing to join in every effort to eliminate grade crossings of steam railroads, but the municipalities invariably refuse to help in a material way in any such improvements.

"Early in the fall the company will have provided space for storing from 300 to 400 additional cars within about 10 minutes' time from the congested portion of the city.

"The company desired to follow your recommendations

and comply with the same. Its officers, however, have been unable to secure, for any plans or arrangements suggested by them, the approval of or serious consideration by the officials of the city, who are disposed to postpone action on all matters pertaining to the improvements in your recommendations until they receive the reports of their experts. In the meantime they are engaged in an active publicity and legislative campaign regarding various franchises of the company. Our rights have been recognized and their existence unquestioned heretofore by the city for from 25 years to 50 years and the company is satisfied they are unassailable.

"In any case, this question of 'these existing franchises' is entirely independent of the 'improving of the service,' and unless the municipal authorities will consider them separately and independently no material progress can be made for several years.

"Many improvements proposed by the city on its streets, which involves extensive changes to the roadbed and railway of the company have been postponed owing to municipal legislation which has been declared invalid. Until such legislation is repassed the company will be unable to proceed with improvements recommended by the commission and desired by the company and communities interested."

Company Sustained in Lawrence Fare Case

The Railroad Commission of Massachusetts has rendered a decision on the petition of citizens of Lawrence relative to fares and service on the Boston & Northern Street Railway in Lawrence.

The petitioners requested an extension of the free transfer privilege, additional car service and an extension of trackage. The decision says:

"It appears that for 5 cents a passenger may, by means of a transfer, ride on the Haverhill line within the limits of the city of Lawrence and to what is known as Pleasant Valley, in Methuen, a maximum distance of 9.27 miles; and on the Lowell line to the junction of Lowell road on the company's private way in the town of Methuen, a maximum distance of 9.20 miles, and both facilities are accorded the residents of the Prospect Hill district, so-called, in Lawrence.

"A consideration of these transfer privileges, taken in connection with the statement of the number of passengers carried on the Prospect Hill-Beacon Street line between the end of the line and the junction of East Haverhill and Prospect Streets leads us to the conclusion that no recommendation ought to be made with respect to additional transfers. The same statement, together with the evidence at the hearing, convinces us that no recommendation should be made with respect to additional car service.

"With respect to an extension of the trackage from the present terminus of the line on Allston Street, a method is provided by statute for obtaining extensions of locations.

"Without indicating what our conclusion might be upon any application addressed to us for approval of the action of the Board of Aldermen of the City of Lawrence, it is enough to say that the contour of the territory and the volume of anticipated traffic disclose no conditions to warrant a recommendation at this time upon the petition before us. It is therefore ordered, that the petition be dismissed."

Collision on Niagara Road—Nine persons were injured in a head-on collision between two cars of the Niagara Gorge Railroad, Niagara Falls, N. Y., on Aug 15, 1910.

New Park Opened in Pennsylvania.—The Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., has opened Red Ridge Park, near Chambersburg, to the public.

Service Between Stockton and Sacramento.—The Central California Traction Company, San Francisco, Cal., has established regular service over its recently completed line between Stockton and Sacramento.

Passenger Fined for Assaulting a Conductor—James E. Burke, Mayor of Jeffersonville, Ind., recently fined Harrison Francis, New Albany, Ind., $35 for assaulting a conductor of the Louisville & Southern Indiana Traction Company, following a dispute over fares.

Accident Near Columbus.—One person was killed and eight persons were injured in a head-on collision on Aug. 11, 1910, between two cars of the Scioto Valley Traction Company, Columbus, Ohio, near Rogers station, which is midway between Groveport and Canal Winchester.

Transfers in Newark.—G. J. Roberts, first vice-president of the Public Service Corporation of New Jersey, Newark, N. J., has replied as follows to the communication from the Board of Works of Newark, dated Aug. 5, 1910, requesting the company "to extend transfer privileges in accordance with city ordinances": "So far as I am aware, we are issuing transfers in accordance with our franchise obligations."

Traffic During Conclave in Chicago.—The Chicago (Ill.) Railways reports earnings of approximately $250,000 during the six days of the Knights Templar Conclave in Chicago recently, an average of more than $40,000 per day, an increase of more than 16 per cent as compared with the same period last year. The company carried daily more than 800,000 fare passengers and more than 600,000 transfer passengers, a total of nearly 1,500,000 passengers daily.

Offer of Company in Washington Fare Case—The Railroad Commission of Washington is considering an offer made by the Puget Sound Electric Railway, Tacoma, Wash., to grant a 25-cent round trip fare to Puyallup, provided 32-ride $4 commutation books are bought to replace the present 50-ride books, which are sold for $7. The 32-ride book will be good only one month. Besides this a 10-ride family commutation book would be issued by the company at the rate of 15 cents per ride, good any time within 30 days from the date of issuance, and transferable. The ordinary cash fare, one way, would remain at 20 cents. The litigation over the fare between Tacoma and Puyallup would be dropped if a settlement of the matter on the basis of the offer of the company is reached.

Public Service Railway Folder.—The Public Service Railway, Newark, N. J., has recently issued a folder in which the most interesting points of its several divisions are described and illustrated. Separate maps are presented of the system as a whole extending from Jersey City, opposite New York, to Philadelphia; of Jersey City, Hoboken and New York, showing the many steamship and pier connections between those cities; and likewise a map of similar connections between Camden and Philadelphia. There is also included a map of Newark, showing its principal places of public interest. The folder states that the Public Service Railway operates about 675 miles of track through 101 separate municipalities, including every important city in New Jersey except Trenton. The population served is about 1,750,000, and constitutes about three-quarters of the total number of people in the State.

Arbitration in Toronto—As mentioned in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, page 164, the negotiations between the committee of employees and the management of the Toronto (Ont.) Railway over a rearrangement of working hours and wages resulted in the appointment of a board of conciliation consisting of J. P. Mullarkey, Montreal, representing the company; John G. O'Donoghue, Toronto, acting for the men, and Judge J. A. Barron, Stratford, appointed by the other two members as chairman of the board. For several weeks the board has been sitting at Toronto. After the board finished taking evidence the members endeavored to obtain concessions from both sides. Mr. Mullarkey has returned to Montreal, and Judge Barron has undertaken the task of effecting a settlement. To this end he has lately been in conference with William MacKenzie, president of the company.

Finding of the Massachusetts Board of Arbitration.—The board of arbitration, consisting of E. C. Foster, New York, N. Y.; W. P. Hayes, Springfield, Mass., and C. S. Hamlin, Boston, Mass., which has been considering the matter of wages to be paid to the employees of the New England Investment & Security Company, has agreed upon the following daily scale: First six months, $2.20; second six months, $2.30; second year, $2.40; third year, $2.45; fourth year, $2.50; fifth year and after, $2.67½. The daily wages paid formerly by the company follow: First six months, $2.05; second six months, $2.15; second year, $2.20; third year, $2.25; fourth year, $2.30; fifth year, $2.35; sixth year, $2.40; seventh year and after, $2.50. The scale of daily wages authorized by the trustees of the company,

which the men refused to accept, follows: First six months, $2.15; second six months, $2.15; second year, $2.25; third year, $2.35; fourth year, $2.40; fifth year, $2.50; sixth year and after, $2.60.

Reply of Baltimore Company in Fare Case.—The United Railways & Electric Company, Baltimore, Md., has replied through its attorney, J. Pembroke Thom, to the complaint of residents of Ellicott City, filed with the Public Service Commission of Maryland, that the fare between Baltimore and Ellicott City is excessive. The company does not admit the jurisdiction of the commission to reduce the existing fare. The maximum fare between the two points is 15 cents, including transfer privileges in Baltimore. The fare was thought to be excessive on account of the 10-cent fare charged on the Catonsville line and on account of the fact that the residents of Catonsville get the benefit of a commutation book which makes the trip cost about 7.5 cents. It was also claimed that the fare over the railroads to Ellicott City is less than that charged by the United Railways & Electric Company. The United Railways & Electric Company informed the commission that it operates 10 times as many cars between the two points as the railroad and that it is necessary to make the additional charge, particularly as the passengers are conveyed to any part of the city by transfer, a privilege which is not afforded by the railroad. The United Railways & Electric Company also showed that there was no comparison with the conditions on the Catonsville line. The bulk of traffic on the Ellicott City line originates at Ellicott, while on the Catonsville line there are several points at which traffic originates. The company admits the sale of commuation tickets to the residents of Catonsville, but claims that the making of this rate has proved to be a mistake. The revenue per capita is decreasing, while the expense per capita is increasing. One item in the increase, it was pointed out, is the increase in the cost of labor and material.

Aldermen of Syracuse Against No-Seat-No-Fare Ordinance.—The special railroad committee of the Common Council of Syracuse, N. Y., which has been considering the adequacy of the service furnished by the Syracuse (N. Y.) Rapid Transit Railway and the petition of some 7000 citizens for the passage of a no-seat-no-fare ordinance, has reported to the Council that it has had satisfactory assurances from C. Loomis Allen, vice-president and general manager of the company, that the service is being constantly improved; that the corporation counsel of Syracuse has advised against the enactment of a no-seat-no-fare ordinance, and that the proper method to pursue to secure relief from alleged inadequate street railway facilities is to appeal to the Public Service Commission of the Second District of New York. After reviewing the result of its conferences with Mr. Allen and giving its experience in Jersey City and Trenton, which it visited to investigate the working of the no-seat-no-fare ordinances adopted in those places, the committee says: "This committee has called for an opinion from the corporation counsel of Syracuse as to the advisability of this Council passing such an ordinance, and from the opinion of Mr. Magee we learned that such an ordinance would not only be unenforceable, but an attempt at its enforcement might seriously affect the peace of the community, and even if the same could be enforced might result in even greater inconvenience and greater annoyance to the public sought to be relieved thereby. With these facts before us we would be unjust and unfair to the 7000 persons who had petitioned the Council for such an ordinance, and likewise to all other citizens of Syracuse if we followed the suggestions of the petition and passed an ordinance seemingly in the public interest, when we honestly believed that such an ordinance would be unenforceable. We do not question the good faith and sincerity of the petitioners; on the contrary we appreciate that they have grievances which should be relieved, and that speedily, but we must act upon the facts as we find them. We believe that the Public Service Commission of this State is the proper tribunal to which the people of our city may appeal for relief, and we have no doubt that the proper proceeding to that end may be taken by the city authorities and that our citizens may then have the opportunity of presenting their claims and obtaining relief." The Council as a whole subsequently voted to adopt the report of the committee.

Personal Mention

Mr. G. R. Millican, Evansville, Ind., has been appointed superintendent of the Owensboro (Ky.) City Railroad, to succeed Mr. C. R. Ray, resigned.

Mr. H. R. Manning, who has been traveling freight agent of the Oregon Electric Railway, Portland, Ore., has been appointed chief clerk of the company.

Mr. J. F. Turner, superintendent of the Fresno (Cal.) Traction Company, has been appointed superintendent of the Power, Transit & Light Company, Bakersfield, Cal.

Mr. S. R. Strong, who has been connected with the auditing department of the Oregon Electric Railway, Portland, Ore., has been appointed traveling freight agent of the company.

Mr. E. Chester Ecker has been appointed superintendent of the Westport division of the Kansas City Railway & Light Company, Kansas City, Mo., to succeed Mr. R. K. Kirkpatrick, resigned.

Mr. Thomas Pumfrey, chief engineer of the International Railway, Buffalo, N. Y., has resigned from the company to accept the position of engineer of maintenance of way of the Portland Railway, Light & Power Company, Portland, Ore.

Mr. Frank C. Halverson has been appointed traveling inspector of the Tacoma Railway & Power Company, Tacoma, Wash. Mr. Halverson entered the employ of the company in 1900 as a conductor. He has recently been road officer with jurisdiction over the cable line and the Point Defiance line of the company.

Mr. G. W. Merrill has resigned as superintendent of the Sacramento Electric, Gas & Railway Company, Sacramento, Cal. Mr. Merrill had been connected with the company for 17 years, and for the last four years had acted as superintendent of the company. He was presented with a silver dinner set by the employees as a token of esteem.

Mr. Dean Treat, chief train dispatcher of the Milwaukee Northern Railway, Cedarburg, Wis., has been appointed superintendent of the Sterling-Dixon Eastern Electric Railway, Sterling, Ill., reporting to Mr. F. A. Maxwell, assistant general manager of the company. Mr. Treat was connected with the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., at the time Mr. E. B. Kirk and Mr. J. Pulliam were with that company.

Mr. George Flett, managing director of Dick, Kerr & Company, London, Eng., whose death was chronicled in this column last week, was also a director of the Metropolitan Amalgamated Railway Carriage & Wagon Company, Ltd.; Patent Shaft & Axletree Company, Ltd.; the Projectile Company; British Aluminum Company, Ltd.; Rio de Janeiro Tramway, Light & Power Company; Mexican Light & Power Company, Ltd.; Monterey Railway, Light & Power Company, and the British Engineering Company of Egypt.

Capt. Robert McCulloch, president and general manager of the United Railways, St. Louis, Mo., is the subject of an interesting sketch in a recent issue of the *St. Louis Post-Dispatch*. Capt. McCulloch is quoted as follows: "A nickel to-day is worth less to the United Railways than it was 10 years ago. The use of the transfer is responsible for this. In 1900 we got 3.48 cents out of every nickel. It was a little higher during the World's Fair year, but it has been getting less every year, until last year all we got out of a nickel was 3.35 cents, and it will continue to grow less."

Mr. N. C. Pilcher, who has been appointed general manager of the Sherbrooke (Que.) Street Railway, assumed the duties of that position on Aug. 15, 1910. Mr. Pilcher has been manager of the Port Arthur & Fort William Electric Railway, Port Arthur, Ont., since November, 1908. Previous to accepting the position of manager of the Port Arthur & Fort William Electric Railway, Mr. Pilcher was connected with the Canadian General Electric Company in its factory and its engineering department. He was also connected with the Montreal (Que.) Street Railway for five years and with the Birkenhead (Eng.) Corporation Tramways and the National Telephone Company, London, Eng.

Mr. C. K. Durbin has been appointed general manager of the Federal Light & Traction Company, New York,

N. Y., which was organized recently with a capital stock of $11,000,000, to control and operate electric railway and electric light properties in Aberdeen, Wash.; Sheridan, Wyo.; Rawlins, Wyo.; Montrose, Col.; Hobart, Okla.; Albuquerque, N. M.; Las Vegas, N. M., and Tucson, Ariz. From January, 1903, until June, 1910, Mr. Durbin was vice-president and secretary of the United States Light & Traction Company. From November, 1889, until Sept. 1, 1900, Mr. Durbin was superintendent of the Denver (Col.) City Tramway. His connection with the Denver City Tramway, however, dated from June, 1888, when he was appointed auditor of the company, his term of service beginning at the time street railway development in Denver was started. During the time that he acted as superintendent of the Denver City Tramway Mr. Durbin had experience with horses, steam dummies, the cable and electricity. Mr. Durbin was particularly successful at Denver in his management of the employees by making the service attractive and lucrative to them.

OBITUARY

Gen. Adoniram Judson Warner died at his home in Marietta, Ohio, on Aug. 14, 1910. Gen. Warner was born in Wales, N. Y., on Jan. 13, 1834. He was educated at the New York Central College and at Beloit. After the close of the war he built steam railroads and electric railways. He assisted in constructing the first underground electric railway in Washington, D. C.

Joseph I. Irwin, president of the Indianapolis, Columbus & Southern Traction Company, Seymour, Ind., died at his summer home near Windemere, Ont., on Aug. 13, 1910. Mr. Irwin was born on a farm near Columbus, in 1824. In 1845 he became a clerk in Columbus. Ultimately he became a prominent banker and electric railway promoter. The Indianapolis, Columbus & Southern Traction Company's line was financed by Mr. Irwin, and members of his family comprise the board of directors of the company.

George Riley, Sr., manager of the *Pacific Miner,* was killed in a railroad wreck on the Northwestern Pacific Railroad near San Rafael, Cal., on Aug. 8, 1910. Mr. Riley was on his way home to Petaluma. For a number of years Mr. Riley was Pacific Coast manager for the *Engineering and Mining Journal,* New York, N. Y., but resigned that position about five years ago to enter the service of the Calkins Newspaper Syndicate, as advertising manager for their technical papers. Afterward he was manager of the *Pacific Rural Press* and only recently took charge of the *Pacific Miner.* Mr. Riley was president of the Petaluma Chamber of Commerce. He leaves a widow and two children.

The Portland Railway, Light & Power Company, Portland, Ore., has adopted a new transfer. Under the new system all transfers have the date printed in large red letters across their faces. A detachable coupon shows whether the transfer was issued in the morning or the afternoon. Four dials indicate the quarter hours. The one nearest to the time of issue of the transfer is punched. The change is said to have been necessitated mainly because of controversies arising between conductors and passengers as to the time for which tickets were punched.

The Public Service Commission of the Second District of New York has served upon the New York State Railways, Rochester, a complaint regarding the alleged refusal of the company to carry certain newspapers in packages upon its cars in Rochester. The complainant alleges that the company has filed its tariff with the commission stating that newspapers in packages printed and issued in Rochester will be carried on all cars at 25 cents per 100 lb., and that this tariff is now in effect. Subsequent to the time this tariff became effective the New York State Railways has continued to carry all such newspapers at that rate, but has refused to carry any other newspapers. The complainant states that he is the circulation manager or distributing agent for certain out-of-town newspapers, and has contracts with them by which he receives a certain percentage of the sales made in Rochester, and that the discrimination in the new tariff affects no one but himself as he is the only person interested in having newspapers carried on cars outside of the Rochester newspapers.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Cave Valley Railway, West Liberty, Ohio**—Incorporated to build a railroad to be operated by steam or electricity in the vicinity of West Liberty. Headquarters, West Liberty. Capital stock, $100,000. Incorporators: Henry W. Holly, F. M. Leach, Charles H. Potter, W. F. Wood and S. R. Collier.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—Chartered in Oklahoma to build and maintain steam and electric railroads in Oklahoma and Kansas. The lines proposed are from Stillwater to Morrison, a distance of 14 miles; north from Stillwater to Perkins, 10 miles; from Stillwater to Glencos, Merrimac, Jennings and Sapulpa, 79 miles; Stillwater to Coyle, Langston and Guthrie, 45 miles. Headquarters, Stillwater. The total estimated cost of the proposed system is $6,000,000 and the company is capitalized at $100,000. Directors: Claude Powell, R. A. Sturgeon and Louis James Lampke, Stillwater; A. G. Lampke, George Washington Tucker, Jr., H. L. Drullard and H. G. Lytle, New York, N. Y. [E. R. J., June 11, '10.]

FRANCHISES

Stockton, Cal.—The Board of Supervisors has granted the application of the Central California Traction Company for a franchise through Fair Oaks to give it access to the Atchison, Topeka & Santa Fé Railroad and direct connections for fruit shipments.

Chatham, Ill.—The Village Board has granted a franchise to the St. Louis, Springfield & Peoria Railroad, Peoria, to construct a track through the village paralleling the Chicago & Alton Railroad track. This company is said to be a subsidiary company of the Illinois Traction System. [E. R. J., Jan. 15, '10.]

Hammond, La.—The City Council has advanced to a third reading the franchise ordinance permitting the Hammond (La.) Interurban Railway to build a street railway in Hammond. [E. R. J., June 25, '10.]

Great Barrington, Mass.—The Selectmen have granted the Berkshire Street Railway, Pittsfield, the location asked for in its petition for the building of the Canaan and Egremont branches. The company has also been granted a franchise by the Aldermen of Pittsfield for a line on Elm Street.

Grand Forks, N. D.—The City Council has granted to the Grand Forks Street Railway a 50-year franchise for the construction of a new line in Grand Forks.

***Greenville, Ohio**—S. A. Price and associates have been granted a 50-year franchise for a 5-mile street railway in Greenville.

McKeesport, Pa.—The City Council has extended the time limit in the franchise ordinance of the Pittsburg, McKeesport & Westmoreland Railway from 25 years to 50 years.

New Castle, Pa.—The franchise held by the New Castle, New Wilmington & Sharon Electric Railway in New Castle expires Sept. 23 and the company will ask for an extension of time. [E. R. J., July 23, '10.]

Philadelphia, Pa.—The Delaware County & Philadelphia Electric Railway, Clifton Heights, formed to build a double-track system through Alden and Lansdowne to the Sixty-ninth Street terminal, has forfeited its franchises through non-compliance with their terms.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company has let the contract to Mayberry & Parker, Los Angeles, for the erection of a 60-ft. combination railway and highway bridge near Naples.

Union Elevated Railroad, Chicago, Ill.—On Aug. 12, 1910, the Board of Supervising Engineers, Chicago Traction, announced that specifications had been prepared and

bids would be asked within a few days for shifting 19 columns of the elevated loop structure which now interfere with the clearance necessary for through routing of cars as specified in the traction rehabilitation ordinances of 1907.

Peoria & Southern Railway, Peoria, Ill.—This company has begun the preliminary survey of its line between Peoria and Pekin. This line when completed will be operated as a branch of the Illinois Traction System. [E. R. J., Feb. 29. '10.]

San Jose (Cal.) Railroad—This company advises that it plans to build 16 miles of new track.

Sterling-Moline Traction Company, Sterling, Ill.—The directors of this company, formed to build an interurban railway between Sterling and Prophetstown, recently met and elected the following officers: W. E. Tuller, Morrison, president; C. A. Sturtevant, Erie, vice-president; Joseph Wright, Rock Falls, secretary; C. E. Windom, Sterling, treasurer; A. G. Van Petten, Sterling, general manager. Contracts submitted by the Northwestern Construction Company were taken under advisement by the directors. [E. R. J., Aug. 6, '10.]

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—This company is reported to have begun work on a section of its proposed electric railway between Hanover and Madison. From Hanover the line will be extended to Scottsburg, where it will connect with the lines of the Indianapolis & Louisville Traction Company, with which interests the Cincinnati, Madison & Western Traction Company is said to be identified. J. E. Greeley, Louisville, president. [E. R. J., Nov. 20, '09.]

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company has nearly completed the grading of its extension to Waverly. Track laying is to begin about Sept. 1, and the new line is scheduled to be completed by Dec. 1.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company has asked the people of Manhattan to vote it $20,000 in bonds to assist in building to Fort Riley and also expects to make a similar request of Ogden township.

***Athens, Maine**—It is stated that preliminary steps are being taken by the people of Athens and Skowhegan for the formation of a company to construct a line between these places. An appropriation of $15,000 has been voted in Athens and a committee composed of J. E. Chapman, F. B. Rollins, C. R. Oliver, Waldo Sanders, George Ayer and George C. Hight has been appointed to promote the line from that end.

Portland, Gray & Lewiston Railroad, Lewiston, Maine—This company is said to be making considerable progress in the building of its proposed 30-mile electric railway between Auburn and Portland. Nearly 7 miles of grading have been finished, and a 100-ft. reinforced concrete bridge over the Little Androscoggin River has been completed. Work on a 22-ft. arch bridge over the Royal River is under way. The general work of construction is under charge of Samuel Ferguson, and the bridge work is being done by Fred T. Ley Company, Springfield. The line is being built by W. Scott Libbey and Harry M. Dingley, Lewiston. [E. R. J., Apr. 30, '10.]

Washington, Frederick & Gettysburg Railway, Frederick, Md.—Plans are being prepared for the early extension of this company's line from Thurmont to Emmittsburg and Gettysburg. The line from Frederick to Thurmont, now operating by steam, is to be electrified.

Boston & Eastern Electric Railroad, Boston, Mass.—This company has deposited $10,000 with the City Treasurer as a guarantee of good faith and to bear the cost of the Transit Commission of the work of surveying portions of Boston Harbor. [E. R. J., May 28, '10.]

Escanaba (Mich.) Electric Street Railway—It is stated that this company is taking definite steps to extend its line from Gladstone to Rapid River, via Kipling and Masonville. Surveys will be made at once.

West Jersey & Sea Shore Railroad, Camden, N. J.—This company has placed in operation a double-track line between Anglesea and Wildwood.

New York & North Shore Traction Company, Mineola, N. Y.—This company placed in operation, on Aug. 12, its newly completed extension between Whitestone, Bayside and Flushing.

Forty-Second, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—Judge Lacombe granted, on Aug. 13, in the United States Circuit Court, the application of Frederick W. Whitridge, receiver for this company, for authority to build a loop running from Manhattan Street along Twelfth Avenue to 129th Street, east on 129th Street for about 340 ft. to a connection with the line again on Manhattan Street near the Fort Lee Ferry, with the consent of the local authorities. The improvements are to cost $35,000.

Black River Traction Company, Watertown, N. Y.—The Public Service Commission, Second District, has granted the petition of the Black River Traction Company for permission to extend its line in Watertown from the intersection of Pearl Street and Water Street through Pearl Street, a distance of 3150 ft. The company has obtained the necessary consents of property owners and a franchise for such construction from Watertown.

Northern Ohio Traction & Light Company, Akron, Ohio—Announcement has been made that this company will make improvements on Howard Street entailing an expenditure of about $25,000. Heavy rails will be laid on steel ties and the track will be put in first-class condition.

People's Railway, Berlin, Ont.—This company advises that it has awarded the contract to F. W. Maxwell, Port Hope, for the construction of the 3-mile section of its projected railway, between Berlin and Bloomingdale, on the main line to Guelph. The contract has also been let from Berlin to New Hamburg, a distance of about 14 miles, to D. B. Campbell, Latchford, Ont. The Acme Construction Company is now grading between Bloomingdale and Guelph. This work was begun four weeks ago and is progressing favorably. The grading will be completed between Bloomingdale and New Germany shortly, and the remainder will be completed by Dec. 15. Thomas Robbins, Galt, Ont., has received the contract to do all the concrete work along the line, including the three large piers and two abutments for the Grand River, east of Berlin. The company expects to place engineers on the line north from Guelph within 10 days, to survey the line from Guelph to Elora, Fergus and Arthur; and also complete the survey from Guelph to Hespeler and Puslinch Lake, which, when the line is completed, will give the company a direct route from the south, partly over the Galt, Hespeler & Preston Railway and thence over the People's Railway to Guelph. The company plans to open a park next summer between Berlin and New Hamburg on the main line, where there is a lake covering about sixty acres. [E. R. J., June 25, '10.]

Chambersburg & Western Electric Railway, Chambersburg, Pa.—An effort is being made to revive the projected Chambersburg & Western Electric Railway, which was incorporated a few years ago to build an electric railway from Chambersburg to Mercersburg via St. Thomas. About $75,000 has been subscribed thus far.

Huntingdon, Lewiston & Juniata Valley Traction Company, Huntingdon, Pa.—This company, which proposes to build an electric railway from Huntingdon to Mount Union and Lewiston, has placed a mortgage on record for $1,500,000 in Huntingdon. [E. R. J., May 7, '10.]

Johnstown (Pa.) Traction Company—The citizens of Prospect have petitioned for an extension of the Johnstown Traction Company's line to that community.

York (Pa.) Railways—This company has received from the Secretary of State a certificate of authority to make certain extensions of its tracks in York.

Amarillo, Tex.—N. A. Brown, holder of the franchise for a street railway west from Polk Street to San Jacinto Heights, is said to have announced that all material to be used in connection with the building of the lines has been ordered. The line is to be completed within 90 days. [E. R. J., June 25, '10.]

Utah Light & Railway Company, Salt Lake City, Utah—This company, which has just placed in operation its line from Midvale and Sandy, will shortly begin surveys to Draper, and thence through Utah valley to Nephi, with branches to Provo canyon and Utah lake. At Lehi a survey will run to Saratoga Springs on the north shore of the lake. At Pleasant Grove a short cutoff line will be surveyed over the Provo bench to the Provo canyon.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—A subscription of $60,000 is being solicited among landowners and others affected to assist this company in its proposal to build an electric railway around Lake Monona. The proposed line will cater to summer resort business, and will be an extension of the line to be built from Madison to Stevens Point. Allen T. Russell, Chicago, Ill., general manager. [E. R. J., Aug. 6, '10.]

SHOPS AND BUILDINGS

Connecticut Company, Bridgeport, Conn.—This company has completed its new car houses in Bridgeport. They are two large one-story buildings, one for repair shops, etc., north of the railroad station facing on Congress Street, with a second story on that side for quarters for its employees. The second building will be built east of the railroad station and will be used chiefly for storage for open and closed cars in season. The buildings will cover an area 241 ft. x 331 ft.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—Bids are now being received by this company for the erection of a passenger and freight station in Elkhart. The building will have an interior finish of marble. [E. R. J., July 30, '10.]

Louisville & Eastern Railroad, Louisville, Ky.—This company will build a station at the fair grounds of the Shelby County Fair Association, near Shelbyville, Ky.

Milford, Attleboro & Woonsocket Street Railway, Milford, Mass.—This company leased property on Main Street, Milford, where it proposes to erect a freight and express station.

Dartmouth & Westport Street Railway, New Bedford, Mass.—Plans are being prepared by this company for a freight station to be located at Sixth Street and Bedford Street, Fall River. The building will be similar to the station in New Bedford.

Morris County Traction Company, Morristown, N. J.—It is stated that this company is considering plans for the erection of a car house and repair shops on a site adjoining its power station at Dover.

Portland (Ore.) Railway, Light & Power Company—It is stated that this company is considering plans for the erection of a large warehouse and ticket office on the Columbia River at Vancouver.

Oregon Electric Railway, Portland, Ore.—This company is said to have purchased a site opposite the present site of its depot in Salem for terminal grounds and for warehouse purposes.

POWER HOUSES AND SUBSTATIONS

Durham (N. C.) Traction Company—This company expects to begin work during the next few days on an addition to its power plant, 36 ft. x 100 ft. All the electrical equipment for this addition has been purchased.

East Liverpool Traction & Light Company, East Liverpool, Ohio—This company has purchased a building located at Yellow Creek which will be remodeled and equipped as a power station.

Pittsburg, McKeesport & Westmoreland Railway, McKeesport, Pa.—It is announced that this company is preparing plans for a power plant, 40 ft. x 40 ft., to be built on a site adjoining its car house in Westmoreland County. At present the company rents power from the West Penn Railways.

Philadelphia (Pa.) Rapid Transit Company—This company has contracted with the Delaware County Electric Company and the Beacon Light Company, Chester, subsidiary corporations of the Philadelphia Electric Company, to supply power for its lines in Delaware County.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company has recently ordered the following power-station apparatus: One 750-kw, mixed-pressure turbine from the General Electric Company, surface condensers, circulating pumps, air pump, etc., from the Wheeler Condenser & Engineering Company; one 250-hp Sterling boiler from the Babcock & Wilcox Company, and Jones stokers from the Under-Feed Stoker Company of America.

Manufactures & Supplies

ROLLING STOCK

United Traction Company, Reading, Pa., is said to be in the market for 10 new cars.

Citizens' Light & Transit Company, Pine Bluff, Ark., is said to be considering the purchase of several new cars.

Boston (Mass.) Elevated Railway, it is reported, is about ready to order 100 semi-convertible surface cars and 30 or 40 new elevated cars.

Knoxville Railway & Light Company, Knoxville, Tenn., has placed an order with the General Electric Company for 10 G. E.-67 two-motor equipments.

Mahoning & Shenango Railway & Light Company, New Castle, Pa., has ordered 12 city cars and six interurban cars from the Niles Car & Manufacturing Company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., is in the market for four semi-convertible cars of the prepayment type, 40 ft. to 45 ft. long, over all, and seating 44 people.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis., has purchased two interurban passenger cars from the Cincinnati Car Company, and one 50-ft. snow plow from the Russell Car & Snow Plow Company. General Electric motor equipments will be installed on these cars.

Michigan United Railways, Lansing, Mich., noted in the ELECTRIC RAILWAY JOURNAL of July 16, 1910, as considering the purchase of 30 double-truck city cars, has placed the order for these cars with The J. G. Brill Company. The company has also ordered one special office car for the interurban system and two express trailers from the McGuire-Cummings Manufacturing Company.

Metropolitan Street Railway, Kansas City, Mo., reported in the ELECTRIC RAILWAY JOURNAL of July 2, 1910, as having ordered 25 closed pay-as-you-enter cars from the Cincinnati Car Company, has specified the following details for these cars:

Bolster centers, length, 21 ft. 10 in.	Curtain fixtures....Forsythe
Length of body....47 ft. 2 in.	Curtain material...pantasote
Width over sills....8 ft. 7 in.	Fenders .....Eclipse
Sill to trolley base. 8 ft. 10 in.	Hand brakes .....Peacock
Height from top of rail to sills .....33¼ in.	Heating system .....Consol.
Body. steel sides, wood frame	Headlights .....Dayton
Interior trim..quartered oak	Motors .....4-West.
Underframe .....composite	Push button signal, battery system
Air brakes, Nat. Brake & Elec.	Registers ..... International
Bolsters, body ....cast steel	Roofs .....turtle back
Bumpers, Hedley anti-climbers	Sash fixtures .....Dayton
Car trimmings .....bronze	Seats, style.....H. & K.
Control system. K-35 one end	Seating material .....rattan
Couplers. Ry. Co.'s std. radial	Trucks .....Standard O-50
	Ventilators ....Pullman type
	Wheels....34-in. forged steel

TRADE NOTES

Vulcan Steam Shovel Company, Toledo, Ohio., will build a plant at Evansville, Ind., to cost $200,000.

Green Engineering Company, Chicago, Ill., has moved its Chicago office to the Steger Building, 39 Jackson Boulevard, where it will occupy the entire thirteenth floor.

Dodge Manufacturing Company, Mishawaka, Ind., held the annual outing of its employees on July 30 at Winona Lake, Ind. The program included numerous athletic events, for which prizes were awarded to the winners. More than 2,000 people attended.

Automatic Ventilator Company, New York, N. Y., announces that it has the contract to equip with automatic ventilators the 20 new cars which are being built by the Pressed Steel Car Company for the elevated lines of the Philadelphia Rapid Transit Company.

American Railway Advertising Company, Evansville, Ind., has filed articles of incorporation with a capital stock of $250,000 for the purpose of manufacturing and selling machinery, devices and appliances for continuous motion adver-

tising in street and interurban railway cars and other places. The directors are: E. C. Henning, G. T. Henning and Frank A. Larkin.

Ackley Brake Company, New York, N. Y., reports that it has recently received orders for Ackley brakes from the West Ham Corporation Tramways, West Ham, Eng.; Manila Electric Railroad & Light Company, Manila, P. I.; Brisbane Tramways Company, Brisbane, Queensland; Cie des Tramways Electriques Genevoise, Geneva, Switzerland; Rio de Janeiro Tramways, Light & Power Company, Rio de Janeiro, Argentina; Caracas (Venezuela) Tramways. Large shipments of Ackley brakes have also been made during July to Yokohama, Berlin, Paris, London, Basle, Switzerland, and Oran, Algeria.

Root Spring Scraper Company, Kalamazoo, Mich., has moved into its new brick building, 60 x 120 ft., at 525, 527, 529 West North Street, Kalamazoo. The building is modern in every detail, and is fully equipped with machinery to facilitate the manufacture of the Root railway spring scrapers. The company announces that its business for the past year was the best in its history. A shipment of scrapers was recently made to the Grand Rapids (Mich.) Railway for use on the 20 pay-as-you-enter cars just purchased by that company. When these scrapers are installed every car operated by this company will be equipped with this device. Another order was recently received for scrapers for equipping the 30 new cars just ordered by the Michigan United Railways from The J. G. Brill Company.

Charles G. Norris, Lea Recorder Company, Manchester, England, is on a visit to this country to present to American manufacturers the advantages of the Lea recorder for measuring boiler feed water, air pump discharges, discharges from pumps, wells, sewage, etc. The recorder is employed extensively abroad in power stations and electrical works for these purposes, among the users being the London County Council, which has eight of them; the Corporation Electrical Works at Manchester, Glasgow, Edinburgh, Belfast, the Great Eastern Railway, J. G. White & Company, Limited, Worthington Pump Company, etc. Mr. Norris has engaged temporary headquarters at Room 823 United Engineering Societies Building, 29 West Thirty-ninth Street, where he has the apparatus on view, and has himself taken a room at the Engineers' Club.

Western Electric Company, New York, N. Y., has recently opened an office in Milwaukee. It is located at No. 378 East Water street, and is in charge of A. C. Keene. Four stories and a basement are devoted exclusively to displaying and storing the company's telephones and power apparatus and its electrical supplies. The Western Electric Company reports that gross sales for the seven months, to June 30, have been at the rate of $61,000,000 per annum. Sales for this period show an increase of 48 per cent over the same period of the fiscal year ended Nov. 30, 1909. Officials of the company expect that the year's business will not vary materially from the $61,000,000 mark, which compares with $46,000,000 of gross in 1909, an increase of $15,000,000. The company now has about 22,000 employees on its pay-roll, an increase of nearly 4,000 since Jan. 1, 1910.

ADVERTISING LITERATURE

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a sheet on ball bearings and their correct use. It is particularly devoted to adapter bearings.

Jesse C. Coogan, Milwaukee, Wis., has issued a supplement to bulletin No. 5, which points out the principal advantages of the Coogan system of hot water heating for different situations.

Kontinentale Bremsen-Gesellschaft m. b. H., Lankivitz-Berlin, Germany, has published in German a description of the Ackley adjustable brake, for which it has the German agency.

U. S. Metal & Manufacturing Company, New York, N. Y., has issued its 1910 catalog describing Diamond steel poles and fittings for electric railway, power, telegraph and telephone lines.

Dodge Manufacturing Company, Mishawaka, Ind., has issued a bulletin entitled "How to Save Fuel," which describes the applications of the Dodge Eureka water softener and purifier.

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a catalog entitled "Modern Ore and Coal Handling Machinery," which contains illustrations of some of the more recent installations of Brownhoist machinery.

General Electric Company, Schenectady, N. Y., has recently issued bulletin No. 4760, illustrating and describing a line of direct current instruments constructed upon the D'Arsonval principle, and designed for switchboard use.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued an attractive booklet of envelope size on its paint for steel cars, which contains color chips showing the four colors in which Dixon's silica-graphite steel car paint is made.

H. M. Byllesby & Company, Chicago, Ill., have reprinted in pamphlet form an article from the *Bankers' Magazine* of July, 1910, entitled "Engineering and Commercial Skill Applied to the Operation and Management of Public Service Corporations," which outlines briefly the Byllesby organization.

General Electric Company, Schenectady, N. Y., has printed in full Judge Lowell's opinion filed in the United States Circuit Court, District of Massachusetts, July 30, 1910, in the oil switch case, involving the Hewlett & Emmet patent, No. 800,916, in which the General Electric Company was the complainant and Frank O. Hartman, et al., defendants.

Pettingell-Andrews Company, Boston, Mass., has printed a handy pamphlet, giving a large number of useful wiring tables, wire markings, fusing currents for different wires, comparative conductivities, electrical symbols for wiring plans, wiring formulas and many miscellaneous tables. Instructions are also given relative to the installation and care of electrical machinery, motor wiring diagrams and lamp data.

Under-Feed Stoker Company of America, Chicago, Ill., has issued the third number of the *Publicity Magazine,* which is devoted to the interests of the Jones stoker. The publication contains, besides other interesting reading matter, an address entitled "Furnace Draft in Its Relation to Smoke Prevention," delivered by Sylvester S. Howell, before the fifth annual convention of the International Association for the Prevention of Smoke, at Minneapolis, Minn., June 30, 1910.

C. A. Wood Preserver Company, Austin, Tex., has printed a booklet composed principally of testimonial letters from users of its C. A. Wood preserver. Among the railways using this preservative are the Denver (Col.) City Tramway Company, the Freeport (Ill.) Railway, Light & Power Company, the Los Angeles (Cal.) & Redondo Railway Company, the Mobile (Ala.) Light & Railroad Company, the Greenville (S. C.) Traction Company, Durham (N. C.) Traction Company, and Austin (Tex.) Electric Railway Company. An interesting feature of the book is a genealogical tree, showing the more important compounds derived from coal tar.

NEW PUBLICATIONS

The Watt-Hour Meter. By W. M. Shepard and A. G. Jones. Technical Publishing Company, San Francisco, 1910; 179 pages; illustrated. Price, $2 net.

This book is intended particularly for sellers of power for lighting and industrial purposes. Simple explanations are presented of power measurement methods and of the different types of watt-hour meters, such as induction, commutating and mercury flotation. A large part of the work is devoted to meter maintenance and testing. A chapter on rates discusses the practice of four large companies in as many different parts of the United States.

Statistik der Elektrizitätswerke in Osterreich. (Austrian Central Station Statistics.) Published by Elektrotechnischen Vereines in Wien, Vienna; paper, 32 pages. Price, 2.5 kroner (approximately 50 cents).

These statistics include the principal data on the 700-odd central stations of Austria which serve about 1500 communities. Information is furnished with regard to the electrical equipment and system of each plant, the extent of the lighting and power networks, power generating and selling costs, population, etc. This work should be a valuable aid to those contemplating the sale of electrical equipment in Austria.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, AUGUST 27, 1910 No. 9

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 27, 1910.

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Rapid Transit in New York

According to rumor Mr. Willcox and Mr. Shonts have at last "gotten together" on the rapid transit situation in New York and an important announcement will soon be made of plans which will be acceptable both to the commission and to the Interborough Rapid Transit Company. This is as it should be. The Interborough Company, through its ownership of the present subway and lease of the elevated system, is in a better position than any other corporation or set of interests can be to give the city what it requires in the way of rapid transportation. No particular good would be accomplished in trying to fix the responsibility for inaction up to this time. Undoubtedly both sides were endeavoring to obtain the best terms possible. But almost any terms are desirable to either side when the needs of the city in the way of transportation are considered. It would seem as if there was sufficient space between the irreducible minimums of each to afford the basis of an agreement and we trust that it has been found.

A Progressive City Council

A municipal body politic, like the individuals which compose it, is subject to idiosyncrasies and disorders of various kinds. Sometimes these assume serious proportions, but more often they are light in character and short in duration. One of these diseases of the recurrent type is the no-seat, no-fare hallucination. Its last abode seems to have been in Syracuse, N. Y., where a small but blatant number of "reformers" petitioned the City Council to inaugurate the street railway millennium by the magic of an ordinance. However, in this instance the City Council was not intimidated, but wisely determined to learn at first hand what experience had been obtained elsewhere with similar measures. A transportation committee was duly appointed and visits were made to Jersey City and Trenton, where the Councilmen were informed that no-seat, no-fare ordinances had proven failures in practice. Further than this the Council had a conference with the Syracuse street railway management from which it was gratified to learn that substantial car orders had been placed long before the senseless no-seat-no-fare agitation had been begun. As the result of the investigation by its committee, the Council rejected the proposed ordinance. The experience in Syracuse shows that many of the errors now made by City Councils would be avoided if the questions at issue with the public-service corporations were considered in a fair spirit and the authorities investigated matters before legislating upon them.

Bridging the Mississippi River

The States of Illinois and Missouri will soon be linked by interurban trolley service. Announcement that the McKinley Bridge of the Illinois Traction System will be ready for through travel on Oct. 1 has just been made. This structure commands attention, not only because of the enormous outlay

required to bridge the Mississippi River, but because it is also of great importance from the traffic standpoint. Trade and travel between St. Louis and the great industrial districts across the Mississippi River have been restrained largely by reason of bridge tolls and lack of frequent through service. The franchise by which the Illinois Traction System was permitted to build its $2,000,000 bridge and its 2.5-mile double-track entrance into the heart of the St. Louis business district, thus making possible through interurban service and electric freight and express service, does not permit any arbitrary charge for bridge traffic. The direct revenue from the bridge, therefore, must come from the 5-cent fares of the local street car service and the interurban fares based on 2 cents per mile. Some additional revenue, of course, will be received from the tolls charged foot-passengers and team traffic moving over the roadways at either side of the electric tracks. The bridge is by far the most important and expensive single engineering undertaking of its kind built by an interurban electric railway company. Its neighbor, the Merchants' Bridge, used by a number of steam railroad companies, was considered at the time of its construction as a wonderful achievement, and it is a striking instance of the development of electric interurban railways that this bridge should now be paralleled by another built by a single electric railway system.

Power Saving Through Anti-Friction Bearings

Mr. Stitzer's article in this issue on "Car Tests in Philadelphia with Anti-Friction Bearings" should attract wide attention as it presents some novel and most instructive data on the vital subject of power consumption. The almost universal tendency, at least up to within a very recent period, to increase the size, weight and speed of cars has encouraged the development of every possible power-saving means whether applied to car construction or car apparatus. The seriousness of the problem is well illustrated by the experience in Philadelphia, where the gradual increase in the number of double-truck cars raised the power consumption per car-mile from 1.4 kw-hours in 1897 to 2.6 kw-hours in 1907. It is no wonder then that the Philadelphia Rapid Transit Company should have consented to try anti-friction bearings as a partial relief. The results of its tests have been so gratifying that this company will soon have in operation over a score of cars equipped with anti-friction bearings, both on the armatures and axles. The figures given by Mr. Stitzer on decreased power consumption per ton-mile and on less temperature rise in the motors of the three test equipments speak for themselves in showing what can be done to stave off the installation of four-motor in favor of two-motor equipments. The anti-friction armature bearings appear to have been of most service in reducing the heating of the motors, while the anti-friction journal bearings were most effective in reducing the power consumption per ton-mile. It is significant that while the addition of anti-friction journal bearings increased the acceleration of the four-motor equipment by 14.2 per cent, the decrease in deceleration was only 4.3 per cent. In general, the use of anti-friction journal bearings obliged the motormen to increase their coasting periods in order to keep to schedule. The bearings have not been in service long enough to state definitely what their annual maintenance cost would be. It is important to note, however, that they were installed without making any material changes in the trucks and motors and that so far they have given no trouble whatever, such as breakage, wedging or appreciable wear.

THE TRACKLESS TROLLEY

From time to time during the past 15 years the project of a trackless trolley system has appeared again and again, only so far as this country is concerned to come to an untimely end. There have been one or two attempts which got as far as making the wheels go round, but nothing more tangible has come of them. On the other hand, abroad the scheme seems to have met some little degree of success, and recently in England there have been two applications for trackless trolley lines on behalf of the cities which have municipal tramway systems. One of these, Bradford, sent a committee to the Continent where such systems are in operation to investigate the matter. Trackless trolley systems were found in measurably successful operation in Vienna, as part of a municipal tramway system on the Italian lakes and in Mülhausen. The first-named system was installed by the Vienna municipality for the purpose of service in districts of very light traffic where the permanent way of an ordinary tramway would involve too much expense. A little outside of Vienna there is a further section of trackless trolley service owned by a local company.

The Bradford committee was favorably impressed with this Viennese system, which gave a smooth and quiet service at reasonable speed over the ordinary macadamized roads on which it runs. There are, however, four trolley wires, two for the cars running in each direction as if it were a double-track tramway. This is to avoid the inconvenient necessity of exchanging trolleys when the cars meet as is actually done on the little suburban line near Vienna, to which reference has been made. This problem of permitting vehicles to pass on a trackless trolley system has always been a troublesome one and where an overrunning trolley is used no very satisfactory solution has been devised aside from a double trolley equipment. The system on the Italian lakes, like that of Mülhausen, works on good macadam road, but at very steep grades, so that the large power supply from the trolley wires becomes a distinct advantage over anything that could be done with a gasoline motor bus. There are in Italy besides Lake Como a number of other short lines, aggregating perhaps 50 miles in length, all of which are in regular use and apparently have done good service. On most of these Italian lines a very long trolley pole is used, carrying a double under-running contactor and permitting the vehicle considerable latitude in regard to direction.

The energy consumed per car-mile is said to be about the same as in the ordinary Continental tramway system. From this we assume that the buses are much smaller than the tramway car taken for comparison, because previous estimates have been to the effect that on a good road the energy required per ton-mile was about double that needed on rails. On one of the Italian lines for which figures were obtained the total operating expense footed up to 11¼ cents per car-mile, of which by far the largest item was the rubber tires, which amounted to a little over 4¼ cents. Altogether the impression made upon the investigators by the trackless trolley systems was distinctly favorable, bearing in mind that their function is a rather special one, that of taking care of territory in which the expense of an ordinary tramway would be too large.

All this, however, does not give any indication that a trackless trolley scheme would be a good one when introduced into this country. The tendency of tramway operation here is so different from anything found abroad that comparisons are

extremely difficult to make. An American city is a sensitive, mobile organization, entirely lacking the stability in habit of the ordinary Continental city. Nothing has been more thoroughly demonstrated here than that traffic follows the trolley. Put a line in almost any direction from any American city and it will make good earnings within a year or two because the new facilities of getting out of the city lead to their immediate utilization. It is very doubtful whether this would be true in the average European city even supposing that the tramway companies there were willing to take the chance. Then again American suburban roads as a whole are very much inferior to those in Europe and driving a trackless trolley in many outlying districts here would be no sinecure. We very much doubt also whether, with the present development of the gasoline omnibus in one form or another, there is much encouragement for the trackless trolley system. It has most of the disadvantages of the trolley line from the standpoint of the residents along the street in that it requires an overhead system somewhat more complicated than the ordinary trolley and it does not possess any particular advantage in general convenience over the automobile omnibus line. If it has any useful function in American practice it seems to us that it is in extremely local use as an auxiliary for the ordinary tramway service on comparatively short runs where the traffic is not heavy, but upon the whole it does not look promising, in spite of its great ingenuity and its undeniable comparative success on some of the lines where it is in use.

It is interesting to note that the development of the system abroad has led to pretty definite conclusions as to the relative advantages of an over-running and under-running trolley. The latter has been found to permit practically as great latitude in the operation of the cars as the former, in addition to possessing undeniable advantages: (1), it simplifies the construction of the overhead turnouts; (2), it allows the use of the standard overhead trolley construction, and (3), when the trackless trolley line is owned by the railway system, the busses can use the trolley company's repair shops and proceed to them over the trolley tracks, taking current from the overhead line.

RIDING QUALITIES OF ELECTRIC LOCOMOTIVES

In an editorial on "Electric Locomotive Problems" published in the Electric Railway Journal of Aug. 6, 1910, the theory was advanced that the nosing of certain types of electric locomotives might be due to the drawbar side stresses exerted through a long lever arm. Elsewhere in this issue we print a letter from G. M. Eaton, who disagrees with this theory and expresses the opinion that "nosing" is caused by track defects which start the wheels riding up on the flange fillets, first to one side and then to the other, with increasing violence.

Mr. Eaton argues that the drawbar side stresses cannot be the cause of nosing for the reason that this action takes place on straight track and is as severe when the locomotive is running light as when hauling a train. He points out further that a locomotive which is nosing on straight track will steady down somewhat on a curve. We have observed a number of electric locomotives running at high speed on straight track and on curves, and while it is true that nosing takes place on straight track and without a trailing load, very severe periodic oscillations have been noted on curves. The wheels do not necessarily swing from side to side, because the leading outside wheel is pressed hard against the rail due to the constant deflection from the tangent. The frame and spring-borne parts, however, lurch sidewise with great force and as long as the guiding pressure exceeds the force of the side swing the leading outside wheel will cling to the rail, but the total side pressure will be equal to the sum of the two and may reach considerable proportions. Whether the nosing action is actually caused by the drawbar side stresses we do not claim as an uncontrovertible fact. On a curve, however, the nosing pressure is added to the guiding pressure.

An interesting point which is not explained by Mr. Eaton's theory is that nosing disappears when the power is shut off and before any appreciable reduction in speed takes place; hence it can hardly be due to track defects. It may represent a definite loss of energy, but the energy of the motors is stored in the moving mass of the locomotive and train and it would be reasonable to suppose that nosing would continue as long as the locomotive was in motion at or near the critical speed. This phenomenon would suggest that there must be a marked difference in the riding qualities of trailing wheels and driven wheels.

INDIVIDUAL MOTOR DRIVING FOR MACHINE TOOLS

The advantages of using individual motors for driving machine tools have been demonstrated in numerous industrial establishments, and it is surprising that this method has not been adopted more generally in electric railway repair shops. The reason undoubtedly is the comparatively high first cost of a number of individual motors as compared with one or two large motors driving shafting. The day is close at hand, however, when every means of forcing the output of an electric railway repair shop must be considered and there is coming to be a better appreciation of the inefficiency of shafting and belt driving. A test of the power required to run even a small shop using overhead shafting usually will show that more current is consumed in turning the shafting, pulleys and belts than in actual machine operations.

There are certain advantages of individual motor drive which are particularly beneficial in a railway repair shop. No other method permits the development of shop facilities so freely along the lines which could not be foreseen when the shop was first built. There is a constant tendency toward using heavier tools in street railway shops and rearranging them on the floor to facilitate routine operations. The cost of moving tools and changing the shafting and pulleys as the shop grows in size or the character of the work done changes often may be equal to the initial expense for direct-connected motors for all the machines. Individual motors can be applied to the larger tools first and to any isolated machine of moderate size for which room cannot be found in the department in which it should be placed. Better light, greater safety to employees and more overhead and aisle space will result from the substitution of individual motors for shaft driving.

In many cases the first cost of the motors for individual drive appears so formidable that the economies which would result from a well-planned installation do not receive the consideration to which they are entitled. The first cost can often be reduced by judicious use of second-hand motors. The present tendency in central-station operation is to substitute alternating-current distribution for 550-volt direct-current power supply and this change has released many direct-current motors in good condition which could be adopted readily for use in railway shops, which can be bought at low prices.

SEATTLE-EVERETT INTERURBAN RAILWAY

The six foremost cities on Puget Sound form a perfect arc which sweeps round the eastern shore of that famous body of water like a Titan's bow. It is drawn as though to discharge across the continent a great arrow heralding this section's future commercial and industrial supremacy. The powerful right hand of Fortune stretching athwart the Pacific grips the arrow with the notch at the coast line and the head close up against the bow just where Everett lies, 112 miles to the east. The southern end of the bow rests at Olympia and the northern end at Vancouver, 150 miles away. Inlaid in the stave of this bow are the cities of Bellingham, Everett, Seattle and Tacoma, with Puget Sound inside the arc.

One of the finest counties in this section is Snohomish, which lies midway on the eastern shore line of the Sound. In fact, were the arrow discharged it would, at the very beginning of its flight, cleave Snohomish through the center. With a population of 75,000 this county has resources that would support many times that number, for it abounds in timber and fisheries, in agricultural and in mineral wealth and is larger than Rhode Island and Delaware combined. Everett is the principal city and is splendidly situated on one of the finest harbors on the Sound. Less than 20 years ago the great fir trees stood in unbroken ranks over the entire site of this city, which now numbers nearly 40,000 inhabitants, and already has cast off the last habiliment of a frontier town. By far the most important step of recent years in the development of Snohomish County is the new interurban railroad just completed between Seattle and Everett. It is quite characteristic of the spirit of the Northwest that, while traversing a section where the professional lumberman's axe was the first and actually the most necessary implement of construction, the road nevertheless has been built for a speed of 40 m.p.h.

For 12 miles the way literally has been bored through a solid forest, large gangs of lumbermen being employed to cut and dispose of the great trees. These trees frequently reached a diameter of 8 ft. and a height of 200 ft., and their stumps and far-reaching roots had to be removed by blasting before the steam shovels could work. The maximum grade of this road is only 2 per cent and the maximum curvature 4 per cent, but this excellent physical condition was not due to favorable topography. It was attained by grading to an average amount of 25,000 yd. per mile or the equivalent of a continuous embankment 6 ft. high and 16 ft. wide on grade. In fact, the standard width of fills was 16 ft., while the width in cuts was 18 ft. The largest fill is over a swamp ½ mile from Halls Lake, the southern terminus of the new section of the line. This fill is 40 ft. high and ½ mile long. A great deal of difficulty attended its making, because the unstable foundation required trainload after trainload of spoil for fully two weeks before the grade rose to view.

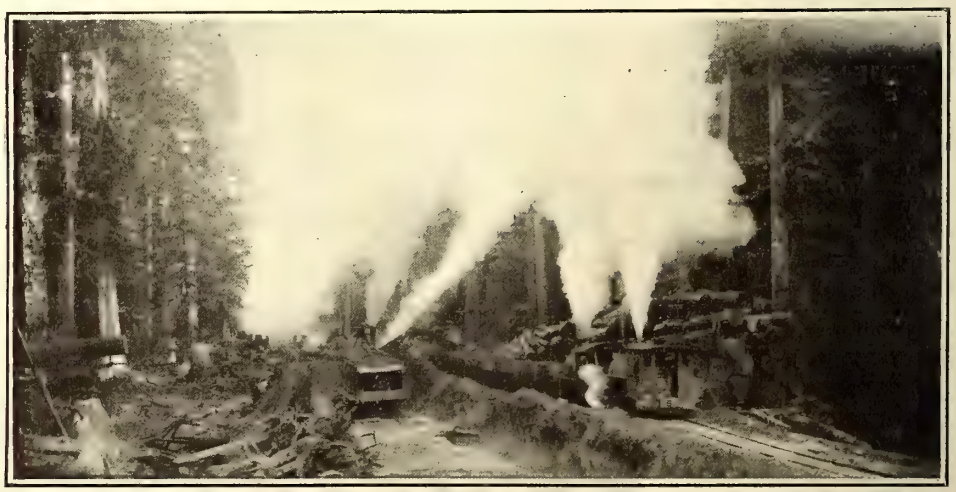
In making some of the cuts there was unexpectedly encountered on the southern section of the line a soil formation almost like hardpan. It could not be handled with steam shovels and so was blasted out, well-boring machines being used for the drilling. In places the holes were drilled to a depth of 25 ft. or 30 ft. The heaviest cut was one of 50,000 yd., with a depth of 30 ft. and length of about ¼ mile, situated midway between Seattle and Everett.



Seattle-Everett Line—A Tangent Through the Woods

In breaking through a largely virgin country like this the problem of taking care of the working forces, especially during a wet winter such as was the past, quite equaled the difficulty of the work itself. First came road building to establish camps. As all the large trees had to be avoided, the camp roads were as tortuous as bridle paths in a forest. Whenever a camp was shifted it meant building a new road and usually the moving of heavy equipments. Among the latter were the donkey engines for logging and drag-scraper work, which made slow, tedious loads to be hauled over sinuous trails by four-horse teams. In spite of the wet climate the problem of watering the camps and also of getting water for donkey engines, steam shovels, loco-





Seattle-Everett Line—Map of the "Magic Bow" and a Scene Showing Grading Operations in the Primeval Forest

motives, etc., required a water-works system that might have done credit to a small town. At one time there were laid 6 miles of temporary mains to supply 500 men in scattered camps besides the extensive steam equipment. The pressure head was afforded by three gasoline-engine pumping sets.

The track consists of 70-lb. T-rail laid on 6-in. x 8-in. x 8-ft. ties. The rail joints are of the Continuous type. The ballast is gravel with from 6 in. to 12 in. depth under the ties. The grading was done by steam shovels in the larger cuts and drag scrapers operated by donkey engines in the smaller cuts. The total material handled by the equipment was about 2000 yd. a day. Five locomotives, two being standard gage, together with 75 dump cars, were kept busy with the ballasting and grading.

The chief point of interest in the overhead equipment of the road is the use of catenary construction. This consists of No. 0000 grooved trolley wire suspended on galvanized hangers 6¼ in., 7½ in., 10 in. and 14¼ in. long. The feeder is 795,000 circ. mil bare aluminum cable of 37 strands, and the transmission line is of 66,370 circ. mil aluminum, which is equivalent to No. 4 B. & S. copper wire. The Ohio Brass Company supplied the overhead equipment.

Passenger service on the line was begun with cars previously used by the Everett Railway, Light & Water Company, but six new interurban coaches are being manufactured by the Niles Car Company and will shortly be placed in service. The new cars will be 52 ft. over the bumpers and will be equipped with four 75-hp G.E.73 motors and multiple-unit control apparatus. The trucks are to be of the M. C. B. type, made by the Baltimore Locomotive Works. Westinghouse air brakes will be used. The company also has two electric locomotives for freight service, 12 flat cars and six box cars. Six more freight cars will shortly be purchased.

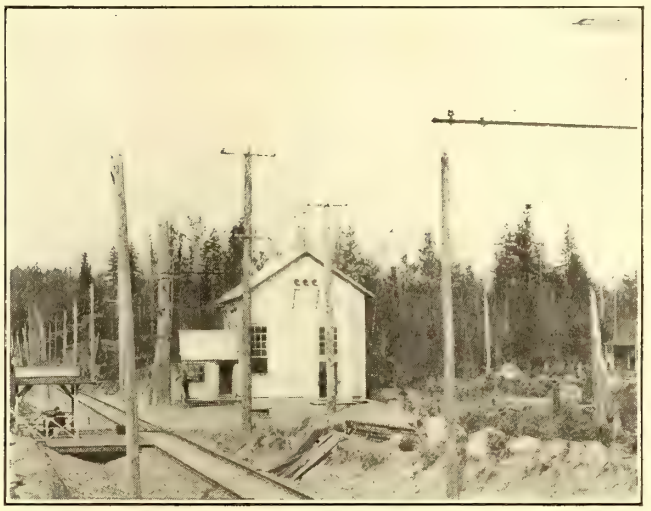
The initial schedule for passenger operation calls for slightly over 20 m.p.h., including stops and turn-outs, but exclusive of time lost running over 6½ miles of terminal tracks. The total length, including terminals, is 22 miles and the full running time is 1 hour and 15 minutes with hourly service and 17 cars each way daily. The new section from Halls Lake to Everett has been constructed to a 40 m.p.h. standard, but the older section from Seattle to Halls Lake, which had previously been built and is now being renovated, will not now permit this speed.

Power for operating the Seattle end of the line is supplied from the system of the Seattle Electric Company to a substation at Halls Lake, where a 500-kw motor-generator is installed. Power for operating the Everett end is supplied from the system of the Everett Railway, Light & Water Company to a 400-kw motor-generator in the Broadway substation.

The operating company is the Seattle-Everett Traction Company, of which William I. Sturtevant is general manager. The Stone & Webster Engineering Corporation carried out the entire contract for the engineering, construction and equipment of the new line.



Seattle-Everett Line—Beverly Park Station



Seattle-Everett Line—Substation at Hall's Lake



Seattle-Everett Line—Turn-Out Near Martha Lake

CAR TESTS IN PHILADELPHIA WITH ANTI-FRICTION BEARINGS

BY ARTHUR B. STITZER, FORMERLY ELECTRICAL ENGINEER, PHILADELPHIA RAPID TRANSIT COMPANY

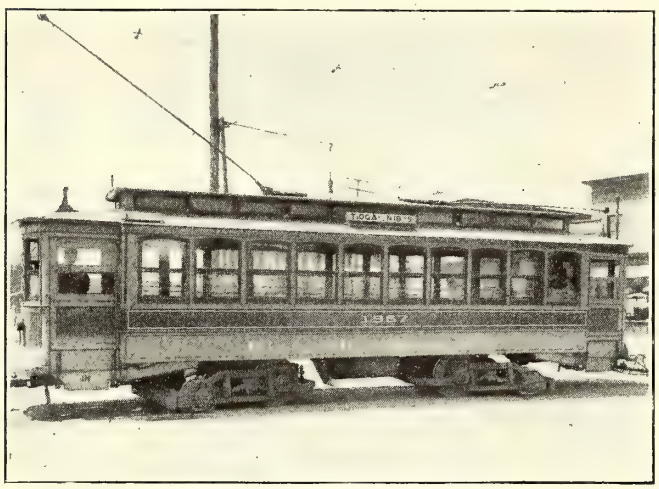
The possible saving in energy attainable by using anti-friction bearings in car equipments has been a subject for discussion in the past, but hitherto all comments have been based on theoretical calculations rather than on practical tests. Among the objections which have been urged against the adoption of such devices the three following deserve special consideration:

First—The saving from the use of anti-friction bearings would be small because the amount of energy dissipated as heat from bearing friction is but a small percentage of the total energy required for operation.

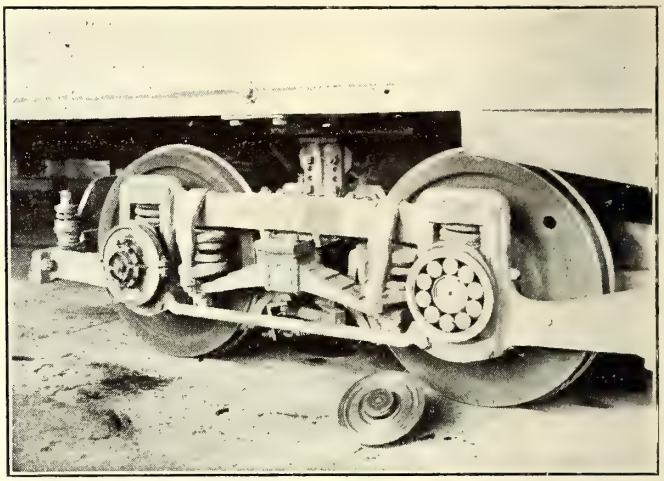
Second—The motorman will not take advantage of the greater possibilities for coasting unless he receives special instructions and most likely he will not do so even then.

Third—Although the rate of acceleration may be greater, the saving will be offset by the decreased rate of deceleration.

In view of the foregoing statements it may be of interest to present the history of a series of tests with anti-friction armature and journal bearings as made under regular running conditions by the Philadelphia Rapid Transit Company for a period of nearly one year, beginning June, 1909, and ending May, 1910. The results obtained were of the most favorable character and upset many preconceived ideas on the effect of anti-friction bearings in car operation. The various trials hereinafter recorded were carried out under the direction of the writer.



Philadelphia Anti-Friction Bearing Tests—One of the Three Trial Cars

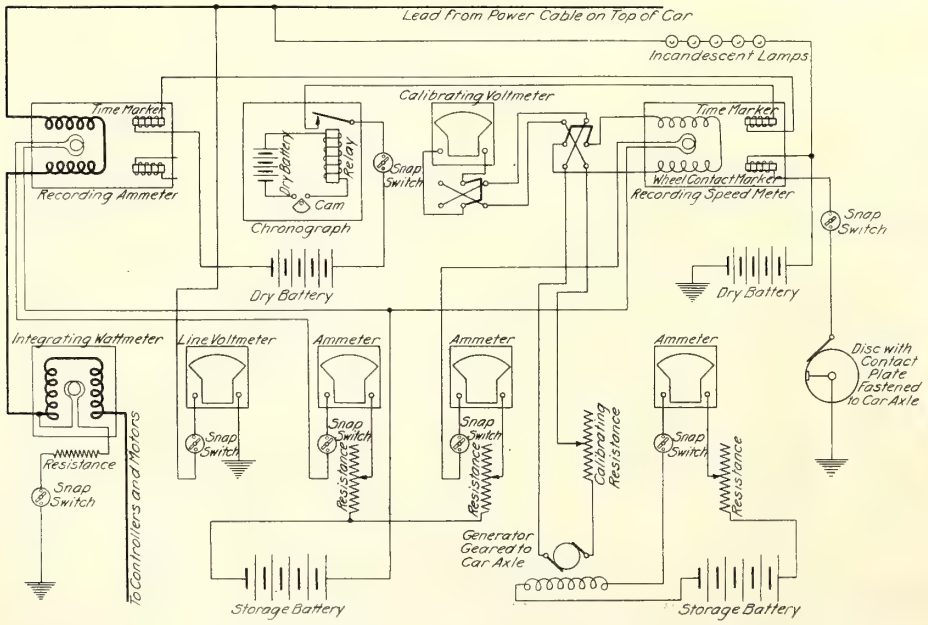


Philadelphia Anti-Friction Bearing Tests—Roller Bearings Installed

TEST CONDITIONS AND RECORDING EQUIPMENT

The tests were inaugurated with car No. 2140 of the company's standard double-truck type, carrying unmodified Brill No. 27-G trucks and four Westinghouse 101-B 40-hp motors. The test car followed a service car around its route, making stops at all streets for approximately the same periods as the service car ahead. Runs were made only on clear days so that the track conditions for all tests would be as nearly uniform as possible. To eliminate the personal factor of the motorman, the same man operated the car throughout all trials, nor were any special instructions or information given to him as to the handling of the car or its equipment.

Car No. 2140 was equipped with recording instruments, as shown herewith. The recording ammeter and speed meter made a record on special paper strips 3 in. wide, which were moved at the rate of 6 in. a minute. By means of a chronograph, two-second intervals were marked simultaneously on both record sheets. The ammeter was calibrated with a Weston portable. The speed meter was calibrated to read speed in m.p.h. and its accuracy was checked by making a run over a known distance and finding the area of the speed curve.* The wattmeter was calibrated before and





Philadelphia Anti-Friction Bearing Tests—Wiring Diagram of Test Car No. 2140 and View of Roller Bearing Encased

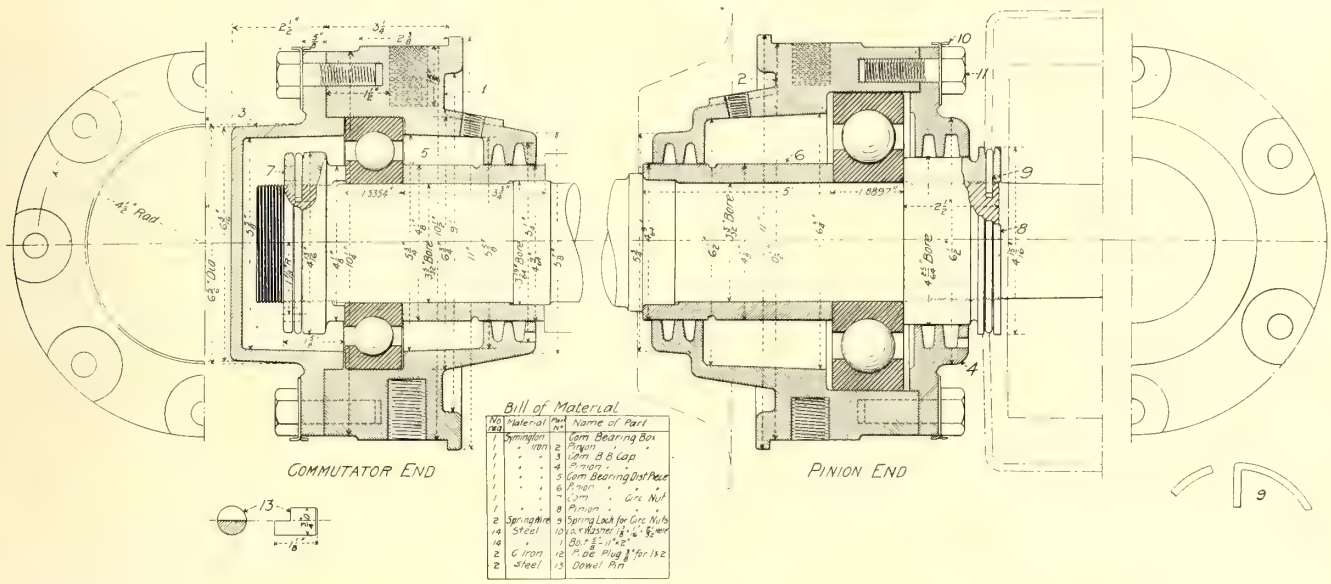
*A description of this speed meter, its calibration and use were presented by the writer before the Engineers' Club of Philadelphia, and published in the January, 1909, Proceedings of that body.

after each set of runs, and the results were checked by integrating the ammeter record and multiplying by the average voltage. All power readings given in the tables are for traction only.

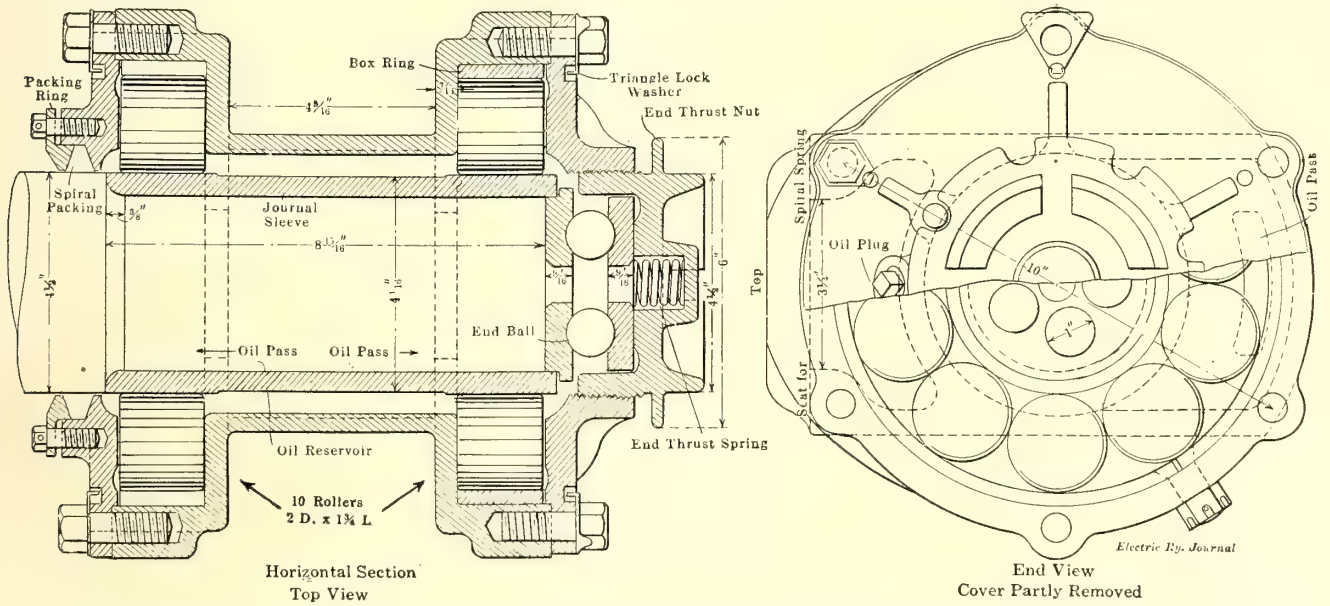
The line voltage was recorded at every stop and while starting and running. The length of stops was taken with a stop-watch and checked from the speed records. Thermometers were placed in each motor and read at the beginning and end of each day's run. The temperature of the air was recorded at the beginning, the middle and at the end of each day's run. At the time these data were finally compiled none of the different bearings installed had shown any appreciable wear. The following descriptions of both types of anti-friction bearings were furnished by the makers.

the coefficient of adhesion for wheels on sanded track, and considering the weight at the tread of these wheels for a crowded car. Each commutator bearing has eight 1 1/16-in. balls and was selected according to the weight of an armature, since it takes its entire end thrust, which is necessarily proportional to its weight. This commutator bearing, therefore, has to be of larger size than would be called for by the simple radial load imposed upon it. Owing to the comparatively long distance between the bearings and the short distance between the pinion and pinion bearing the pinion load produces no severe radial stress on the commutator bearing.

The outer races of the bearings are assembled with an easy fit in their housings, permitting them to move around gradually in operation, so that hammer-blows, which would otherwise



Philadelphia Anti-Friction Bearing Tests—Details of Armature Ball Bearings



Philadelphia Anti-Friction Bearing Tests—Section and End View of Roller Bearings for the Journals

ANTI-FRICTION ARMATURE BEARINGS

The armature anti-friction bearings were furnished by the Hess-Bright Manufacturing Company, Philadelphia, Pa. In this ball-bearing arrangement the pinion bearings are placed as near the pinions as the necessary clearances for the bearing housings and gear cases permit. Each pinion bearing has 1⅜-in. balls and was selected according to the maximum load which it is called upon to sustain. This load was determined from the force necessary to slip a pair of driving wheels, using

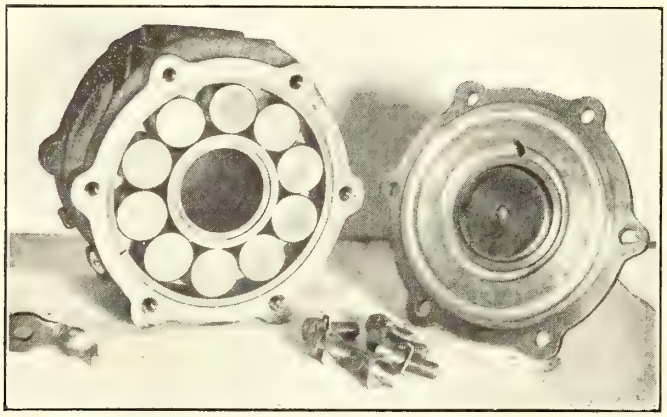
come continually upon one or two points, are distributed around the races. This prevents fatigue in the metal and consequent fractures which might occur on that account. A very small lateral clearance, not more than 1/64 in. on either side, is allowed around the outer race of the commutator bearing to facilitate machining and insure that this race is not pinched between the shoulders formed inside and housing itself. The pinion bearing is not bound endwise, thus the shaft can expand freely under an increase in temperature without pro-

ducing any lateral stress between the ball bearings.

Both bearings are mounted firmly on the shaft with a light drive fit, representing a steady pressure of about 1000 lb. The inner races are securely clamped between two shoulders; the inside shoulder is formed on the shaft itself and the outside one is the face of a circular nut. The ball-bearing housings or frameheads are made of Symington iron. This material has about twice the tensile strength of cast iron and consequently may be subjected to greater shocks without causing breakages, at the same time it is hard and wears better than malleable iron.

ANTI-FRICTION JOURNAL BEARINGS

The roller-bearing journal boxes used in the tests were manufactured by the Railway Roller Bearing Company, Syracuse, N. Y. This journal box, which is made of special malle-



Philadelphia Anti-Friction Bearing Tests—Roller Bearings for Journal

able iron, contains a series of rollers without cage or separators, placed on both sides of the truck frame. Each roller raceway in the box contains 10 rollers of 2-in. diameter and 1¾-in. length, enclosed in a hardened alloy steel ring which forms the outer raceway. The inner raceway is a single journal sleeve of the same material, forming a raceway for both series of rollers.

The rollers are relieved of end thrust duty by an adjustable ball end thrust nut contained in the outer cover of the box; the inner raceway of the ball thrust engages the end of the axle when screwed into place and was locked after the truck frames were dropped into the channel separating the two roller raceways. The ball races contain six high-duty balls of 1 in. diameter. It is worth mention that the roller journal boxes were placed in operation without requiring any change in the trucks. The roller journal sleeves were placed with a light drive fit on the regular axles, which previously had been operated with plain bearings.

Roller bearing journal boxes similar to those just described were also installed during the past year on cars Nos. 2130 and 1967, which have plain bearing armatures. Car No. 2130, weighing 18¾ tons and equipped with Brill No. 27-G trucks and two 40-hp motors on the rear truck, operates on the Tenth and Eleventh Street line; car No. 1967 is of like weight and motor equipment, but equipped with Brill No. 39-E maximum traction trucks and is operated on the Seventeenth and Nineteenth Street line. Both cars began operation with the roller bearing journals nearly a year ago and have since maintained their schedule easily without undue motor heating or repairs.

EFFECT ON POWER CONSUMPTION AND MOTOR HEATING

The accompanying Table I shows the watt-hours per ton-mile obtained from the tests with car No. 2140 on six different lines. These values are not the result of a single run, but the average of from three to six round trips on each route. This made the actual running time for each type of bearing for each route about six hours—a period long enough to secure the motor temperature rise for each condition. The temperature rise for the various conditions is given in Table II.

Although the application of ball bearings to the armatures of the four-motor equipment on car No. 2140 showed a saving of only 3 per cent in power, it is noteworthy that the decrease in motor temperature rise was 16.4 per cent.

The total losses in a railway motor (excluding gears) are about 10 per cent of its output, of which losses approximately one-third is bearing friction. All of this lost energy reappears directly as heat in the motors. Therefore, any reduction of bearing friction will decrease the temperature rise of the motors much more than it decreases the power consumption.

While it is true that the speed of the armature is greater than that of the axle journal (in accordance with the gear ratio) the weight on each journal box is about eight times greater than the weight on each armature bearing. Hence the saving in power from reduced journal friction must be far greater than that from reduced bearing friction. However, the decrease in motor temperature rise will not be as great proportionately because this energy reappears in the motor only as heat in proportion to the efficiency. In these tests on the four-motor car No. 2140 the addition of anti-friction journal bearings to the ball bearing armature equipment decreased the power consumption from 3 per cent to 21.1 per cent, but decreased the temperature rise only from 16.4 per cent to 24.2 per cent. The temperature values in the two-motor equipment tests are given in the next chapter.

Table No. III shows the average coasting and braking time in minutes for each series of tests on the six different lines with car No. 2140. The total running time was obtained from the speed curves; the time with power on from the current curves and as ⅕ in. on both tape records representing two-second intervals were marked simultaneously on both records, the values were very accurately derived.

TABLE I— POWER TESTS WITH ANTI-FRICTION BEARINGS, CAR NO. 2140.

Weight of car with four-motor equipment, "plain," 21.34 tons; with four-motor, "ball," 20.97 tons; with four-motor, "roller," 21.58 tons; with two-motor, "plain," 18.32 tons; with two-motor, "roller," 19.72 tons; Brill 27-G double trucks.

Run.	Four-motor equipment—Power, watt-hours per ton-mile. Plain.	Ball.	Per cent saving.	Roller.	Per cent saving.	Two-motor equipment. Power, watt-hours per ton-mile. Plain.	Roller.	Per cent saving.	Power per cent saving two-motor roller over four-motor plain.
12th and 16th	154.6	153.8	0.5	120.9	21.8	....	....	...	...
17th and 19th	155.0	148.8	4.0	122.1	21.4	148.4	110.2	25.8	28.9
13th and 15th (League Id.)	147.8	142.4	3.7	118.3	20.0	128.1	105.0	18.1	29.0
Baring (Subway)	147.3	140.6	4.5	114.7	22.2	147.3	113.7	22.8	22.8
Lancaster (Subway)	143.3	140.7	1.8	113.6	20.7	132.2	113.1	14.4	21.1
Darby	158.1	152.4	3.6	125.2	20.8	135.1	119.7	11.4	24.3
Averages	151.0	146.5	3.0	119.1	21.1	138.2	112.3	18.5	25.2

Note—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings. The round trip lengths of each route are as follows: 12th and 16th, 10.97 miles; 17th and 19th, 12.36 miles; 13th and 15th, 16.81 miles; Baring, 8.26 miles; Lancaster, 8.26 miles; Darby, 10.69 miles.

TABLE II—TEMPERATURE RISE OF MOTORS, CAR NO. 2140.

Run.	Four-motor equipment—Temperature rise, degrees Centigrade. Plain.	Ball.	Per cent saving, ball over plain.	Roller.	Per cent saving	Two-motor equipment. Temperature rise, degrees Centigrade. Plain.	Roller.	Per cent saving, roller over plain
12th and 16th	34.69	30.62	11.7	27.42	21.0	....	....	...
17th and 19th	34.36	28.67	16.6	26.37	23.1	70.37	43.09	37.1
13th and 15th (League Id.)	42.35	33.82	20.1	29.70	29.9	74.50	50.37	32.4
Baring (Subway)	36.59	30.95	15.4	27.29	25.4	69.17	46.08	33.4
Lancaster (Subway)	37.87	31.08	17.7	29.65	21.7	72.17	53.17	26.4
Darby	36.08	29.95	17.0	....	...	61.83	44.50	28.1
Averages	36.97	30.85	16.4	28.08	24.2	69.61	47.44	31.8

Note—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

EFFECT ON COASTING AND BRAKING, ACCELERATION AND DECELERATION

The total coasting and braking time with anti-friction armature bearings alone showed a decrease of 2.9 per cent over plain bearings, although in theory there should have been an increase. Naturally this value would be small in any event in accordance with the small saving in power. Small variations in the proportion of series and multiple running periods easily might change this value from negative to positive, yet still show a saving in power.

With the addition of anti-friction bearings on the axle journals there was a large increase in coasting and braking time, amounting to an average of 31.2 per cent. All the values are positive, although they cause no appreciable difference in the average running times in Table III. This shows that the reduced friction of the journal bearings practically forced the motorman to increase the coasting time in order to hold his car to schedule.

The acceleration and deceleration values shown in Table IV were obtained directly from the speed curves by measuring the angle between the curve and the base line. In the four-motor tests the acceleration and deceleration were but slightly affected by adding anti-friction armature bearings to the plain bearings, and naturally would be, but the addition of anti-friction journal bearings increased the acceleration 14.2 per cent with a decrease of only 4.3 per cent in deceleration.

TWO-MOTOR TESTS

On account of the low temperature rise of the four-motor equipment with plain bearings, it was thought possible to operate cars similar to No. 2140 with only two motors by installing both types of anti-friction bearings and still keep the rise in temperature below a value consistent with low cost of maintenance. The results are shown in Table II.

The average rise in temperature of the motors of the two-motor equipment with plain bearings alone was 69.61 deg. C. This was reduced to 31.8 per cent, or 47.4 deg. C., by using anti-friction bearings on the armatures and axle journals. At the same time, there was a saving in power of 18.5 per cent over the two-motor equipment with plain bearings. Almost all of this saving in power was due to the reduction of axle journal friction for the reasons before given.

The coasting and braking periods of the two-motor cars with plain bearings was 12.8 per cent less than for the four-motor equipments with plain bearings, but with both types of anti-friction bearings applied the coasting period for the two-motor equipments was increased 22.5 per cent over the four-motor plain bearing equipment and increased 42.8 per cent over the two-motor equipments with plain bearings.

Although the deceleration of the two-motor equipments with both types of anti-friction bearings showed a decrease of 2.1 per cent over the four-motor equipment with plain bearings, it showed an increase of 6.5 per cent over the two-motor equipment with plain bearings. This is but a small change in the deceleration in proportion to the great increase in acceleration. The two-motor equipment with anti-friction bearings showed an increased acceleration of 9 per cent over the four-motor plain bearings and a decrease of 4.6 per cent over the four-motor anti-friction bearings, with an increased acceleration of 35.3 per cent over the two-motor plain bearings.

TABLE III—TIME COASTING AND BRAKING.

TIME GIVEN IN MINUTES.

Run.	Four-Motor Equipment. Plain: Running time.	Plain: Power on.	Plain: Coasting and braking.	Ball: Running time.	Ball: Power on.	Ball: Coasting and braking.	Ball: Per cent increase of coasting and braking.	Roller: Running time.	Roller: Power on.	Roller: Coasting and braking.	Roller: Per cent increase of coasting and braking.	Two-Motor Equipment. Plain: Running time.	Plain: Power on.	Plain: Coasting and braking.	Roller: Running time.	Roller: Power on.	Roller: Coasting and braking.	Roller: Per cent increase of coasting and braking.
12th and 16th	73.9	33.0	40.9	69.8	34.5	35.3	—13.7	72.3	22.8	49.5	21.0	...	...	...	...	...	...	...
17th and 19th	87.1	42.8	44.3	84.5	42.2	42.3	—4.5	87.5	32.7	54.8	23.7	89.6	51.1	38.5	86.3	31.2	55.1	42.8
13th and 15th (League Id)	99.3	51.1	48.2	99.1	52.4	46.7	—3.1	99.2	38.0	61.2	26.9	105.0	59.9	45.1	102.5	39.5	63.0	39.7
Baring (Subway)	46.8	25.8	21.0	45.0	23.8	21.2	1.0	46.4	15.5	30.9	47.1	47.4	30.4	17.0	46.4	20.5	25.9	52.3
Lancaster (Subway)	60.9	32.4	28.5	62.0	32.7	29.3	2.8	61.2	21.4	39.8	40.0	62.6	39.4	23.2	60.6	25.7	34.9	50.4
Darby	89.3	43.6	45.7	87.0	41.3	45.7	0.0	90.9	32.2	58.7	28.4	93.0	50.7	42.3	92.5	38.0	54.5	28.8
Averages	76.2	38.1	38.1	74.6	37.8	36.8	—2.9	76.2	27.1	49.1	31.2	79.5	46.3	33.2	77.7	31.0	46.7	42.8

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

TABLE IV—ACCELERATION AND DECELERATION TESTS, CAR NO. 2140.

ACCELERATION AND DECELERATION IN MILES PER HOUR PER SEC.

Run.	Four-Motor Equipment. Plain: Accel.	Plain: Decel.	Ball: Accel.	Ball: Decel.	Roller: Accel.	Roller: Decel.	Two-Motor Equipment. Plain: Accel.	Plain: Decel.	Roller: Accel.	Roller: Decel.
12th and 16th	2.19	1.83	2.41	1.87	2.54	1.68	....	....	....	....
17th and 19th	2.14	1.83	2.18	1.81	....	....	1.81	1.49	2.28	1.68
13th and 15th (League Id.)	2.13	1.88	2.28	1.90	2.51	1.66	1.85	1.68	2.40	1.65
Baring (Subway)	2.37	1.82	2.35	1.83	2.60	1.81	1.80	1.61	2.37	1.80
Lancaster (Subway)	2.27	1.86	2.28	1.88	2.61	1.83	1.76	1.86	2.65	1.90
Darby	2.43	1.83	2.18	1.90	2.57	1.82	1.82	1.75	2.54	1.92
Averages	2.25	1.84	2.28	1.86	2.57	1.76	1.81	1.68	2.45	1.79

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

SEMAPHORE SIGNAL FOR SMOKE FLUE DAMPER.

The smoke flues of the large boiler house of the Twin City Rapid Transit Company's main generating station are equipped with Mason automatic damper regulators. The location of the flues is such that the firemen standing in front of the boilers cannot see the position of the damper, and so a semaphore blade has been mounted on a bracket near the middle of the boiler house and connected in such a way with the cables which operate the damper that the position of the semaphore blade will indicate the damper opening and show the firemen whether or not more coal should be fed to the grates.

THE STRIKE IN COLUMBUS

On Aug. 15 Governor Harmon, on his own initiative, called out 1000 soldiers to aid in preserving peace during the strike of the union employees of the Columbus Railway & Light Company. In doing this he virtually took matters out of the hands of Mayor Marshall, who, after a week of rioting, had declared that he had done all he could to preserve peace. The step was taken after several private business organizations of the city had demanded Mayor Marshall's resignation. The Builders' & Traders' Exchange attacked the course taken by the Mayor and accused him of co-operation with the element that has been engaged in rioting.

Gen. John C. Speaks is in charge of the troops and Adjutant-General C. C. Weybrecht is acting as the Governor's personal representative in control of the troops. It is Governor Harmon's intention to keep troops in the city until peace is permanently restored and General Weybrecht has announced that the soldiers are armed with riot ammunition, with orders to shoot to kill. At first the officials said that the troops would not be required to do patrol duty, but would be ready at all times to answer call of the city officials or the patrolmen on duty.

It has been announced that, if by chance any of the men are



Columbus Strike—Troops at Corner of State House Grounds

ever allowed to return, they will have to commence as new employees. Many of the men employed to operate the cars during the strike are taking their families to Columbus, with the intention of remaining permanently. These men will be allowed to retain their runs.

At 11 o'clock on the morning of Aug. 14 an attempt was made to dynamite the car houses on the West Side, and in the evening an attack was made on the South High Street car house. Not much damage was done in either case. Troubles were more frequent during the day than usual and attacks on cars were started early in the evening. This was probably due to the fact that many men were idle over Sunday and some of them took the opportunity to aid in the riots.

Governor Harmon and President C. J. Pretzman, of the Chamber of Commerce, are reported to have made an effort on Aug. 17 to induce a settlement. Governor Harmon, however, asserted later that he had not been interested in any plan of settlement.

The company put armed guards on the cars on the evening of Aug. 17, following the decision of the military authorities that they will furnish men to put down riots, but are not directly interested in the operation of cars. Men were also employed to mingle with the crowds and discover those who are engaged in throwing stones. The employees are instructed to defend themselves in case of attack. Four more men were arrested on the evening of Aug. 17 on the charge of throwing stones.

There was no violence on the evening of Aug. 18, as a close watch was kept on all the streets by the detectives and police.

Complaint has been made that members of a Cleveland detective agency have been committing depredations in order to induce the company to employ more men.

MAINTENANCE OF SERVICE

Service has been maintained with unusual freedom from interruption. In spite of the lack of protection afforded by city authorities for the cars and passengers therein the company has been successful in securing temporary and permanent employees to operate the cars. On the direction of the authorities the company suspended part of its service in the early part of the strike, but restored full operation, despite the warnings of the officials of Columbus, that it was not safe to do so in view of the conditions prevailing in the city. The success with which full operation was maintained, during the day as well as through the evening hours until the runs were completed shortly after midnight, demonstrated the entire ability of the company to meet the situation created by the withdrawal of its men.

Patronage on the cars increased steadily after the arrival of the troops, although efforts to discourage it were continued by the strikers or their sympathizers. Both strangers and residents of the city were watched if they rode on the cars. A traveling salesman who visited a store in Columbus was told that the place would be boycotted if he rode on a car while in Columbus. Threats to residents of Columbus were common incidents of the strike.

As an example of the discouragement offered by the city authorities toward the resumption of full service the following letter, written on Aug. 16, by Mayor Marshall to E. K. Stewart, vice-president and general manager of the company, may be cited:

"I am still of the opinion that I am unable to give proper protection for the operation of cars after nightfall, and I therefore request that all cars operated by the Columbus Railway & Light Company be withdrawn from the streets before dark."

Mr. Stewart's reply, written the same day, said:

"Will say in reply that I am astounded at your acknowledgment as to the inefficiency of your police force.

"Nevertheless, this company proposes to operate its cars and will make every possible effort to do so, and will protect our employees and our property to the very best of our ability, and we demand protection from you."

STRIKE POSTPONES A REDUCTION IN FARE

One of the principal lasting effects upon the people of Columbus as a result of the strike is the postponement of further reduction in the fare. Diminished traffic, due to the disorder and the threats upon passengers, has lessened the gross earnings to a point that reduces the probability of the increase necessary to secure the lower rate of fare for which the ordinance makes provision.

The ordinance passed on Feb. 4, 1901, provides that the Columbus Railway, an underlying property of the Columbus Railway & Light Company, shall charge 5 cents for a single cash fare and also sell seven tickets for 25 cents until the annual gross receipts from fares reach $1,750,000; thereafter the rate for tickets is to be eight for 25 cents. It was expected that the normal increase in business in 1910 would raise the total revenue to more than $1,750,000.

The following statement was issued by the company on Aug. 12:

"The ordinance of 1901, under which the street railway company is operating, provides that when the gross receipts from fares of the Columbus Railway Company lines amount in any year to the sum of $1,750,000, the rate of fare shall be reduced from seven tickets for a quarter to eight tickets for a quarter, or, in other words, a reduction of 14.2 per cent.

"Gross receipts from fares on the lines of the Columbus Railway Company, now operated by the Columbus Railway & Light Company, for the year 1908, amounted to the aggregate sum of $1,592,572.02. The gross receipts for the year 1909 amounted to $1,687,341.25, an increase of $94,769.21, or 5. 9 per cent. At the same rate of increase the gross amount for the year 1910 would be $1,786,894.43. Therefore, with a normal rate

of increase during the year 1910, as compared with the year 1909, the company would be required to sell eight tickets for a quarter from and after Jan. 1, 1911, because at that rate of increase the gross receipts for the current year would amount to $1,786,894.43, an excess of $36,894.43 above the amount fixed by the ordinance as the basis of a reduction of fares to eight tickets for a quarter.

"It is apparent, therefore, that any interference with the business of the company which will diminish its gross receipts from fares on the lines of the Columbus Railway Company during the year 1910 more than $36,894.43 will postpone the reduction of fares to the year 1912.

"During 1909 the number of fares collected was 45,695,926. If during the year 1910 there should be the same rate of gain as there was during 1909 the number carried in 1910 would be 48,392,915. At the same rate of increase the number of fares during the year 1911 would be 51,248,096. Approximately 5 per cent of the fares are paid in cash, at the present rate paid for tickets. When the price paid for tickets is reduced it is reasonable to infer that the percentage of cash fares will be reduced.

"But even if with a reduced rate of fare the ratio between tickets and cash fares would remain the same, the number of tickets used during the year 1911 would be 48,683,292. The difference between the cost of that number of tickets when sold seven for a quarter and their cost when sold eight for a quarter would amount to the sum of $163,312.43. Therefore, a boycott on the street railway company, which would reduce its fares during the present year to the amount of $36,894, would cost patrons of the company during the year 1911 $163,312.

"It is obvious, therefore, that the boycott, if continued a week or two longer, will cost the patrons of the street cars more than $163,000 next year, an item of expense which would bear most heavily on those who do not own their vehicles and must depend for transportation to and from their work on the street cars of this city. On the other hand, it is entirely problematical whether the direct pecuniary results of such a boycott will injure the stockholders of the company at all. That would depend upon whether the loss resulting from the reduction of the price of tickets would be more than counterbalanced by the number of tickets sold.

"The boycott, if continued much longer, must certainly result in a great financial loss to the traveling public, while it may not result in any financial loss to the street railway company. The loss to the public is capable of mathematical demonstration. The loss to the company is purely a matter of speculation."

DIVIDENDS AND OTHER BENEFITS GIVEN THE MEN

Prior to the development of the troubles leading to the present strike the relations of the Columbus Railway & Light Company and the trainmen had been unusually friendly. With the progress toward union activities these conditions became strained until the issue became one of whether the company should continue to operate its organization as in the past or should no longer recognize its employees as individuals but treat with them through a union.

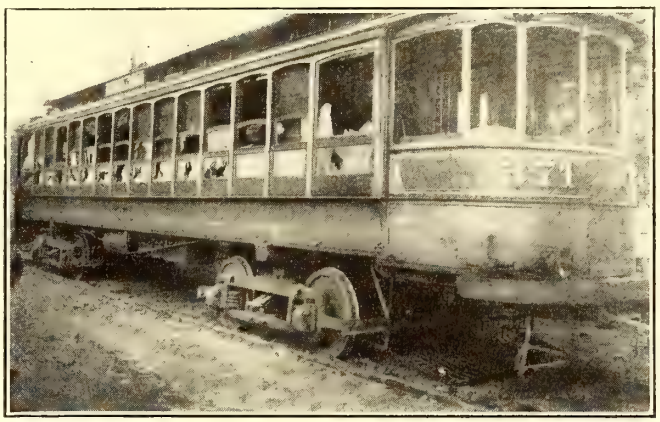
The company has maintained a profit-sharing arrangement, whereby its employees receive dividends on their wages corresponding to the rates of dividends paid to holders of the stock of the underlying Columbus Railway Company and of the present corporation, the Columbus Railway & Light Company. The Columbus Railway pays 5 per cent dividends annually on its preferred stock and a like rate on its common stock. The Columbus Railway & Light Company paid in 1909 on its one class of stock 3 per cent. The 5 per cent on the preferred and common stock of the Columbus Railway is paid as rental to that company by the Columbus Railway & Light Company. The Columbus Railway then declares dividends to its stockholders.

The Columbus Railway & Light Company gives to its employees, payable quarterly, the same ratio of dividends on wages earned when these dividends are paid to stockholders of the Columbus Railway Company, an amount annually equal, therefore, to 10 per cent on the wages earned for the year. In addition, whenever the Columbus Railway & Light Company pays a dividend on its stock the employees are given a dividend in the same ratio on wages earned.

In 1909 the total of dividends paid to employees was 13 per cent, or $75,877. The dividends to employees have been paid by check in accordance with this plan for several years.

Besides this definite profit-sharing arrangement the company has followed the practice of furnishing conductors and motormen who have been in the employ five years one uniform suit each year. Those who have been in the employ of the company for 10 years have been given two uniform suits each year. Some instances have occurred where men have taken care of their uniforms and, instead of receiving the second uniform, have been paid the cost of a uniform in cash when a satisfactory showing of plenty of good uniforms was made.

For a number of years the company also gave each married employee a turkey at Christmas time and each single employee $1 in silver. On account of the difficulty of securing a sufficient number of turkeys to meet the requirements and of proper distribution the company changed this plan several years ago and adopted instead the practice of depositing in a Columbus savings bank $2 to the credit of each married man and $1 to the credit of each single man. This plan appeared to meet



Columbus Strike—Car Damaged by Strike Sympathizers

with great satisfaction, and the management was surprised at the extent to which these accounts were increased by employees. The gift of the company started many men in the habit of keeping a savings account. Savings accounts were started in December, 1906. One of the trust companies with which accounts were opened for about three-fourths of the employees reported the following results as of Jan. 1, 1909:

Total number of accounts opened	1,581
Total deposits made by company for employees	$2,809
Number accounts remaining on books	315
Total balance to credit of accounts	$13,816.87

Another feature of the company's treatment of employees is an annual picnic. At the time of this picnic the employees and their families are furnished free transportation over the lines of the company and an outing. This usually takes place in one of the pleasure parks of the city, but the management of the park admits the employees and their families free to the park and the amusements therein.

Another concession is that employees ride on their badges when on or off duty.

The Columbus Street Railway Employees' Beneficial Association has been aided materially by the company, and has been a successful organization.

The schedule of wages for trainmen is as follows:

	Cents per hour.	With dividend. Cents per hour.
For the first three months	20	23
Next nine months	20½	23½
Next year and thereafter	21½	24½

ATTITUDE OF POLICE AND TROOPS

A remarkable feature of the strike has been the apathy of the police toward disorder by strike sympathizers and the zeal

with which they have repressed attempts of the men employed by the company to operate cars to defend themselves against attack. Many instances are reported where attacks of strike sympathizers upon cars and trainmen have been witnessed by police and allowed to develop without hindrance until they culminated in serious accident. Trainmen secured by the company to take the places of strikers have been arrested freely on the charge of carrying concealed weapons. In showing sympathy with the strikers the police have apparently been influenced by the attitude of their superiors.

The extraordinary refusal of 32 men out of the 140 regular policemen in the employ of the city to ride on the cars was followed by the belated dismissal of this part of the force sworn to protect life and property. When the men refused to obey the order of Mayor Marshall that they ride on the cars he issued a statement holding the men employed to take the places of strikers responsible for the rioting and, to the undoubted surprise of residents of Columbus as well as of other observers of the situation, expressing hope that the men would do all within their power to suppress rioting. Upon the failure of the men to obey the orders, the Mayor pleaded with them to ride on the cars for one night before they made up their minds definitely. The *Ohio State Journal* of Aug. 13, 1910, quoted Mayor Marshall as saying in reference to the mutiny of the men:

"I never met with anything like it. I see how some of the men look at the matter and deplore the affair, but there is nothing to do but to dismiss them from the service.

"The men will be given an opportunity to resign.

"I was never so stunned in my life. I had heard rumors during the afternoon that the men would refuse to obey orders, but I did not believe they would. I do not blame the men, personally. I argued with them and used all the persuasive powers I possess. I believe that they are conscientious in their refusal to go on cars.

"Of course, it will mean dismissal. Under the law the Mayor cannot dismiss men. The chief does that and then if they wish the men can appeal to the director of safety. After that there can be a hearing by the civil service commission. Personally I should be willing to let the men resign."

Notwithstanding the varying sentiments indicating the uncertainty of the action of the Mayor, the men were dismissed from the service.

The pronounced encouragement to the strikers caused by the attitude of the policemen has been seconded to some extent by the position of the State troops called to suppress the disorder, which the city authorities permitted to increase to the danger point. One regiment from Toledo contributed $500 from the compensation received from the State and one of its officers was quoted in an interview in reference to the friendly feeling between the soldiers and the strikers. The policy adopted of reserving the State troops for emergency use, however, was regarded generally as effectual as a moral agency operating to deter extreme disorder. It was the prevailing opinion that strike sympathizers were uncertain as to the lengths to which the soldiers might go if disorder became rampant and that they therefore, curbed the tendencies to riotous attacks on life and property, which were unchecked when the city police were the only representatives of law and order to be considered. The correctness of this conclusion is shown by the fact that after the first outbreaks of disorder and the failure of the police to cope effectively with the breakers of law the troops called by Governor Harmon put a stop to the disorder. With the subsequent withdrawal of the troops rioting began anew and it continued until troops were ordered to Columbus again. It is the judgment of the people of Columbus from these experiences that the prevention of great disorder rests wholly upon the presence of the troops in the city.

To use its influence against rioting the company issued on Aug. 5 the following notice of reward for arrest and conviction of persons guilty of felonious acts:

"The Columbus Railway & Light Company hereby offers a reward of $200, payable at any time within one year from this date, for information which will lead to the arrest and conviction to the penitentiary of any person guilty of committing any felonious act against any of its employees or with reference to any of its property, in connection with the present strike, whether such act be a personal assault on any of its employees, or the shooting or throwing of stones or other missiles at any of its cars, or the placing of obstructions on its tracks, or interfering with its cars, tracks, rails, switches, buildings or other property, whether such unlawful act be committed in the city of Columbus or elsewhere in Franklin County."

EFFECT OF STRIKE IN COLUMBUS

The general population of Columbus has been greatly concerned over the effect of the disorder attending the strike upon the reputation of the city. Newspapers which have lamented the attacks upon life and property have called attention frequently to the widespread advertisements which have gone throughout the country and have made public the failure of the authorities to protect either the property of the company or innocent persons who traveled on the cars.

While leading citizens have deplored the unwholesome comment which this situation created, the merchants have felt greatly the effect upon their business. Some of the Columbus newspapers have a large circulation in the sections of Ohio tributary to the city and they have published freely cartoons calling attention to the prevailing condition of mob rule, startling headlines from newspapers in other cities and editorial comment. Strangers visiting Columbus and observing the disorder and residents of the city traveling in other parts of the country have talked without hesitation of the danger of the situation.

The merchants have felt the results in diminished purchases by residents of the city and in practically complete cessation of shoppers from outside. Travelers have found little or no business in the city, and have not remained long and the hotels have suffered from the decreased patronage. In certain localities the result of the suspended wages of trainmen who had been in the employ of the company has been felt in reduced sales by merchants, inflicting hardships upon owners of small stores. Quoted prices of real estate are said to have been reduced in districts where the greatest rioting prevailed.

Many letters have been received by the company approving its course. A typical communication said, in part:

"The strike, in my opinion, would have failed some time ago but for the encouragement given the strikers by officials, and the well-meant, but ill-gaged demands of prominent citizens for arbitration, thereby encouraging the strikers to hold out long after it was absolutely certain that their case was hopeless and that the company would not yield.

"It is clearly the duty of all good citizens to use every effort to end the strike. It is a lost cause. The city will not recover from the effects of it for years. Rioting and disorder will cease when the strike ends and not till then."

COMPANY WILL NOT ARBITRATE

On Aug. 17 the company, in a letter addressed to the City Council by Mr. Stewart, reiterated its declination to submit the issues to arbitration. The union representing the men had previously agreed to abide by a decision of the City Council upon the differences. Mr. Stewart said in his letter:

"This company is unwilling to submit any supposed differences between it and its employees to the decision of the City Council. In fact, there are no differences between the company and any of its present or former employees which should be submitted for decision to the City Council or to anyone else."

Various estimates have been made of the cost of the strike. The loss to the company will arise from the increased cost of operation as a result of the strike and attendant disorder, and the loss arising from destruction of property. For the latter loss the State, county or municipality may be held liable. The State has expended $105,000 in connection with the use of the State troops and has asked for an additional $100,000. Expenses of the city of Columbus as a result of the strike are estimated at $75,000 to $100,000. Bankers of Columbus have

donated $12,500 to Franklin County, in which Columbus is located, to pay for special deputy sheriffs employed to quell disorder.

In order to secure revenue the strikers sell photographs on postal cards of incidents connected with the present strike and also with the previous strike. The illustrations on pages 326 and 327 are samples of the photographs sold by the men. Trips were made by the men to nearby cities to solicit contributions with which to support the movement.

EXECUTIVE COMMITTEE MEETING OF THE TRANSPORTATION AND TRAFFIC ASSOCIATION

A meeting of the executive committee of the American Street & Interurban Railway Transportation and Traffic Association was held at the headquarters of the association, at 29 West Thirty-ninth Street, New York, on Tuesday, Aug. 23. Those of the committee in attendance at the meeting were: President Robert I. Todd, of Indianapolis; N. W. Bolen, of Newark; George W. Parker, of Detroit; J. N. Shannahan, of Baltimore, also the following chairmen of the committees: C. D. Emmons, of Fort Wayne, chairman of the committee on interurban rules; R. E. Danforth, of Newark, chairman of the committee on city rules; P. P. Crafts, of Clinton, Ia., chairman of the committee on express and freight traffic; M. R. Boylan, Newark, chairman of the committee on transfers and transfer information; J. H. Pardee, New York, chairman of the committee on topics.

President Todd stated that the first business before the committee was to consider the change in the name of the association to American Electric Railway Transportation & Traffic Association and the corresponding changes in the wording of the constitution which this change in the name would require. He stated that at the last meeting of the executive committee of the American Street & Interurban Railway Association a change in the name of that association to American Electric Railway Association was approved by the executive committee, which will recommend this change at the Atlantic City convention. If the parent association changes its name, it would naturally be desirable for the Transportation & Traffic Association to make a corresponding change in its name and in the clauses of its constitution where the association is mentioned by name. In addition, where the objects of the association are mentioned as now being that of taking up subjects connected with "the actual operation of street and interurban railway companies," the following words were to be added: "and the electrified sections of steam railways." Upon motion, the executive committee decided to recommend these changes to the Transportation & Traffic Association provided the proposed change should be made by the parent association.

The president then asked for reports from the chairmen of the different committees present.

CITY RULES

Mr. Danforth, chairman of the committee on city rules, stated that the code of city rules as revised at Denver had been carefully considered by the committee at several meetings and letters were mailed to all member-companies asking whether the code as so amended was satisfactory. Specific questions were asked and where no replies were received, follow-up letters and postal cards were sent. As a result, the committee received fairly full replies from 66 companies and 109 replies altogether. The principal amendments which the committee will recommend to the association are in Rule 2 on responsibility, Rule 10 on bell signals, Rule 101 on position of the conductor in the car, Rule 116 on making change, and Rule 213 on power off the line. The wording of Rule 2 which the committee expects to recommend is as follows:

"The motorman is held responsible (a) for the safe running of the car; (b) for the proper operation of the machinery of the car; (c) for running car according to schedule. The conductor is in charge of the passengers on the car and is held responsible (d) for the safety and convenience of the passengers; (e) for the collection and proper accounting of fares. Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor."

The rule as it now appears in the code reads:

"The conductor is in charge of the car and is responsible (a) for the stopping and starting signals; (b) for the safety and convenience of the passengers; (c) for the collection and proper accounting of fares. The motorman is held responsible (a) for the safe running of the car; (b) for the proper operation of the car and its machinery; (f) for running the car according to schedule. Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor."

Mr. Danforth said that the replies from the companies expressing an opinion on this matter were about evenly divided between the amended rule as proposed and the wording of the rule as it is at present in the rule book.

In the rule on bell signals, the committee was of the opinion that the rule should be changed so far as it relates to the backing of cars. Its proposed amendment reads as follows:

"When the car is standing and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'All is clear behind.' When it becomes necessary to reverse a car for a greater distance than 10 ft., motorman must take handles to the opposite end of car and operate it from that end. The conductor, under these circumstances, will change his position, that is to say, he will go to the opposite platform in order to give proper signals to motorman."

This rule as it now appears in the code reads:

"When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'All is clear behind.' However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends."

Of the replies received, a large majority approved the amendment as recommended by the committee.

In Rule 21 on steps, the committee recommends that the rule be amended to read as follows:

"Permit no person to stand or ride on the steps, buffers, dashers, fenders or roof. Passengers should be fully inside the car or safely landed on the platform before the signal is given to start."

The rule as it now appears in the code reads:

"Permit no person to stand or ride elsewhere than in a safe place upon the car. The standing or riding of passengers upon buffers, dashers, fenders, roof or outside of a closed vestibule door is forbidden."

Of the 66 companies replying to the circular, 60 approved of the recommendation of the committee, 8 prefer the rule as printed in the code, 4 oppose the rule entirely, 1 suggested a change, and 1 stated no preference.

Through an error in the minutes of the 1909 convention, the following sentence was omitted, "Passengers should be fully inside the car or safely landed on the platform before the signal is given to start." The committee, therefore, will recommend that this sentence be added to the rule.

In Rule 101 the committee will suggest that the words "or at main entrance" be eliminated from the rule as there are comparatively few companies which use a center entrance exclusively. Mr. Danforth thought that the standard rule book of the association should be compiled and worded so as to suit the majority of companies, and if a few companies wished to modify the rules they can do so by a local rule.

In Rule 116 the committee proposes to omit the final paragraph reading "Previous to taking charge of the car, conductors will provide themselves with ——— dollars for the purpose of making change," as this is really a car-house rule and, instead, substitute the following, "Conductors will make change for passengers to the amount of ——— dollars."

The majority of those companies whose opinion could be obtained by correspondence approved this change.

For Rule 213, the committee decided to recommend the following rule:

"When the power leaves the line cars must be stopped clear of all crossings or danger points. The overhead switch must be thrown off and the light switch thrown on and the car started only when the lights burn brightly."

The rule as it now appears in the code reads:

"When the power leaves the line, the controller must be shut off, the light switch must be turned on and the car started only when the lights burn brightly, but motormen must never allow their cars to coast when power is off the line except to clear crossings or dangerous points."

In this case, the change was approved by a large majority of the companies who expressed a preference. The object of the change is to permit cars, where necessary, to coast into terminals, a short distance away, like ferries or railroad stations, to discharge passengers.

The report to be submitted by the committee at the Atlantic City convention will contain quotations from the letters received from different companies in favor and against the changes which will be recommended by the committee. This will allow the members of the association to be in possession before the meeting of the principal arguments for and against the proposed changes.

INTERURBAN RULES

C. D. Emmons, chairman of the committee on interurban rules, said that the committee had completed its report and was ready to submit it to the association. The committee had taken up the subject of the revision of the rules not only with member-companies of the association, but also with the State commissions from whom expressions of willingness to co-operate with the committee in the compilation and standardization of its rules had been received. Briefly, the work of the committee during the past year has been in the direction of harmonizing the rules with those of the American Railway Association. But Mr. Emmons thought that it was of even greater importance that the interurban rules should harmonize so far as possible with the city rules. It had not been possible to accomplish all that the committee wished to do during the current year, and the committee also wanted to learn whether the direction in which it had been working met the approbation of the association. It would, therefore, present a code with the modifications already made and a report of progress, hoping to have a full discussion of the rules and a vote of instructions for future work of the committee.

COMMITTEE ON TOPICS

J. H. Pardee, chairman of the committee on topics, presented the program of the meeting of the association printed in this paper last week. It was approved.

COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION

M. R. Boylan, chairman of the committee on transfers and transfer information, said that some very interesting data had been received in reply to its data sheet No. 56, and that the answers showed a very wide diversity of practice. The committee expects to present an interesting report at Atlantic City.

COMMITTEE ON SCHEDULES AND TIME-TABLES

N. W. Bolen, chairman of the committee on schedules and time-tables, said that the committee had completed its work and its report was already in the hand of the secretary of the association. This report covers the following, among other, topics:

Schedules for different hours of the day, methods of checking the running time, practice in regard to changes in running time, methods of making passenger counts, practice in regard to the official or officials authorized to make changes in Sunday and holiday schedules, definitions of straight runs and swing runs, various methods of assigning regular runs, extra runs and tripper runs, the organization of the traffic departments of different companies, methods of constructing time-tables, etc.

COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

P. P. Crafts, chairman of the committee on express and freight traffic, reported that the committee had held meetings in Cleveland and Toledo and had completed its report. This report was based on data sheet 59, and the answers received from companies showed a wide variety of practice in regard to the methods of separating the expenses of the passenger business from the freight and express business. In some cases companies divided the expenses on a basis of gross earnings, in other cases a mileage basis was used, in other cases combinations of the two previous methods were employed or there were arbitrary divisions. Mr. Crafts said that the committee soon concluded that the most important work which it could undertake was this question of the proper division of expenses, and its report will be devoted largely to a recommended basis for accomplishing this result.

COMMITTEE ON PASSENGER TRAFFIC AND THE TRAINING OF TRANSPORTATION EMPLOYEES

F. W. Coen, chairman of the committee on passenger traffic, and G. O. Nagle, chairman of the committee on the training of transportation employees, reported by letter to the president of the association that the reports of these committees were being compiled and would be forwarded to the secretary soon.

SPECIAL PAPERS AND OTHER BUSINESS

The secretary reported that he had received a paper from George L. Radcliffe, of Cleveland, on the use of metal tickets. This paper gives an extended history of the use of metal tickets in Cleveland, and discusses the relative merits of metal and paper tickets so far as difficulty of counterfeiting, cost of tickets, cost of counting tickets, etc., are concerned.

It was decided to distribute to the members of the association before the convention as many of the reports and papers as possible.

CONFERENCE ON UNIFORM ACCOUNTS IN NEW JERSEY

A conference between the Board of Public Utility Commissioners of New Jersey and representatives of electric railway companies in reference to a uniform system of accounts was held at Trenton on Aug. 18. Commissioner Thomas N. Hillery presided over the meeting.

Philander Betts, chief inspector of the commission, recommended the adoption of the standard classification of accounts of the American Street & Interurban Railway Accountants' Association. He said that every company should keep a depreciation account. While the commission did not have power to fix rates, it had power, he said, to correct discriminations in rates and the maintenance of depreciation accounts made the income account show more fairly what the earnings were than if no provision for depreciation was made.

J. M. Campbell, of Atlantic City, suggested the adoption of a uniform fiscal year and the opinion was generally expressed that either June 30 or Dec. 31 should end the year.

Commissioner Hillery, in closing the conference, said that he would report to the commission and the subject would be given further consideration.

Among those present, representing the companies, were the following: C. L. S. Tingley, Bridgeton & Millville Traction Company; David C. Carver, Elizabeth & Trenton Railway; M. R. Boylan, Public Service Railway; G. B. Cade, Atlantic Coast Electric Railroad; J. B. Livingston, Jersey Central Traction Company; George H. Thomas, Millville Traction Company; J. A. McCarthy, New Jersey & Hudson River Railway & Ferry Company, and J. E. Price, Ocean Street Passenger Railway.

The progress of the Quebec Railway, Light & Power Company, Quebec, Que., was reviewed in the Montreal *Daily Witness* recently. Particular attention was given to the new work being done by the company, all of which is being carried out under the direction of C. E. A. Carr, general manager.

MEETING OF THE STANDARDIZATION COMMITTEE OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

H. H. Buckman, chairman of the standardization committee of the Central Electric Railway Association, has called a meeting of the committee to be held at the Hotel Anthony, Fort Wayne, Ind., on Thursday, Sept. 1 at 9:30 a. m., for the purpose of discussing further the design of a standard coupler and attachments for electric railway cars. The committee desires to recommend something tangible at the next meeting of the Central Electric Railway Association to be held in Indianapolis on Sept. 22. An invitation is extended to all railroad representatives interested in this movement to be present at the meeting. The committee will be glad to have any members or others interested in the subjects to be discussed to contribute any information which they may have by letter, if they cannot attend in person. Communications may be addressed to any of the following members of the committee and should be sent not later than Tuesday, Aug. 29:

H. H. Buckman, chairman, Louisville & Northern Railway, New Albany, Ind.; R. N. Hemming, secretary, Ohio & Southern Traction Company, Columbus, Ohio; L. W. Jacques, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; W. E. Ralston, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio; Fred Heckler, Lake Shore Electric Railway, Freemont, Ohio; W. N. Crayden, Western Ohio Railroad, Wapakoneta, Ohio; R. C. Taylor, Indiana Union Traction Company, Anderson, Ind.

At the meeting of the Central Electric Railway Association held at Toledo on May 26, 1910, the standardization committee made the following recommendations with regard to automatic couplers:

1. The self-centering feature of couplers should be dispensed with.
2. Couplers must be made to couple and uncouple automatically with all types of M. C. B. contour couplers, whether used by steam or traction roads.
3. A device should be adopted for holding couplers on center when coupling with steam railroad cars.
4. An open knuckle for shackle bar connection should be used.
5. The draft rigging should meet M. C. B. requirements, and the drawbar anchorages should be equivalent in strength to M. C. B. requirements.
6. Couplers must not uncouple when cars are being pushed around a curve of 35 ft. center radius.
7. There should be an arrangement to open and release the knuckle without requiring the operator to pass between cars.
8. The depth of the face of the knuckle should be 11 in. minimum and 15 in. maximum. A flexible drawbar carrier should be installed and there should be a locking device in the coupler head to keep the couplers from uncoupling vertically.
9. The height of drawbar center should be 31½ in. minimum and 34½ in. maximum above the head of the rail.
10. The coupling center of the coupler should be at least 11 1/16 in. from the nearest point of the buffer face.
11. The air hose angle fitting should be placed with its coupling center 12 in. from the face of the angle air brake hose fitting and all hose and hose couplings should be M. C. B. standard.
12. Whenever possible the radius of the bumper should be 5 ft. to permit of uniformity in couplers and to maintain a uniform distance between bumper face and the coupling centers of couplers.
13. Adjustable continuous tie rods should be installed from coupler to coupler passing from the base, or extreme bottom of anchorage of the coupler, thence over the bolster to the coupler on the other end of the car.
14. Couplers should be placed on both ends of the cars.
15. The association should purchase and have on file at the secretary's office the dictionary and the proceedings of the M. C. B. Association.
16. The standards should be published after adoption.

At this meeting, the following subjects were also recommended as suitable for study by the standardization committee:

1. A standard drawbar anchorage or attachment to be used with the proposed standard drawbar.
2. A standard marker or tail lamp bracket suitable for either oil or electric lamps.
3. A standard jumper connection for trail cars which will not pull out and will not endanger life.
4. A uniform plug, socket and hanging device for electric headlights.
5. Improved destination signs for cars.
6. The design of a standard symbol which could be used as an identification mark for all electric railway material to be accompanied by the initial of the company to which the material belongs.

POSSIBLE CONNECTION OF MR. BEGGS WITH THE ST. LOUIS CAR COMPANY

An important announcement was made last week that under certain circumstances, John I. Beggs, president and general manager, The Milwaukee Electric Railway & Light Company and a director in the North American Company which controls the United Railways of St. Louis, might become connected in an administrative and financial capacity with the St. Louis Car Company. Bankers in St. Louis who are financially interested in the St. Louis Car Company have for some time been conducting negotiations with George J. Kobusch, looking to the reorganization of the company and an extension of work through the introduction of considerable new cash capital. It is supposed to be largely through the influence of these bankers, coupled with the great interest which the North American Company has in the growth of St. Louis, that Mr. Beggs was led to consider the proposition. The conditions under which he will take an interest in the company are clearly defined in the following statement which was made Aug. 15 by him to the *St. Louis Post-Dispatch* and was published in the daily papers of St. Louis on Aug. 16:

"Finally yielding to long-continued and increasing pressure of many of the largest and most influential bankers, merchants and manufacturers of St. Louis who are vitally interested in its growth and prosperity and the strengthening and enlargement of its manufacturing interests, which, as you know, I have repeatedly and strongly urged for several years, I have tentatively agreed, under certain circumstances and if certain financial arrangements are perfected and consummated, to take, in association with Mr. Kobusch, a large financial and administrative interest in the reorganization, strengthening and enlargement of the St. Louis Car Company. This would not change my relations with the North American Company or the Milwaukee properties, at least not for a considerable length of time."

The St. Louis Car Company is greatly to be congratulated upon the tentative offer made by Mr. Beggs and if this proposed arrangement should become a reality, Mr. Beggs' well-known executive and administrative ability, as well as wide knowledge of railway conditions, will be of great value to the company as well as to the entire electric railway industry.

HEADQUARTERS SELECTED FOR THE ENGINEERING ASSOCIATION

The headquarters of the American Street & Interurban Railway Engineering Association will be at the Chalfonte Hotel, Atlantic City, instead of at the Hotel Dennis, as originally announced.

During the month of June, 1910, 63,717 steam passenger trains were run in New York State and 88 per cent were on time at division terminals. In June, 1909, only 55,551 trains were run, and in June, 1908, 50,122 trains were run.

CAPITALIZATION, CARS AND MILEAGE OF ELECTRIC RAILWAYS IN THE UNITED STATES

Totals of some of the statistics published in the 1910 edition of the *American Street Railway Investments* have been compiled and are shown in the supplement published herewith. These show a total of 1253 railway companies in 1909 or an increase of one company over the preceding year. The number of miles of track was increased from 40,247 in 1908 to 40,490 in 1909 or 0.6 per cent. The total number of cars showed an increase somewhat larger than the addition in trackage. The number reported was 91,153 in 1909 as compared with 89,216 in 1908 or a gain of 2.1 per cent.

The amount of funded debt outstanding in the United States was $2,224,800,236 in 1909, an increase for the year of $112,356,150 or 5.3 per cent. The amount of capital stock outstanding, however, showed a decrease. It stood at $2,427,935,397 in 1909, a decrease of $13,956,660 for the year. This change is due largely to a different method of compilation of the statistics relating to Connecticut. The capital stock of street railway companies that were merged into the Consolidated Railway Company, which was later absorbed by the New York, New Haven & Hartford Railroad, cannot now be estimated with reasonable accuracy. The Connecticut figures, therefore, show $22,322,300 stock in 1909 as compared with $36,524,100 capital stock in 1908 or a decrease of $14,201,800. Except for this inability to estimate the proportion of capital stock representing the street railway properties which have been absorbed in this manner, the total would probably show an increase. The funded debt of these lines is included as that is readily ascertainable from the figures at hand.

During the fiscal year covered by the figures of Massachusetts companies three or more railways in that State were consolidated, effecting a decrease in stock. There was also a decrease due to the fact that the stock of several companies whose securities are owned entirely by a holding company has been eliminated from the report for the first time this year. In this instance the stock of the holding company has been included although it was less than the total stock of the railway companies combined.

In the compilation of these statistics for the year 1908 the stock of the Public Service Corporation of New Jersey has been included, but in 1909 only the stock of the newly formed subsidiary Public Service Railway was used. The latter company now operates the electric railways controlled by the Public Service Corporation.

The large decrease in capital stock for companies in New York State is due to the elimination of two or more companies which are now a part of the New York State Railways but which were reported separately in the edition for the previous year. The large increase in outstanding bonds in New York is the result of new construction work, the completion of extensions and other improvements.

The mileage shown for lines in Ohio is believed to be nearly a correct estimate. It was compiled by investigations of the reports listed under Ohio and elimination of a reasonable proportion for the sections of railways located in other States. The same division of interstate properties explains the decrease in stock in Ohio.

The statement of funded debt in Maryland in 1909 does not include $13,946,000 income bonds of the United Railways & Electric Company of Baltimore. These bonds were included in the previous year.

Changes in the totals of Virginia properties are due in part to the reorganization of the system in Richmond, which involved a scaling of securities.

In the compilation of the results for Nebraska the operations of one company, included in the 1908 returns, were allotted to the adjoining State of Iowa as the property, although located in two States, has most of its mileage in Iowa. Another company with over $500,000 stock, included in the 1908 returns, was eliminated in 1909.

The 1909 returns of Utah are affected by the elimination of one property which was included in the previous year. A decrease was shown in the outstanding bonds of another company.

The stock and mileage totals of Arkansas were reduced by the elimination of one company that was included in the previous year.

A projected railway, with $8,000,000 of capital stock, included in the 1908 returns for Wisconsin, was eliminated in 1909.

In Kansas one company which showed in 1908 $4,000,000 stock, reported in 1909 that no securities were outstanding and the totals for that State, therefore, are affected to a corresponding degree.

GROSS EARNING POWER OF URBAN ROADS

An article entitled "Gross Earning Power," which appears in the 1910 edition of *American Street Railway Investments*, showed the following 10 companies with gross revenues of $6,000,000 or over in 1909: Boston Elevated Railway, Brooklyn Rapid Transit Company, Chicago Railways Company, Detroit United Railway Company, Interborough Rapid Transit Company, Philadelphia Rapid Transit Company, Pittsburg Railways Company, Twin City Rapid Transit Company, United Railways Company of St. Louis, and United Railways & Electric Company, Baltimore. The per cent of increase in gross revenue for the foregoing 10 companies was 12 per cent in 1906 over 1905, 7.7 per cent in 1907 over 1906, 2.3 per cent in 1908 over 1907, 3.6 per cent in 1909 over 1908 and 27.9 per cent in 1909 over 1905. The total gross earnings were, in 1905, $105,223,534; in 1906, $117,829,774; in 1907, $126,934,285; in 1908, $129,878,049; in 1909, $134,615,487.

The following 20 companies with gross revenues of less than $5,000,000 but not below $500,000 were also shown:

Birmingham Railway, Light & Power Company, Capital Traction Company, Washington, D. C., Cincinnati Traction Company, Columbus Railway & Light Company, Denver City Tramway Company, Georgia Railway & Electric Company Grand Rapids Railway Company, Houston (Tex.) Electric Company, Indianapolis Traction & Terminal Company, Knoxville Railway & Light Company, Louisville Railway Company, Milwaukee Electric Railway & Light Company, Mobile Light & Railroad Company, New Orleans Railway & Light Company, Schenectady Railway Company, Scranton (Pa.) Railway Company, Toledo Railways & Light Company, United Traction Company, Albany, N. Y., United Traction Company, Reading, Pa., Worcester (Mass.) Consolidated Street Railway Company.

The per cent of increase for these was 11.3 per cent in 1906 over 1905, 10 per cent in 1907 over 1906, 0.5 per cent in 1908 over 1907, 6.4 per cent in 1909 over 1908, and 30.8 per cent in 1909 over 1905.

The total gross earnings were, in 1905, $33,674,607; in 1906, $37,465,016; in 1907, $41,215,904; in 1908, $41,405,119; in 1909, $44,051,719.

COMPANIES WITH GROSS REVENUES OF OVER $1,000,000

The 1910 edition of *American Street Railway Investments* contained the following table of companies with gross revenues in 1909 of over $1,000,000.

	1908.	1909.
Alabama.		
Birmingham Railway, Light & Power Co.	$2,167,546	$2,286,369
California.		
Pacific Gas & Electric Co., San Francisco	12,853,817	13,332,501
United Railroads of San Francisco	6,866,303	7,455,965
United Rys. Investment Co., San Francisco	1,558,789	1,830,685
Colorado.		
Denver City Tramway Co.	3,152,567	3,374,132
Connecticut.		
Connecticut Company (The), New Haven	6,961,436	6,841,425
District of Columbia.		
Capital Traction Co., Washington	1,855,974	2,038,210
Washington Railway & Electric Co.	3,720,573	4,080,064
Georgia.		
Georgia Railway & Electric Co., Atlanta	3,339,021	3,673,007
Illinois.		
Aurora, Elgin & Chicago R. R. Co., Chicago	1,400,892	1,467,215
Chicago City Railway Co.	*9,195,783	9,094,048
Chicago Consolidated Traction Co.	‡1,235,307	2,135,583
Chicago Railways Co.	11,037,071	12,442,882
East St. Louis & Suburban Co., E. St. Louis	2,009,514	2,035,790
Illinois Traction Co., Champaign	4,098,621	4,752,082
Met. W. Side Elevated Ry. Co., Chicago	2,746,840	2,818,430

*13 months ending Jan. 31, 1909.
‡June 25 to Dec. 31, 1908.

	1908.	1909.
Northwestern Elevated R. R. Co., Chicago	2,463,188	2,540,883
South Side Elevated Railroad Co., Chicago	2,241,690	2,234,973
Union Railway, Gas & Electric Co., Rockford	.....	2,820,349
Western Railways & Light Co., Galesburg	1,094,570	†1,262,096
INDIANA.		
Ft. Wayne & Wabash Val. Trac. Co., Ft. Wayne.	1,322,720	1,414,526
Indiana Union Traction Co., Anderson	1,902,330	2,103,018
Indianapolis Traction & Terminal Co	2,673,436	2,861,283
Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis	.....	2,456,995
Terre Haute Traction & Light Co	1,028,157	1,072,169
IOWA.		
Tri-City Railway & Light Co., Davenport	1,819,077	2,039,488
KENTUCKY.		
Louisville Railway Co	2,758,555	2,969,132
LOUISIANA.		
New Orleans Railway & Light Co	5,968,498	6,034,325
MARYLAND.		
United Railways & Electric Co. of Baltimore	6,838,042	7,212,,474
MASSACHUSETTS.		
Boston Elevated Railway Co	14,074,696	14,493,853
Boston & Northern Street Ry. Co., Boston	4,662,562	4,791,869
Massachusetts Electric Companies, Boston	7,809,010	8,052,355
Old Colony Street Railway Co., Boston	2,935,599	2,934,281
Springfield Street Railway Co	1,317,871	1,412,684
Worcester Consolidated Street Railway Co	1,626,143	1,702,657
MICHIGAN.		
Detroit United Railway	7,114,760	8,047,555
Grand Rapids Railway Co	940,645	1,029,011
Michigan United Railways Co., Jackson	943,324	1,026,796
MINNESOTA.		
Twin City Rapid Transit Co., Minneapolis	6,399,509	6,969,775
MISSOURI.		
Kansas City Railway & Light Co	6,175,796	6,627,977
United Railways Co. of St. Louis	10,593,166	11,111,431
NEBRASKA.		
Omaha & Council Bluffs St. Ry. Co., Omaha	2,304,162	2,328,951
NEW JERSEY.		
Public Service Corp. of New Jersey, Newark	24,267,687	26,560,451
Public Service Railway Co., Newark	10,989,970	12,008,680
West Jersey & Seashore R. R. Co., Camden	5,114,889	5,542,101
NEW YORK.		
American Light & Traction Co., New York	2,723,064	3,345,441
Brooklyn Heights Railroad Co	7,101,313	6,833,232
Brooklyn, Queens County & Suburban Railroad Co., Brooklyn	1,789,980	1,355,267
Brooklyn Rapid Transit Co	20,548,390	20,300,279
Brooklyn Union Elevated Railroad Co	6,853,057	7,029,474
Coney Island & Brooklyn R. R. Co., Brooklyn	1,562,061	1,479,173
Forty-second Street, Manhattanville & St. Nicholas Avenue Ry. Co., New York	1,171,463	1,240,583
Interborough-Metropolitan Co	3,348,044	3,342,581
Interborough Rapid Transit Co., New York	25,279,469	27,160,036
Long Island Railroad Co., Long Island City	9,818,544	10,898,371
Metropolitan Street Railway Co., New York	.....	13,194,733
Nassau Electric Railroad Co., Brooklyn	3,434,132	3,847,662
New York State Railways, Rochester	2,991,051	3,803,427
North American Co., New York	1,723,186	2,023,418
Schenectady Railway Co	880,440	1,015,400
Syracuse Rapid Transit Railway Co	1,300,326	1,417,063
Third Avenue Railroad System, New York	§2,231,303	3,576,585
Union Railway Co., New York	1,590,156	1,921,359
United Traction Co., Albany	2,145,220	2,165,261
Utica & Mohawk Valley Railway Co., Utica	1,089,343	1,193,806
OHIO.		
Cincinnati Traction Co	4,428,278	4,731,731
Cleveland Railway Co	5,062,878	6,311,022
Columbus Railway & Light Co	2,289,296	2,577,203
Mahoning & Shenango Railway & Light Co., Youngstown	1,747,927	1,966,066
Northern Ohio Traction & Light Co., Akron	1,890,473	2,177,642
Ohio Electric Railway Co., Cincinnati	.....	2,963,246
Toledo Railways & Light Co	2,542,111	2,733,177
OREGON.		
Portland Railway, Light & Power Co	4,351,676	4,818,022
PENNSYLVANIA.		
Lehigh Valley Transit Co., Allentown	1,087,277	1,103,421
Philadelphia Co., Pittsburg	16,583,425	18,247,516
Philadelphia Rapid Transit Co	18,557,503	18,797,993
Pittsburg Railways Co	9,846,984	9,342,677
Scranton Railway Co	1,183,687	1,172,953
West Penn Railways Co., Pittsburg	1,551,138	1,275,173
Wilkes-Barre & Wyoming Valley Traction Co., Wilkes-Barre	1,000,273	1,017,475
RHODE ISLAND.		
Rhode Island Co. (The), Providence	4,217,022	4,192,958
TENNESSEE.		
Memphis Street Railway Co	1,627,648	1,719,609
Nashville Railway & Light Co	1,597,030	1,724,380
TEXAS.		
Dallas Electric Corporation	1,169,967	1,320,122
Galveston-Houston Electric Co., Galveston	1,088,447	1,206,543
Northern Texas Electric Co., Fort Worth	1,080,577	1,259,551
UTAH.		
Utah Light & Railway Co., Salt Lake City	1,925,935	2,053,511
VIRGINIA.		
Norfolk & Portsmouth Traction Co., Norfolk	1,877,930	1,911,938
WASHINGTON.		
Puget Sound Electric Railway Co., Tacoma	1,694,973	1,869,096
Seattle Electric Co	4,520,488	5,854,175
Spokane & Inland Empire R. R. Co., Spokane	1,146,177	1,269,100
Washington Water Power Co., Spokane	2,464,118	2,794,159
WISCONSIN.		
Milwaukee Electric Railway & Light Co	3,991,105	4,355,007
Milwaukee Light, Heat & Traction Co	1,471,477	1,519,781
CANADA.		
Dominion Pwr. & Transm. Co., Hamilton, Ont.	1,600,312	1,691,696
Montreal Street Railway Co	3,677,432	3,874,838
Toronto Railway Co	3,610,273	3,926,828
Winnipeg Electric Railway Co	2,206,095	2,623,731
CUBA.		
Havana Electric Railway Co	2,002,108	2,192,835
PHILIPPINE ISLANDS.		
Manila Elec. R. R. & Ltg. Corp. (The)	1,127,341	1,141,688

†11 months ending Nov. 30, 1909.
§Jan. 12 to Sept. 30, 1908.

TRANSPORTATION ARRANGEMENTS FOR ATLANTIC CITY CONVENTION

The president of the American Street & Interurban Railway Association has appointed the following local committees on transportation arrangements at the time of the Atlantic City convention next October:

New York City: W. G. Gove, chairman, Brooklyn, N. Y.; J. H. Pardee, New York, N. Y.; T. N. McCarter, Newark, N. J.; E. C. Foster, New York, N. Y.

New York State, exclusive of New York City: M. C. Brush, chairman, Buffalo, N. Y.; E. F. Peck, Schenectady, N. Y.; E. S. Fassett, Albany, N. Y.

Philadelphia and vicinity: Chas. O. Kruger, chairman, Philadelphia, Pa.; H. J. Crowley, Philadelphia, Pa.; John Blair MacAfee, Norfolk, Va.; John A. Rigg, Philadelphia, Pa.

New England States: C. H. Hile, chairman, Boston, Mass.; Calvert Townley, New Haven, Conn.; H. C. Page, Worcester, Mass.; L. S. Storrs, Springfield, Mass.; Robert S. Goff, Boston, Mass.

Middle Atlantic States, including Delaware, Maryland, Virginia and District of Columbia: H. W. Fuller, chairman, Washington, D. C.; J. N. Shannahan, Baltimore, Md.; Wm. Northrop, Richmond, Va.; E. C. Hathaway, Norfolk, Va.

Southeastern States, including North Carolina, South Carolina, Georgia and Florida: G. W. Brine, Atlanta, Ga.

Central Electric Railway Association Territory, including Indiana, Ohio, Michigan and Western Pennsylvania: Geo. Whysall, chairman, Marion, Ohio; Robert I. Todd, Indianapolis, Ind.; C. D. Emmons, Ft. Wayne, Ind.; Dana Stevens, Cincinnati, Ohio; P. N. Jones, Pittsburgh, Pa.; F. W. Brooks, Detroit, Mich.; E. F. Schneider, Cleveland, Ohio; F. W. Brown, Jackson, Mich.; H. A. Nicholl, Anderson, Ind.; M. J. Insull, New Albany, Ind.

Chicago, including northern Illinois and Wisconsin: J. M. Roach, Chicago, Ill.; E. C. Faber, Wheaton, Ill.

Central Northwestern States, including Minnesota, North Dakota, South Dakota and Iowa: L. D. Mathes, Dubuque, Ia.

St. Louis and Kansas City, including Missouri and southern Illinois: Capt. Robert McCulloch, chairman, St. Louis, Mo.; L. C. Haynes, East St. Louis, Ill.; C. F. Holmes, Kansas City, Mo.

Southwestern States, including Oklahoma, Arkansas, Louisiana, Texas and Arizona: D. A. Hegarty, chairman, Little Rock, Ark.; H. T. Edgar, Ft. Worth, Tex.; W. J. Jones, Austin, Tex.

Colorado, Utah, Nebraska and Kansas: C. K. Durbin, chairman, Denver, Col.; J. H. Humpe, Lincoln, Neb.

California: C. N. Black, chairman, San Francisco; Howard E. Huntington, Los Angeles, Cal.; John A. Britton, San Francisco, Cal.

Washington, Oregon and Montana: F. I. Fuller, chairman, Portland, Ore.

Canada: W. G. Ross, Montreal, Que.

The American Street & Interurban Railway Manufacturers' Association has appointed the following chairmen and members of local committees in each of the districts who will serve jointly with the committees appointed by the American Association:

New York City: W. L. Conwell, chairman, C. R. Ellicott, Bertram Berry, Thomas Farmer, Jr.

New York State and Canada: Cornell S. Hawley, chairman.

Philadelphia, Middle Atlantic and Southeastern States: William H. Heulings, Jr., chairman.

Central Electric Railway Association Territory, St. Louis, Kansas City and Southwestern States: Arthur S. Partridge, chairman.

New England States: Charles C. Peirce, chairman.

Chicago, Western and Northwestern States and California: J. W. Porter, chairman; L. E. Gould and Hiram Kenfield.

Special trains will be run from New York, Boston, Chicago and St. Louis. The only arrangements completed so far for

these special trains are for the special train to be run from St. Louis. The train will be run over the Pennsylvania Lines and will be in charge of the following committee:

Capt. Robt. McCulloch, chairman, president, United Railways Company, St. Louis.

L. C. Haynes, vice-president, East St. Louis & Suburban Railway Company, East St. Louis, Ill.

John M. Egan, president, Metropolitan Street Railway, Kansas City, Mo.

C. F. Holmes, president, Kansas City-Western Railway, Kansas City, Mo.

D. A. Hegarty, general manager, Little Rock Railway & Electric Company, Little Rock, Ark.

Anton H. Classen, president, Oklahoma Railway, Oklahoma City, Okla.

H. T. Edgar, manager, Northern Texas Traction Company, Ft. Worth, Tex.

W. J. Jones, president, Austin (Tex.) Electric Railway.

Arthur S. Partridge, street railway supplies, St. Louis.

It will be composed of a composite car with bathroom, barber, buffet, and library, a library smoking car, baggage car, standard Pullman sleeping cars, compartment observation sleeping car and dining cars. A maid will be in attendance on the train. All cars will be lighted with electricity with lights in each berth and electric fans in each car. By special arrangement, members of the party will have access to their baggage in the baggage car, if desired. Dining cars will serve meals à la carte, en route, except a special table-d'hôte dinner the first night.

The train will run on the following schedule:

Leave St. Louis, Saturday, Oct. 8, 1 p. m.
Leave Terre Haute, Ind., Saturday, Oct. 8, 5:10 p. m.
Leave Indianapolis, Ind., Saturday, Oct. 8, 7:10 p. m.
Leave Columbus, Ohio, Sunday, Oct. 9, 12:30 a. m.
Leave Pittsburgh, Pa., Sunday, Oct. 9, 7:05 a. m.
Leave Philadelphia, Pa., Sunday, Oct. 9, 3:20 p. m.
Arrive Atlantic City, Sunday, Oct. 9, 5:42 p. m.

The railroad fare from St. Louis to Atlantic City and return will be $33.40. Tickets will be sold at this low rate from Oct. 6 to 9, good returning up to Oct. 18. The sleeping car rates from St. Louis to Atlantic City will be: Berth, $6; compartment, $17; drawing-room, $21. The return trip will be made on regular trains. Sleeping car reservations for the return trip can be made after arrival at Atlantic City through J. S. Murphy, passenger agent of the Pennsylvania Railroad at Atlantic City. Applications for sleeping car accommodations on the special train from St. Louis should be sent in at an early date to Arthur S. Partridge, New Bank of Commerce Building, St. Louis, Mo.

SUBURBAN ELECTRIC RAILWAY MAGAZINE OF AMERICA

A number of manufacturers of electric railway apparatus have received during the past two weeks a request for advertisements from a paper with the name given above and purporting to be issued in Syracuse. The magazine is said to have a circulation of 10,000 copies, to reach all general electric railway officers and to be "in close touch with the Beebe electric railway system." It is also said to be the official publication of the Suburban Electric Railways Association of New York State, and the claim is made that electric railway companies of the State are interested in the magazine and that the Beebe lines are pushing it as best they can, and contribute very largely to its success.

Investigation showed that the interest of the Beebe lines is limited to $15, which was paid for a page advertisement in the magazine and that the magazine has no official connection with the so-called Beebe syndicate lines, nor is it published, so far as could be learned, with the authority of any of the other New York State railways. So far as we know, also, no association of electric railway companies in New York State has been formed under the name of the Suburban Electric Railways Association.

COMMUNICATION

NOSING OF ELECTRIC LOCOMOTIVES

Westinghouse Electric & Manufacturing Company,
Pittsburgh, Pa., Aug. 18, 1910.

To the Editors:

In the issue of the Electric Railway Journal for Aug. 6 there is an editorial on the subject "Electric Locomotive Problems." Several points in this editorial invite comment.

1st. Does the drawbar angularity produce nosing on curves? This can be answered in the negative, because nosing does not occur on curves. A locomotive, whether steam or electric, that is nosing on tangent track will steady down when it runs into a curve, even though the running speed is not reduced. Also a

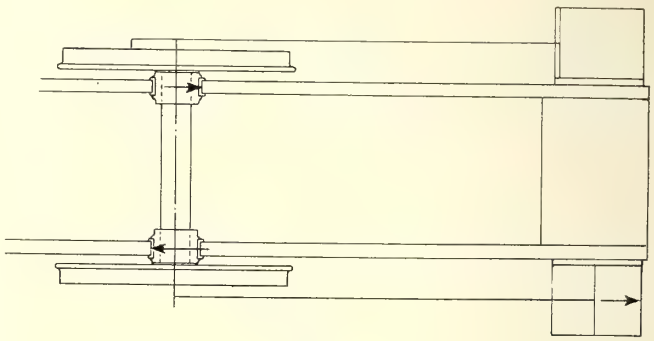


Fig. 1

locomotive when running with no trailing load will nose at least as badly as when hauling a car, which of itself has good riding characteristics.

2d. Does the unbalanced piston load on the two sides of the cylinder saddle produce nosing? This involves a definition of the term "nosing."

The spring-borne parts of the locomotive may skew and slide sideways relative to the wheels with a pendulum regularity, keeping time with the reversals of the piston loads, without particularly effecting the flange pressure exerted by the various wheels against the rail head. This action is not nosing in the sense in which the term is used in this discussion. Nosing is a more or less destructive action in which the rails are alternately subjected to flange pressures tending to spread the gage.

Fig. 1 shows that in a horizontal plane, the piston load, con-

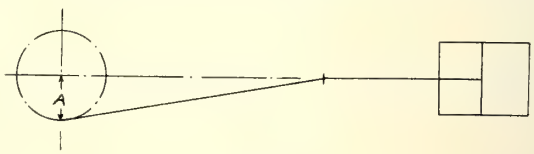


Fig. 2

sidered statically, produces only internal stress in the locomotive framing and can have no effect in skewing the entire locomotive in the gage.

When the driver hub plates are new, so that the transverse clearances between them and the journal boxes are small, and when the brasses fit snugly on the journals, there will be little transverse movement of the spring borne parts, for it is evident that the various forces indicated are in equilibrium.

As the engine wears, however, there will be a general increase in all clearances. Then the tendency of the unbalanced piston loads will be to skew the spring-borne parts and axles relative to each other, also to produce a transverse sliding of the spring borne parts on the axles.

If these movements are violent enough to take up the clearances, bringing up with a shock at the limit, before the moved parts are caught and returned by the next reversal of the piston loads, then a transverse blow is delivered to the rail and a true nosing tendency may exist. This has been noted somewhat at length in order to show that the apparent nosing, so frequently

noted in steam locomotives, may have no damaging effect on the track.

The vertical component of the pressure on the cross-head, indicated by *A* in Fig. 2, has a tendency to oscillate the spring borne parts, around an axis parallel to the rails. This force, however, is small compared with the piston load and is built up much more gradually than the piston load. Furthermore, at high speed this component is reduced on account of the earlier cut-off and any wire-drawing of the steam that may occur. There is, however, some possibility that this component will

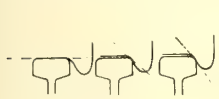


Fig. 3

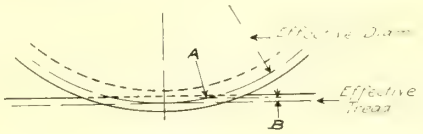


Fig. 4

noticeably contribute to the production of nosing actions and the unbalanced reciprocating parts of the steam locomotive unquestionably tend to set up nosing actions.

All the nosing tendencies referred to above are in phase with the wheel revolutions and are independent of track irregularities and of the time of transverse vibration, which is characteristic of the locomotive as a whole. This point will be referred to again later.

3d. Why does nosing occur in an electric locomotive? Before suggesting a possible reason it will be well to note that when a locomotive is nosing and the power is cut off, the nosing disappears before any material reduction of speed occurs. The nosing action represents a definite loss of energy and a continual energy input is required to maintain this nosing action.

When a track defect starts an unfortunately proportioned locomotive to nosing, then it is entirely possible for a locomotive on tangent track, which is fully up to the standard, to not only maintain a nosing action, but to hit the rail harder with every swing. If the nosing is cumulative and the power is not shut off a derailment will result.

Irrespective of the wheel arrangement on the locomotive; let the leading driver on the right side be suddenly displaced transversely by a rail defect with a sufficient force to crowd its mate hard against its rail, then the fillet of the left leading driver will ride up onto its rail. As the fillet climbs the rail the tangent to the surface of contact between the rail and the wheel becomes more and more inclined as indicated in Fig. 3. This elevation of the wheel and any deflection of the rail, wheel, axle, locomotive frame, etc., represent stored energy. The elevated wheel is then rolling on a diameter larger than the tread this being marked the effective diameter in Fig. 4. The actual contact *A*, between the flange and rail will occur at a point above the effective tread and through the distance *B*, a climbing tendency will exist. This tendency will co-operate with the original disturbing transverse force to still further elevate the wheel with an accompanying storage of energy.

As soon as the wheel reaches the highest point to which it can climb under the existing conditions, it is in a state of unstable equilibrium and starts downward and toward the other rail, this action being assisted by the fact that the effective diameter, which is larger than the tread on the right-hand wheel, has been swinging the left-hand wheel ahead and to the right, as far as the clearances will permit.

As the wheel that was elevated drops and retreats from its rail, the stored energy, less friction loss, is redelivered and accelerates the return to the right-hand rail.

If the return to the right is as severe as the first displacement to the left, then a nosing action has been established. If the return is more severe than the original disturbance then the action is cumulative. There are other forces of minor importance that might be considered in connection with nosing action but which would be out of place in this brief discussion.

If we assume, say the M. C. B. standard shape of flange, nosing is a function of flange pressure and cannot occur with any given locomotive until flange pressures of a certain severity are in evidence. Then any feature of design tending toward the reduction of flange pressure will tend to eliminate nosing.

Some of the features which do tend to this reduction of flange pressure are:

(A) Increase of distance between the center of gravity of spring-borne parts and the point of transverse restraint of spring-borne parts.

(B) In truck vehicles, an increase of the truck center distance.

(C) The addition of idle guiding wheels, etc.

It seems entirely reasonable that electric locomotives, with perfect balance, and no inherent harmonic vibration, excepting such as may be started by the track, should be more liable to develop nosing action than is a steam locomotive having the inherent vibrations, noted early in this discussion, because these vibrations will generally be out of phase with the tracking vibrations and will therefore tend to break up their sequence.

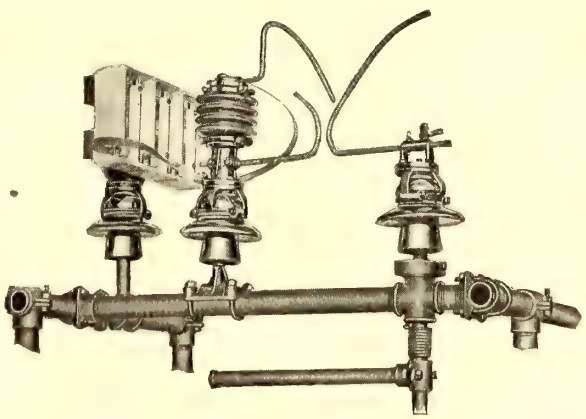
4th. What did the Pennsylvania tests indicate regarding the relative tracking characteristics of engines with symmetrical and unsymmetrical wheel arrangements? The tests indicated that the unsymmetrical engines which were tested ran better than did the symmetrical engines which were tested. Incidently the symmetrical engines were short coupled bogie truck machines with no idle guiding wheels and with a comparatively low center of gravity both of spring-borne parts and of the entire locomotive, while the unsymmetrical machines were equipped with guiding trucks and had a higher center of gravity. Therefore the tests did not prove anything conclusive regarding the relative merits of symmetrical vs. unsymmetrical wheel arrangements, other things being equal.

It would be very profitable if other engineers would advance theories for this nosing tendency in electric locomotives as there is much to learn on the subject, and this subject is of most vital importance in the developing of new locomotive designs.

G. M. EATON.

ALUMINUM LIGHTNING ARRESTERS FOR UNDERGROUND CABLES

One of the most serious problems which operators of underground cable systems have to meet is the protection of the cables against internal surges and against lighting in cases where the underground circuits are connected to overhead lines. During the past two years the General Electric aluminum arrester has been given a very wide application in the protection of cable and mixed overhead and cable circuits. One important characteristic of the arrester for this duty is



Horn Gap with Charging Resistance for Cable System

the daily charging of the cells—a process which consists simply of subjecting the stacks of aluminum cones to the line voltage and short-circuiting the series horn-gaps for a brief period. This charging process, as well as the normal discharges resulting from high-voltage disturbances, is accompanied by a slight arcing at the horn-gaps. On cable systems where the electrostatic capacity is large compared with the inductance of the

circuit, it is advisable to take every possible precaution to limit the charging current to a minimum value. In this aluminum arrester this limitation is accomplished by a special horn-gap used with a charging resistance. The resistance limits the charging current and even if the cells are in poor condition smooths out the wave-shape of the current and damps out any tendencies to oscillate. At the same time it does not prevent the cells from taking their full charge. These auxiliaries are so arranged as to give selective paths to the cells; one through a horn-gap without resistance which is the same as in the arresters for overhead circuits, and the other through a resistance and a horn-gap, the setting of which is slightly less than that of the gap without resistance. With this arrangement the daily charging current and the average surge discharge take the path through the resistance. This resistance is adjusted to a value which will so modify the nature of the charging arcs that there is no liability of resonance. It also makes the charging more uniform and reliable.

Heavy discharges which will be impeded somewhat by the resistance will be shunted through the principal horn-gap and have a free path without resistance. The arc from this discharge, rising on the horns, will be intercepted by the horn blade, which is connected to the resistance; hence the current is limited at the end of the discharge and as the arc breaks. The surging which would be produced by the breaking of a large current arc in air, therefore, is entirely eliminated by suppressing the arc and current. Thus the safety horn-gap with the charging resistance combines a number of valuable features in safety of operation without in any way decreasing the efficiency of the arrester as a protector of cable systems.

PAY-AS-YOU-ENTER CARS FOR WICHITA, KAN.

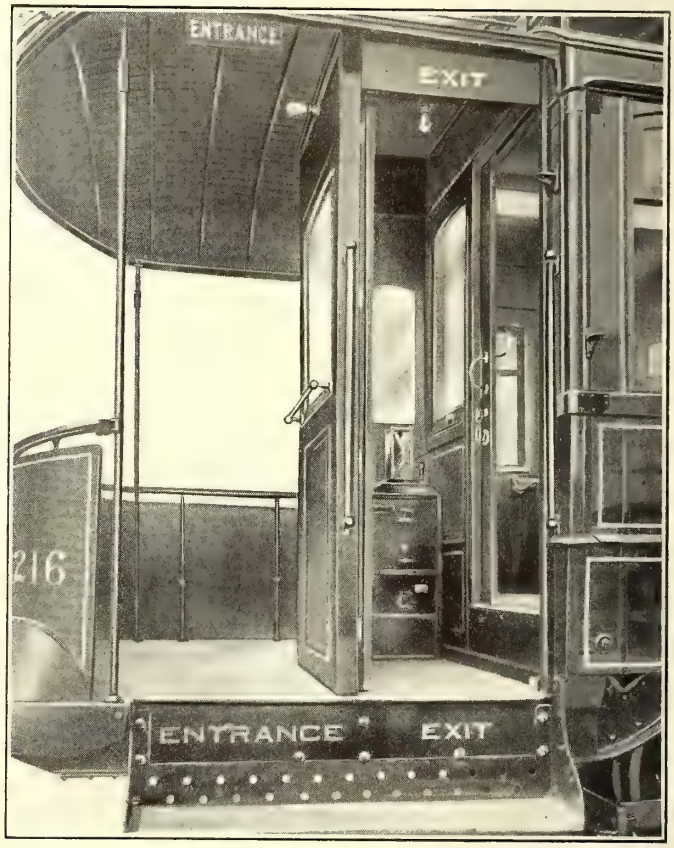
The Wichita (Kan.) Railroad & Light Company has recently received from the American Car Company, St. Louis, Mo., four single-end, double-truck closed pay-as-you-enter cars which have a novel rear platform arrangement. As shown on the floor plan and engraving from a photograph, the rear platform is not enclosed, but a small vestibule for the conductor is built out from the end bulkhead. This vestibule consists of wooden panels up to a height of about 36 in. with glass above, so that the conductor can see all passengers as they enter. The sash next to the entrance door is arranged to drop so as to provide an opening through which passengers can deposit their fares in a fare box. A double folding door forms the outside wall of the vestibule above the exit step. An incandescent lamp is mounted under the hood above the center of the vestibule and another lamp on the vestibule partition illuminates the remainder of the platform and the entrance step. The vestibule may be removed in summer and a pipe railing installed in its place to separate the exit and entrance passageways.

The car body is 28 ft. long and 8 ft. 4 in. wide over posts. Both the front and rear platforms are 6 ft. 6 in. long, the front platform being entirely enclosed. Cross seats for 26 passengers are provided in forward end of the car, while two longitudinal seats for four passengers each are placed at the rear. Generous free space has been provided for near all entrance and exit doors. The interior finish is plain golden ash with inlaid borders. The seats are upholstered in rattan. The special equipment includes Brill four-till fare boxes, Brill 27-G1 trucks, Hunter destination signs, Pantasote curtains with Forsythe No. 88 ring fixtures, Dedenda gongs and Nichols-Lintern sanders.

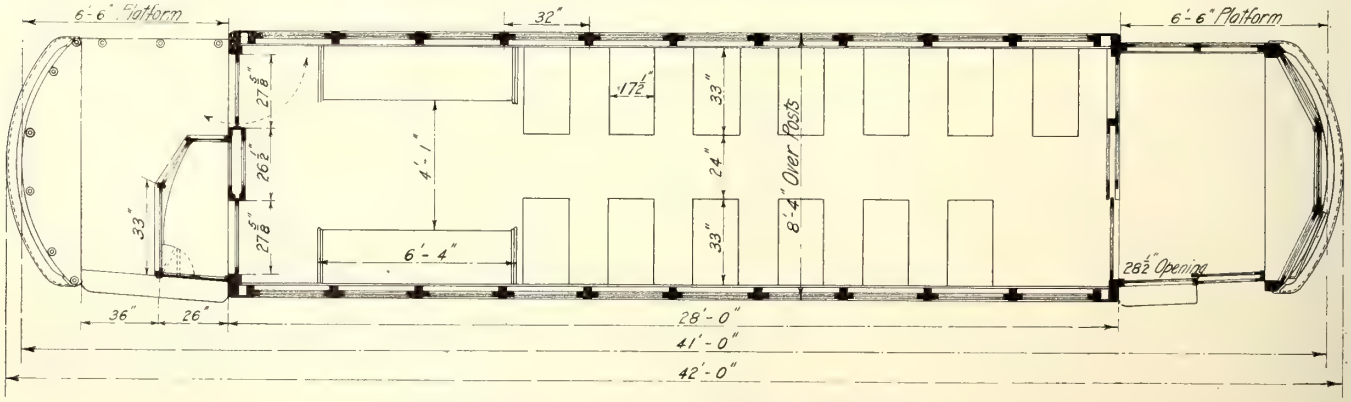
The cars were built under license of the Pay-as-You-Enter Car Corporation.



Pay-As-You-Enter Car for Wichita, Kan.



Rear Platform of Wichita Pay-As-You-Enter Car



Floor Plan of Wichita Pay-As-You-Enter Car

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Michigan. — Operation — Regulation — Additional Service—Constitutional Law—Obligation of Contracts—Impairment—Street Railroad Franchise.

A provision, in an ordinance, granting a street railway franchise, requiring the company to maintain two lines crossing each other at right angles and to give transfers, fixing the fare, and stipulating that the rates of fare shall not be reduced, which reserves to the city the right to make, by ordinance, reasonable rules to protect the interests of or accommodation and running of cars for the public, does not authorize the city to compel the establishment of an additional route, which route will be a combination of portions of both the original lines, and thereby compel an unnecessarily frequent schedule on parts of the lines, or an infrequency of cars on others, and deprive the company of its right to collect a second fare from passengers transferring to other lines intersecting.

An ordinance making such a requirement would be void as violating the constitutional provision against impairing the obligation of a contract.—(People v. Detroit United Ry., 121 N. W. Rep., 321.)

Mississippi. — Street Railroads — Franchises — Rights Acquired—Municipal Corporations—Powers of Mayor and Aldermen—Power to Bind Successors—Public Improvements—Surrender of Power—Ordinances—Grant of Exemptions—Estoppel—Against City—Ultra-Vires Contracts—Notice of Limitation of Powers—Street Improvements—Local Assessment—Property Subject to—Paving Tracks—Work Done by City—Recovery of Expenses—Right of Property Owners to Make Improvement.

A street railway company, obtaining from a city a franchise, can only obtain such powers as the city may lawfully grant, and the company must take its franchise subject to the limitations imposed on the mayor and board of aldermen in the exercise of their powers to grant a franchise.

The powers delegated to a city by Code 1892, sec. 2925 et seq., conferring on the mayor and board of aldermen the control of the city and its property, with power to adopt ordinances for purposes named, and to alter, modify, and repeal ordinances, and providing that the powers granted shall be held and exercised by the mayor and board of aldermen as trustees for the city, are given for the benefit of the city, and are to be exercised in the discretion of the mayor and board of aldermen in power at the time, and each mayor and board of aldermen may in their discretion determine when the powers shall be exercised, and one mayor and board of aldermen may not bind their successors.

A city may not contract away its charter powers to require the paving of streets and assess a part of the cost on abutting property.

Exemptions of any character claimed under a municipal ordinance can only be claimed when the intent to grant the exemptions is expressed in the clearest and most unambiguous terms.

A settlement by a city, seeking to collect a specified sum from a city railway company due the city for paving done, is valid so far as the claim is concerned; but a stipulation therein surrendering the right of the city in the future to pave streets at the cost of abutting property cannot be enforced because beyond the power of the city authorities.

An ultra-vires contract, made with agents of a city, does not operate as an estoppel on the city.

All persons dealing with a city must take note of its charter and the powers of its officers.

A street railway company having a franchise to operate a street railroad in a street has property rights in the street which are subject to local assessment for a city improvement.

A city, desiring to pave a street on which street car tracks are maintained under a franchise, must grant to the street railway company the right to lay the pavement for itself; and the company is not liable for the cost of pavement laid by the city without previous notification to the company to lay the same.

A city has no power to pave a street at the cost of abutting property until after notification to and refusal of abutting owners to do the paving.—(Edwards Hotel & City R. Co. et al. v. City of Jackson, 51 Southern Rep., 802.)

New York.—Regulations—Validity—Ejection of Passengers.

A general rule of a street railroad requiring passengers to deposit the fares in a box on entering the car, and forbidding conductors from handling fares, is a reasonable one, and while exceptional circumstances may arise which will make the strict enforcement of the rule vexatious, the railroad need not provide for all the possible exceptions, justifying a suspension of the rule.

A conductor of a car operated under a rule requiring passengers to pay as they enter by depositing fares in a box on the rear platform, and forbidding conductors from handling fares, who receives a transfer from a passenger, has a reasonable time to examine it, and where he soon discovers that the transfer is wrong, and then notifies the passenger and demands fare, the passenger must pay fare and comply with the rule by depositing it in the box, and where he refuses to do so the conductor may eject him, without using violence.—(Elder v. International Ry. Co., 122 N. Y., Suppl., 880.)

New York.—Taxation—Corporations—Gross Earnings Tax—Estoppel to Dispute Liability—"Gross Earnings"—Obligation of Lessor—"Gross Receipts."

Where a street railroad company whose road was operated by a lessee, notwithstanding this, filed gross earnings reports with the City Comptroller, and the city had received gross earnings taxes paid in accordance with such reports, the railroad company was not estopped thereafter to claim that it was not liable for such tax because it did not operate the road in resistance of the city's claim for more taxes on the theory that the reports were untrue, under the rule that there can be no estoppel unless the party asserting it has been induced by the representation relied on to change its position.

Laws 1884, c. 252, sec. 8, provides that every railroad corporation organized, constructed, or extended thereunder shall pay a 3 per cent gross earnings tax for the year ending the next preceding 30th day of September, and, after the expiration of five years, shall pay a 5 per cent tax. Held, that the term "gross earnings" as so used was synonymous with "gross receipts" to be derived from fares; and hence the statute should be construed as applicable only to the company operating a railroad so organized, and not to its lessor.—(City of New York v. Thirty-fourth St. Crosstown Ry Co., 122 N. Y. Rep., 344.)

Wisconsin.—Eminent Domain—Right to Condemn Street for Interurban Railway—Condemnation of Street for Interurban Railway—Institution of Proceedings by Person Damaged.

The right of any street or interurban railway company to condemn the right to use city streets, not being authorized till adoption of Laws 1901, p. 686, c. 465 (St. 1898, sec. 1863a), which grants the right on the express condition that the use thereof shall first be granted by a franchise duly passed by the common council, and a company prior to Jan. 7, 1907, or at latest July 20, 1908, only having authority to operate a street railway for transporting passengers, which authority gave it no right to institute condemnation proceedings as an interurban railway company, its right to condemn the use for interurban business of a city street on which it had laid its tracks was not obtained till ordinances were passed on the dates specified, granting the right to use it for such purpose.

Delaying for more than four months after right accrued to institute proceedings to condemn a street for use of the business of an interurban railway is sufficient to warrant a party entitled to damages in proceeding in the matter as authorized by St. 1898, sec. 1852, when the company delays or omits to prosecute the same.—(In re Plowright, 122 N. W. Rep., 1043.)

LIABILITY FOR NEGLIGENCE

California.—Damages—Personal Injuries—Excessiveness.

Plaintiff, a female child 13 years of age, of robust health,

was thrown from an electric car and injured. Her physician testified: That her face was torn to ribbons; that the only part could be recognized as a face was one eye and the teeth; that two of the tendons of the right wrist were cut, and an artery injured; that the left wing of the nose was split through to the bone; that he found the upper lip in her throat; that there was an area of two by three inches on the right side that was lost entirely; that she sustained a fracture of the orbital plate of the frontal bone, and also had a comminuted fracture of the ankle, and would be permanently disfigured, Three years after the injury, she testified that her ankle was still weak, and that she experienced difficulty in walking. Held, that a verdict for $15,000 was not excessive.—(James v. Oakland Traction Co. (Civ. 501.), 103 Pac. Rep., 1082.)

California.—Death—Excessive Damages.

Decedent was 26 years old at his death. He was employed in a hardware store at a salary of $75 a month, had the full confidence of his employers, and was considered well acquainted with the hardware business for one of his experience. Held, that in an action by his widow and child for his death, a judgment for $12,000 will not be reversed as excessive. —(Hale et al. v. San Bernardino Valley Traction Co., 106 Pac. Rep., 83.)

Delaware.—Letting Off Passengers—Care Required—Setting Down Passengers—Sudden Start—Duty—Alighting from Car—"Reasonable Care"—Knowledge—Negligence—Presumptions—Concurrent Negligence—Decrees of Negligence—Damages—Personal Injuries—Element.

A street railway company, in letting off passengers, is bound to stop at usual stopping places, and wait a reasonable time for passengers to alight, and use reasonable care to secure their safety.

If a street car slows up or stops at an unusual place, so as to clearly invite a passenger to alight, and the passenger attempts to do so, using due care, it is the carrier's duty not to suddenly start the car, so as to endanger the passenger's safety.

A carrier of passengers is bound to exercise great care and diligence in their safe transportation, but is not an insurer of their safety under all circumstances, being responsible only for negligence.

A passenger is bound to act with prudence and use the means provided for transportation with reasonable care, and if his negligent act causes or contributes to the injury of which he complains he cannot recover.

"Reasonable care," which a street car passenger is required to exercise in alighting from a car, is such care as a person of ordinary prudence would exercise under similar circumstances; such care being proportioned to the risk incurred.

A street car passenger, familiar with the railway at the place of the accident and the operation of car there, is bound to avail himself of such knowledge.

No presumption of negligence, either of plaintiff or defendant, arises from the fact that plaintiff was injured while alighting from defendant's street car, on which she was a passenger.

Where an injury was occasioned by plaintiff's negligence, or the concurrent negligence of both parties, plaintiff cannot recover, as the law will not measure degrees of negligence attributed to each.

In an action for injuries, plaintiff is entitled to such sum as would reasonably compensate her for her injuries, including past pain and suffering, and such as may come to her in future from the injuries sustained, and also for any impairment to her ability to earn a living in the future, or any expenses incurred for medical or surgical services in endeavoring to effect a cure.—(Elliott v. Wilmington City Ry. Co., 73 Atl. Rep., 1040.)

Georgia.—Carriers—Ejection of Passenger—Actions—Admissibility of Evidence—Damages—Wounded Feelings—Double Recovery.

In a suit by a passenger against a common carrier for an illegal ejection from the conveyance because of his refusal to accede to a wrongful demand for fare, evidence that immediately after the ejection the passenger tendered a second fare, and attempted to re-enter the conveyance, is admissible for the purpose of showing aggravating circumstances authorizing the recovery of punitive damages.

It is erroneous to instruct the jury that they can give compensatory damages for wounded feelings and additional punitive damages in the event aggravating circumstances appear for the purpose of deterring the wrongdoer or compensating the plaintiff for wounded feelings. There can be no double recovery of damages for the purpose of compensating the plaintiff for wounded feelings.—(Georgia Ry. & Electric Co. v. Davis (No. 1,712.), 65 S. E. Rep., 785.)

Massachusetts.—Negligence in Starting Car.

It is a matter of common knowledge that electric cars sometimes start with a jerk or jolt; but, unless the jerk or jolt in starting a street car is so unreasonable or excessive as to show negligence, it is no ground of recovery for injuries to a passenger caused thereby. (Tupper v. Boston Elevated Ry. Co., 90 N. E. Rep., 422.)

Michigan.—Contributory Negligence—Negligence.

A passenger on an electric car, who had given notice on paying her fare where she wished to alight, was not negligent as matter of law in leaving her seat, and passing to the door while the car was still in motion, as it approached the station platform and slackened its speed.

A carrier is not bound to take notice that a passenger on an electric car will leave her seat and move to the door as the car slackens its speed and approaches the place where she has announced that she wished to alight; so that acceleration of the speed of the car while, unknown to any servant of defendant, she is in such position, is not negligence, where it would have been negligence had she not assumed such position. (Schultz v. Michigan United Rys. Co., 123 N. W. Rep., 594.)

Missouri.—Damages—Excessive—Personal Injuries.

Plaintiff, while driving a steam roller, was thrown therefrom by a street car colliding with it. He testified that prior to his injury he was in good health; that he had operated a steam roller about eight months in a season; that he received from $3.50 to $4 a day; that since his injury he was disabled in his limbs; that he had tried to work, but, owing to his disabilities, had been unable to do anything except light work and for short periods; that he had lost wages for nearly two years; that he continued to suffer pain. A physician who treated him testified that he would never fully recover, and another physician that his injuries were permanent. He incurred a doctor's bill of $50 to $75, and a bill of $100 for medicine. Held, That a verdict of $2,000 was not excessive.—(Slezak v. St. Louis Transit Co., 121 S. W. Rep., 1095.)

Nebraska.—Damages—Excessive—Compensatory.

Plaintiff received the personal injury complained of in the suit when she was 22 years of age. From that time until the trial of the case, six years thereafter, she suffered continually from the effects of the injury. Her mental and physical faculties were impaired. She had at no time been able to engage in her usual avocations, and during portions of the time she was unable to care for herself. The undisputed and convincing evidence was that no recovery could follow, but that she was thus injured for life. Held, that the sum of $12,750, which included medical attendance, was no more than compensatory.—(123 N. W. Rep., 305.)

South Carolina.—Collision with Vehicle—Action—Evidence—Wantonness.

In an action for damages to a wagon from a collision with a street car alleged to have been caused by the wanton, willful negligence of defendant, where the evidence merely showed the plaintiff's driver saw a car pass as he approached the crossing, and, assuming that it would be some time before another would come, drove on the track; that the driver could not see an approaching car until he got very close to the track; and the motorman testified for plaintiff that he was running 6 or 8 miles an hour, first saw the wagon when about two car lengths from it, and immediately reversed the power, but too late to avoid the accident—a nonsuit was promptly ordered for failure of proof of wantonness or willfulness.—(Harris v. Greenville Traction Co., 65 S. E. Rep., 818.)

News of Electric Railways

Opinion of New York Commission on the Application of Third Avenue Bridge Company

An abstract of the opinion of Milo R. Maltbie, of the Public Service Commission of the First District of New York, on which the commission based its decision to grant a certificate of public necessity to the Third Avenue Bridge Company to operate an electric railway over the Queensboro Bridge from Manhattan to Long Island City, and to grant the company permission to exercise its franchise and to enter into a contract with the Third Avenue Railroad for the operation of its proposed road follows:

"It is evident that if this line is constructed, a service may be operated between Jackson Avenue, Queens, and Third Avenue, Manhattan, or through cars may be run from the Third Avenue Railroad over the bridge to Jackson Avenue and return. The Queensboro Bridge at present contains two sets of tracks available for surface or subway transportation. The outer set of tracks was designed for rapid transit purposes to connect with a subway in Manhattan. At present these tracks are used by surface cars, but when a rapid transit line is built, the surface cars must be placed elsewhere, for it would doubtless be unsafe to allow swiftly moving trains to use the same tracks that are used by trolley cars, even, if the tracks were of sufficient capacity for both.

"The great advantages that any new line may offer are through transportation and a ride from the Queens plaza to any point upon the lines of the Third Avenue Railroad and its subsidiaries for a single fare of 5 cents. Consequently, it is necessary to consider, in connection with the application for a certificate of public convenience and necessity, the terms of the franchise under which this company is to operate and the provisions of the contract which provide for the leasing of its lines to the Third Avenue Railroad.

"It would doubtless be preferable if the franchise had been granted to the Third Avenue Railroad so that the line would have been an extension of that system. If a new company is to be given this short line, the company's franchise contract with the city appears to go as far as possible under the circumstances toward guaranteeing through service at a 5-cent fare. The francise requires that transfers shall be exchanged with the Third Avenue Railroad, the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, the Kingsbridge Railway and the Dry Dock, East Broadway & Battery Railroad, whereby passengers shall be given a continuous ride over all of these lines, including the lines of the Third Avenue Bridge Company, for a single fare of 5 cents, it being stipulated, however, that this shall not include a transfer and ride over the Williamsburg Bridge for a single fare. It is provided that in the event of the failure of the company or of any of the other companies referred to, to exchange transfers as above provided the company's franchise shall ipso facto become void and forfeited. The franchise contract also reserves to the city the right to grant to any other company the use of the railway constructed by this company upon the payment of certain stipulated rentals. The company is also bound to consent to the construction or operation of any other railway that may necessitate the use of any portion of East Fifty-ninth and Sixtieth Streets covered by this franchise. The city also reserves the right to grant to other companies the use of the tracks on the bridge that may be assigned to this company by the Commissioner of Bridges. The Board of Estimate and Apportionment reserves the option upon six months' notice to the company, whenever in its judgment the use of the tracks or any part of the tracks belonging to the company or assigned to the company on the Queensboro Bridge would interfere with the operation or construction of a rapid transit railroad over the bridge, either to rescind and revoke the franchise or to designate other tracks to be used by the company.

"The contract between the Third Avenue Bridge Company and the receiver of the Third Avenue Railroad, approval of which is also requested, provides that the receiver shall construct the company's road, maintain it in good condition, comply with the obligations of the company's contract with the city, pay all bridge tolls and percentages of gross receipts required to be paid under the contract with the city so far as relates to cars operated by the receiver, etc. Charges for such cars and services are to be at a reasonable rate to be hereafter agreed upon or to be fixed by arbitration. The Third Avenue Bridge Company also retains the nominal right to operate cars, but the terms of the contract do not give any assurance that the Third Avenue Bridge Company will operate any cars on its own account. The contract provides for an exchange of free transfers between the Third Avenue Bridge Company's line and the lines of the Third Avenue Railroad substantially in accordance with the requirement of the company's city franchise. The contract is to go into effect as soon as the company is lawfully authorized to construct its road, and is to continue in effect until May 1, 1920. It should be noted that the company's franchise runs to Dec. 31, 1934, unless sooner revoked on account of the city's rapid transit plans.

"At the hearings attention was called to the conditions upon which the company may be deprived of the use of the outer set of tracks, assuming that this set of tracks will be assigned to the company by the Bridge Commissioner and removed to another set of tracks on the bridge. It was stated by counsel for the applicant that the city could revoke the franchise and stop the company from operating entirely, or it could remove the company to other tracks in the discretion of the Board of Estimate and Apportionment. This is specifically provided for in the franchise.

"The South Shore Traction Company urged that at some future time it might wish to extend its lines into Manhattan via Sixtieth Street, and, therefore, would desire to build a track upon the southerly side of Sixtieth street, using the track of the Third Avenue Bridge Company for westerly service, and its own southerly track for easterly service, turning down Second avenue at Sixtieth street and then crossing the tracks of the Second avenue line for a connection with the bridge in Fifty-ninth street. As there is no application before us from the South Shore Traction Company, as the plan it suggests has objectionable features, and as there are other ways by which the South Shore Traction Company could obtain access to Manhattan, it does not seem desirable to require the Third Avenue Bridge Company to locate its track as suggested by the South Shore Traction Company.

"In view of the provisions in the franchise and in the contract providing for through service at a 5-cent fare and free transfers to all the lines of the Third Avenue Railroad in the Borough of Manhattan and in view of the provisions of the Public Service Commissions Law, which give this commission jurisdiction over service and rates, it is believed that a certificate of public convenience and necessity should be issued and that the franchise and contract should be approved."

Transit Affairs in New York

Proposals submitted to the Public Service Commission for a change of route of the New York, Westchester & Boston Railroad set forth that the plans of the company are to provide an integral portion of a comprehensive rapid transit system for the zone lying east of White Plains Road and north of the Bronx River. L. S. Miller, president of the company, asks for the establishment of a new terminal at 180th Street, to be used jointly by the Interborough Rapid Transit Company and the New York, Westchester & Boston Railroad. Among the changes in route suggested, he says, his company, instead of building new tracks, proposes to run its line over the six tracks of the New York, New Haven & Hartford Railroad from Willis Avenue to 174th Street. It is also proposed to build a two-track elevated railroad from the main line, near Unionport Road,

up White Plains Road, or at the choice of the commission some street further east, with a connection with the Harlem River branch of the New Haven near Van Nest station. Moreover, it is stated, an exchange of traffic will be arranged with the Broadway and Lexington Avenue subway line, if that road is built, in the vicinity of Westchester Avenue and Edgewater Road. Instead of the line to Throgg's Neck, the company proposes to run a much straighter and shorter line, along East 177th Street, with a branch south in White Plains Road to Clason's Point.

The stockholders of the Second Avenue Railroad have adopted a resolution which provides for the abandonment of franchises for the construction of tracks on certain streets, and for the abandonment of lines already constructed in certain other streets. It is pointed out that some of the franchises have never been exercised and that some of the trackage is not suitable for use as part of an electrically operative line and that, furthermore, it cannot be profitably operated by horses.

Replying to criticisms which have been made in the last few months regarding the delays in starting the new tri-borough subway and explaining why construction work had ceased on some parts of the Fourth Avenue subway in Brooklyn, Chairman Willcox of the Public Service Commission said:

"The plans, specifications and forms of contract for the tri-borough system of subways have been completed for three or four weeks and ready for advertising so far as the commission is concerned. As soon as the Corporation Counsel has approved the form of contract, as required by law, bids will be asked upon these contracts.

"The routes embraced in the tri-borough system have been approved by the Board of Estimate and Apportionment and the work of preparing these plans and specifications has been going on for many months. Nothing has ever been done upon these plans by our predecessors. The plans call for building nearly twice as many miles of subway as compose the system of the Interborough Rapid Transit Company, and the details have been made much more explicit than any former contracts. The work of preparation has been enormous.

"It will be remembered that it was late in the spring when the Legislature passed the law setting forth the method which should be followed in exempting revenue producing bonds from the constitutional provisions affecting the debt limit. It was some time in the month of June that application was made by the Comptroller to the Appellate Division of the Supreme Court under the terms of this law, so that municipal funds have only been available for rapid transit purposes a very short time.

"The commission awarded contracts for the construction of this Fourth Avenue subway more than a year before the Board of Estimate found it possible to approve the same. Such approval was made only last fall and work was commenced soon afterward.

"As to the reported delay upon the work of the second and third sections of this subway it may be said that on these sections it is necessary to condemn certain easements for private property and that the condemnation proceedings are conducted by the Corporation Counsel before commissioners appointed by the Court.

"On June 10, 1910, the commission asked the Corporation Counsel to begin these proceedings regarding certain easements necessary on Fulton Street and the Corporation Counsel has duly advertised such application before the court, but the same will not take place until the first week in September. As soon as the commissioners are appointed and their oaths of office filled the property vests in the city and work can at once be begun.

"So far as the work on Ashland Place is concerned it can be said that after several hearings it was determined to change the line in the Ashland Place portion of the subway about 10 feet. As soon as the condemnation commissioners are appointed and oaths of office taken work can go ahead on that particular part of that section. Generally speaking the work on the Fourth Avenue subway is ahead of the schedule time.

"The Centre Street loop, contracts for which were awarded before this commission came into office, has proceeded and all work would have been entirely completed but the delay asked by Mayor McClellan on account of the foundations of the Municipal Building delayed that particular subway for more than a year. It is now nearly completed."

Rutland Strike Ended—The Rutland (Vt.) Street Railway has filled the places of its employees who went on strike recently, and the regular schedule has been in force now for some time.

Vote on New Franchise in Mason City—The Mason City & Clear Lake Railway, Mason City, Ia., has applied to the City Council of Mason City for an extension of its franchise for 25 years, and the question will be submitted to the voters at an election to be held on Sept. 1, 1910.

Another Arnold Report on Street Railway Service in Pittsburgh.—During the week ended Aug. 27, 1910, B. J. Arnold made public another section of his report on the Pittsburgh traction situation. It is devoted almost entirely to a history of the organization of the railway companies operating in the Pittsburgh district.

Electrification of Lackawanna Discussed—It is stated that at a conference held in Scranton, Pa., on Aug. 19, 1910, between representatives of the Delaware, Lackawanna & Western Railroad, the General Electric Company and the American Locomotive Company, the electrification of the Delaware, Lackawanna & Western Railroad east from Scranton to Lehigh and west from Scranton to Clark's Summit was discussed.

Strike on Ohio Electric Railway—The Ohio Electric Railway has filled the places of the employees on its Dayton and Columbus divisions who went on strike recently, and the regular schedule is being maintained. The men on strike demanded that the company re-employ nine men that they claimed had been discharged because of their affiliation with a union organized among the men. The company says that the men discharged were dismissed for infractions of the rules. A number of the old men have returned to work.

New York State Committee on Subjects—John H. Pardee, president of the Street Railway Association of the State of New York, has appointed the following committee on subjects to select topics to be considered at the next quarterly meeting of the association in November: Joseph K. Choate, general manager, Otsego & Herkimer Railroad Company; J. C. Calisch, vice-president and assistant treasurer, Buffalo & Lake Erie Traction Company, and W. H. Collins, general superintendent, Fonda, Johnstown & Gloversville Railroad.

Chicago Consolidated Traction Ordinance—At a special meeting of the committee on local transportation of the City Council of Chicago, Ill., on Aug. 18, 1910, the proposed ordinance in favor of the Consolidated Traction Company was recommended for passage and it was expected that a special meeting of that body would be held during the week commencing Aug. 22, 1910, to take steps to enact the measure. In accordance with the rules of the Council, definite action will be delayed for one week in order to give the aldermen time to familiarize themselves with the contents of the ordinance. At the meeting on Aug. 18, 1910, discussion centered largely around the question of where rehabilitation work should begin. It was agreed that of the 27 miles of track to be constructed on or before Jan. 28, 1911, 20 miles will be laid along thoroughfares where through routes are to be operated, and the remainder divided between Milwaukee Avenue, Belmont Avenue and Irving Park Boulevard. An effort also was made to have the committee exact a promise from the Chicago Railways, which will pay for the rehabilitation work, to pay for damage claims against the Consolidated Traction Company which have not yet been adjusted. The principal features of the ordinanee, as approved on Aug. 18, 1910, follow: Operation of 215 double-truck cars in addition to those now in use; 172 single-truck cars now in service to remain at discretion of board of supervising engineers. Acceptance of ordinance within 60 days of its passage. Ordinance shall not extend beyond Feb. 1, 1927. Valuation of Consolidated properties fixed at $3,957,454.49. Chicago Railways must obtain a clear title to the Consolidated properties; if it does not it can be required to enter upon streets now occupied by the Consolidated Traction Company as rapidly as the latter's franchises expire.

Financial and Corporate

New York Stock and Money Market

August 23, 1910.

While there undeniably has been a better tone in the stock market during the past week prices have continued to be irregular and trading is dull. The general improvement in crop reports and the reawakening of business to some extent have encouraged Wall Street to anticipate the return of outsiders to the market.

Time money is quoted at rates not out of line with previous seasons. Quotations to-day were: Call, 1¼ to 1½ per cent; 90 days, 3½ to 3¾ per cent.

Other Markets

The Philadelphia market has been dull during the past week and price changes have been insignificant. Within the past few days both Rapid Transit and Union Traction have been a trifle easier and prices are off about 1 point from those quoted a week ago. There is very little stock coming forward.

Tractions have played a very small part in the trading on the Boston Exchange during the past week. A few small lots of Massachusetts Electric and scattering sales of Boston Elevated have practically covered the transactions. Prices are without important change.

In Chicago the principal trading of the week has been in Series 1 and 2 of the Chicago Railways Company. The latter of these has been the more active and has shown some disposition to recede in price. Changes, however, have been fractional.

Trading in the stock of the United Railways Company, which was active in the Baltimore market a few weeks ago, has almost stopped. The bonds continue to be dealt in liberally and prices for these are a trifle lower.

	Aug. 16	Aug. 23.
American Railways Company	a43½	a44½
Aurora, Elgin & Chicago Railroad (common)	*50¼	*50¼
Aurora, Elgin & Chicago Railroad (preferred)	*90	*90
Boston Elevated Railway	126¼	126
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	36	36
Brooklyn Rapid Transit Company	77¾	75¼
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82¾	82¼
Capital Traction Company, Washington	*129	a130
Chicago City Railway	a185	a185
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a71½
Chicago Railways, ptcptg., ctf. 2	a16¾	a16
Chicago Railways, ptcptg., 3	a12	a12
Chicago Railways, ptcptg., ctf. 4s	a6	a5½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	*72	a73
Consolidated Traction of N. J., 5 per cent bonds	*103	a103
Detroit United Railways	*45	*45
General Electric Company	145	144
Georgia Railway & Electric Company (common)	106¼	107½
Georgia Railway & Electric Company (preferred)	a86	*86
Interborough-Metropolitan Company (common)	17½	17¾
Interborough-Metropolitan Company (preferred)	48	48
Interborough-Metropolitan Company (4½s)	78¾	79⅛
Kansas City Railway & Light Company (common)	a25	a25
Kansas City Railway & Light Company (preferred)	*79½	a78
Manhattan Railway	130⅜	131
Massachusetts Electric Companies (common)	a17½	a18
Massachusetts Electric Companies (preferred)	81	a83
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a65	a65
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	69½	*69½
Northwestern Elevated Railroad (common)	a18	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a45	a44
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a19⅞	a18¼
Philadelphia Traction Company	a83	a84
Public Service Corporation, 5 per cent col. notes	*96	a95
Public Service Corporation, ctfs	*99	a100
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a60	a60
Third Avenue Railroad, New York	8½	*8½
Toledo Railways & Light Company	*7	*7
Twin City Rapid Transit, Minneapolis (common)	*106½	*106½
Union Traction Company, Philadelphia	a45¼	a43¼
United Rys. & Electric Company, Baltimore	14½	a15
United Rys. Inv. Co. (common)	31	*31
United Rys. Inv. Co. (preferred)	59½	56
Washington Ry. & Electric Company (common)	*33	a33
Washington Ry. & Electric Company (preferred)	*87½	a90
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*100	*100
Westinghouse Elec. & Mfg. Company	60½	*60½
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale.

Annual Report of the Brooklyn Rapid Transit Company

Gross earnings of the Brooklyn Rapid Transit Company for the year ended June 30, 1910, were $20,906,930, an increase of $1,212,468 over the previous year. Operating expenses amounted to $11,726,392, an increase of $331,738, or 2.91 per cent. Net earnings were $9,180,538, a gain of $880,730, or 10.61 per cent. As income from other sources showed a material gain and the deductions for taxes, interest and rentals increased but 2 per cent, the net income increased 34.85 per cent. Special appropriations of $108,560 were made, leaving available a surplus of $2,503,035. To this there was added a profit of $69,185 from real estate disposed of during the year. A comparative statement follows:

Gross earnings:	1910.	1909.	Increase.
Passenger	$20,477,145	$19,058,693	$1,418,452
Freight, mail and express	272,140	254,643	17,497
Advertising	157,645	155,860	1,785
American Railway Traffic Company	.....	225,266	*225,266
Total earnings from operation	$20,906,930	$19,694,462	$1,212,468
Operating expenses:			
Maintenance of way and structure	$1,309,719	$1,194,014	$115,705
Maintenance of equipment	2,068,271	1,690,916	377,355
Operation of power plant	1,498,712	1,596,759	*98,047
Operation of cars	5,061,150	4,812,556	248,594
Damages and legal expenses	921,538	1,129,396	*207,858
General expenses	689,522	676,666	12,856
Freight, mail and express—expenses	174,288	138,644	35,644
American Railway Traffic Company—expenses	3,192	155,703	*152,511
Total operating expenses	$11,726,392	$11,394,654	$331,738
Net earnings from operation	$9,180,538	$8,299,808	$880,730
Income from other sources:			
Rent of land and buildings	$69,087	$74,949	*$5,862
Rent of tracks and structure	103,370	104,997	*1,627
Miscellaneous	366,970	425,871	*58,901
Total income	$9,719,965	$8,905,625	$814,340
Deductions:			
Taxes	$1,454,213	$1,337,620	$116,593
Interest and rentals (net)	5,654,157	$5,631,396	22,761
Total deductions	$7,108,370	$6,969,016	$139,354
Net income	$2,611,595	$1,936,609	$674,986
Special appropriations	108,560	65,430	43,130
Surplus	$2,503,035	$1,871,179	$631,856
Profit from real estate disposed of	69,184	.....	69,184
Total surplus for year	$2,572,219	$1,871,179	$701,040
Surplus at June 30, 1909-08	4,387,230	3,583,460	533,770
Surplus June 30, 1910, and June 30, 1909	$6,959,449	$5,724,639	$1,234,810
Of this amount there has been appropriated:			
For discount on bonds sold	.....	$89,575	*$89,575
Old accounts written off	$636	8,728	*8,092
Additional reserve for special franchise taxes in litigation	232,917	238,457	*5,540
Expenses of prior years adjusted	13,281	20,197	*6,916
Supercession losses, etc	25,293	83,376	*58,083
Dividend on B. R. T. stock outstanding	1,906,287	897,076	1,009,211
Total appropriations	$2,178,414	$1,337,409	$841,005
Balance surplus June 30, 1910, and June 30, 1909	$4,781,035	$4,387,230	$393,805

* Decrease.

Edwin W. Winter, the president, says in the report, in part:

"Expenditures for maintenance of way and structures increased $115,705. The increase is chiefly due to quite extensive rebuilding of trolley tracks.

"Maintenance of equipment shows an increase of $377,355. The unit cost of shop work was materially less than in 1909; the increase lies mainly in cost of changing air brake equipment on elevated cars, and the substitution of steel for iron wheels, together with over $100,000 charged off and carried in accrued amortization of capital.

"The increase of over $200,000 in operation of cars is largely accounted for by advance in wage scale.

"There was a decrease of $207,858 in the combined items of damages and legal expenses. The cost of damage settlements and judgments amounted to 2.66 per cent, and legal and claim department expenses 1.43 per cent of gross earnings from operation. There was a further reduction in number of suits brought, and barring slightly over $25,000 in judgments on appeal there is no outstanding judgment against any company in the system.

"Compared with last year there was a decrease of 6.10

of a mill in the average gross receipt per passenger and 9-10 of a mill in operating charges. Taxes increased 1-10 of a mill, interest and rentals decreased 7-10 of a mill, making a total reduction of 1.5 mills in cost per passenger, and increase in surplus of 9-10 of a mill or 25.7 per cent per passenger carried.

"The total power house output measured at the switchboard was 326,894,950 kw-hours. Average cost of power house operation, including power house and substation repairs, was 0.567 cent per kw-hour. Although the output was nearly 16,000,000 kw-hours in excess of last year the cost of operation of power plant was $98,000 less. In the four years ending June 30 there has been a reduction of slightly above 20 per cent in unit cost of power at the switchboard. A lower consumption of power per car-mile through improvement of appliances and better methods of operation has contributed to favorable results in this department of the service.

"A pension system was inaugurated on Jan. 1, 1910, the affairs of which are administered by a board of pensions consisting of the vice-president and general manager, the secretary and treasurer of the Brooklyn Rapid Transit System, and the president of the Brooklyn Rapid Transit Employees' Benefit Association. The amount of pension is based upon the average monthly wage received by the pensioner during the 10 years immediately preceding retirement and graduated from a minimum of 30 to a maximum of 50 per cent of this rate, according to length of service. At the end of the first six months 26 employees had qualified and were receiving pension allowances.

"In addition to $51,428 insurance reserve fund accumulated prior to the agreement entered into on Nov. 15, 1907, by the companies composing the system, there has been earned $183,897, making a total to credit of the reserve fund of $235,325. The balance sheet reflects but $180,979 for the reason that the difference, $54,345, while earned, is not distributable until the close of the insurance year, November, 1910. There has been invested by the trustees in interest-bearing securities $190,243, representing a par value of $201,000, yielding an income of $8,895 per annum.

"No important construction work was undertaken during the year.

"Thirteen thousand five hundred ft. of elevated structure was reinforced, making a total of 61,000 ft. of structure reinforced to June 30, 1910.

"A new freight house and yard were constructed at the Sea Beach Terminal, Coney Island, and rented property abandoned.

"Two thousand six hundred and seventy-nine surface and 828 elevated cars were put through the shops for overhauling, repainting and varnishing."

Following are additional statistics from the report:

	1910	1909.	1908.
Passengers carried	569,438,773	530,149,597	515,184,907
Increase over preceding year per cent	7.41	2.93	0.65
Transfers redeemed	151,279,806	141,326,128	128,650,863
Increase over preceding year, per cent	7.04	9.82	5.57
Revenue mileage	77,984,651	74,200,436	73,674,770
Increase over preceding year, per cent	5.10	0.71	7.91
Earnings per revenue mile, cents	26.3	25.7	25.7
Units per passenger—cents.			
Passenger earnings	3.60	3.60	3.68
Miscellaneous earnings	.17	.23	.31
Total earnings	3.77	3.83	3.99
Operating charges	2.08	2.17	2.36
Taxes	.26	.25	.18
Interest and rentals	.99	1.06	1.09
Total	3.33	3.48	3.63
Surplus	0.44	0.35	0.36
Charges per cent of operating earnings.			
Repairs and renewals	16.36	14.63	14.39
General operating	35.52	37.48	39.45
Damages	2.66	3.66	4.14
Legal expense	1.75	2.07	2.11
Total operating	56.09	57.86	60.09
Taxes	6.96	6.79	4.68
Interest and rentals (net)	24.46	25.52	24.80
Special appropriations	.52	.33	1.15
Surplus	11.97	9.50	9.28
	100.00	100.00	100.00

Action of the New Jersey Public Utility Board in Burlington County Transit Application

A short note was published last week of the action of the Board of Public Utility Commissioners of New Jersey on the application for the issue of securities by the Burlington County Transit Company. This is a new company organized to take over the property formerly owned by the Burlington County Railway. The authorized capitalization of the latter company consisted of $550,000 of capital stock, made up of 5500 shares of a par value of $100 each, of which 4847.9 shares were issued and $550,000 of mortgage bonds, of which $475,000 were issued. On Sept. 8, 1909, a receiver was appointed for the company. Soon after his appointment the receiver had an appraisal made of the assets and franchises of the company and filed with the court a statement that they were valued at $227,817. On June 16, 1910, the property was sold to pay a judgment for $502,108.56, the amount due April 23, 1910, for principal and interest on the mortgage bonds. The highest bid received was $120,000 and the road was sold at that price. The purchasers thereupon paid $10,000 in cash and by a subsequent decree they were permitted in lieu of the payment of the rest of the purchase price to deposit with the special master first mortgage bonds of the old company to the amount of $470,000, with coupons attached which fell due and became payable on Sept. 1, 1909, and subsequent coupons.

The purchasers organized the Burlington County Transit Company and applied to the Board of Public Utility Commissioners for the authority to issue 3325 shares of capital stock of par $50 each, the whole constituting $166,250, which, they stated, was considerably less than the appraised value of the property, according to the appraisal made by the receiver.

The board declined, however, to authorize the issue of more than $120,000 capital stock. Upon this point, the board said:

"In application before the board the purchase money was $120,000, which to the extent of $10,000 was paid in cash and the balance of which was made up by the surrender of bonds.

"It is probably true that the fair value of the property purchased exceeds $120,000.

"It is likewise probable that the fair value of the bonds surrendered exceeds $110,000.

"The purchase money to which the purchasers contributed, however, is the sum bid at the sale, namely, $120,000, and the capital stock issued to the purchasers cannot exceed that sum.

"The application for approval of an issue to such purchasers, of capital stock in amount $166,250, must be denied; the board, for the reasons stated, not being satisfied that such proposed issuance is to be made in accordance with the provisions of law relating thereto."

The organizers of the Burlington County Transit Company thereupon amended their petition so that it applied for permission to issue 2400 shares at par $50 each, or a total of $120,000. This application was considered by the board on Aug. 9 and was granted.

Chicago (Ill.) Consolidated Traction Company—Suit has been brought in the Municipal Court at Chicago by holders of $125,000 of the general mortgage bonds of the Chicago Consolidated Traction Company to recover from the Chicago Railways that amount and two years' defaulted interest, making a total of $139,000. The bonds are of the same series involved in the decision of Judge Ball in a case now in the Appellate Court brought by Attorney John Barton Payne, in which the court held that the Chicago Railways was responsible for the issue of $6,750,000 because the obligation had been taken up by its predecessor, the Union Traction Company, in 1900. Isaac H. Mayer, of the firm which brought the suit in the Municipal Court at Chicago, is reported to have said in explanation: "Our clients are satisfied that the proposed reorganization plan now under way is unfair to the holders of the bonds of the Chicago Consolidated Traction Company. We have, therefore, determined to enforce collection of these bonds from the Chicago Railways and its directors. We shall further insist that all of the Chicago Railways' bonds were wrongfully issued and that the entire issue of

$6,750,000 of the Chicago Consolidated Traction Company's bonds are a lien on the Chicago Railways' property ahead of all that company's own bonds."

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Andrew Cooke, vice-president of the Harris Trust Company, Chicago, Ill.; George M. Reynolds, president of the Continental & Commercial National Bank; Frank A. Vanderlip, president of the National City Bank, New York; John M. Gibson, Lieutenant-Governor of Ontario, and E. B. Osler, president of the Dominion Bank, Toronto, are working out the finances of the Chicago & Milwaukee Electric Railroad. Mr. Cooke, the chairman of the committee mentioned, is reported to have said that nothing of an authoritative nature can be given out at the present time regarding the financial plan which has been agreed upon. According to *The Economist*, it seems probable that the settlement with the bondholders of both the Wisconsin and the Illinois divisions of the company will be effected through a new bond issue on the entire property and a first and second preferred stock issue.

Chicago & Southern Traction Company, Chicago, Ill.—William S. Reed, Chicago, Ill., has filed suit for $125,000 in the Circuit Court at Chicago against the Chicago & Southern Traction Company, alleging that the amount mentioned is due him for work in connection with the construction of the company's line. Mr. Reed alleges that on July 5, 1905, the Chicago & Southern Traction Company entered into a contract with him to obtain all the rights of way and franchises necessary for the operation of the road and proceed to build the road and bridges from Harvey to Kankakee, a distance of 38½ miles, and that he gave all his time to this work until May, 1907, but received no compensation. Receivership proceedings are now pending.

Forty-Second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, under foreclosure, has been postponed from Sept. 1, 1910, to Sept. 26, 1910.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—A report has been filed in the Superior Court at Indianapolis by Charles L. Henry, receiver for the Indianapolis & Cincinnati Traction Company, in which he asks the court to order the sale of the property of the company, the proposed plans of reorganization having failed on account of the refusal of the holders of $142,305 of receiver's certificates to enter into an agreement with W. T. Durbin, J. J. Appel, Claude Cambern, T. F. Rose and Geo. A. Ball, trustees representing stockholders and bondholders, to take new bonds in place of receiver's certificates. The indebtedness of the company is $1,113,805. The amount of certificates issued is $927,973.26, and the floating indebtedness is $76,032, on which interest for more than two years is due. A hearing will be held before Judge Carter on Sept. 7, 1910.

Milford & Uxbridge Street Railway, Milford, Mass.—The Massachusetts Railroad Commission has authorized the Milford & Uxbridge Street Railway to issue $85,000 of 20-year 5 per cent bonds to pay floating debt.

Missoula (Mont.) Street Railway—The capital stock of the Missoula Street Railway has been increased from $100,000 to $500,000.

Underground Railways Company, Ltd., London, Eng.—The Underground Railways Company, Ltd., has declared an initial semi-annual dividend of ½ of 1 per cent on the income bonds for the half year ended June 30, 1910. This payment will be made in New York at the office of New York Trust Company, at the rate of $4.8666 per pound sterling.

Union Street Railway, New Bedford, Mass.—The stockholders of the Union Street Railway and of the Dartmouth & Westport Street Railway will vote shortly on the question of consolidating the companies. The capital stock of the Union Street Railway will be increased from $1,125,000 to $1,625,000, the $500,000 of new stock to be exchanged, dollar for dollar, for the stock of the Dartmouth & Westport Street Railway.

United Electric Company, Dennison, Ohio—The property of the United Electric Company, which includes the electric railway between Uhrichsville and Dennison, has been purchased by Brooks & Company, Scranton, Pa.

Traffic and Transportation

Transfer Charge Continuance Sustained on Middlesex & Boston Street Railway

The Massachusetts Railroad Commission issued an order on Aug. 9, 1910, extending for one year the right of the Middlesex & Boston Street Railway, Newtonville, Mass., to charge 6 cents for every fare with which a transfer is issued, on the lines formerly operated by the Newton Street Railway. At a hearing given by the board on Aug. 8, 1910, Carl A. Sylvester, general manager of the company, filed a statement showing the earnings, expenses and traffic records of the lines in question for the 10 months ended June 30, 1910.

In explanation of the data filed Mr. Sylvester said that during the period from September, 1907, to June, 1908, the gross passenger receipts were $285,689, and that during the corresponding period ended June 30, 1910, the gross passenger receipts were $293,974, showing an increase of $8285, or about 2.9 per cent. During 1907-8 the company carried 6,434,602 passengers, and in 1909-10, it carried 6,439,806 passengers, an increase of 5204 passengers, or 0.08 per cent. During 1907-8 the company received 623,556 transfers against 561,042 passengers in 1909-10, there being a decrease of 62,514 transfers, or about 11 per cent. During the period 1907-8 the company issued 733,733 transfers against 580,985 in 1909-10, showing a decrease of 152,748 transfers, or about 26 per cent below the former period. During the period from Sept. 1, 1909, to June 30, 1910, the company received as additional revenue on account of the 1-cent additional charge for each transfer issued $5809.85. The Lexington & Boston Street Railway was paid on 33,385 transfers at ½ cent each, $166.93. The Newton & Boston division was paid on 195,586 transfers at ½ cent each, $997.93, making a total deduction of $1144.86 out of the $5809.85 received, showing a net gain to the Newton Street Railway division on account of the additional charge of 1 cent each of $4664.99. Comparing the period from September, 1908, to June, 1909, the net gain on the Newton Street Railway division on account of the additional charge was $4398.06. The gain of the second period, from Sept. 1, 1909, to June 30, 1910, shows an additional income over the first period of $266.93. Mr. Sylvester said that in order to secure, with least burden upon the public, a proper and just return upon capital actually invested it is necessary to continue the charge of 1 cent, as during the past year. There was no opposition.

Toronto Railway Wages Question Settled

The differences between the Toronto (Ont.) Railway and its employees regarding wages, hours of labor, uniforms and other matters have been satisfactorily adjusted. The award of the board of conciliation which has been considering these matters was made public at Toronto on Aug. 19, 1910, and accepted by the employees of the company by a vote of 1200 to 200. The agreement is to continue in force for two years from June 16, 1910. The wages per hour for motormen and conductors, shedmen and motor and truck repairmen under the award, the present rate of wages and the scale which was asked for follow:

Motormen and conductors.	Awarded.	Present scale.	Asked for.
First year	21	20	25
Second year	23	22	28
Third year and after	25	23½	28
Shedmen.			
Foremen	25	..	..
Assistants	22	21	25
Car washers	21	20	25
Motor and truck repairmen.			
First year	21	20	25
Second year	23	22	28
Third year and after	25	23½	28

It has been agreed that "the general superintendent or manager shall receive a committee of employees at any reasonable time to discuss any matters arising out of this agreement."

Meeting of Central Electric Traffic Association

The Central Electric Traffic Association met at the Anthony Hotel in Fort Wayne, Ind., on Aug. 16. One

session was held from 8 to 12 a. m., and there was a good attendance of representative traffic men. The subjects discussed were: (1) The advisability of publishing a carefully made map showing all the lines in the Central Electric territory, and (2) the advisability of arranging for the monthly publication of an official interurban railway guide to show the time of all trains in the Central Electric territory. It was proposed that a guide of standard folder size be published by an official printer, the contents to be made up of the time-tables of the interurban lines, each road to pay its proportion according to the number of pages used or the mileage of the road; and also to include in the book advertisements of the hotels and miscellaneous advertisements. The advertising matter would be grouped at the front and back of the guide and the time-tables would appear on consecutive pages as the body of the publication. It was suggested that such a guide could be published monthly and be put on sale at all ticket offices.

The decision regarding the publications of the maps and the guide was deferred until the next meeting of the Traffic Association, which will be held at Winona Lake, Ind., on Sept. 27, 1910.

Through Service Between Indianapolis and Goshen—The Winona Interurban Railway, Winona Lake, Ind., and the Indiana Union Traction Company, Anderson, Ind., have established through service between Indianapolis and Goshen, via Noblesville, Peru, Warsaw and Winona. At Peru connection is made with the lines of the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.

Chicago Meeting of Central Electric Accounting Conference.—At the meeting of the Central Electric Accounting Conference, which will be held in Chicago on Sept. 10, 1910, it is planned to discuss the subject, "Uniform Statistics." The Chicago & Milwaukee Electric Railroad has offered the members of the conference the courtesy of a special car between Milwaukee and Chicago.

Illinois Traction System Carries Vice-President and Party—Vice-President Sherman, who is touring Illinois and Missouri, was announced as the principal speaker for Aug. 27, 1910, at a Chautauqua being held near Clinton, Ill., on the Bloomington-Decatur division of the Illinois Traction System. The vice-president and his party plan to travel from Clinton to Decatur and thence to St. Louis, Mo., over the lines of the Illinois Traction System.

Suspension of Subway Service Order Continued—The Public Service Commission of the First District of New York has extended until Sept. 5, 1910, the order suspending the order of April 5, 1910, as to service in the subway, at least that portion of the order which requires that the maximum headway during the non-rush hours in the daytime should be 2½ minutes. The order was originally suspended for 30 days from July 12, 1910, and last week an application for an extension was submitted by the Interborough Rapid Transit Company.

Long Island Railroad Files Terminal Rates—The Long Island Railroad has filed with the Public Service Commission a schedule of passenger fares to be charged to the new Pennsylvania Terminal, to which trains will be run on and after Sept. 8, 1910. The rates to the terminal on single tickets will be 5 cents more than the present rates to Long Island City. This will be two cents more than to the Manhattan end of the Thirty-fourth Street Ferry, as an extra 3 cents is now charged for the ferry trip. The increase in commutation tickets to the terminal is a trifle more than 1½ cents a trip.

Complaint Against Westchester Electric Railroad—The Public Service Commission of the Second District of New York has received a complaint from the municipal authorities of Eastchester, Westchester County, against J. Addison Young, receiver of the Westchester Electric Railroad, Mount Vernon, N. Y., in regard to lack of waiting room at Waverly Square, where passengers change cars; and to the unsanitary condition of the passenger car operated between Tuckahoe station and Waverly Square. The commission issued an order to the Westchester Electric Railroad on July 25, 1910.

Passes Discontinued in Baltimore—William A. House, president of the United Railways & Electric Company, Baltimore, Md., recently sent the following letter to the holders of passes issued by that company: "This company, having received a letter from the Public Service Commission stating that, under the advice of its counsel, the issuance and use of complimentaries is in conflict with the provisions of the Public Service Commission Law, and supplementary to that letter notice having been received to-day from the commission that such passes should not be accepted for transportation after Aug. 20, I beg to advise that the coupons of such book should not be tendered to conductors after that date."

Summer Boarding Folder—The Pittsburgh & Butler Street Railway, Pittsburgh, Pa., has issued a 24-page folder, entitled "Summer Boarding and Tent Life on the Butler Short Line." Attention is called to the value of living in the open, and advice is given about selecting a place for spending a vacation. A list is published of the boarding places in towns along the company's line, a brief description of the accommodations available and the rates per week being given. The publication is concluded with some advice to campers. The cover design is in white, green and gray, and the subjects of the front cover and the rear cover are suggestive of the contents of the folder.

Opening of McKinley Bridge—Announcement is made that the McKinley bridge, of the Illinois Traction System, will be opened for interurban traffic only on Oct. 1, 1910. This bridge, which was described in the Electric Railway Journal of Jan. 22, 1910, page 138, affords a through route from the south end of the Illinois Traction System, with its 550 miles of interurban track, to the wholesale and retail business center of St. Louis. A new terminal building, a large freight warehouse on 24 acres of property at the Missouri end of the bridge, a passenger station at Broadway and Salisbury Streets, an express terminal 80 ft. x 200 ft. at Twelfth Street and Lucas Street, and a passenger terminal at the latter location, which is one and a half blocks north of the Jefferson Hotel, will all be erected. The first of the three 521-ft. river spans of the bridge was completed in January, 1910, but high water delayed the erection of falsework during the spring. The center river span has just been swung and the falsework for the remaining space has been finished. The bridge builders announce that this last span will be completed by Sept. 15, 1910, and two weeks is allowed in which to lay one track across the bridge. It is not expected that the roadways or the second track which will be needed for carrying material will be finished by Oct. 1, 1910. At a later date the bridge will be formally opened with appropriate dedicatory ceremonies.

Brooklyn Bridge Traffic—The Department of Bridges of New York has issued a statement which shows a decrease in the number of elevated trains and surface cars operated across the Brooklyn Bridge during July, 1910, as compared with July, 1909. According to the report there were in July, 1909, 130,264 trips across the bridge, while in July, 1910, there were only 118,501, including the local bridge line, operated from the Brooklyn terminal to the Park Row terminal. In July, 1909, there were 31,302 trains of an aggregate of 138,336 cars, which crossed the span, while this year, in the same month, the number was reduced to 30,491 trains, with an aggregate of 132,339 cars. In connection with this report the Brooklyn Rapid Transit Company has issued the following statement: "There has been no change in the schedule of elevated trains or surface cars over the Brooklyn Bridge during the rush hours in the last year. The same number were operated during the morning and evening rush hours in July, 1909, and July, 1910. Whatever decrease there may have been in the schedule, for either elevated or surface lines was for the non-rush hours, and during these hours the company has always provided every passenger with a seat. A part of the decrease in the elevated service, as noted in the report of the Department of Bridges, was due to the fact that in July, 1910, there were several delays on the bridge, which prevented the regular and full operation of the elevated service until the tracks were cleared. The large increase in the number of surface cars and elevated trains operated across the Williamsburg Bridge in the last 12 months shows that the Brooklyn Rapid Transit Company is meeting the expanding traffic over that structure."

Personal Mention

Mr. William R. Alberger, traffic manager of the Tonopah & Tidewater Railway, Los Angeles, Cal., has been elected vice-president and a director of the Oakland (Cal.) Traction Company.

Mr. H. Askin has resigned as superintendent of the Atchison Railway, Light & Power Company, Atchison, Kan., to become general manager of the Bartlesville (Okla.) Interurban Railway.,

Mr. E. H. Clark, formerly master mechanic of the Cleveland & Erie Railway, Girard, Pa., has been appointed master mechanic of the Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.

Mr. F. T. Loftus has been appointed acting auditor of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., to succeed Mr. W. B. Wright, who has become connected with the *Toledo Blade*. Mr. Loftus will have his headquarters at Rushville, Ind.

Mr. Fred C. Randall has resigned as general superintendent of the Galveston (Tex.) Electric Company, and has opened an office as consulting and constructing engineer, First National Bank Building, Houston, Tex. He will devote himself particularly to electric railway, lighting and power plant engineering work.

Mr. Horatio A. Foster, who is associated with Bion J. Arnold, of Chicago, is in Los Angeles, in connection with the appraisement of some electric properties in that region. Owing to many developments of water power in that particular region some of these properties spread over a great deal of territory covering the ground from the Kern River power station, about 120 miles north of Los Angeles, to Redlands, about 70 miles east of the same city, and to Santa Ana, some 35 miles south.

Mr. J. W. Hewitt, for a number of years connected with the Seattle (Wash.) Electric Company, as inspector, and later as superintendent of employment, has been appointed superintendent of transportation of the Oregon Water Power division of the Portland Railway, Light & Power Company, Portland, Ore. Previous to entering upon his duties as superintendent of transportation of the Oregon Water Power division of the Portland Railway, Light & Power Company, Mr. Hewitt served as trainmaster of the company.

Mr. J. H. M. Andrews has been appointed assistant to the chief engineer of the Philadelphia Rapid Transit Company. Mr. Andrews is a graduate of Pennsylvania State College in the class of 1898, and from 1903 to 1909 was connected with the engineering department of the Philadelphia Rapid Transit Company, first as draftsman and engineer in the roadway department and later in charge of inspection, maintenance, renewal and repair of special work. About a year ago he resigned to become connected with the Lorain Steel Company, from which he resigned to accept the position with the Philadelphia Rapid Transit Company mentioned above.

Mr. J. J. Johnson has been appointed assistant to Mr. Anton H. Classen, president of the Oklahoma Railway, Oklahoma City, Okla. Mr. Johnson entered railway work in February, 1889, as stenographer and clerk in the office of superintendent of the St. Louis Southwestern Railway, at Tyler, Tex. He filled various clerical positions in the accounting and auditing departments of the St. Louis Southwestern Railway, finally being elected vice-president and general solicitor of the company. Mr. Johnson resigned from the St. Louis Southwestern Railway to become connected with the operating department of the Mexican Central Railway in the City of Mexico, but resigned this position to enter the legal department of the Missouri Pacific Railway at St. Louis. On Oct. 1, 1906, he resigned from the Missouri Pacific Railway to become chief clerk to Mr. Classen, president of the Oklahoma Railway. In 1907 Mr. Johnson was appointed assistant secretary of the Oklahoma Railway. Later he was elected secretary of the company, which office he still retains.

Mr. M. S. Ralls has been appointed engineer of maintenance of way of the Michigan United Railways, Lansing, Mich. During the last 2½ years Mr. Ralls has been engineer in charge of track special work and subway construction for the Chicago (Ill.) Railways. Mr. Ralls began his engineering career in 1887, with the Union Pacific Railroad, but resigned from the company in 1890 to become assistant city engineer in Salt Lake City. In 1892 he accepted a position with the World's Columbian Exposition, but resigned in 1893 to accept a position with the Lake Street Elevated Railroad, Chicago, Ill., as principal assistant engineer. He was appointed chief engineer of the Trans-Mississippi and International Exposition at Omaha, in 1897, and on the completion of this work in 1900 he became connected with Riggs & Sherman, Toledo, Ohio, engineers, on railroad location and construction. In 1905 Mr. Ralls resigned from Riggs & Sherman to accept a position with the South Side Elevated Railroad, Chicago, Ill., with which he remained until the spring of 1908, when he entered the service of the Chicago Railways.

Mr. George F. Faber has been appointed superintendent of transportation of the Michigan United Railways, Lansing, Mich. Mr. Faber was formerly traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. Mr. Faber began his railroad career with the Pennsylvania Railroad as clerk in the superintendent's office, where he served from 1890 to 1892. He resigned from this position to become connected with the accounting department of the East Cleveland Railroad, for which, during 1893 and 1894, he filled several minor offices of responsibility and trust. From 1894 to 1901 Mr. Faber was associated with the Warner & Swasey Company, Cleveland, Ohio. During 1900 and 1901 Mr. Faber had charge of the company's department of record of costs on all apparatus manufactured. His object in resigning from this company was to re-enter the electric railway field, and he accepted a position with the so-called Appleyard Lines in Ohio, and afterward acted as superintendent of two of the properties until the termination of the receivership. Mr. Faber then accepted the position of superintendent of the Elgin-Belvidere Electric Railway, which was at that time under construction. After the completion of this property he organized and operated the road for a year, leaving the company to become general superintendent of the Western Ohio Railway, Lima, Ohio, in charge of transportation, car shops and power station. Early in 1909 Mr. Faber accepted the position of traffic manager of the Chicago, Lake Shore & South Bend Railway.

OBITUARY

William H. Silverthorn, president and a member of the executive committee of the Railway Steel-Spring Company, New York, N. Y., died at his home in Painesville, Ohio, on Aug. 13, 1910. For the last 36 years Mr. Silverthorn was associated with Mr. Julius E. French, chairman of the board of directors of the Railway Steel-Spring Company. His first work in the railway supply field was with the Paige Car Wheel Company, of which he was general manager. In 1897 this concern was consolidated with a number of other makers of wheels into the Steel Tired Wheel Company, and Mr. Silverthorn became its general manager. In June, 1902, the Steel Tired Wheel Company was merged into the Railway Steel-Spring Company, and Mr. Silverthorn was elected a director and, later, president of the company.

Theodore P. Bailey, assistant manager of the Philadelphia district of the General Electric Company, Schenectady, N. Y., a pioneer in electric lighting and electric railways, is dead. Mr. Bailey was born in Covington, Ky., on Aug. 17, 1856. In 1883 he became identified with the Van Depoele Electric Company, and after the purchase of that company in 1885 by the Thomson-Houston Company he became its Western representative. When the Thomson-Houston Company was merged into the General Electric Company Mr. Bailey continued in immediate charge of the street railway business in the Chicago district. Later he became assistant manager of that office. In 1905 he resigned to go into the railway contracting business as vice-president and general manager of the L. E. Myers Company, Chicago, Ill., where he remained until 1907. In the fall of 1908, after being in charge of the automobile department of the St. Louis Car Company about a year, Mr. Bailey returned to the General Electric Company as assistant manager of the Philadelphia district. He is survived by a widow and one child.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Charlotte (N. C.) Rapid Transit Company—Application has been made by this company for charter to build a street railway in Charlotte and its suburban districts. Authorized capital stock, $150,000. Applicants for the charter are Cameron Morrison and Paul Chatham, Charlotte; Hugh Chatham, Elkin, and J. E. Kavanaugh, Winston-Salem. [E. R. J., June 18, '10.]

FRANCHISES

***Selma, Ala.**—A franchise has been granted to Ernest Lamar and associates for the construction of a street railway in Selma. It is the intention of the promoters to extend the line to the Birmingham district.

Jonesboro, Ark.—The City Council has granted an electric railway franchise to Preston Thatcher for a line in Jonesboro. [E. R. J., Nov. 6, '09.]

San Diego, Cal.—The San Diego Electric Railway has asked the Council for a franchise extending from the intersection of Fifteenth Street and K Street to M Street.

***Santa Barbara, Cal.**—It is announced that Henry P. Post, representing a group of capitalists, will soon apply for franchises for a street railway that will parallel the lines of the Santa Barbara Consolidated Railway. It is said to be the intention to build one line out toward Goleta, and another line toward Montecito.

Joliet, Ill.—The City Council has granted to the Chicago & Joliet Electric Railway a franchise to double-track its lines on Cass Street, Jefferson Street and Chicago Street.

Iowa City, Ia.—At a special election held in Iowa City on Aug. 10, the Iowa City, Ottumwa & Southwestern Electric Railway was voted a franchise for a line in that city. [E. R. J., July 16, '10.]

Mason City, Ia.—The Mason City & Clear Lake Railway has applied for 25-year extension of its franchise in Mason City. The matter will be voted upon at a special election to be held on Sept. 1.

Minneapolis, Minn.—The Electric Short Line Railroad has petitioned the City Council for a franchise to cross city streets to its proposed terminal at Seventh Street and Third Avenue North. E. D. Luce, president. [E. R. J., Aug. 28, '08.]

Virginia, Minn.—W. M. Prindle, Duluth, has applied for an extension of his franchise until Aug. 24, 1911, in which to begin work on the proposed street railway in Virginia. [E. R. J., Feb. 29, '10.]

***St. Louis, Mo.**—A. A. Busch, H. B. Hawes, C. A. Lemp and Frank Weber have petitioned the County Court for a franchise to build an electric railway from the city limits to Fenton on the Gravois road.

East Grand Forks, N. D.—The Grand Forks Transit Company has been granted a 50-year franchise for a street railway in East Grand Forks.

Butler, Pa.—The City Council has granted a 50-year franchise to the Pittsburgh, Butler, Slippery Rock & Grove City Railway for a street railway in Butler.

San Antonio, Tex.—The City Council has granted a franchise to the San Antonio Traction Company to extend its South Flores Street line from its present terminus to the city limits.

***Provo, Utah**—Abel J. Evans has applied to the County Commissioners on behalf of himself and associates for a right-of-way for an interurban railroad along the highways of Utah County.

Chehalis, Wash.—The City Council has granted a franchise to the Twin City Light & Power Company, Centralia, to construct a street railway over certain streets in Chehalis. [E. R. J., Apr. 2, '10.]

TRACK AND ROADWAY

***Nanaimo, B. C.**—It is stated that the Dominion Stock & Bond Corporation, Vancouver, is planning to construct a street railway in Nanaimo.

Glendale & Eagle Rock Railway, Glendale, Cal.—This company has recently completed and placed in operation an extension to Verdugo Park. It now operates 5½ miles of track.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company is said to be making surveys for an extension of its line from the present terminus at Forestville to Mirabel Park, 1½ miles distant and construction will be begun this fall. It is intended to build the line down the river westward and touch all the principal summer resorts as far as Monte Rio.

Stockton Terminal & Eastern Railroad, Stockton, Cal.—It is stated that this company has completed the first section of its line from Stockton to Linden. It is expected that work will be begun at once on the extension of the railway from Linden to Jenny Lind. The line will be 27 miles long. Gasoline motor cars will be used. R. N. Griffith, president. [E. R. J., May 28, '10.]

Southern Pacific Company, San Francisco, Cal.—The work of equipping the suburban steam lines of the Southern Pacific Company in Alameda, Cal., with electricity is nearing completion. Practically all of the tracklaying has been finished and nearly all of the grading is done. Trolley poles have been installed and the feeders placed in position. The auxiliary electric power plant on the north side of the tidal canal near the Fruitvale Avenue bridge, Alameda, is approaching completion, and the steel framework of the car house at Alameda Point is in position. The ballasting of the double track roadbed on the extension loop from Eagle Avenue and Broadway around the east end of the city to the eastern end of Encinal Avenue is under way. On the Alameda mole the trolley wires and power cable will be carried on trusses already in position.

***West Palm Beach, Fla.**—It is stated that the Palm Beach Farms Company is financing a projected narrow gage interurban railway to extend from West Palm Beach to Deerfield, running parallel with the Florida East Coast Railroad, and about 5 miles west of this line. The C. T. McCrimmon Company, Miami, will construct the line.

Chicago, Aurora & De Kalb Railroad, Aurora, Ill.—This company has placed in operation its newly electrified line between Aurora and De Kalb. It is said to be the intention to extend the line from De Kalb to Rockford, a distance of 30 miles.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company has secured the services of H. A. Strauss, vice-president and chief engineer, Falkenau Electrical Construction Company, Chicago, as consulting engineer to undertake the design of its proposed extension to Jerseyville, involving about 20 miles of roadbed, track and overhead construction, together with power house. Work on this extension will begin within the next few days.

Sterling-Moline Traction Company, Sterling, Ill.—This company has awarded the contract to the Northwestern Construction Company, Milwaukee, Wis., for the construction of its projected line between Sterling and Prophetstown. Preliminary surveys have been completed between Sterling and Moline, including two surveys between Sterling and Prophetstown. It is said that $100,000 has been subscribed toward the building of the line. It is planned to construct a power plant and dam on the Rock River at Lyndon. A. Van Petten, Sterling, general manager. [E. R. J., Aug. 20, '10.]

Louisville & Eastern Railroad, Louisville, Ky.—This company placed in operation on Aug. 20 its entire line between Louisville and Shelbyville, a distance of 30 miles. It is reported that the company, in the near future, will construct a line from Shelbyville to Frankfort, connecting with the Bluegrass Traction Company.

Midland Power & Traction Company, Cambridge, Md.—It is stated that this company will soon begin the construction of a 6-mile extension from Byersville to Pleasant City.

***Hedgesville, Md.**—It is reported that citizens of Black Creek Valley are planning to construct an electric railway through that section. J. B. Clary, Hedgesville, is said to be interested in the project.

Boston & Providence Interurban Electric Railroad, Boston, Mass.—This company has petitioned for a location in North Attleboro to operate its proposed interurban railway. It is the intention of the company to seek a location

at the extreme easterly portion of the town, near the Attleboro line. The company has been granted locations in the other towns along the line. Among the directors of this company are F. S. Pratt, H. Newton, Russell Robb and Richard M. Saltonstall.

Berkshire Street Railway, Pittsfield, Mass.—This company is said to be preparing plans for several new extensions to its lines to be built within three years. There are four of these, and work on one, a line from Great Barrington to South Egremont, a distance of 3½ miles, has already begun. The next extension will be 12 miles long and will reach from Great Barrington to the State line, where it is expected to run through Connecticut territory to Canaan, the Connecticut right being held by the Canaan & Berkshire Tramway. The third extension will be a line from Huntington to Lee, a distance of about 23 miles. The fourth extension will be a line up Mt. Greylock, between North Adams and Cheshire, Mass.

Pittsfield (Mass.) Street Railway—This company has awarded a contract to Fred T. Ley & Company, Springfield, to run additional feed wires and repair the overhead construction on its Dalton-Hinsdale line.

St. Louis, St. Charles & Northern Traction Company, Mexico, Mo.—Surveys and estimates have been completed for this company for its 98-mile railway to connect St. Louis and Loddonia. R. E. Race, Mexico, has succeeded C. B. Duncan as president and general manager of the company. [E. R. J., June 11, '10.]

North Missouri Central Railway, Mexico, Mo.—M. M. Stephens, president of this company, which proposes to build an electric railway from Mexico to Jefferson City via Columbia, asked Columbia, Mexico, Ashland and Jefferson City to raise $500,000 to be invested in stock or second mortgage bonds to secure the immediate construction of the line. [E. R. J., May 14, '10.]

Montana Rapid Transit Company, Helena, Mont.—Press reports state that W. A. Clark has subscribed $3,000,000 of the proposed bond issue of this company. The line will be 75 miles long. It will be operated by power generated at a dam across the Missouri river near Helena. It is expected that the construction of the line will be undertaken during the fall. [E. R. J., Mar. 12, '10.]

Public Service Railway, Newark, N. J.—This company is said to be considering the construction of an extension of its line from Woodbury to Paulsboro. It is probable that the line will be ultimately extended to Pennsgrove.

Cleveland (Ohio) Railway—This company recently placed in operation an extension of its Lorain Avenue line from Ninety-eighth Street to 117th Street.

Cleveland, Van Wert & Indianapolis Traction Company, Norwalk, Ohio—Press reports state that this company has revived the project of building an interurban railway between Norwalk and Bluffton, Ind., 147 miles, to connect Cleveland with Indianapolis. J. Y. Todd, Spitzer Building, Toledo, is said to be interested. [E. R. J., Oct. 24, '08.]

Coos Bay Traction Company, North Bend, Ore.—This company, recently incorporated to build an electric railway from Roseburg to Coos Bay, announces that it is the intention to begin the construction of the line within 60 days. The following officers have been elected: Geo. T. Averill, president; J. H. Somers, vice-president; W. P. Evans, secretary; N. B. Campbell, treasurer; J. H. Robinson, chief engineer. [E. R. J., Aug. 13, '10.]

Scranton (Pa.) Railway—It is stated that the contract for building the new Mulberry Street viaduct in Scranton will be let within the next few days. The Scranton Railway will bear, it is said, $100,000 of the cost of the structure in return for the use of the viaduct.

West Penn Railways, Pittsburgh, Pa.—It is stated that this company will begin work within the next few weeks on a new extension between Leisenring and Uniontown, 8 miles, and 3,300 ft. of new double track is to be built between Uniontown and Brownsville Junction. It is said that the entire system of the company is to be ultimately double-tracked.

Waynesburg & Blackville Street Railway, Waynesburg, Pa.—This company has let a contract to David Smith for 8,000 ties to be used in the construction of its proposed line from the Pennsylvania-West Virginia State line boundary to Waynesburg, 14 miles. The company will also build about 50 miles of extensions. [E. R. J., July 30, '10.]

Lake View Traction Company, Memphis, Tenn.—This company has completed track laying between Memphis and Lakeview, Miss., and the ballasting has been done on about 4 miles. The distance is 10¼ miles, and the ballasting will have been completed within the next two weeks. The poles have been placed and the stringing of wire will begin in a few days. It is expected to place the line in operation by Sept. 15.

Houston-Bay Shore Traction Company, Houston, Tex.—This company has awarded the contract for the first 7 miles of the grading between La Porte and South Houston to E. Gay & Sons, Houston. Construction has been begun at the La Porte end of the line. The company proposes to build a line extending from Houston to La Porte via Harrisburg. A. F. Irwin, president. [E. R. J., June 25, '10.]

SHOPS AND BUILDINGS

Dartmouth & Westport Street Railway, New Bedford, Mass.—This company has awarded the contract to John Crowe, Fall River, for the construction of its new freight station at Sixth Street and Bedford Street, Fall River.

Marion, Bluffton & Eastern Traction Company, Bluffton, Ind.—Construction is said to have been begun in Bluffton of a union passenger station for the joint use of the Marion, Bluffton & Eastern and the Bluffton, Geneva & Celina traction companies.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has submitted plans and specifications to contractors asking for bids for the construction of a new car house, 100 ft. x 250 ft., to be located between Avenue B and Avenue C. The walls of the new building will be of reinforced concrete and steel construction for all the remainder. It will afford trackage for about 100 cars.

POWER HOUSES AND SUBSTATIONS

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company, which proposes to extend its lines from Godfrey to Jerseyville, will also erect a power station at Jerseyville to furnish power for the entire line. At present power is leased from the Alton Gas & Electric Company.

Springfield (Mass.) Street Railway—This company is said to be considering plans for remodeling the boiler house at its power station on Margaret Street. It is said that the improvements to be made will cost, it is estimated, $60,000.

Western Massachusetts Street Railway, Westfield, Mass.—The additions being made to this company's power plant at Westfield include a boiler room 30 ft x 40 ft., and an engine room 40 ft.x 50 ft. The new machinery includes a 500-hp Hamilton-Corliss cross-compound engine, which is to be directly connected to a 350-kw General Electric generator. Two new boilers of 150 hp each will be placed in the boiler room.

North Jersey Rapid Transit Company, Paterson, N. J.—This company, which is building an electric railway from Paterson to Suffern, N. Y., has ordered 2 300-kw. rotary converters, 6 transformers and switchboard apparatus from the Westinghouse Electric & Manufacturing Company.

New York Central & Hudson River Railroad, New York, N. Y.—This company has placed an order with the General Electric Company for four 2000-kw rotary converters. Three of these rotaries are to be used in the substation which is now being constructed at Irvington, and one will be placed in the present substation at Glenwood. It is expected to have them all in service by next spring. The company proposes to extend if possible within the present year the electric zone from Yonkers to Hastings, a distance of about 4 miles, for the service of multiple-unit trains. The electric zone will eventually be extended to Croton, and a new substation will be erected at Ossining.

Third Avenue Railroad, New York, N. Y.—This company has ordered from the General Electric Company a 1500-kw. rotary converter, with transformers and switchboard, for installation at its 129th Street substation. The company has also purchased from the General Electric Company 4 100-kw. rotary converters with series boosters for charging the storage battery cars which it is now building.

Manufactures & Supplies

ROLLING STOCK

Burlington (Vt.) Traction Company has ordered three semi-convertible cars from J. M. Jones' Sons.

Moose Jaw Electric Street Railway, Saskatchewan, Can., which has under construction a 7-mile line in Moose Jaw, will purchase six new cars.

Beech Grove Traction Company, Indianapolis, Ind., will purchase eight cars for use on its line now being built from Indianapolis to Beech Grove.

Richmond & Henrico Railway, Richmond, Va., which is building an electric railway in Richmond and its suburbs, is contemplating the purchase of 16 cars.

Chicago (Ill.) Railways, it is reported, will buy 200 double-truck cars as soon as the merger of the company with the Chicago Consolidated Traction Company is effected and the rehabilitation ordinance is passed by the Chicago City Council.

United Railways, Portland, Ore., has placed an order with The J. G. Brill Company for two 51-ft. 8-in. combination passenger and smoking cars. One of these cars will be for first-class passengers and the other will be for second-class passengers.

Knoxville Railway & Light Company, Knoxville, Tenn., noted in the ELECTRIC RAILWAY JOURNAL of June 11, 1910, as contemplating the purchase of 15 cars, has placed an order with the McGuire-Cummings Manufacturing Company for 15 single-truck closed cars. General Electric motor equipments will be installed on these cars.

New York & Queens County Railway, Long Island City, N. Y., has specified the following details for the 25 double-truck city cars which it has recently ordered from the Jewett Car Company:

Seating capacity.....44	Bumpers .....plate
Weight (car body only), 17,000 lb.	Car trimmings .....bronze
	Couplers .....Hovey
Bolster centers, length, 18 ft. 7¼ in.	Curtain fixtures..Cur. S. Co.
	Curtain material...pantasote
Length of body.....30 ft.	Destination signs, Ry. Co.'s Std.
Over vestibule.....41 ft.	
Width over sills.7 ft. 11¼ in.	Fenders.....Ry. Co.'s Std.
Over posts at belt, 7 ft. 11¼ in.	Hand brakes.....geared
	Heaters .....electric
Height from top of rail to sills .....32 13-16 in.	Motors .....2 G. E. 210 E.
	Sanders .....Jewett
Body .....wood	Seats ..... longitudinal
Interior trim.....cherry	Seating material .....rattan
Underframe .....wood	Trucks, type..Max. traction
Air brakes.....West.	Wheels .....34 in.

TRADE NOTES

Safety Foot Guard & Railway Appliance Company, Columbus, Ohio, has been incorporated with a capital stock of $10,000. The incorporators are H. D. Ridenour and others.

Kellogg Switchboard & Supply Company, Chicago, Ill., has been made exclusive agent of the United States Electric Company, New York, N. Y., for the sale of railway telephone equipments, including the Gill selector.

Wheeler Condenser & Engineering Company, Carteret, N. J., announces that it is now prepared to furnish Conover condensers and their repair parts, as it has recently acquired the patterns and drawings of this condenser.

Crocker-Wheeler Company, Ampere, N. J., has recently received a large number of orders for direct-current and alternating generators, ranging in size from 120 kw to 750 kw. They aggregate a capacity of 6190 kw. The company also reports the receipt of several orders for direct-current motors aggregating a capacity of 4050 hp.

New England Engineering Company, New Haven, Conn., has removed its engineering offices, under the management of L. L. Gaillard, from New Haven to 50 Church Street, New York, N. Y. The company announces that the following additions have been made recently to its engineering staff: J. W. Thomas, formerly of the engineering staff of Westinghouse, Church, Kerr & Company, New York, has been appointed mechanical engineer, and L. R. Parker, formerly connected with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has been appointed electrical engineer.

Kasson Mica Company, Camden, N. J., has been incorporated by A. R. Kasson, H. R. Staley and W. B. Wolcott, Camden, with a capital stock of $50,000, to manufacture and deal in mica. A. R. Kasson, president of the company, has been in the electrical insulation business for the past six years and has recently purchased mica mines in Franklin, N. C., which will be operated by the new concern. Mr. Kasson has been operating these mines for the past three months, and it is said that they are producing a fine quality of mica in satisfactory quantities. It is the intention to install pulverizers in the company's factory at Camden, in order to utilize its waste product and place on the market a superior grade of ground mica. The officers of the company are: A. R. Kasson, president, and H. R. Staley, secretary and treasurer.

Western Electric Company, Chicago, Ill., reports that for the eight months to Aug. 1, 1910, gross sales have been running at the rate of $61,000,000 per annum, an increase of 48 per cent over the same period of 1909. The per centage of increase in sales in July, 1910, over July, 1909, was about 50 per cent. The company now has 23,000 employees on its pay rolls, an increase of 3000 in the last four months. Last fall the company had 17,000 employees. The addition to working forces in the last few months has been necessitated largely by the increasing use of telephone apparatus in train dispatching. If the present movement holds, it is believed that inside the next five years more than 50 per cent of American railway mileage will be operated by telephone rather than telegraph.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has purchased a 70-acre tract of land at Trafford City, adjoining the property owned by the Westinghouse Machine Company, for the purpose of erecting a large foundry. The cost of the property is said to have been about $250,000. Nearly 2500 men will be employed at the plant. The Westinghouse Electric & Manufacturing Company has also purchased the controlling interest in the Inter-Works Railroad, which extends from East Pittsburgh through the Boroughs of Turtle Creek, Wilmerding, Pitcairn and Trafford City, a distance of 7 miles. When the new foundry is completed the road will be used to carry material between East Pittsburgh and Trafford City. It will also be equipped with several passenger cars for accommodation of workmen and visitors to the various Westinghouse works. The road has been principally used for testing electric locomotives and other electric motive power.

ADVERTISING LITERATURE

Wickes Brothers, Saginaw, Mich., have issued their August "Monthly Stock List of Power Equipment."

Lindsley Brothers Company, Spokane, Wash., is mailing a card calling attention to its cedar poles, piling and fir cross-arms.

Crane Company, Chicago, Ill., in the *Valve World* for July, presents an illustrated account of the celebration attending its fifty-fifth anniversary.

Yale & Towne Manufacturing Company, New York, N. Y., has issued a new loose-leaf catalog, No. 20, on locks and builders' hardware. The publication contains 900 pages and more than 4000 new illustrations. A loose-leaf price book has been prepared for use in connection with the catalog.

De Laval Steam Turbine Company, Trenton, N. J., has issued a 96-page catalog entitled "High Efficiency of Centrifugal Pumps," in which the various types of De Laval centrifugal pumps are described and illustrated. It also contains several charts, which show the characteristic curves and efficiencies obtained in tests made on De Laval pumps of various sizes and types.

Goldschmidt Thermit Company, New York, N. Y., has issued a 20-page bulletin in which is described the Thermit process of welding, particularly as applied to repairing electric motor cases, truck frames and armature shafts. It also contains lists of prices of appliances used in connection with the company's welding process.

STREET RAILWAY CAPITALIZATION

STATES	Number of Railway Companies		Mi T	UTSTANDING		TOTAL STOCK AND BONDS OUTSTANDING		
				Increase		Total		Increase
Year	1908	1909	1908			1908	1909	
New England States								
Connecticut	14	13	1,03	9,400	$1,424,022	$73,869,478	$61,091,700	*$12,777,778
Maine	16	18	49	4,000	2,206,500	22,872,213	25,341,113	2,468,900
Massachusetts	69	66	2,98	8,500	*5,261,850	171,814,800	158,251,550	*13,563,250
New Hampshire	20	20	29	7,000	43,000	10,994,200	11,575,132	580,932
Rhode Island	10	11	46	6,000	*137,500	43,646,200	43,828,300	182,100
Vermont	11	10	12	1,500	426,000	7,295,500	8,082,000	786,500
Total	140	138	5,39	6,400	*1,299,828	330,492,391	308,169,795	*22,322,596
Eastern States								
Delaware	4	4	7	4,000	1,195,000	9,679,000	10,874,000	1,195,000
District of Columbia	8	10	39	8,518	*6,306,569	83,853,187	80,546,818	*3,306,369
Maryland	14	12	56	5,000	*14,945,000	99,758,050	83,717,050	*16,041,000
New Jersey	48	51	1,28	8,600	*14,659,900	221,408,480	197,375,830	*24,032,650
New York	168	155	4,72	5,307	68,576,857	951,143,125	999,969,547	48,826,422
Pennsylvania	170	175	4,21	8,456	10,490,225	514,559,918	536,654,816	22,094,898
Virginia	24	23	47	1,100	*3,670,000	67,627,700	59,327,750	*8,299,950
West Virginia	24	22	35	1,500	801,500	26,227,900	27,934,200	1,706,300
Total	460	452	12,06	2,481	41,482,113	1,974,257,360	1,996,400,011	22,142,651
Central States								
Illinois	65	79	3,01	3,857	26,467,017	370,303,340	413,315,817	43,012,477
Indiana	53	50	2,32	9,050	6,685,300	178,091,010	184,789,330	6,698,320
Iowa	30	29	76	2,000	4,497,500	61,492,700	65,650,300	4,157,600
Kentucky	13	12	38	7,000	3,786,000	43,351,900	50,059,400	6,707,500
Michigan	28	26	1,35	8,000	*1,182,000	99,896,800	96,032,500	*3,864,300
Minnesota	10	10	56	8,000	*360,000	56,370,000	54,615,000	*1,755,000
Missouri	27	27	1,08	6,000	*2,253,000	187,164,700	185,825,500	*1,339,200
Ohio	105	100	4,45	7,540	*1,590,460	369,108,973	357,721,538	*11,387,435
Wisconsin	23	25	79	1,900	884,500	83,374,400	77,578,900	*5,795,500
Total	354	358	14,72	3,347	36,934,857	1,449,153,823	1,485,588,285	36,434,462
Southern States								
Alabama	11	11	30	8,000	684,000	30,259,000	30,473,000	214,000
Arkansas	9	8	13	3,000	65,000	10,089,800	9,114,800	*975,000
Florida	10	11	15	8,500	291,500	8,171,000	8,520,500	349,500
Georgia	13	18	39	5,000	1,917,500	46,235,794	50,565,094	4,329,300
Louisiana	8	8	25	5,808	2,934,808	84,896,900	90,204,108	5,307,208
Mississippi	10	10	9	2,000	385,500	7,417,870	7,715,370	297,500
North Carolina	14	14	15	8,000	*33,000	12,313,000	12,060,500	*252,500
South Carolina	7	7	14	0,000	*90,000	9,789,280	9,699,280	*90,000
Tennessee	11	11	36	8,000	199,000	42,155,600	48,957,900	6,802,300
Total	93	98	1,97	8,308	6,354,308	251,328,244	267,310,552	15,982,308
Western States								
Arizona	4	5	37	0,000	.....	960,000	860,000	*100,000
California	53	55	2,53	6,200	13,973,200	260,398,400	280,394,300	19,995,900
Colorado	17	17	47	0,000	2,660,000	43,752,200	50,381,700	6,629,500
Idaho	7	5	14	3,000	174,000	4,199,400	4,697,000	497,600
Kansas	17	17	29	1,000	*644,000	15,406,000	13,504,295	*1,901,705
Montana	6	7	8	0,000	10,000	4,409,615	4,639,615	230,000
Nebraska	10	8	24	3,000	526,000	24,614,400	23,184,000	*1,430,400
Nevada	2	2	1	0,000	.....	1,230,000	1,172,000	*58,000
New Mexico	2	2	1	0,000	.....	700,000	650,000	*50,000
North Dakota	3	3	1	0,000	.....	660,000	614,980	*45,020
Oklahoma	15	15	21	3,500	1,292,500	8,325,000	10,862,300	2,537,300
Oregon	12	12	39	9,000	7,025,000	46,184,000	57,199,000	11,015,000
South Dakota	4	3	3	0,000	.....	150,000	650,000	500,000
Texas	29	33	55	6,000	3,320,000	44,036,000	49,259,200	5,223,200
Utah	5	4	16	1,000	*2,664,000	16,097,500	12,658,500	*3,439,000
Washington	18	18	90	7,000	3,412,000	77,706,810	84,465,100	6,758,290
Wyoming	1	1	5	.....	.....	75,000	75,000	.....
Total	205	207	6,09	9,700	29,084,700	548,904,325	595,266,990	46,362,665
United States	1,252	1,253	40,24	0,236	112,356,150	4,554,136,143	4,652,735,633	98,599,490
Hawaii, Porto Rico and Philippine Islands & West Indies	11	11	18	1,000	*412,500	26,014,500	25,491,000	*523,500
Canada and Newfoundland	52	55	1,25	6,887	4,425,475	104,437,074	106,395,497	1,958,423
Cuba	4	4	14	7,731	1,304,550	40,785,681	42,590,231	1,804,550

* Decrease

STREET AND ELEVATED RAILWAY MILEAGE, CARS AND CAPITALIZATION

COMPILED FROM "AMERICAN STREET RAILWAY INVESTMENTS," EDITION OF 1910

STATE	Number of Railway Companies		Electric Railways: Miles of Track		Electric Railways: Electrically Equipped Cars, Sweepers and Locomotives		Electric Railways: Service and Other Cars		Electric Railways: Total Cars		Capital Stock Outstanding: Total		Capital Stock Outstanding: Increase	Funded Debt Outstanding: Total		Funded Debt Outstanding: Increase	Total Stock and Bonds Outstanding: Total		Total Stock and Bonds Outstanding: Increase
Year	1908	1909	1908	1909	1908	1909	1908	1909	1908	1909	1908	1909		1908	1909		1908	1909	
New England States																			
[illegible]	14	13	1,035	1,037	1,930	2,163	170	314	2,100	2,477	$36,524,100	$22,322,300	*$14,201,800	$37,318,378	$38,760,[illegible]	$1,424,022	[illegible]	[illegible]	[illegible]
[illegible]	16	18	495	495	530	550	225	210	755	760	10,904,713	11,167,113	262,400	11,967,800	11,17[illegible]	2,206,500	[illegible]	[illegible]	[illegible]
[illegible]	69	66	2,980	2,985	8,260	8,265	2,250	2,255	10,510	10,520	99,074,450	90,773,050	*8,301,400	72,740,350	67,478,500	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	20	20	295	297	450	385	15	15	465	430	6,570,200	7,108,132	537,932	4,424,000	4,46[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New Hamp[illegible]	10	11	460	461	1,000	1,015	200	170	1,200	1,185	26,192,700	26,512,300	319,600	17,183,500	17,316,000	[illegible]	43,646,200	43,828,300	[illegible]
[illegible] Island	11	10	125	114	130	130	20	20	150	150	3,970,000	4,330,500	360,500	3,325,500	3,751[illegible]	[illegible]	7,295,500	[illegible]	[illegible]
Vermont																			
Total	140	138	5,390	5,389	12,300	12,508	2,910	3,014	15,210	15,522	183,236,163	162,213,395	*21,022,768	147,256,228	145,956,400	[illegible]	[illegible]	[illegible]	[illegible]
Eastern States																			
[illegible]	4	4	75	75	155	155	16	16	171	171	4,350,000	4,350,000		5,329,000	6,524,000	1,195,000	9,679,000	10,874,000	[illegible]
[illegible]	8	10	303	303	1,015	1,018	435	445	1,450	1,463	42,048,100	45,048,300	3,000,200	41,805,087	35,49[illegible]	*6,306,569	[illegible]	80,546,818	[illegible]
[illegible]	14	12	560	560	1,990	1,890	185	180	2,175	2,070	26,808,050	25,712,050	*1,096,000	72,950,000	58,00[illegible]	*14,945,000	99,758,050	[illegible]	[illegible]
[illegible]	48	51	1,285	1,320	2,825	2,745	365	225	3,190	2,970	105,549,980	96,177,230	[illegible]	[illegible]	[illegible]	*14,659,900	[illegible]	[illegible]	[illegible]
[illegible]	168	155	4,720	4,750	13,700	14,450	4,290	4,050	17,990	18,500	495,714,675	475,964,240	*19,750,435	455,428,450	[illegible]	[illegible]	951,143,125	999,969,547	[illegible]
[illegible]	170	175	4,210	4,215	8,475	8,270	1,150	1,100	9,625	9,370	302,411,687	314,016,360	11,604,673	212,148,231	[illegible]	10,490,225	[illegible]	[illegible]	[illegible]
[illegible]	24	23	470	470	670	670	210	210	880	880	32,766,600	28,136,650	*4,629,950	34,861,100	31,191,100	*3,670,000	67,627,700	[illegible]	[illegible]
[illegible]	24	22	350	315	435	480	35	40	470	520	14,217,900	15,122,700	904,800	12,010,000	12,811,500	[illegible]	26,227,900	27,934,200	[illegible]
Total	460	452	12,063	12,098	29,265	29,678	6,686	6,266	35,951	35,944	1,023,866,992	1,004,527,530	*19,339,462	950,390,368	991,872,481	41,482,113	1,974,257,360	1,996,400,011	[illegible]
Central States																			
[illegible]	65	79	3,015	3,034	5,100	5,550	2,260	2,290	7,360	7,840	172,956,500	189,501,960	16,545,460	197,346,840	223,81[illegible]	26,467,017	370,303,340	413,315,817	[illegible]
Indiana	53	50	2,320	2,328	2,000	1,990	440	458	2,440	2,448	102,297,260	102,310,280	13,020	75,793,750	82,479,050	6,685,300	178,091,010	184,789,330	6,698,320
[illegible]	30	29	760	765	860	870	130	135	990	1,005	36,588,200	36,248,300	*339,900	24,904,500	29,402,000	4,497,500	61,492,700	65,650,300	[illegible]
Kentucky	13	12	380	460	625	800	300	305	925	1,105	23,620,900	26,542,400	2,921,500	19,731,000	23,51[illegible]	3,786,000	43,351,900	50,059,400	[illegible]
Michigan	28	26	1,355	1,445	1,915	1,935	500	505	2,415	2,440	42,666,800	39,984,500	*2,682,300	57,230,000	56,048,[illegible]	*1,182,000	99,896,800	96,032,500	[illegible]
Minnesota	10	10	560	560	790	850	50	45	840	895	32,912,000	31,517,000	*1,395,000	23,488,000	23,098,000	*360,000	56,370,000	54,615,000	[illegible]
Missouri	27	27	1,088	1,090	2,320	2,260	390	300	2,710	2,560	87,975,700	88,889,500	913,800	99,189,000	96,936,000	*2,253,000	187,164,700	185,825,500	[illegible]
Ohio	105	100	4,455	4,245	5,100	5,135	620	645	5,720	5,780	234,240,973	224,443,998	*9,796,975	134,868,000	133,27[illegible]	*1,590,460	369,108,973	357,721,538	[illegible]
Wisconsin	23	25	790	790	835	800	115	116	950	916	38,477,000	31,797,000	*6,680,000	44,897,400	45,781,[illegible]	884,500	83,374,400	77,578,900	[illegible]
Total	354	358	14,723	14,717	19,545	20,190	4,805	4,790	24,350	24,989	771,735,333	771,234,938	*500,395	677,418,490	714,353,547	36,934,857	1,449,153,823	1,485,588,285	[illegible]
Southern States																			
Alabama	11	11	302	302	410	412	190	192	600	604	15,475,000	15,005,000	*470,000	14,784,000	15,468,000	684,000	30,259,000	30,473,000	[illegible]
Arkansas	9	8	132	100	193	217	35	35	228	252	5,491,800	4,451,800	*1,040,000	4,508,000	4,663,[illegible]	65,000	10,089,800	9,114,800	[illegible]
Florida	10	11	150	153	175	178	60	45	235	223	5,074,000	5,132,000	58,000	3,097,000	3,388,500	291,500	8,171,000	8,520,500	[illegible]
Georgia	13	18	395	430	570	573	105	142	675	715	24,378,294	26,790,094	2,411,800	21,857,500	23,775,000	1,917,500	46,235,794	50,565,094	[illegible]
Louisiana	8	8	250	254	640	635	60	62	700	697	53,395,900	55,768,300	2,372,400	31,501,000	34,435,808	2,934,808	84,896,900	90,204,108	[illegible]
Mississippi	10	10	96	100	155	160	20	18	175	178	3,421,370	3,333,370	*88,000	3,996,500	4,38[illegible]	385,500	7,417,870	7,715,370	[illegible]
North Carolina	14	14	150	150	185	222	40	51	225	273	6,842,000	6,622,500	*219,500	5,471,000	5,48[illegible]	*33,000	12,313,000	12,060,500	[illegible]
South Carolina	7	7	140	140	160	160	30	25	190	185	4,369,280	4,369,280		5,420,000	5,330,[illegible]	*90,000	9,789,280	9,699,280	[illegible]
Tennessee	11	11	360	360	680	685	65	70	745	755	19,346,600	25,949,900	6,603,300	22,809,000	23,008,000	199,000	42,155,600	48,957,900	[illegible]
Total	93	98	1,975	1,989	3,168	3,242	605	640	3,773	3,882	137,794,244	147,422,244	9,628,000	113,534,000	119,888,308	6,354,308	251,328,244	267,310,552	[illegible]
Western States																			
Arizona	4	5	37	42	30	33	7	6	37	39	860,000	760,000	*100,000	100,000	100,000		960,000	860,000	*100,000
California	53	55	2,530	2,537	2,579	2,629	1,330	1,620	3,909	4,249	162,435,400	168,458,100	6,022,700	97,963,000	111,936,200	13,973,200	260,398,400	280,394,300	[illegible]
Colorado	17	17	472	535	445	520	480	570	925	1,090	24,192,200	28,161,700	3,969,500	19,560,000	22,220,000	2,660,000	43,752,200	50,381,700	[illegible]
Idaho	7	5	145	150	65	70	50	50	115	120	2,460,400	2,784,000	323,600	1,739,000	1,913,000	174,000	4,199,400	4,697,000	[illegible]
Kansas	17	17	295	295	235	260	95	90	330	350	8,751,000	7,493,295	*1,257,705	6,655,000	6,011,000	*644,000	15,406,000	13,504,295	[illegible]
Montana	6	7	81	107	117	118	20	25	137	143	2,759,615	2,979,615	220,000	1,650,000	1,660,000	10,000	4,409,615	4,639,615	[illegible]
Nebraska	10	8	240	235	460	465	60	50	520	515	14,587,400	12,631,000	*1,956,400	10,027,000	10,553,000	526,000	24,614,400	23,184,000	[illegible]
Nevada	2	2	11	11	10	10	2	2	12	12	1,100,000	1,042,000	*58,000	130,000	130,000		1,230,000	1,172,000	[illegible]
New Mexico	2	2	11	11	10	10	1	1	11	11	350,000	300,000	*50,000	350,000	350,000		700,000	650,000	[illegible]
North Dakota	3	3	18	18	45	45	5	5	50	50	360,000	314,980	*45,020	300,000	300,000		660,000	614,980	[illegible]
Oklahoma	15	15	215	215	140	180	30	50	170	230	5,604,000	6,848,800	1,244,800	2,721,000	4,013,500	1,292,500	8,325,000	10,862,300	[illegible]
Oregon	12	12	390	391	360	440	295	349	655	789	22,310,000	26,300,000	3,990,000	23,874,000	30,899,000	7,025,000	46,184,000	57,199,000	[illegible]
South Dakota	4	3	30	30	8	8	2	4	10	12	100,000	600,000	500,000	50,000	50,000		150,000	650,000	[illegible]
Texas	29	33	550	615	735	740	130	132	865	872	26,770,000	28,673,200	1,903,200	17,266,000	20,586,000	3,320,000	44,036,000	49,259,200	[illegible]
Utah	5	4	166	200	255	260	25	80	280	340	7,512,500	6,737,500	*775,000	8,585,000	5,921,000	*2,664,000	16,097,500	12,658,500	[illegible]
Washington	18	18	900	900	875	950	1,025	1,030	1,900	1,980	45,031,810	48,378,100	3,346,290	32,675,000	36,087,000	3,412,000	77,706,810	84,465,100	[illegible]
Wyoming	1	1	5	5	5	10	1	4	6	14	75,000	75,000					75,000	75,000	
Total	205	207	6,096	6,297	6,374	6,748	3,558	4,068	9,932	10,816	325,259,325	342,537,290	17,277,965	223,645,000	252,729,700	29,084,700	548,904,325	595,266,990	[illegible]
United States	1,252	1,253	40,247	40,490	70,652	72,366	18,564	18,787	89,216	91,153	2,441,892,057	2,427,935,397	*13,956,660	2,112,244,086	2,224,800,236	112,356,150	4,554,136,143	4,652,735,633	[illegible]
Hawaii, Porto Rico and Philippine Islands & West Indies	11	11	185	175	240	260	140	140	380	400	12,061,000	11,950,000	*111,000	13,953,500	13,541,000	*412,500	26,014,500	25,491,000	*523,500
Canada and Newfoundland	52	55	1,250	1,252	2,800	2,860	255	420	3,055	3,280	62,585,662	60,118,610	*2,467,052	41,851,412	46,276,887	4,425,475	104,437,074	106,395,497	1,958,423
Mexico	4	4	140	140	326	328	329	376	703	704	22,862,500	23,362,500	500,000	17,923,181	19,227,731	1,304,550	40,785,681	42,590,231	1,804,550

*Decrease

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, SEPTEMBER 3, 1910 No. 10

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 3, 1910.

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Western Attendance at the Convention

The time-table of the convention train from St. Louis was published last week, and the arrangements made for the special train from Chicago are printed in this week's issue, both in ample time for those who are planning to travel on these trains to engage their reservations. It will be a great convenience to the transportation committees if this is done soon, so that the accommodations required will be known. There is no doubt that the attendance at the convention this year from the East and the Central States will be larger than ever before, and it is hoped that the Far-Western members will be present in such numbers as will make a record for an Eastern convention. Last year, for the first time in its history, the association held a convention west of Kansas City, yet the attendance of the Eastern members was very large. It is due these gentlemen that the Far-Western members attend the Atlantic City convention in an equally representative way. Their contributions to the technical proceedings and discussions of the different associations last year were very valuable, and as equally important subjects are to be discussed this year their advice and suggestions are again greatly needed. We feel it our duty to make to them the same recommendations which we did to the Eastern companies last year, to secure their convention reservations early, so as to be sure and be on hand.

Opening of the Pennsylvania Station in New York

On Sept. 8, the new Pennsylvania terminal station in New York will be opened for regular traffic by electric trains of the Long Island Railroad. The engineering feats accomplished in driving the tunnels under Manhattan Island and the two rivers which flank it on either side and in rearing the monumental terminal station building have overshadowed in the public eye the electrical problems connected with the equipment of the tunnels for train operation. But if the art of heavy electric traction had not reached its present development the enterprise would be doomed to failure from the start. The electrical apparatus installed represents for the most part adherence to well-tried principles. A new and powerful type of side-rod locomotive is to be used for hauling through trains, but the power generation and distribution systems do not differ in their essential details from other standard direct-current third-rail installations. Nothing has been left undone to insure safety and reliability of operation, which are of paramount importance on a high-speed underground road. The electric locomotive tests on the West Jersey & Sea Shore Railroad and the construction of an experimental overhead line on Long Island may be mentioned as typical of the thoroughness and expense with which the preliminary work was carried on before any final decision was made. As an example of terminal and suburban electric operation the Pennsylvania and Long Island suburban systems rank first among the electric railway undertakings so far completed.

Keeping Cars Clean

Hercules' assignment to cleanse the Augean stables was a trifling task compared with that of keeping the ordinary street car in absolutely clean and sanitary condition. The vast difficulty of securing this result is not appreciated by the public, which seems to expect that every car should be accompanied by a scavenger as third member of the crew. A case in point is afforded by the experience of a company which recently answered some complaints about the cleanliness of its rolling stock. It showed that the cars are cleaned and disinfected every night at a daily cost of 22 cents to 30 cents per car. In other words, the equivalent of about five fares is required every day merely to free the cars from filth. It is a hard job to keep even an ordinary sitting-room free from dust and odd papers. How much harder would it be to do so if such a room were visited every hour by 50 to 100 people of all classes from bricklayers to bankers, while the room itself was being moved through a dusty or muddy street with doors and windows open. Yet these are exactly the conditions to which a city electric railway car is exposed. Here is a direction in which the public can assist. No matter what care the company exercises the sanitation of public conveyances would be greatly bettered if the riders did not use the seats for foot-rests, the window sills for whittling blocks and the floors for cuspidors and waste-paper receptacles. To our knowledge at least one company has been obliged to prohibit the carrying of fish because of the offensive odors which permeated the cars despite the liberal use of disinfectants. If the cars are to remain reasonably free from malicious microbes after they leave the depot in the morning, it is essential that the passengers themselves should be considerate and cleanly during their riding hours.

Drawing Up Specifications

The average specifications for material are such formidable documents at best that great care should be exercised to make them as free as possible from unnecessary clauses. Most operating engineers are not personally familiar with all the conditions met in the manufacture of the material used by them and consequently when they extend their requirements beyond those of the performance of the material to include methods and processes of manufacture they run some danger of not securing the results sought. This is particularly the case when the clauses used to describe the manufacturing processes desired follow some form, honored because of its antiquity. It often happens that a specification drawn in this way will not apply to existing conditions of manufacture or will prove too exacting for material sold at standard prices. To avoid this it might be well to follow the example of one company which desired to draw up a series of standard specifications for overhead material. Before doing so, its engineers made inspection trips to the shops of all the prominent manufacturers where they familiarized themselves with the difficulties and extra expense inherent to making odd sizes and unusual shapes of line material items. In consequence, the final specifications were free from all freak designs and unreasonable requirements. Of course, small railways cannot afford to send their representatives on trips of this kind but this should not deter them from seeking expert help in other ways so long as no standard association specifications are available for their conditions. Probably the most satisfactory method would be to consult some testing laboratory which could first assist in drawing up the proper forms and later could undertake to see that all the terms of the specification were fulfilled. As a general rule, a specification ought to contain little about details of the manufacturing processes, but rather should be devoted to specifying clearly for what class of service the material will be used. Nothing is gained by inserting inspection and penalty clauses unless arrangements have been made to test the goods before shipment.

THE AMERICAN TOURIST ABROAD

The number of Americans who spend their summer holiday traveling on the continent of Europe is constantly on the increase and it seems impossible to build enough large and fast transatlantic steamers to carry them. Statistics show that those who have crossed the Atlantic this season, most of them, like John Gilpin, "on pleasure bent," are more numerous than ever before, and at this time of the year it is almost impossible to secure passage home unless it has been engaged several months in advance. The subject of transatlantic travel is pertinent in this place because many of the home-coming tourists, upon their return, will undoubtedly discourse on how much better things are done in Europe, and, among other directions, how superior in its appointments is the average city electric railway system there to that in their own city. Indeed, one article on this subject has already appeared in our esteemed contemporary, *Engineering News*.

We agree with the writer of this article that some of the electric railway methods on the continent of Europe are extremely commendable and might be introduced to advantage in this country. The most conspicuous of these is the distinct marking of stopping places for city cars. In America, the variety of the practices as regards stopping on the near and the far side of the crossing is confusing to strangers. Moreover, when cars stop at every cross street at which passengers wish to mount or dismount, as is practically the universal rule in this country, more frequent stops are made than are necessary. If stopping signs were used they could be so spaced that cars would have to stop only at every other corner on short blocks. This, in New York, would mean that the cars would still stop every 400 ft., whereas in Berlin the stopping signs are an average of 750 ft. apart, and last year the company petitioned to have them spaced 900 ft. apart. Of course, there is a question as to whether the American public could be educated to accepting this longer run between stops, but if this were possible it would increase materially the schedule speed of the cars without increasing the maximum speed. Another European practice which could be introduced in this country to advantage is the erection of artistic shelters at busy junctions for the use of waiting passengers.

There are still other features connected with electric railway operations abroad which impress the American tourist as being attractive and commendable, but which are not so susceptible of being transplanted. Among them are the military appearance and deportment of the employees, which is the result, not only of actual service of each man in the army from one to three years, but undoubtedly is an inherited trait, the effect of centuries of military discipline. This training and obedience to the law and regulations are shown not only in the conduct of the trainmen but of the passengers themselves who are liable to prompt arrest and fine or imprisonment if they violate such

regulations of the company and of the municipality as that of getting on or off a car while in motion. All of these customs, especially so far as they govern other people, appeal to the American who is not accustomed to have his life and actions minutely regulated by law. Each system of government has its advantages but we doubt whether most of the Americans to whom these rules appeal during a superficial acquaintance with them would be content to have their own actions regulated by these laws for any great length of time.

All of these points appeal to our countryman in Europe, and he is apt to confuse these and perhaps other real points of merit in foreign operating practice with others which are actually disadvantageous, and from which the foreign company would be glad to escape if it could. Among the latter is the short car and train of short cars. This is one point upon which the correspondent in our contemporary waxes very enthusiastic, partly because, as he says, such cars are very easy on the track compared with the heavy, huge cars now run in American cities, and partly because they permit the management readily to provide for variations in traffic by adding to or dropping off cars. But the facts are that the short narrow car is a practical necessity in many cities abroad on account of the narrowness of the streets and the sharp curves, and trains of short cars have to be used to secure rush-hour capacity, and sometimes a separation of class. But in the suburbs of large European cities and on certain routes where the width of the streets permits them, numerous long double-truck cars are operated, many of them as long as those on most American city systems.

Of course, there can be but little question as to the relative merits from an operating standpoint of the double-truck car of, say, 36 ft. over the corner posts, and a train of two single-truck cars, each of half that length, as used in many European cities. The slower acceleration and the far greater liability to accident of the latter would be sufficient to condemn it for city service if there was any alternative, as many companies here know. As for double-deck cars they are hardly ever seen in Europe outside of the United Kingdom. They seem to be popular there and fairly well suited to the climate, although even there there is a tendency to enclose the upper decks in winter. But they are slow in loading and unloading, are hard on the track and would be unsuited to the extreme variations in temperature and climate found in America.

The low fares charged on the zone system for short rides abroad as compared with the uniform fare in America are also likely to be a cause of invidious comment on the part of the returning traveler. The latter usually has had occasion to ride on European tramways for short distances only in going from his hotel to points of interest within the city, like the art galleries and cathedrals. For short trips of this kind the zone system of fare collection provides a very cheap method of traveling, because the passenger always pays the minimum fare. But we believe that the average charge per passenger mile in any of the large cities in America, if it could be determined, would not be much, if any, greater than the average fare per passenger mile on lines in cities of equal size in Europe, with the possible exceptions of Berlin and Hamburg where straight fares are in force. Thus an article in a recent issue of this paper showed that while the fare on the New York subway is slightly less than double the average fare on the Paris subway, the average length of ride per passenger was from 2 to 2½ times that in Paris.

A NEW CLASS OF LITIGATION

The pay-as-you-enter car, like any other radical change in an industry, is bound to create new questions of law as well as of engineering and operation. Of course, fare boxes themselves are very old devices, and the right of a railway company to compel passengers to deposit their fares in such a box instead of handing them to the conductor was established long ago—certainly in most States, but the inconvenience to which a passenger can be put in the enforcement of this rule has not been so clearly defined by the courts. Possibly as extreme a case as ever came before the Supreme Court of New York State was tried two or three months ago in the suit of Elder against the International Railway Company. Here the plaintiff transferred from one Buffalo car to another, and as the latter was a pay-as-you-enter car he handed his transfer to the conductor, according to the rules of the company, entered the car and took a seat. Shortly after he had done so the conductor entered the car and told him that the transfer could not be accepted for transportation because it had not been presented at the proper transfer point. Some argument followed, but the conductor adhered to his position and told the plaintiff he would have to pay a fare. The latter thereupon offered to do so, but the conductor stated to him that he would have to go back to the platform and deposit the nickel in the fare box because the rule of the company forbade conductors handling fares. The plaintiff became incensed at this, and while willing to pay an additional fare, refused to walk back and put it into the box. Whereupon the conductor, without unnecessary violence, put the plaintiff off the car.

Mr. Elder brought action in the City Court, alleging an unlawful assault, and secured a verdict of $50 with costs, whereupon the company appealed to the Supreme Court. The latter considered the case very carefully and said that as a general rule the requirement that passengers should deposit the fares in the box on entering the car was a reasonable one. The court admitted that exceptional circumstances might arise which would make the strict enforcement of the rule vexatious, but hardly thought it incumbent on the company to provide for all the possible exceptions which would justify a departure from the rule. It said that the conductor should be given a reasonable time to examine a transfer and see if it was good for passage. The time taken in this case was not unreasonable. It then became the passenger's duty to pay his fare and to comply with the reasonable rule of the company as to its mode of payment. The court consequently decided in favor of the company and reversed the judgment of the lower court, but, in view of the extenuating circumstances, did not reverse the costs.

The decision of the court in regard to the legality of the ejectment admits, of course, of no question but it is a little difficult to understand the reference to the extenuating circumstances. The passenger broke two rules of the company: he presented a defective transfer and he refused to deposit his fare in the fare box. Either one would warrant ejectment if not remedied, but after his attention had been called to his illegal conduct he offered to comply with one of the rules but not the other, and as the rule with which he would not comply was legally a perfectly reasonable one the company was warranted in compelling him to leave the car. This phase of the decision, however, is a small one compared with the establishment in the clearest possible language by the court that a railway company has the right to eject both for the presenta-

tion of a transfer at a point which is not the transfer point and for the refusal of a passenger to place his fare in the fare box, and also that the conductor is allowed a reasonable time to examine a transfer on a pay-as-you-enter car even after the passenger takes his seat to see whether the passenger has the right to ride on the car.

THE UNION ISSUE IN COLUMBUS

One issue stands forth clearly as the principal stake in the strike at Columbus. From the beginning of the difficulties between the Columbus Railway & Light Company and its employees the chief underlying point at controversy has been the recognition of the union organized recently among the men. Allied with this point is the retention of men whose services are not desired by the company, but for whose continued employment the union struggles.

Since the question of whether or not a union shall exist, and its relative advantages or disadvantages to the employees and the company, is one that concerns the public in Columbus, as well as in other cities, the position of street railways on this topic should be considered to reveal in what vital respects, if any, it differs from that of other large employers of labor.

Such consideration shows that the most conspicuous aspect of the duties of street railway trainmen is, first, their responsibility to the company and also the public for lives of passengers and others, and, second, their responsibility to the company for the proper collection and return of the revenues from traffic. No other public utility, and certainly no class of private business, is so burdened with heavy responsibility and danger from these sources as the street railway. By careless operation of cars and wilful or inadvertent disobedience of orders, trainmen may destroy lives and property, inflicting irreparable harm upon both the public and the company. Apart from the direct effect of accident upon the public, which desires and is entitled to safety of operation, the financial effect upon the company is a matter for serious thought. A single accident, involving fearful casualties and resultant heavy suits for damages, has led many a company into bankruptcy. With the considerations that have to do with safety the public admits its concern. It does not appear, however, to be so greatly concerned with the protection of the revenues of the company. These will be safeguarded as the honesty of conductors is maintained.

Where companies are entirely dependent upon traffic revenues in order to pay not merely dividends and the coupons of bonds but all the expenses of operation, the necessity for the employment of trustworthy men, so far as they can be secured, is plain. The management is obliged to take all the steps that lie within its power to keep the ranks of employees filled with men who shall serve it wisely and well, protecting the lives and limbs of the public and returning to the company the revenue to which its service entitles it.

How best to accomplish these ends is admittedly a problem. Does the union contribute better than individual initiative toward these undoubtedly proper aims of the management, or does it use its influence in preventing the administration of just discipline and in protecting men who deserve nothing but elimination from the ranks? If its strength is manifested in the cultivation of greater efficiency, the development of greater loyalty and of more permanence of service, it can accomplish some satisfactory results.

As a fair proposition it may be admitted that organization among employees has protected men from imposition in some cases. But the instances where organization has been followed, whether with or without the sanction of the union need not be argued here, by unlawful attacks upon life and property if an employer failed to meet the conditions demanded, are measurably greater in number and in degree of violation of moral ethics and statutes. If the union is to meet the corporation on equal terms it should be financially responsible and its contracts should be enforceable, but if no financial responsibility is possible for the union, its pledge or the word of its responsible officers should be kept.

While these are general considerations they are pertinent because of the distinctness with which the union issue in Columbus stands forth. The general manager of the company against which the strike has been directed has been pilloried in the newspapers as a hater of unions, although the papers and not the men may be justly chargeable with this attempt to arouse the prejudices of sympathisers with organized labor against the company. The class feeling which this and kindred attacks have aroused has undoubtedly contributed to the spread of the disorder which has disgraced the city of Columbus.

Easily and rightly separable from the questions at issue between the company and its employees is the question of operation of the cars. If there are merits to the claims of the employees, the company should be free to accept or reject the terms on which the men will return to work, just as the men are free to accept or reject the terms on which they are offered employment. In the meanwhile the company should make every effort to operate its cars with safety, speed and regularity. Whatever scale of wages may be fixed by the company the men are free to decline. But if the company does not care to pay the wages asked by the men, it should be free to fill the rejected places with other men who are glad to have the opportunity for steady employment thus offered.

It is clearly in the interest of the company to retain men trained in the service. But it is likewise in its interest to have a force of men upon whom discipline may be visited if breaches of conduct occur that hamper the success of the property. Conditions of labor and likewise wages have improved steadily in the street railway industry during a period when all costs of materials have advanced and the unit of passenger revenue has gone down. The question of whether the union shall exist or shall be abandoned together with its necessary expenses of maintenance, is of less importance to the company and the employees than the successful development and protection of the property in order that fair conditions of employment may be created and the public be made to meet the reasonable cost.

From one point of view, the separate interests of the main body of employees, of the public, of the security-holders and of the management are far apart and as hostile in tone as are the conflicting interests in any other business transaction—where each interest strives to protect its own. But from the broad point of view of the real welfare of each one of the interests enumerated, the wisest policy, the most profitable in the ultimate results is a cooperation which abandons minor differences for the major gain that accrues to the majority from such continued operation of the property as renders service where service is desired and wages or other remuneration where they are earned. The strike is not a means to this end.

REPORT OF THE ILLINOIS TRACTION SYSTEM

By the publication in pamphlet form of the sixth annual report of the management to the board of directors of the Illinois Traction Company information which emphasizes the extent of the system and the diversity of its operations is made available.

A list of 26 principal component properties of the system is followed by a résumé of the public utility services rendered in various communities, which shows that, exclusive of the interurban transportation facilities by which the company is known most widely outside of the section of the country in which it operates, electric lighting and power are furnished in 12 communities, street railway services in 10, gas in 5 and heating in 5.

From the variety of business and the distribution of territory served which these few figures show, it will be appreciated that diversity of the sources of gross earnings is a marked characteristic of the report. It will be instructive to see the proportion of the total gross which was contributed by each of the various sources of revenue during the year 1909. The figures are as follows: Interurban, $1,980,779, or 41.7 per cent; local street railway, $1,371,119, or 28.8 per cent; gas, $293,072, or 6.2 per cent; electric light and power, $961,115, or 20.2 per cent; steam heating, $138,486, or 2.9 per cent; miscellaneous, $7,511, or 0.2 per cent; total, $4,752,082, or 100 per cent. It is thus shown that interurban lines constitute the most important single source of earnings of the system and that the railway lines as a whole furnish over 70 per cent of the total gross revenue reported. In the previous year, 1908, the proportion was practically the same for the interurban lines, being $1,847,381, or 41.8 per cent of the total, but some variations from the 1909 figures are shown in the other departments. The 1908 figures, in addition to those just stated for the interurban lines, were as follows: Local street railway, $1,283,892, or 29.1 per cent; gas, $277,085, or 6.3 per cent; electric light and power, $872,394, or 19.8 per cent; steam heating, $134,286, or 3 per cent. The 1908 total, including $14 of miscellaneous revenue, was $4,415,052. To carry the comparison back one year earlier the corresponding figures for 1907 may be given, as follows: Interurban, $1,610,257, or 39.7 per cent of gross; local street railway, $1,226,591, or 30.2 per cent; gas, $259,572, or 6.4 per cent; electric light and power, $819,427, or 20.2 per cent; steam heating, $127,453, or 3.2 per cent; miscellaneous, $13,282, or 0.3 per cent; total, $4,056,582, or 100 per cent. By comparison of the figures for the railway operations in 1907 and 1909 the tendency of the interurban lines to develop more rapidly than the street railways is revealed. As a matter of fact, earnings of the interurban lines increased 23 per cent in the two years as compared with a gain of 12 per cent by the street railways in the same period.

A charge for depreciation, made in the report for 1909, indicates a recognition by the management of this large system of the importance of this element in the cost of operation. There was appropriated for depreciation the sum of $200,000. This is equal to 4.2 per cent of the total gross earnings for the year. As, unfortunately, the general operating expense accounts are not published in the report, the ratio which this appropriation for the upkeep of the property bears to current expenditures for maintenance cannot be shown. The operating ratio as stated in the report is 57.85 per cent. In the computation of this ratio, however, taxes of $120,876, and an item of $43,150 for "general and overhead expenses," were added to the amount of $2,585,043 specified as "operating expenses." If the latter item alone is used in the computation the operating ratio is 54.4 per cent. It is interesting to show that the 4.2 per cent of gross allowed for depreciation, when added to the 57.85 per cent considered as the total operating ratio, makes an aggregate of 62.05 per cent as representing both elements of cost. The depreciation allowance, added to the 54.4 per cent which represents operating expense minus taxes and the other charge of $43,150, makes a total of 58.6 per cent of gross. These ratios compare with 58.4 per cent, the average shown by 76 companies with gross earnings each of $1,000,000 or over in reports for the 1907 census of street and electric railways. In the same census report 26 companies were shown as having made depreciation deductions aggregating $2,397,250. Undoubtedly the next census will show notable additions both to the number of companies and the total deduction for depreciation.

It is to be hoped that the management of the Illinois Traction Company will continue to take the public into its confidence in the future as fully as it has done in this report through its presentation of financial results and its publication of the interesting review of the progress of the year, which is signed by H. E. Chubbuck, the general manager, and is published elsewhere in this issue.

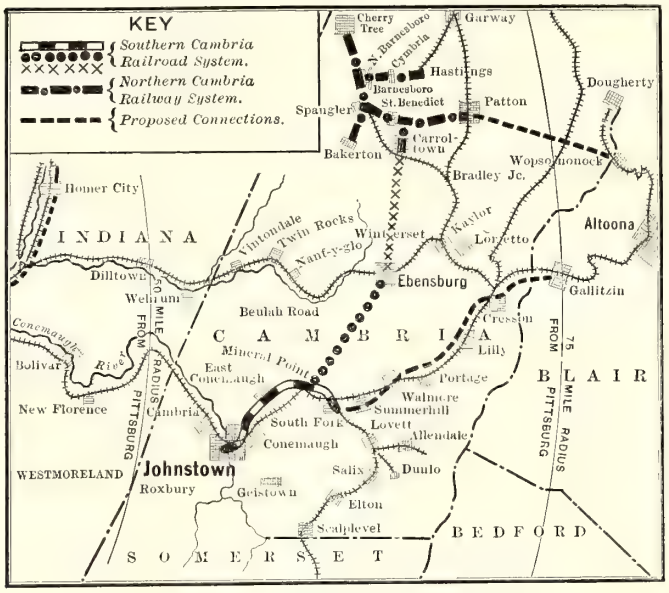
POWER CONTRACTS FOR ELECTRIC RAILWAYS

The extension of high-tension power transmission systems into electric railway territory brings the question of power contracts into prominence when an investigation of the economics of any given case shows that it may be desirable to purchase current from the incoming organization. Co-operation between the legal and engineering departments is here most important. The technical problem is obviously based upon a reliable service of sufficient volume to meet the transportation requirements within a specified area. The power company usually has its own contract forms, but in the case of a large customer like an electric railway it is often necessary to draw up a special form of contract on account of the peculiar conditions to be met in the supply of electricity. This can be done without interfering with the application of standard rates by the power company if the contract points are carefully looked after, even though the agreement may represent a departure from the usual forms of expression.

To insure satisfactory relations and to avoid future disagreements a typical contract will take account of such questions as the maximum, minimum and average loads to be supplied; the hours of service; points of delivery; limits of responsibility for equipment; methods of metering and billing; the rates for a given service; provision for cutting down the demand or the securing of additional power; consequences of non-payment and non-supply; right to check apparatus for current measurement; responsibility for maintenance, accidents, division of labor expenses, ownership of machinery and arbitration in case of a dispute. The detailed provisions that will be applicable to different cases will, of course, vary widely. In some instances a much simpler form of contract may be successful; but it is well not to overlook the fact that the tendency is toward the supply of power on a large scale by great systems, which renders greater care in covering all contingencies more expedient than when the transaction is merely a local matter.

SOUTHERN CAMBRIA 1200-VOLT D. C. RAILWAY

The Southern Cambria Railway in Western Pennsylvania is another interesting example of the simplicity to be secured by using a 1200-volt. d. c. trolley on an interurban road. The line is now completed and in operation between Johnstown and South Fork, situated 11 miles apart. The power house and



Southern Cambria Railway—Map

car barns are located near Mineral Point, which is 7.12 miles from Johnstown and 3.88 miles from South Fork. There are no substations, no transmission line, and no extra feeders aside from the double No. 0000 trolley, as the whole system is fed straight from the power house. It is anticipated that the road will soon be constructed and open for traffic between Mineral Point and Ebensburg, when another generating unit will be added to the power house. The distance from Mineral Point to Ebensburg is 11.8 miles. A future extension of 9½ miles, connecting Carroltown and Ebensburg, is planned. This will connect the Northern and Southern Cambria systems, which are largely owned by the same interests. The accompanying map shows the district served.

The proposed method of supplying power for this future extension is of special interest. A 500-kw low-pressure Curtis turbine and condenser will be installed in the Mineral Point power house to use the exhaust steam from the present unit and that to be installed for operating the Mineral Point and Ebensburg section. In all probability a transmission line will be built from Mineral Point to the present power house of the Northern Cambria system at St. Benedict. A substation will then be supplied with power from Mineral Point, as coal can be taken from the company's mines at the latter place for 45 cents per ton cheaper than it can be purchased at St. Benedict.

It is a point of general interest to record that a portion of the Southern Cambria Railway now in operation follows the course of the Conemaugh River from South Fork to Johnstown, as it was the breaking of the dam at South Fork that caused the terrible flood at Johnstown, 21 years ago. The road is built on the hillsides and follows their contour, winding in and out and assuming much the same form as the river which in some places is 200 ft. below the tracks. The route in summer time should be of more than ordinary beauty and should for this reason attract many pleasure seekers; at the same time it connects the busiest commercial centers in that portion of Pennsylvania.

ROLLING STOCK

At present the rolling stock consists of four cars, two straight passenger cars and two combination passenger and baggage cars. The electrical equipment of all four cars is identical and was manufactured and supplied by the General Electric Company. The car bodies were supplied by the Niles Car & Manufacturing Company. Each car is equipped with four motors of the GE-205 type, which are commutating pole units of 75 hp each, designed for full speed operation on both 600 volts and 1200 volts. For 1200-volt operation the standard practice of operating two motors in series is followed. In general design and construction these motors are similar to the maker's standard line of 600-volt railway motors except that they are insulated for 1200 volts.

The control is of the type M relay automatic design and is similar in general to that used on a standard 600-volt equipment. The control and power circuits are electrically separate. A commutating switch is provided in the power circuit for commutating the motors and rheostat connections when the car passes from a 600-volt to a 1200-volt section and vice-versa.



Southern Cambria Railway—Overhead Construction on City Streets



Southern Cambria Railway—Construction Through Cut on Right of Way

This switch can be operated either pneumatically or by hand, the master controller being mechanically interlocked with the air valve, which so operates the commutating switch that the controller must be in the "off" position before the switch can be thrown. A separate cut-out switch is provided to cut out a pair of motors, if necessary.

The control circuits are taken care of on the 1200-volt sections by a dynamotor which provides 600-volt current for operating the control, lighting and air compressor circuits. A selector relay is used to transfer these circuits from the 600-volt

tap of the dynamotor to the trolley when the car passes to a 600-volt section, so in all cases these circuits are operated at 600 volts. The dynamotor is underneath the car. All the control apparatus, such as the contactors, switches, etc, is standard 600-volt apparatus, provided with extra insulation. The air brakes are also of the standard General Electric 600-volt design; they are of the straight air type with CP-22, 24-ft. compressors. All of the apparatus is carried under the car on steel supports made to templates so that installation is greatly simplified.

The straight passenger car illustrated is of handsome appearance and is exceptionally well lighted as shown by the interior view. All the cars are double-ended and equipped for train operation. The general dimensions, weight, etc., are given below:

Length over all	48 ft. 0 in.
Length over vestibules	46 ft. 8½ in.
Length over end plates	37 ft. 1⅛ in.
Width over all	8 ft. 10 in.
Height over body	9 ft. 5 in.
Seating capacity	50
Weight of car body	27,000 lb.
Total weight	64,500 lb.
Trucks: (All are motor trucks)	
Distance between centers	25 ft. 6 in.
Wheel base of trucks	6 ft. 6 in.
Diameter of wheels	34 in.
Type of truck	Baldwin 28-25
Weight of truck	8500 lb.

It is interesting to note that designs for side entrance cars are being prepared for future rolling stock.

POWER

The power station and car house are situated near Mineral Point only a short distance from the Conemaugh River. Both buildings are constructed of Mahoning sandstone taken from the nearby hillsides. The power house is 94 ft. 6 in. long and 92 ft. wide. The engine room measures 92 ft. x 42 ft. and the boiler room 92 ft. x 52 ft. 6 in. The height below the roof girders of the power house is 16 ft. 6 in. and that of the boiler room 24 ft. 6 in. This building is laid out for three units, only one of which is now installed. The additions will be one unit similar to that already in use and a 500-kw, low-pressure Curtis turbine and condenser. The latter unit is to use the exhaust steam from the two reciprocating engines.

The present steam-using equipment consists of one Filer & Stowell non-condensing, cross-compound, 900-hp, horizontal reciprocating steam engine with Corliss valve gear with centrifugal governors and cylinders 22 in. x 38 in. x 36 in. stroke. This engine is direct-connected to two General Electric eight-pole, 300-kw, d.c., commutating-pole, 600-volt railway generators. The speed of the set is 120 r.p.m. The two electrical machines are connected in series to give 1200 volts.

The switchboard consists of but one generator, two feeder panels, with a negative equalizer panel besides a swinging bracket for the voltmeter. The generator and feeder panels are all of the same dimensions. There is only one generator panel for the two machines, and both the circuit breakers and knife switches are provided with remote control. The ammeters have insulating covers.

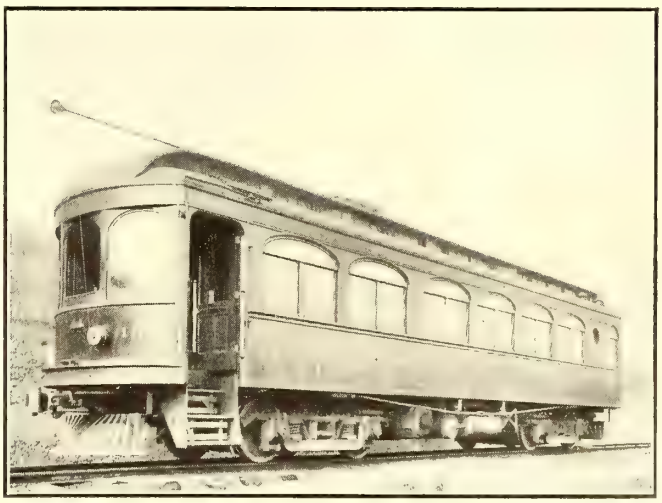


Southern Cambria Railway—Interior of Standard Car Showing Seating and Lighting

The equipment of the boiler house now consists of two B. & W. water tube boilers, each of 302 hp capacity. They are provided with Perfection shaking grates, but have no mechanical stokers or superheaters. The auxiliary apparatus consists of two feed pumps and a feed water heater. The pumps were made by the Scranton Feed Pump Company and are of the duplex type with cylinders 10 in. x 6 in. x 12 in. stroke and a capacity of 130 gal. per minute. The feed water heaters are of 1500 hp capacity and were manufactured by the Pittsburg Feed Water Heater Company. Coal is brought directly into the boiler room on an elevated track and dumped in front of the boilers. The coal is obtained from a mine adjacent to the power house.



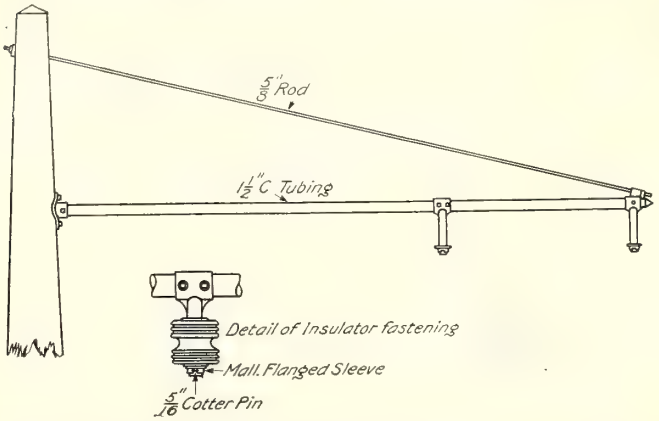
Southern Cambria Railway—Viaduct at Johnstown, Pa.



Southern Cambria Railway—Standard Interurban Car

OVERHEAD CONSTRUCTION

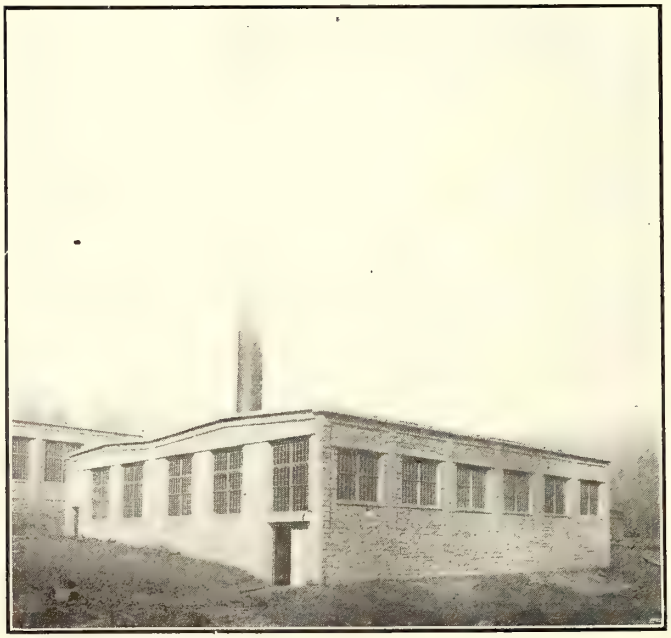
The overhead system is very simple as there are no transmission lines or extra feeders. It consists of two No. 0000 grooved trolley wires spaced 6 in. apart. Single bracket construction is used on private right of way and span construction in towns and cities. A general view of the bracket construction is presented and also drawings of the bracket, the insulators and the twin hangers employed. The distance between the in-



Southern Cambria Railway—Bracket for 1200-Volt Trolley and Detail of Insulator

sulator pins is not fixed in this design but can be altered as desired. The insulators are not cemented to the pins but are held by a washer and cotter which greatly facilitate their renewal when necessary. Another view shows the special bracket construction used on the long viaduct at Johnstown, Pa.

The pole spacing on private right-of-way is normally 90 ft., but as pull-offs, push-offs and guys have been avoided, the spacing varies at curves and where the conditions demand closer spacing to bring the trolley wires centrally over the track. The distance from trolley to track is 19 ft., while the total length of pole varies from 30 ft. to 35 ft. The longer poles are employed where there is a probability of transmission lines being



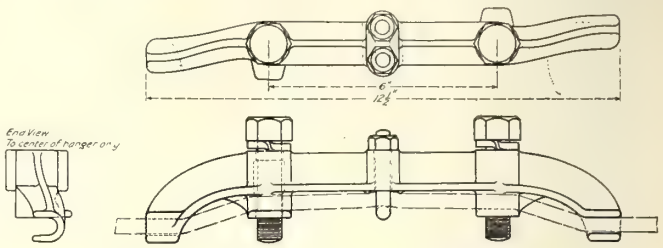
Southern Cambria Railway—Power Station

strung later. The poles are chestnut and are buried to a depth of 6 ft. in the ground.

For city work steel poles are used. The details of the pole strain porcelain insulators are shown in one of the accompanying cuts. The line strain insulators are built up of two 14-in. hickory wood insulators with malleable iron terminals, and with a double trolley hanger between. The span view construction also shows the type of dead section used; in this particular instance a 600-volt city line crosses the 1200-volt line, and there are two dead sections with a 600-volt section between. A lead-covered cable is used as a jumper and a knife switch is provided in the jumper cable.

TRACK

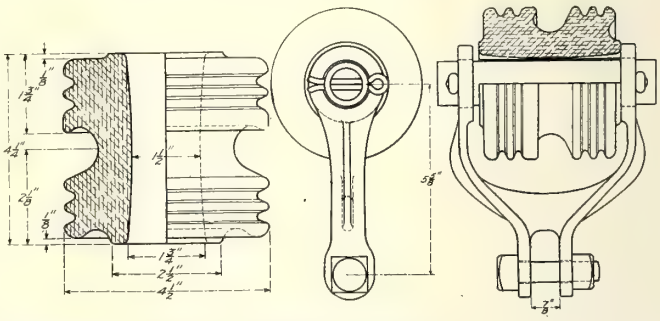
Owing to the nature of the country the grades and curves are very severe and numerous. The roadbed is well ballasted with granulated blast furnace slag and it is probable that a surface



Southern Cambria Railway—Twin Hanger

of stone will be added later, but even under the worst conditions—when the frost had just gone out of the ground—the roadbed was in remarkably good condition. The line is of single track throughout, with turn-outs at crossing points, but all bridges and viaducts are built with provision for future double tracking.

The rails used in Johnstown are 87 lb. girder section for



Southern Cambria Railway—1200-Volt Line and Pole Strain Insulators.

straight track and 127 lb. for curves; in Conemaugh, 73 lb. for straight track and 108 lb. and 127 lb. for curves. On the private right-of-way, forming the larger part of the road, T-rails of 70 lb. A. S., C. E. standard section are used. The rail joints are six-hole joints. Three kinds of bonds are used—compressed terminal bonds for concealed work on girder rails, 2 miles of twin terminal bonds and 8-in. brazed bonds of No. 0000 on the remainder of the road. The ties are of white oak and chestnut and are of standard dimensions.

Some of the civil engineering features of the road are of great interest, such as the long viaduct at Johnstown, which crosses the river, railroad tracks and city streets. This viaduct is of steel and is 525 ft. in length with sufficient breadth to accommodate a double-track road. There is also another steel bridge spanning the Conemaugh at the entrance to South Fork, of equal length.

It is interesting to add that this is the third railway to adopt 1200-volt d.c. apparatus, on the advice of James Bryan as consulting engineer. The operation of the Indianapolis & Louisville and the Pittsburgh, Harmony, Butler & New Castle systems has fully justified his selection.

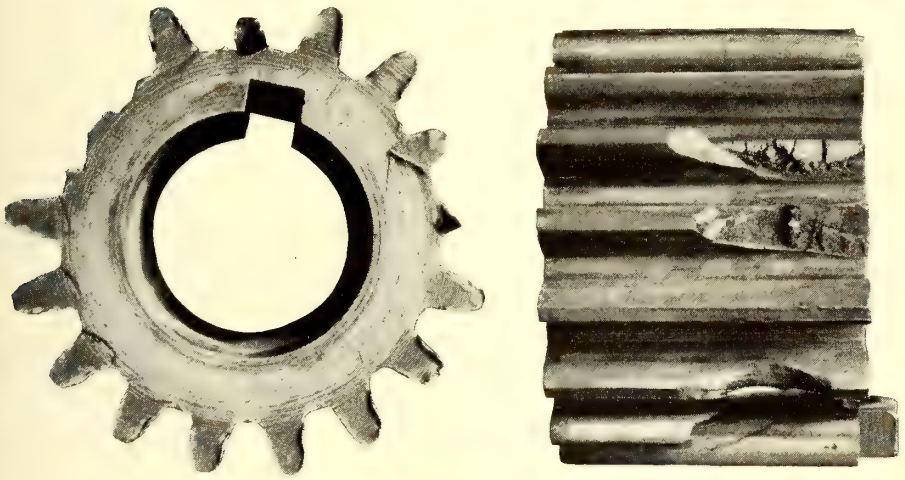
The Indiana Union Traction Company will begin at once to set all of its poles in cement. It is believed that poles set in this manner will last a great deal longer time than if set where moisture can get to them. After the cement is placed around the pole, the top of the cement will be covered with a pitch preparation to prevent moisture from entering the wood below the ground.

BREAKAGES OF RAILWAY MOTOR PINIONS

BY GEO. L. FOWLER

In a paper read before the American Society of Mechanical Engineers in December, 1908, Norman Litchfield, engineer car equipment, Interborough Rapid Transit Company, presented a statement of the character of service and record of breakages of motor gears and pinions of the New York subway cars and gave an analysis of the stresses to which they were subjected, basing the strength to resist fracture on the limit of elasticity of the metal rather than the ultimate strength. It appeared that the metal in the gears and pinions which had an elastic limit of 45,000 lb. per sq. in. had been subjected to stresses of 39,400 lb. per sq. in., and it was suggested that the elastic limit of the metal used in the gears should be raised to 90,000 lb. Another change suggested was to give the teeth a rounded contour longitudinally so as to bring the bearing at the center at all times regardless of the spring of the armature shaft or axle.

Shortly after this paper was read I was retained to investigate and report on a case of pinion breakage that, in general, appeared to be very similar to that described by Mr. Litchfield.



Pinion Failures—Fig. 1—Appearance of Tooth Fractures

As shown by the accompanying engraving, (Fig. 1) the teeth broke off on diagonal lines forming a V-shaped fracture beginning at the root of the teeth. At first glance it would seem that, as in the case of the subway, the metal was being overstrained, as the cracks which were formed corresponded with the line of maximum stress to which the teeth of the pinion are subjected. A further examination of the fractured surfaces showed that the breaks were, in no instance new and bright, but were invariably of a progressive character. The cracks started at the root of the tooth and worked gradually into the metal until the solid material remaining was insufficient to sustain the stress, when fracture occurred. This was shown by the smooth and worn condition of the surfaces. These surfaces differed, however, from the usual form of progressive fracture in homogeneous material in that they were filled with sharp ridges parallel to the line of fracture, and were not worn to that rolling smoothness that characterizes progressive breakage due to fatigue of the metal. With the experience of the Interborough Company in mind, the investigation was started with the expectation of finding that the metal had been overstrained. The first points to be settled were the actual strength and the chemical composition of the metal of the pinion. To determine this two tensile test pieces, each with 2 in. of length available for the test were cut from the pinion. One was cut from the body of a sound tooth and the other from the main body of the pinion immediately below the first test piece. The centers of the two test pieces were, therefore, about ⅝ in. apart, a condition that has an important bearing on the conclusions finally reached.

Owing to the limitation of the thickness of the metal in the tooth, it was necessary to reduce the diameter of the test piece cut from it to ⅜ in. The test piece cut from the body of the pinion was turned to the same diameter for the sake of uniformity. The results of the tensile tests were as follows:

	Tooth	Body
Maximum load	144,413 lb.	133,680 lb.
Limit of elasticity	90,775 lb.	80,385 lb.
Elongation	16 per cent	16.5 per cent

From these tests it appears that, while the strength and quality of the metal were such as to sustain the load with an ample factor of safety, there was a marked difference in the quality of the metal in the two test pieces cut out of the pinion only about ⅝ in. apart. Except for a slight difference in the elongation the metal in the tooth was better than the metal in the body. This variation was checked elsewhere and has an important bearing on the results. The chemical analysis of the two test pieces were as follows:

	Tooth	Body
Silicon	.033 per cent	.024 per cent
Manganese	.73 " "	.57 " "
Sulphur	.033 " "	.036 " "
Phosphorus	.018 " "	.017 " "
Carbon	.768 " "	.671 " "

It will be noticed that there was 37.5 per cent more silicon in the metal of the tooth than in the body. Whether this excess had anything to do with the variation in the texture of the two parts as developed under the microscope I cannot say as I have no information as to the heat treatment to which the pinion was subjected, but it is well known that silicon has a decided effect in increasing the soundness of castings and so its presence in larger amount may have influenced the freedom of the teeth from the small blowholes that existed in the body of the pinion.

These pinions were of 2½ diametral pitch and were cut with 14½° involute teeth. Taking the Lewis formula and assuming the most unfavorable conditions of load and acceleration that obtained in service, the maximum fiber stress of the material was but 19,895 lb. per sq. in. or 24.74 per cent of the elastic limit of the material, at its weakest place, giving a factor of safety of more than four. This stress might have been increased by springing of the armature shaft, but even were this to occur to an exaggerated degree, it is safe to assert that the working stress on the tooth was not enough to break it under normal working conditions and sound material.

As there was nothing the matter apparently with the material physically or chemically, the next step was to examine it structurally.

Visual inspection showed no defects; the metal was seemingly perfectly sound throughout. For a better inspection, the teeth at the inside ends of several pinions were polished and the whole periphery examined with a microscope magnifying to 18 and 34 diameters.

In the case of one pinion this careful search revealed two fine hair cracks, one of which, magnified 34 diameters, is shown in Fig. 2. Even on a polished surface these fine cracks were quite invisible to the naked eye, nor were they brought out by a hand glass that magnified about 6 diameters. It was only after polishing the surface and examining it in detail under the microscope that they were detected. It would have been quite impossible to have found them with any degree of magnification, with the surface bearing the tool marks as received from the makers.

When these cracks were found the metal was cut away back of them and worked down until the two pieces dropped apart without strain.

The cracks were so fine and the metal had been held so tightly together that no oil had worked in, so that, when opened, the

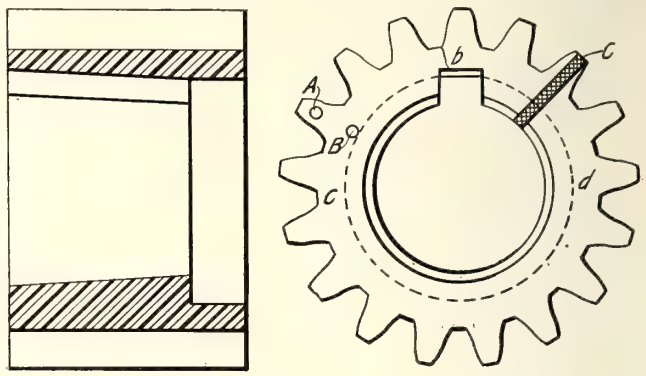
surfaces were clean. They showed unmistakable heat effects. The surfaces were covered with that peculiar blue and straw-colored oxide that can only be produced by heat. They were not detail or progressive cracks, as they ended abruptly and showed no signs of the rubbing that always characterizes the progressive fracture. The surfaces, moreover, had the same peculiar markings at right angles to the outer surface that existed where a piece had actually broken out. These markings are characteristic of heat cracks, but they could not be identified positively in the developed fractures because of wear and the presence of oil that had entered. The presence of these fine cracks could explain a portion of the breakages as the cracks which developed at the root of the tooth by some heat treatment to which the pinion had been subjected, would eventually have caused a fracture.

Aside from these cracks there were other defective features of the structure. In the search for the fine cracks an interesting condition of the metal was revealed by polishing the ends of the pinions.

The tooth itself could be polished to a state of great brilliancy, but there was an annular space immediately below the root that was filled with minute blow holes. These holes were so numerous as to mar the whole surface and were plainly visible with the eye. Farther down towards the bore the metal was sound again. At the point of the tooth, the metal was clean and homogeneous. The blowholes increased in size and number, until at a depth of 1⅛ in. below the point of the tooth, the major portion of the surface was filled by them. They, then, rapidly decreased towards the bore, until at a depth of 1¾ in. from the point of the tooth they had largely disappeared.

Where the visible cracks occurred the transition was usually very marked from the solid to the defective metal. The whole surface of the tooth on one side of a crack would present clean, homogeneous metal and on the other a cluster of blowholes. This structure is brought out very clearly in the engravings, Figs. 3 and 4. These cracks started at the edge along the line separating the sound from the defective metal, and, in some instances worked along this line until fracture occurred. The blowholes, however, did not extend all of the way through the metal but were deep enough to cause concentration of stresses and the development of a crack.

This investigation had just been completed when another type of pinion began to fail in an entirely different way. This was of the same size as the first ones examined having a 2½ diametral pitch, and 17 teeth. The fractures occurred through the center of the key way out to the space between the teeth, or to the root of the teeth as shown in Fig. 5. The puzzling feature of these breakages was the fact that the cracks started from the center of the keyway and not from the corner. An examination of the fractures showed that, in every case, they were progressive. They started at the armature end and worked down, in and across the pinions until the metal remaining had not sufficient strength to sustain the working stresses put upon it and a fracture occurred. The final portion of the fracture was of the usual granular character whereas the progressive portion was worn smooth and showed no evidence of having been caused by any heat treatment to which the pinion might have been subjected. In the accompanying engraving (Fig. 7) the form of a typical fracture is shown. The double hatched lines indicate the bright granular or final fracture, while the dotted section indicates the progressive fracture. It will be seen that the crack undoubtedly started at the point *a*, on the outside between the teeth and worked in until the whole area represented by the dotted portion was a crack.



Pinion Failures—Fig. 5—Location of Crack in Keyway

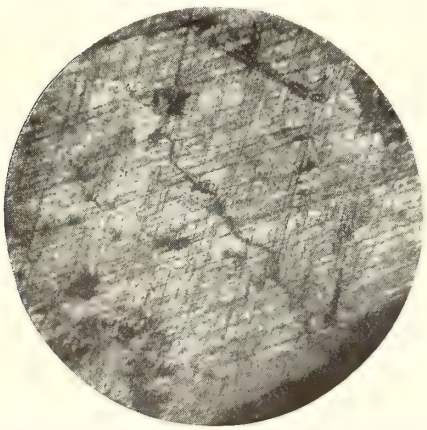
A careful examination was made of broken and sound pinions of the same type without detecting any incipient cracking whatever. Moreover, the fact that the breakages invariably occurred in the same place, indicated some other cause than heat treatment or cracks.

Physical tests of the material gave the following results:

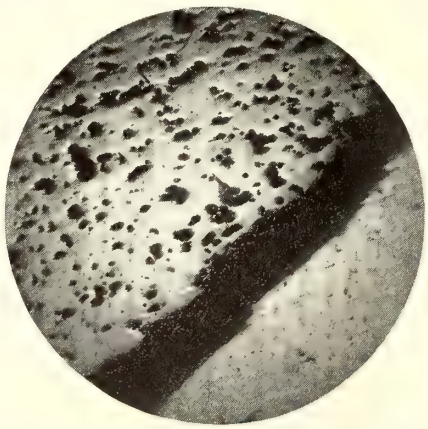
	Tooth	Body
Maximum load	140,342 lb.	126,043 lb.
Limit of elasticity	91,279 lb.	70,244 lb.
Elongation	12.5 per cent	13 per cent
Reduction of area	28.16 " "	31.51 " "

It will be noted that there was a marked difference between the physical properties of the tooth and the body. This can be explained readily by the method of heat treatment. The thinner metal of the tooth was cooled more rapidly than that of the body and was harder as the result. This raised the ultimate strength as well as the limit of elasticity.

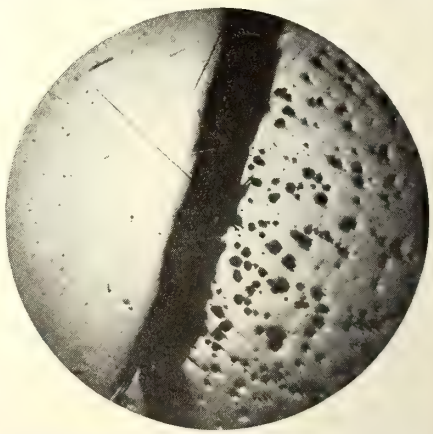
In the chemical analyses the metal was very uniform throughout with a carbon content of about 0.70 per cent. The microscope also showed a high degree of homogeneity so that it was demonstrated that the metal was of an exceedingly high grade, and that some other cause than defective material must be sought to account for these breakages. The next step was



Pinion Failures—Fig. 2—Hair Cracks on Polished Surface. Magnified 34 Diameters

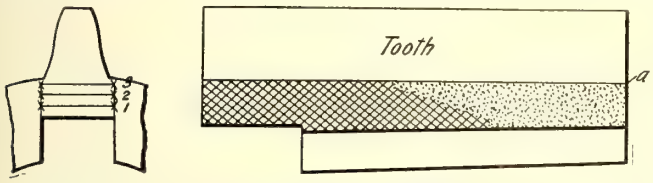


Pinion Failures—Fig. 3—Division Between Sound and Honeycombed Metal. Magnified 34 Diameters



Pinion Failures—Fig. 4—Crack Dividing Sound and Honeycombed Metal. Magnified 34 Diameters

to make an examination of the condition of the metal when the pinion had been keyed on the armature shaft. In order to determine this the armature end of a pinion was polished in three places, over the keyway and at the ends of a diameter drawn at right angles to a radius drawn through the keyway. These points are shown at *b*, *c* and *d* of the end elevation. (Fig. 5) Markings were made on the two latter surfaces, and on the polished surface above the keyway three lines were drawn approximately parallel and about ⅛-in. apart as shown in Fig. 6. These lines were intersected by lines drawn from the edges of the keyway and the distances between the



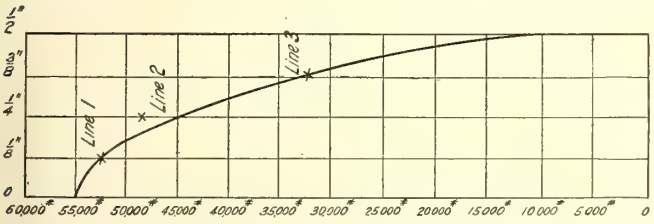
Pinion Failures—Figs. 6 and 7—Marked Tooth and Granular Fracture

points of these intersections, as indicated by the crosses, were accurately measured with a microscope and micrometer.

A stub end of an armature shaft was then cut from the main shaft so that later measurements could be made, and then the pinion was mounted on this stub in exactly the same manner as for a pinion to be used in service.

The method of doing this is that commonly used by most railways. The key was put in place and the pinion slipped on and first driven down with a hand hammer and then struck three heavy blows with a 12-lb. sledge, after which the nut on the shaft was tightened. It was then struck three medium blows with the sledge.

When the pinion had been set on the mandrel the latter projected from the back 0.445 in. After the pinion had been driven on the projection was 0.365 in. As the taper of the mandrel was 1 in 10, the increase in the diameter of the hole (the mandrel remaining uncompressed), would be, for the distance driven on, 0.008 in. Measurements taken between the points *b* and *c*, showed that the increase in diameter was 0.0032 in. on points midway between the bore and the root of the teeth. Such an increase in diameter would call for an actual increase of circumference of 0.012021 in. Measurements taken of the stretch observed on line No. 1, showed a strain of 0.0021 in. which multiplied by the modulus of elasticity of the metal, which had been found to be about 28,000,000, gave an initial



Pinion Failures—Fig. 8—Diagram of Stress in Metal Surrounding Keyway when Pinion is Driven On

stress in the metal of 58,000 lb. per sq. in. As the limit of elasticity of the metal in this part of the pinion was 70,000 lb., it is quite possible that that limit might have been exceeded when the working load of 19,000 lb. was added to this initial stress.

It was suggested that driving on the pinion with a sledge was severe treatment for a high grade pinion and that heating in hot water and shrinking on would be more reliable in giving uniform results.

The pinion, therefore, was placed in boiling water where it was allowed to remain for two hours until it was, presumably, evenly heated throughout to a temperature of 212° Fahr. It was then removed, placed on the mandrel and driven gently down with a hand hammer until it was seated. When it was cool, and was measured, it was found that line No. 1 had increased in length by 0.00085 of its original length; No. 2 by 0.0009 and No. 3 by 0.001. Assuming that the modulus of elasticity of the metal was the same as that of the pinion from which the test piece was cut, we have a stress on the metal, due to stretching, of 27,093 lb. at line No. 1; 28,142 lb. at line No 2, and 31,076 lb. at line No. 3. In other words, the stress was practically uniform throughout the metal above the keyway.

The mandrel was then put on an anvil and the pinion struck with a sledge until it was driven on 1/16 in. further. Measurements of the three lines were again made and it was found that the stresses in the metal had been greatly increased. Taking the original measurements as a base, it was found that they had been stretched so that line No. 1 indicated a stress of 52,678 lb.; line No. 2, 48,465 lb. and line No. 3, 32,630 lb. These results were afterwards checked by pressing the pinion on to the same position on the mandrel. The stresses developed were somewhat less.

These investigations showed that when a pinion is put on the armature shaft by careful shrinking, all parts of the metal contract together and the result is a uniform stress throughout. When driven on with a sledge the metal in contact with the shaft is distorted and stretched more than the metal which lies beyond, and, while the average may not be high, there may be zones that are subjected to an excessive stress. This stress decreases rapidly as the distance from the bore is increased.

As line No. 1 was ⅛ in. from the edge of the keyway, it is fair to assume that the stress at the edge was much greater. To show this graphically, a parabolic curve (Fig. 8) has been plotted through the two outer points, as indicated by the crosses; carrying out this curve to the edge of the keyway gives a stress at that point of 55,000 lb. per square inch. It must be borne in mind, also, that the limit of elasticity at that point is about 70,000 lb. Almost identical results were obtained with another pinion having a shallower keyway. The stress was less, but the section of the metal strained was more.

If this work served no other purpose it at least demonstrated that the driving on of a pinion with a sledge is an unscientific method of making the adjustment and one that is apt to set up unequal progressive strains in the metal that may run dangerously close to the limit of elasticity. It also shows that the shrinkage by the hot water treatment will put the pinion on the shaft sufficiently tight to meet all requirements of service. Finally it illustrates how impossible it is to arrive at a correct conclusion as to the cause of a breakage of this sort without making a thorough examination into all of the conditions under which the metal is worked.

In both cases the metal of the pinion was all that could be asked for as far as the ordinary methods of inspection and testing could determine and yet it was found that in the one case the breakages were due solely to microscopic defects that no inspector could detect and which, nevertheless, put the responsibility on the maker. In the other case it was due to unfair treatment and the user accepted the responsibility.

ECHOES OF THE PHILADELPHIA SYMPATHETIC STRIKE

The *Annals* of the American Academy of Political and Social Science for September are devoted to the "Settlement of Labor Disputes." Among the articles is one by C. O. Pratt on the sympathetic or general strike in Philadelphia. He writes:

"The general strike was positive evidence before the world of the justice of the carmen's cause, and there was no other way by which this fact could be established. The truth of the actual conditions became generally known and understood. . . . Our forefathers acted in sympathy when they threw off the yoke of tyranny and fought for the establishment of a government of the people, by the people and for the people. Our own fathers, many of them, from '61 to '65, did not stop to ask if they had contracts with their employers when they went to the front to fight for the preservation of the union and eventually the freeing of the chattel slave. Nor did they stop to question whether such an action would injure a friendly employer. There was a paramount issue involved which surmounted all other questions that were insignificant in comparison. So it was in this strike."

INSTRUCTION OF STUDENT CONDUCTORS IN BROOKLYN

The Brooklyn Rapid Transit System has drawn up and printed in pamphlet form a guide for the instruction of student conductors. The rules are reproduced practically verbatim in the following paragraphs, but attention may be directed to the logical order in which the instructions are printed, beginning with the exit from the depot in the morning to the return in the evening:

AT THE DEPOT—PULLING OUT

1. Daily Assignment of Students.

Each instructing conductor will consult this sheet every evening to see if a student is assigned to him for the following day. If so, find out if he is there as soon as you report in the morning.

2. Student's Assignment Sheet.

Get this from the student, as it covers your authority for breaking him in. See if he is assigned to the line you are working on that day. If not, take him at once to the despatcher. If he is assigned to your line, take him to the time-table.

3. Time Table.

Show him how to copy your run, running time and time points.

4. Bulletins.

Instruct him where to find bulletins and explain to him the importance of watching the bulletin board every day.

5. Day Card.

See that he is provided with a day card, and at the end of each half trip have him make all the necessary entries, filling in actual time of leaving the terminals; not the table time unless this agrees with the actual. This day card you will turn in to the depot, together with student's assignment sheet at the end of the day. Your day card will be made out as usual.

6. Time Card.

See that he is provided with a time card and show him about entering the name of the motorman, with additional entry if the motorman is changed during the day.

7. Inspection of Car.

This inspection will be made to cover condition as to bell and register cords, steps and running boards, doors, ventilators, gates, trolley ropes and poles; inspect for cleanliness, wet paint and projections or defects liable to injure passengers or damage their clothing. Report to starter any defects needing immediate attention.

Compare readings on registers with entries on register card, and if any difference exists, report it for correction to the register taker or starter.

INSTRUCTIONS ON THE ROAD

NOTE.—If starting with a student on a rush-hour trip and a heavy load, do not attempt to let him collect fares unless you think he is capable of doing it properly, nor take up your time in instructing on the subjects which follow. Station him on the back platform, instruct him briefly on signals and use him for that purpose until the end of the half trip. On the return trip you will have few passengers and can devote your attention to his instruction in detail.

1. Position of Conductor.

When not busy, to remain always on the rear platform between the step and controller, and facing the front end of the car in order to see everything which occurs.

2. Trolley Pole.

When approaching special work, crossings or rounding curves, the trolley ropes are to be taken in the left hand and held until they have been passed. This leaves the right hand free for any emergency or to protect passengers if necessary.

3. Bell Signals.

See that the student understands all bell signals, not only those which he is required to give, but those given to him by the motorman.

4. Transfer Points.

Have the student make a list, which he will keep in his rule book, of all transfer points on the line, arranging them in the order of reaching them. Show under each transfer point the line or lines to which transfer may there be made. Question him to see if he remembers, and instruct him to call out transfer points and lines to which transfer is made so passengers will not be carried by.

5. Time Points.

The conductor is jointly responsible with the motorman that his car is run on schedule time, for which reason a knowledge of the time points is important. These he will have copied from the time table before pulling out. Have him watch the time to see that the car is being operated on schedule and instruct him that when the car is on stand at terminal, he must be on board to give the starting signal at the proper time.

6. Registers Out of Order.

Instruct the student that when a register gets out of order on the line, he will mark a piece of paper "Out of Order," and, by wetting, paste it over the dial. He will then keep account of fares or transfers collected and not rung up, and will notify the depot master or the starter as to the number, when reaching the terminal. Register out of order should be reported to the first inspector found on the line after the trouble develops.

7. Backing Cars.

Instruct the student that when backing a car he must face to the rear of the car, with trolley rope in his right hand and bell cord in left, sounding foot gong. Then give three bells to the motorman, and be sure to give the stop signal in plenty of time to enable the motorman to shut off power and stop the car within the required distance. This latter is of special importance when a wagon or other obstruction is on the track in rear of car. Cars are not to be backed around curves, over special work, and only 50 ft. on a straight rail.

8. Transferring without Transfers.

See that the student understands what to do if passengers are for any reason transferred from another car to his car without transfers. In such cases he will count the number of passengers, ring up on his cash register the proper number and then have his day card "O.K.'d" for this amount by the inspector or official directing the transfer.

9. Conversation.

It is very important that students should realize that they must not hold any conversation, except to answer questions asked by passengers. A conductor's business is to keep his eyes on everything that happens, and this he cannot do if he fails to observe this rule.

10. Disabled Car Being Pushed.

See that the student thoroughly understands how signals are passed in pushing a disabled car. The conductor on the rear car gives the two-bell signal on his car. This is repeated by the conductor on the front car. If everything is clear, the motorman on the front car rings overhead bell twice, which is the authority for the motorman on the rear car to apply the power.

11. Head Lights, Tail Lights and Flagging.

During heavy fog, headlights must be kept lighted on the rear of the car during the day. At night the headlight on the front part of car must always be kept lighted.

Tail lights on the cars of suburban lines must be frequently inspected at night to be sure that they are burning.

Whenever a car is stalled on a curve or a straight rail under conditions when it cannot be seen by the motorman of a following car or train, the conductor of the stalled car must immediately go back 500 ft. and be prepared to flag any approaching car. This paragraph is of great importance, for accidents happening through failure to comply with it in every detail are always serious.

TRANSFERS

1. Punching and Issuing.

Be sure that the student is supplied with "Notice to Conductors," and see that he thoroughly understands all of the requirements in regard to punching and issuing transfers.

2. Receiving.

The student should be shown how to inspect the list of trans-

ferring lines printed on the face of all transfers at the top. If he is in doubt about accepting a transfer, he can readily satisfy himself. This is of interest to him, for transfers improperly accepted are charged against the conductor accepting them and collection made from him at the rate of five cents for each transfer.

3. Where Carried.

Yellow (first) and green (second) transfers will be carried by the conductor in the outside breast pocket. In rainy weather or on open cars they may be carried on the inside pocket to prevent damage or loss. Explain to the student about placing the pads back to back and holding with a rubber band; about punching his transfers for the half trip and how to prepare them so as to remove a single transfer at a time without taking out the whole package.

PROTECTION OF PASSENGERS

Under the following headings will be found items requiring special attention, and the student should be instructed thoroughly in regard to them.

1. Passengers Boarding.

The conductor must guard against injury to his passengers when boarding the car, being careful not to give starting signal until the passenger is safely on the platform. If the car is coming to a stop and passengers attempt to board while the car is still in motion, caution them to wait until the car stops. If a passenger attempts to board a swiftly moving car between blocks and persists in his attempts, it is better to signal the motorman to stop than to run the risk of an accident.

2. Passengers Alighting.

The student should understand that like attention is necessary when passengers are leaving the car, which should not be started until passengers clear it and let go of the grab handles. If conductor sees passengers attempting to alight while car is still in motion, he will call out loud enough to be heard by the other passengers, "Wait until the car stops, please!" Should the passenger persist in leaving and start to fall, the conductor will give the motorman three bells for a sudden stop and do what is possible to prevent injury to the passenger.

3. Giving Signals from Inside the Car.

Should it be necessary to give starting signal from inside the car, the conductor being busy collecting fares, he will make certain that no one is in the act of boarding or alighting. This he may do by looking through the windows on the right side of the car to the rear step, or should the car be crowded, making this impossible, he will call out, "All right back there, Please?" and will not give the starting signal until satisfied that everything is O.K.

4. Passing Obstructions.

When passing proceed signal in answer to the motorman's three bells, warning of an obstruction he is approaching, the conductor will caution passengers, especially on open cars. Should any be standing on the running board, he will call out, "Step inside off the running board, please," and will take every precaution to see that passengers are not injured.

5. Children on End Seat.

The student should be instructed that when operating an open car, children should be kept off the end seats as far as possible to avoid the danger of their falling, due to the motion of the car or when rounding curves.

6. Bumpers, Running Board and Steps.

Instruct the student to prohibit passengers from riding on the bumpers. They should also never be allowed to ride on the running board or steps provided there is room on the platform or inside the car. Children 16 years of age or under should never be allowed on running board.

7. Old or Infirm Passengers.

Assistance should be rendered passengers of this class when boarding or alighting, to prevent injury from falling.

8. Passengers Injured.

In case of an accident where a passenger or passengers are injured, attention must first be given to the injured and ascertain if they wish an ambulance, and if they do, call police headquarters over telephone, telling them who you are, the location of accident, asking them to send an ambulance. As soon as this is done, secure all the witnesses you can, both on the car and on the street.

9. Fatal Accident.

In case of fatal accident where the body is blocking the car, call 2991 Main (company headquarters) over telephone and ask for the depot you are assigned to, telling them of the accident and the location of same.

10. Fire on Car.

In case the car is on fire from hot resistance or any short circuit, warn all passengers to wait until the car stops. Put sand on the burning parts to put the fire out, and if this does not put it out, secure water. If water is used, have car towed to the depot.

11. Peddlers Boarding Car.

Boys or any one selling papers, candy, fruit or any other article should not be allowed to board car to sell such articles. In case they should board car while it is in motion, do not eject them until the car has been brought to a stop.

12. Stop and Fly Bells.

At all stop points the conductor should see that motorman brings the car to a full stop, proceed signals not being passed until this has been done. This is very important to avoid collisions and accidents caused by the motorman not having car under full control at points along the line when such things are most liable to occur; also to give passengers ample time to alight from or board car safely.

13. Trolley Pole Off Wire at Terminals.

Instruct the student that when reaching a terminal or turning back point, at night, when the car is reversed, he must never remove the pole from the wire until all passengers are off the car, as otherwise they are liable to fall in attempting to alight with the car in darkness.

14. Politeness.

The student should clearly understand that politeness to passengers will be insisted upon. He will answer courteously all questions asked him, without engaging in any unnecessary conversation. In no instance must he engage in an altercation with a passenger about rules which he, the conductor, is required to enforce. Should a passenger object to these rules, the conductor should politely inform him that he has no alternative in the matter.

15. Ejectments.

See that the student clearly understands that he has a right and is expected to eject passengers who are so intoxicated as to be offensive to other passengers; also those who refuse to pay their fare or who attempt to ride on a transfer which is not valid. Passengers carrying large bundles or those of such a nature as are liable to dirty up the car or soil the clothing of other passengers, will not be allowed to board the car. Passengers of this latter class who board the platforms while the conductor is busy inside the car should be told that it is against the rules of the company to permit them to ride under such circumstances. Should they refuse to get off, they may also be ejected. In putting passengers off the car, the assistance of the motorman should be called if necessary, but no force or violence must be used other than that required to remove the unruly passenger.

16. Front Platform—Closed Cars.

The following persons only are permitted to ride on front platforms:

1. Policemen and firemen in full uniform.
2. Uniformed inspectors and instructors of the company.
3. Officials and employes of the company in citizen's clothing. Those of the third class must have a permit properly signed.

17. Rear Platform—Closed Cars.

Uniformed employees of the company are forbidden to ride on the rear platform if there is room inside. The student should be instructed that it is desirable to keep the rear platform as clear as possible of passengers. Not only does a crowded platform cause delay when passengers are boarding and alighting, but those on the platform run the risk

of being thrown from the car in rounding the curves, with the location of which they are not familiar.

18. Passengers Carried Free.

The following passengers only are carried free:

When in Full Uniform.

Policemen, firemen, members of salvage corps, members of Society for Prevention of Cruelty to Animals, U. S. mail carriers and special delivery messengers of the Postal Department (last two only when carrying mail pouches), uniformed employees of the Brooklyn Rapid Transit System.

Ununiformed.

Certain ununiformed employees of the authorized advertising companies and of the Brooklyn Rapid Transit System are allowed to ride free when wearing badge properly displayed on uniform type of head gear.

19. Ventilation, Heat and Light.

Instruct the student that a conductor is responsible for the proper ventilation and heating of his car. With reference to the first, see that he understands the rules governing the opening and closing of doors and ventilators in the car. Also that he understands turning heat and light switches and where to look for signs covering heat points to be used.

COLLECTION OF FARES.

1.

The best way to teach a student is to let him do the work himself. Go with him through the car and correct his mistakes as he makes them. Remember that he is new at the business and the things that are easy for you seem difficult at first to him. As he becomes more familiar with the work, let him collect all the time, until finally he will be able to handle any load. He should be carefully instructed on the following points:

2. Where to Commence.

The conductor should begin at the front of the car, working back to the rear door. In this way he is able to see readily the signals of passengers wishing to alight and also has a view of the rear platform, which is essential in the prevention of accidents.

3. Order of Collection.

1. Collect the fare.
2. Register it.
3. Return change (if any).
4. Issue transfer (if requested).

See special bulletins for exceptions to this order.

4. Identification of New Passengers.

The student should be taught the importance of not only counting passengers who board, a number at a time, but of trying to remember something peculiar about each, such as the size, color of dress or hat. This, together with watching to which part of the car the new passengers go, will help him to pick them out when he goes for their fares. In working through the car, the conductor should repeat the words, "Fares, please," watching carefully the motion of the hands or arms of passengers as they sometimes offer their fares and, if not seen, pay no more attention to the conductor's request. If the conductor believes a passenger has not paid his fare, he should touch him lightly on the arm and repeat his request for the fare. Experienced conductors can give students a great many points about this feature of the business and they should make this a part of the instruction.

AFTER PULLING IN AT NIGHT.

1. Laying Up the Car.

Take the student with you and instruct him on the following points:

1. Turn registers to zero and lock.
2. Turn off light and heat switches.
3. Close ventilators and doors.
4. On open cars, hook up steps.
5. Swing trolley pole to proper end.
6. Inspect for defects for which conductor is responsible.

2. Turning in Student's Papers.

Make the necessary entries on student's assignment sheet and turn it in together with student's day card, to the despatcher. In filling out student's papers, remember that you should enter only the actual time he is with you on the car. If you sign a student up for more time than this, you make a false statement, besides you do him an injustice, for then he will not get the benefit of the full instruction period and is liable to get into trouble on account of the mistakes he will make when he starts out for himself.

On the student's assignment sheet, in the column headed "Remarks," enter your conscientious opinion of his work while with you. Do not make use of the sign "O. K.," but state in a few words your opinion of the man.

In handling students you should always remember that it is very easy to discourage a new man. Instead of doing this, you should encourage him all you can, taking up the details of the work one by one and seeing that he understands each before going on to the next. This is better than telling him about a lot of things at one time for that only confuses him and makes it hard for him to get a clear understanding of his work. If the student repeats his mistakes, don't lose your temper, but go over the explanation again until he is able to do his work properly.

TREATMENT OF DEPRECIATION IN GLASGOW

In presenting the report of the Glasgow Corporation Tramways for the year ended May 31, 1910, Bailie W. F. Russell, of the tramways committee, discussed the treatment of depreciation in the accounts. He said that the committee had always heard a great deal about the excessive amount it was writing off for depreciation, but he had always been of the opinion that it was writing off no more than it should do; in fact, he would like to have seen a still more liberal provision made. The rates of depreciation in operation at the present moment would give an average of something between 5 per cent and 6 per cent on their gross capital. This matter had just been under consideration of the management, which, he was glad to say, was averse to any reduction being made in the rates of depreciation now in operation.

It was pointed out that sooner or later in renewing their track the method of street paving would require to be improved, and that this, while enormously increasing the cost, could not possibly be regarded as capital expenditure. In fact, they were still waiting for some satisfactory form of smooth paving, which could be adopted in all the busiest streets of the city on the tramway routes. Again, from a practical point of view it was admitted that in setting £440 per mile on street track for renewal they were doing nothing more than what was absolutely necessary, and this figure, he understood, was recognized as a fair rate by the different tramway undertakings throughout the country. Then they had the electric equipment, which had cost to date £708,652, which in the opinion of practical men they ought to continue writing down as at present for some years, as if a change of the system were coming about the whole equipment could only be worth scrap value.

Then as regarded the depreciation on the buildings, that had been written off at the rate of 2½ per cent, notwithstanding that many of the buildings were still standing on the books at a higher figure than they could be erected for to-day. Regarding their power station plant at Pinkston and six substations, although Pinkston was perhaps as efficient as any other power station in the country, it was a fact that the plant there could be installed at less than half its original cost. Therefore, to quote the words of the manager, the object of the committee should be first of all to write down the original capital expenditure as soon as possible to the present value of the plant, and when that figure had been reached the question of depreciation could be again considered. Another item was the cars, and if they included the partly completed cars at present in the workshops the work had cost practically £500,000. The present rate of depreciation should, he thought, still be continued here, as if a more suitable car for their requirements was devised they ought to be in a position to take advantage of it, even if the present cars should be scrapped.

ORDERING AND STANDARDIZATION OF SUPPLIES ON THE LONDON COUNTY COUNCIL TRAMWAYS

It is far from easy to list the thousands of detail parts used on a large electric railway system in such a logical manner that there can be no misunderstanding of requisitions in the storerooms. It is a fact that men employed even on the same properties but in different shops do not use exactly the same terms in calling for supplies. In making up lists of separate parts for convenience in ordering, some companies go no further than to bind together a collection of manufacturers' catalogs or to mimeograph lists for general distribution, but a great many more trust to the description forwarded by the signer of the requisition. To overcome the disadvantages of these uncertain methods of describing supplies, A. L. C. Fell, chief officer of the London County Council Tramways, had printed some time ago a series of several illustrated catalogs, listing by definite numbers every kind of railway and structural material employed on the system. These supply lists were not prepared from similar corresponding publications issued by

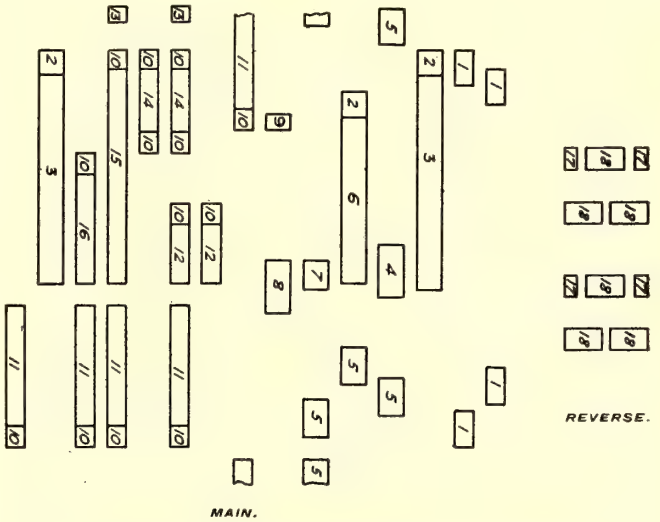
Section III.—Class 04 Tramway Controller

Catalogue No.	Description	Illustrated on page	Drawing No	Sketch.	Pattern.	Stock levels. Max.	Stock levels. Min.	Central Stores Bin No	Substores Bin No.
2401	**CONTROLLER** complete (without operating handles)	—	—	—	—	—	—	O 394	
	FRAME and COVERS.								
2402	Frame, C.I. machined, &c., complete	92	—	—	—	36	6	O 387	
2402Z	" " (casting)	"	—	—	—	—	—	—	
2403	Hose, canvas flexible rubber lined	"	—	—	—	250'	75'	O 750	
2404	Piece, fibre clamping, for cable hose	"	—	—	—	288	72	O 751	
627e	Screws, csk. ⅜" × No. 2 B.A.	"	—	—	—	See Section I		O 834	
2405	Plate, top, C.B.	"	—	—	—	24	6	O 691	
2405Z	" " (casting)	"	—	—	—	—	—	—	
482B	Screws, set, brass, raised hd., 1⅛" × ⅜"	"	—	—	—	288	36	N1614	
2538	Pin, pivot, for main drum ratchet pawl, 2" × ⅜" countersunk ¼" Whit. ⅜" up	—	—	—	—	144	36	O 4	
2539	Pin, pivot, for reverse drum ratchet pawl, 1⅝" × ⅜", screwed ¼" Whit. ⅜" up	—	—	—	—	144	36	O 43	

Section of London Supply Part Catalog

Where material is stocked, it is indicated by a catalog number and description and also by a reference to stock levels where provision is made for the latter. The quantities refer to finished articles and apply only to the central storeroom. The auxiliary storerooms keep on hand only such articles as are required for general maintenance and merely in sufficient amounts to meet their weekly requirements. If the material needed

—Class 04 Tramway Controller

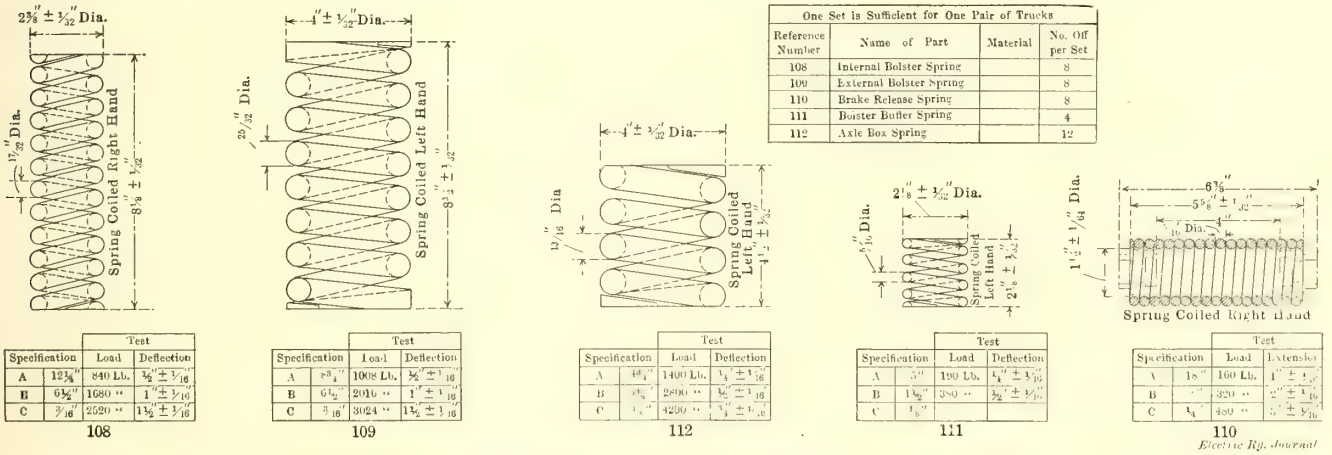


Listing of Controller Segments in Catalog

manufacturers, but were based upon a direct examination of everything actually used by the tramways. A thorough overhauling and inventory of the supply department showed that there had been unnecessary duplication of parts owing to the varying names given by different men for the same article and, furthermore, the investigation clearly revealed the necessity of standardizing many details which could be adapted for use on different classes of equipment.

The catalog, which is supplied to all storekeepers, foremen and other interested employees, is divided into 28 sections, among which are the following relating to car maintenance: I—Bolts, nuts, washers, screws, studs, plugs, nails, tacks, rivets, cotter pins, etc.; I-A—Tools; II—Different classes of motors; III—Different classes of controllers; IV—Circuit-breakers, canopy switches, plug connections, and similar fittings; V—Current-collecting apparatus, (i) plows, (ii) trolleys; VI—Magnetic brakes and mechanical track brakes; VII—Trucks; VIII—Car bodies and fittings. The remaining sections relate to the power, line and way departments.

Each catalog is accompanied by a direction page in part I explaining the scheme used in listing and ordering supplies. is not kept on hand, the nearest stock article must be used, unless it is practically or economically unsuitable. All articles are listed in order according to their numbers and only these numbers must be used in ordering supplies. Compounds of numbers and letters are used in certain cases, as follows: Where length, width or diameter is the varying factor, letters are employed for fractions and multiples of an inch; where the articles are unfinished, as in the case of castings and stampings, the letter "Z" is placed after the order. An example of the first case is this: Catalog "No. 556—D" means screw, set, hexagon head, 1¾ in. x ¾ in., while "No. 556-E" refers to the same type of screw, except that the dimensions are 2 in. x ¾ in. Special abbreviations are used to indicate the different metals, wires, etc., and a car plan outline is presented to define left-hand and right-hand sides. The illustrations in these catalogs are original but the numbers which are given them are not used in ordering, as the cuts are presented only to give the user of the catalog a general idea of the appearance of the parts listed elsewhere. The idea of the catalog arrangement as applied to controller parts can be obtained from the accompanying reproductions. It will be noted that the controller



Specification	Test: Load	Test: Deflection
A	12⅜"	840 Lb.	½" ± 1/16"
B	6½"	1680 "	1" ± 1/16"
C	⅜"	2520 "	1½" ± 1/16"

108

Specification	Test: Load	Test: Deflection
A	4⅜"	1008 Lb.	½" ± 1/16"
B	6½"	2016 "	1" ± 1/16"
C	⅜"	3024 "	1½" ± 1/16"

109

Specification	Test: Load	Test: Deflection
A	4⅜"	1400 Lb.	½" ± 1/16"
B	⅝"	2800 "	½" ± 1/16"
C	⅜"	4200 "	¾" ± 1/16"

112

Specification	Test: Load	Test: Deflection
A	5"	190 Lb.	¼" ± 1/16"
B	1⅝"	380 "	½" ± 1/16"
C	⅛"		

111

Specification	Test: Load	Test: Extension
A	18"	160 Lb.	1" ± 1/16"
B	"	320 "	" ± 1/16"
C	¼"	480 "	" ± 1/16"

110

Electric Ry. Journal

One Set is Sufficient for One Pair of Trucks			
Reference Number	Name of Part	Material	No. Off per Set
108	Internal Bolster Spring		8
109	External Bolster Spring		8
110	Brake Release Spring		8
111	Boister Buffer Spring		4
112	Axle Box Spring		12

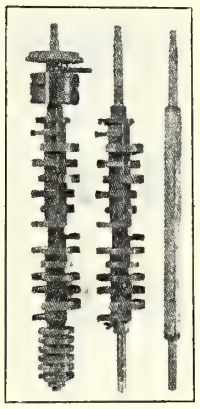
Drawings and Specifications Covering Standard Truck Springs

segments are listed by their position on the cylinder, and not by length alone.

MOTOR AND CONTROLLER FEATURES

The London County Council Tramways use only two-motor equipments made up of the following combinations: Dick-Kerr No. 25-a 25-hp motors with Dick-Kerr DB1 Form D controllers, Dick-Kerr No. 3-a 35-hp with Dick-Kerr DB1 Form D controllers; Westinghouse No. 200, 30-hp motors with No. 90-M controllers; Westinghouse No. 220, 42-hp motors with No. T-2-A controllers. The last-named equipment represents the company's latest practice. The T-2-A controllers are provided with an insulated return for the magnetic brake citcuit to keep the latter entirely separate from the power circuit. This means that when the controller handle is turned from the running to the braking positions the power circuit is opened; otherwise, with a high ground potential, a slight defect in the magnetic brake would be dangerous. In the T-2-A controller the reverser is carried on the main cylinder.

The tramways are also making a number of improvements covering all of their controllers. Thus the wooden finger boards are being superseded by micanized steel bars, to which the fingers will be clamped in such a manner as to permit of easy replacement. This change will greatly improve the resistance to fire, as no wood will be left in the controller except that used in the brake cylinder. One of the illustrations shows the new square type main cylinder spindle to which the segments are clamped in halves, thus making it possible to exchange old or new segments without dismantling the controller.



Controller Parts

MISCELLANEOUS

The standardization of apparatus naturally has gone hand in hand with the codification of supply parts, as the latter work brought out very clearly the fact that while equipments may vary as entities, there is no reason why all the parts should be different. Standardization has been successfully carried out in such items as screws, nuts and bolts, brake rods and various truck parts. Brake shoe patterns have been reduced to one for pony and two for driving wheels. Even drafting-room practice has been greatly simplified by using only two sizes of drawings, the larger size serving for the assemblies and the smaller size serving for the individual details.

A large part of the tramways' metal supplies is bought on specification. Particular attention is given to spring specifications, and separate drawings have been prepared to cover the requirements for each of the trucks now in service. The drawing on page 363 and specifications below show the Council's standards for its center-bearing, swing-bolster, maximum traction trucks.

GENERAL SPECIFICATION

Springs to be made of spring steel, and are to be carefully hardened, tempered and black japanned; ends to be ground flat. The conditions and dimensions given on the drawing may be varied, to obtain the requisite tests, but approval of any proposed modification must first be obtained from the chief officer of tramways.

SPECIFICATION FOR OPEN COIL SPRING

Number of coils (end to end) "A" Closed length not more than "B." Makers must guarantee springs not to take a permanent set more than "C" after 12 months' continuous service, and that springs when tested after a like period are to be within 5 per cent of specified test. Spring to close repeatedly under power hammer without taking any permanent set.

SPECIFICATION FOR CLOSED COIL SPRING

Number of coils (end to end) "A." Extension without taking permanent set (with bushes in position) not less than "B." Makers must guarantee springs not to take a permanent stretch of more than "C" after 12 months' continuous service, and that springs when tested after a like period are to be within 5 per cent of specified test.

MEETINGS OF CAR HOUSE AND SHOP EMPLOYEES AT BOSTON

For several years the Boston Elevated Railway Company has devoted considerable attention to securing the benefits of co-operation among its employees. The management has long appreciated that much is to be gained by the periodical meetings of employees more or less intimately concerned with the maintenance of service and equipment. The conditions under which operation takes place on any large urban street railway system are constantly changing. In applying the best modern practice over wide areas with varying traffic requirements there is always opportunity for improvement, whether it take the form of the institution and trial of new methods, or the correction of old policies and habits in handling the company's property and business. This is especially true in Boston, where the forms of service rendered the public illustrate such a wide range of operation, where the density of traffic varies through such extremes, where the types of car routes illustrate such diverse conditions and where the subdivision of the mechanical plant surrounds repair and manufacturing operations with such differences in circumstances bearing upon the cost of maintenance.

In following the plan of maintaining regular conferences between responsible employees in regard to problems confronting the maintenance forces of the company from time to time, there have been held for several years in the fall, winter and spring, monthly meetings of car-house foremen at which a great variety of topics bearing upon rolling stock repairs and service has been discussed. The scope and conduct of these meetings have been fully reviewed in the Electric Railway Journal. In brief, at each meeting, which is held in the annex of the mechanical drafting room of the principal shops in Boston, a review is made by the presiding officer of the defects occurring in rolling stock service during the preceding month. The presiding officer is usually the head of the department of rolling stock and shops, who discusses the service records of the different car houses, points out variations in the equipment defects for different parts of the system and reviews the failures of different types of motors, and defects occurring in car bodies, brake equipment, control apparatus, etc., in the month as compared with previous months and years. Graphic methods of illustration are liberally employed, and at the conclusion of the discussion of defects and their causes, which is participated in by those in attendance at the meeting, the rest of the time is usually devoted to the consideration of some particular topic of pertinent scope at the time of the meeting. Among the subjects which have been considered are "Fire Protection," "Preparing Open Cars for Service," "Causes of Motor Failures," "Snow Plow Maintenance," "Painting," "Car Cleaning," etc. The results of these meetings have included an increased interest in the problems arising in the car houses, a larger amount of team play between different houses, and a general appreciation of the importance of little things in the conduct of the company's affairs.

About two years ago several meetings were held for the benefit of inspectors and instructors of motormen. The object was to bring about an improvement in the handling of the cars, and so to reduce the strains imposed upon the apparatus and lessen the number of failures and consequently the cost of repairs. At these meetings the fundamental principles of controller handling and motor operation were discussed in the fullest detail; apparatus was shown in dismantled and assembled condition; drawings of the variation of current and speed with the handling of the controller were exhibited and explained, and finally, practical runs were made

on a car equipped with a recording ammeter, so that the current consumption with good and bad operation could be seen and measured. The bearing of energy consumption upon the cost of operation per car mile was discussed; the effect of various resistance combinations and setting considered, and the meaning of acceleration and retardation brought home to the men in attendance. These meetings leavened the handling of cars over the entire system, noticeable improvement following the more intimate grasping of electrical and mechanical phenomena by the inspectors and instructors.

Last fall the company decided to enlarge the value of the previous monthly meetings of car house foremen by extending their influence through the inauguration of additional weekly meetings to be attended by foremen and certain shop employees. The object of these meetings has been to give the attendants a deeper knowledge of fundamental principles bearing upon the equipment and its service. The meetings are usually addressed by an employee having an expert knowledge of the assigned subject. Beginning with a discussion of the principles of frictional electricity, magnetism, current electricity, and measurement, the subjects have passed through the field of inductive phenomena and considerations of design in railway motors, to the detailed study of each type of motor used on the system from the earliest to the latest forms of apparatus. In general an entire evening has been devoted to the consideration of any given type of motor and the progress in design from the early motors to the modern interpole form. The reasons controlling the adoption of different winding arrangements, changes for the better in the mechanical structure of the motor, etc., have also been discussed. Apparatus loaned by the Massachusetts Institute of Technology was used in illustrating fundamental principles at the earlier lectures. Among the subjects discussed were multiple unit control, four evenings taking up auxiliary wiring and apparatus; main control; details of apparatus, and locating faults; trolley equipment, one evening; brake rigging; air brakes with compressor and governor details; air brakes, automatic type, with functions of feed, brake and triple valves; truck maintenance; blue print reading; records and accounting.

POWER GENERATING COSTS IN LYNCHBURG AND ROANOKE, VA.

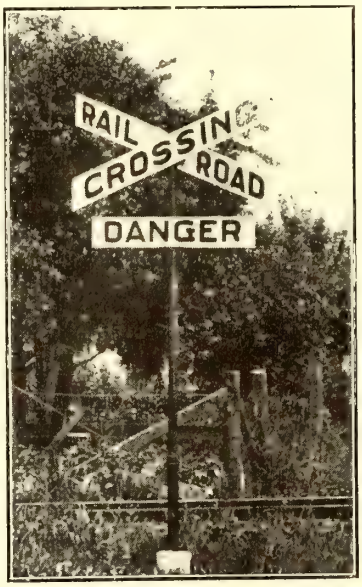
The Lynchburg (Va.) Traction & Light Company has been operating a mixed water and steam plant since 1905. The water power is derived from the James River and has proved very reliable. In 1909, for example, only 3 per cent of the total power output came from steam. However, owing to a drought during January and February of this year, 6 per cent to 7 per cent was generated from steam. The water power machinery is rated at 1500 hp, but can be operated at 50 per cent overload.

The steam equipment owned by the company includes a 500-kw Curtis turbine which has been in service for over four years. The turbine output is usually employed for the lighting service and the water power for the railway. The railway apparatus at the substation in the power plant consists of two 300-kw rotaries, one 500-kw rotary and two 225-kw engine-driven railway generators. The cost of power is 0.9 cent to 1.0 cent per kw-hour at the d.c. end of the switchboard, including depreciation and standby charges.

The Roanoke (Va.) Railway & Electric Company, which, like the Lynchburg Company, is under the management of R. D. Apperson, also operates a mixed steam and hydroelectric plant. The water power at Roanoke is less reliable than that near Lynchburg. Thus during November, 1909, only 30 per cent of the output was hydroelectric although the water-power output is 60 per cent to 70 per cent of the total energy requirements at other times. The power units consist of one 375-hp and three 750-hp hydroelectric sets; also one 1500-kw and two 500-kw Curtis turbines. The railway circuits are supplied by two 500-kw rotaries, one of which is a reserve unit. The approximate cost of power to the Roanoke company is 1⅛ cents per kw-hour at the d.c. end of the switchboard.

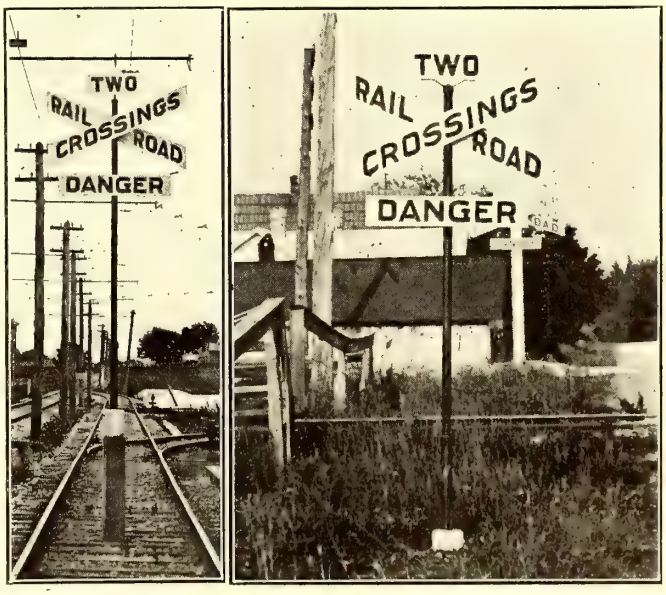
NEW CROSSING SIGNS ON THE LOUISVILLE & INDIANAPOLIS

In a recent issue an account was published of the standard crossing signs adopted by the Railroad Commission of Indiana for both steam and electric road crossings. Briefly the sign consists of a post 10 ft. high on which are placed two boards of 8-in. width, intersecting at the center at an angle of 50 deg. and lettered "Railroad Crossing." Underneath is a horizontal board lettered "Danger," and where there are two railroad crossings the commission recommends that the word "Two" be added to the sign.



Single Crossing

The Indianapolis & Louisville Traction Company has recently installed new signs on its system which are in accordance with the recommendations of the Railroad Commission, but have also been improved. Instead of the usual wood post, the post is made of concrete 8 in. square and about 5 ft. long. The corners of this post are beveled. Imbedded in this concrete post is a piece of 2½-in. pipe which extends 2½ ft. above the concrete where it is reduced to 2 in. and extends 7½ ft. farther, making the total height 10 ft. above ground. Metal clamps made of 3/16-in x 6-in. soft steel attach the regulation boards to the iron post which is topped with a round pipe cap. Where there are two crossings a hole is drilled in the cap and a bracket containing the word "Two" is attached to the top of the post. The line of the Louisville & Northern Railway & Lighting Company



Views of Double Railroad Crossing

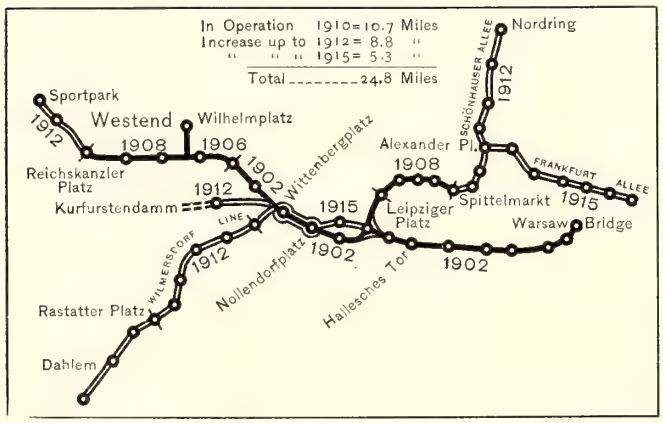
has also been equipped with this sign. The new post is the design of H. D. Murdock, Superintendent of the Indianapolis-Louisville line.

One of the accompanying views shows the entire post above ground. The position of the post in this view was selected for the convenience of the photographer and of course is not that which the sign would occupy. Another picture

shows a country crossing where a parallel track of a steam road is only a few feet away, and shows the use of the word "Two." The third picture shows the single crossing sign where but one track is to be crossed. The cost of the newly designed post is about $7. Another little "kink" in the construction of the sign is that the top of the concrete post around the pipe is hollowed out. This cavity is filled with tar or asphalt so that the base of the iron post is made practically weather proof. The signs present a very attractive appearance.

NEW SUBWAYS FOR BERLIN

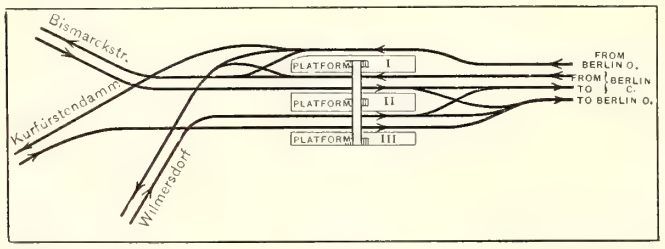
As noted in an article on "Present and Proposed Berlin Subways," published in the Electric Railway Journal of Jan. 15, 1910, a number of different plans for underground railways in Berlin have been presented by conflicting interests. The only system actually operating at present is the privately owned Berlin Elevated & Underground Railway, which runs from



Map Showing the Past and Approved Future Growth of the Berlin Subway System

east to west and embraces about 11 miles of route, including spurs.

The transportation conditions in the western section of Berlin are now to be greatly improved in accordance with a franchise just granted for the construction of one line from Dahlem through Wilmersdorf and one from the nearby Kürfürstendamm parkway, both ending at the Wittenbergplatz station of the present rapid transit company. The new routes are shown in the accompanying map, which also shows the past and author-



Approved Track Plan for Connection with the Wilmersdorf Subway at Wittenbergplatz

ized future growth of the unified rapid transit system. The Wilmersdorf-Dahlem line will run underground for 3.1 miles to Rastatterplatz and thence over open right-of-way for the remaining 1.6 miles. The greater part of this line will be constructed by the communities interested, but it will be operated by the rapid transit company. The second line will be less than a mile long at present, extending only to Uhland Strasse.

The accompanying track plan of the Wittenbergplatz station shows how the trains will be handled there eventually. Platform I will serve for trains from Berlin (O) to Kürfürstendamm and Wilmersdorf and also from Berlin (C) to Bismarckstrasse on the main line and to Wilmersdorf; platform II will serve for trains from Bismarckstrasse to Berlin (C) and from Wilmersdorf to Berlin (C and O): platform III will serve for trains from Kürfürstendamm to Berlin (O). This arrangement will permit the majority of transferring passengers to get into other trains without going to another platform. The initial service on both lines will be given by shuttle trains to Wittenbergplatz without changing the present main line schedules. In about three years the tracks will be reconstructed for through operation as explained previously. It may be added that the Schöneberg municipality has almost completed its independent subway line, which will terminate underground near the elevated Nollendorfplatz station of the rapid transit company. It has been suggested that this municipality and the company should make arrangements for transferring passengers from one line to the other, but no agreement has yet been reached.

EFFECTS OF INJURY BY ELECTRICITY

An article by John J. Moorhead, M. D., in a recent issue of the *Journal of the American Medical Association* contains some interesting observations of the results of injury by electricity. Dr. Moorhead, as chief surgeon of the Metropolitan Street Railway Company and Interborough Rapid Transit Company, New York, and through his connection with three New York hospitals, had exceptionally good means for obtaining data on this subject. The author says that the physical effects of electricity are mainly determined by the following: Amount and duration of current; site, type and area of contact; the individual. High voltage (1000 volts and over), long duration (8 seconds and upward) and positive contact generally predicate coma, severe systemic shock, burns and oftentimes death. Medium intensity (400 volts to 600 volts) with medium duration (five to eight seconds) and partial contact generally cause burns of lesser degree, less profound coma and shock with more or less paresthesia, especially numbness and tingling. Low intensity (100 volts to 300 volts) with short duration (one to five seconds) and brushing contact generally cause burns of the first degree or none, slight coma, if any, and moderate paresthesia, mainly of the tingling type. Low intensity and brief duration and partial contact generally mean absence of burns or systemic symptoms, the only complaint being that of paresthesia of the formication (ant-creeping sensation) type. Site, type and area of contact are less important, pursuant to the physical law that electricity takes the shortest route between two electrodes. It has been found that the tissues transmit in proportion to the amount of their fluid constituents. Blood is the best conductor, mainly because of the saline serum. Muscle comes next, then nerve tissues and finally bone. Dry skin has a resistance according to one authority 150 times as great as the underlying tissues. The greater the area of contact, the greater the effect, especially if the current traverses the vital organs. The variation among individuals is striking, notably as to sex, age, physique, occupation and temperament. Those accustomed to electric energy are often less influenced than the novice. Those of rugged and muscular physique have a greater conductivity than those of the opposite type. Illness, sleep and alcoholism render persons less sensitive.

In a general way the physical effects are three in number, namely, death, burns and nervous symptoms. The most careful examination of all the tissues in post-mortem cases have as yet failed to give any adequately uniform causes of death. In general the findings are not unlike those following drowning or suffocation. The two principal theories to account for death by electrocution are that the heart muscle is paralyzed by a tetanic spasm and that there is a definite cellular destruction, especially of the vital centers. In connection with the second theory Dr. Moorhead states that the disintegration that seemingly takes place may generate poisonous materials, thus adding a chemical to the mechanical irritation. Death by low-tension current is by heart fibrillation; heart and respiration alike fail from lethal medium tensions, and respiratory failure is the cause of death, in high-tension accidents.

Burns from electricity differ only in origin from those due

to extremes of temperature. The existence of an electric burn indicates the high resistance of the tissue affected. The character of the burn is sometimes determined by the metal acting as a conductor, and burns by arcs and flashes or copper sometimes produce less severe burns than those from iron or steel. Deep electric burns in contrast with burns due to flame and contact with steam, hot solids or liquids, are apparently less painful produce less systemic shock and heal more quickly.

Dr. Moorhead describes several third rail burns and points out that electric destruction of tissues is as sudden and absolute as if done by electric cautery. Burns from partial or arcing contact often heal slowly and show a tendency to become gangrenous. Cases of this type sometimes give external signs disproportionate to the underlying damage. In one case, a laborer repairing a 550-volt contactor rail fell and the rail came in contact with his back at about the lower scapular (shoulder-blade) level while his feet were grounded on concrete. He remained in this position several minutes and when released was found to have a burn which practically escharred his back from the mid-scapular to the lower lumbar region, the burn even exposing the viscera. He suffered profoundly from shock and his recovery was protracted. Six years later there was still an unhealed area about 3 in. by 4 in. in the central portion of the scar but all except this place cicatrized without skin grafting in a remarkable way, considering the original extent and severity of the wound. The scar had contracted enough at first almost to draw the wings of his scapular together and spinal flexion was impossible; but by continued self-bending and manipulation of his back, he was able to resume manual labor although not completely healed.

Another severe case was that of an iron worker who, while repairing overhead wires on a suburban electrified steam railroad, came in contact with a 11,000-volt wire while assuming an upright position. He became temporarily unconscious but at the end of 10 days was able to be out of bed for a portion of each day. At the end of this period, he presented numerous sloughing and granulating burns of the left upper extremity and chest, and an extensive burn of the left lower back part of the head and soles of the feet. He had little, if any, systemic shock. There was no nervous involvement organically or functionally. The duration of contact in this case could not be ascertained, but it must have been short and imperfect. The contact was on the head and the left upper extremity and the man was grounded through his feet which were resting on a metal support so that the main part of his body was temporarily a part of the circuit. The victim wore no hat, his shoulders were bare except for a thin shirt and he had no tools in his hand. Theoretically, this man should have been unable to withstand electric shock of the volume mentioned but the burns showed that only a portion of the voltage was received. The author was told by Dr. F. B. Littlewood, consulting physician at the New Rochelle (N. Y.) Hospital, that this patient made an excellent recovery.

The nervous effects in the absence of direct destructive or inflammatory damage to nerve fiber are almost invariably those of the hystero-neurasthenic type. The author had never known an organic disease of the central nervous system to develop from the passage of electricity through the body nor does the available literature on the subject narrate more than one instance of this nature. Where direct injury to the nervous tissue is absent or minor in extent, the subsequent developments of neurasthenia and hysterical symptoms are generally psychic in origin or dependent on auto-suggestion or suggestion from others. The signs then presented usually are disproportionate to the actual physical damage sustained. Such cases rarely present objective evidence of electric contact and occur usually in those predisposed to them because of neurotic or actually hysterical temperaments. The flash or arc of charged metallic contact points occasionally induces such symptoms either with or without bodily contact. Cases of this and allied sorts are often designated by the term "electric shock" and less frequently as "electric neurosis," but the symptoms do not differ in any essential respect from the ordinary shock or neurosis. Examination of such a patient develops a wealth of subjective symptoms and a poverty of objective symptoms. The following cases in point is quoted by Dr. Moorhead:

A woman was alighting during a rain from a suburban electric car operated by overhead trolley. While she had one foot on the car platform and the other on the metal step, with her hand on the dasher handle, she claimed to have received a shock which threw her face downward on the ground. She was stunned but not unconscious, did not vomit and when assisted to the sidewalk was able to discuss the occurrence with some show of agitation and not a little anger. She walked unaided to her home nearby and a few hours later saw her doctor, who gave her lotions for the bruises on the knee, elbow and hands. There were no burns or obvious electric effects but she had complained of a tingling and needle sensation in the hand that had touched the dasher handle and in the feet which contacted with the metal step. When the patient was seen by Dr. Moorhead some 14 days after the accident, she was in bed, somewhat pallid, had a characteristically tense and drawn expression and was markedly irritable. All of these characteristics were said to be foreign to her normal state. There was an obvious rapid tremor of the closed eyelids, about the angles of the mouth and the outstretched fingers and the protruded tongue. The external evidences of injury were lacking aside from a faded area of bluish discoloration just above the right knee, probably from her fall. No evidences of electric contact were apparent, no paralysis, and no areas of diminished sensation. In general, the physical condition was normal. Her gait was normal and her pulse rapid. The patient recovered perfectly in a short time.

Occasionally, cases are reported in which blindness, deafness and other especial sense defects have been attributed to electric contact or flashes. All instances of this sort are of the hysterical variety and fall into the class of so-called fright-neurosis.

Treatment for electric shock presents no special problems, inasmuch as it is for the relief of shock, burns or neurosis. In case of profound injury and even where death has apparently occurred, prolonged artificial respiration should be maintained as in drowning cases. Even digital compression of the heart itself has been proposed but never successfully practiced. Dr. G. W. Crile recommends rhythmic pressure over the heart area, the tongue being drawn out to combine circulatory and respiratory artificial stimulation. With the foregoing manual methods, the use of stimulants of the atropin, strychnin and adrenalin sort is also advisable. Burns are treated in accordance with the custom of the individual physician. Neuroses are best treated by isolation plus the mental or therapeutic means best liked by the individual practitioner.

In conclusion, Dr. Moorhead says there does not appear to be any sound basis for the claim that one electric shock renders the recipient more prone to similar experiences, but on the contrary, an acquired immunity seems to be created by repeated applications. There is no good reason for the view often expressed that the effects of electricity on the human economy are unusual or peculiar.

PLEASING THE PUBLIC

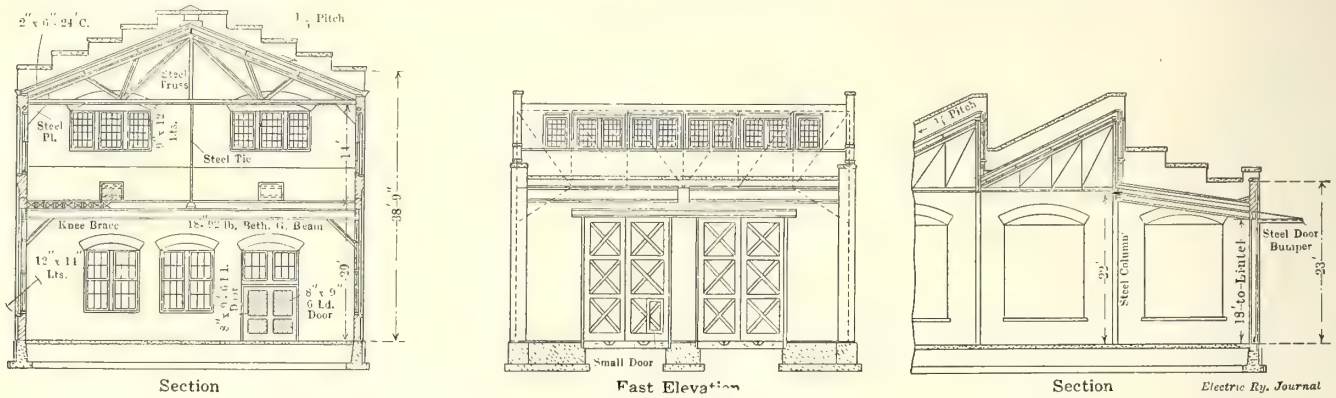
The Cleveland, Southwestern & Columbus Railway has placed on its cars and in its stations a card indicating that its motto is: "The Public Be Pleased." Many favorable comments concerning the action of the company and its endeavor to meet the public requirements for service have been received at the general offices.



Advertisement of Cleveland, Southwestern & Columbus Railway

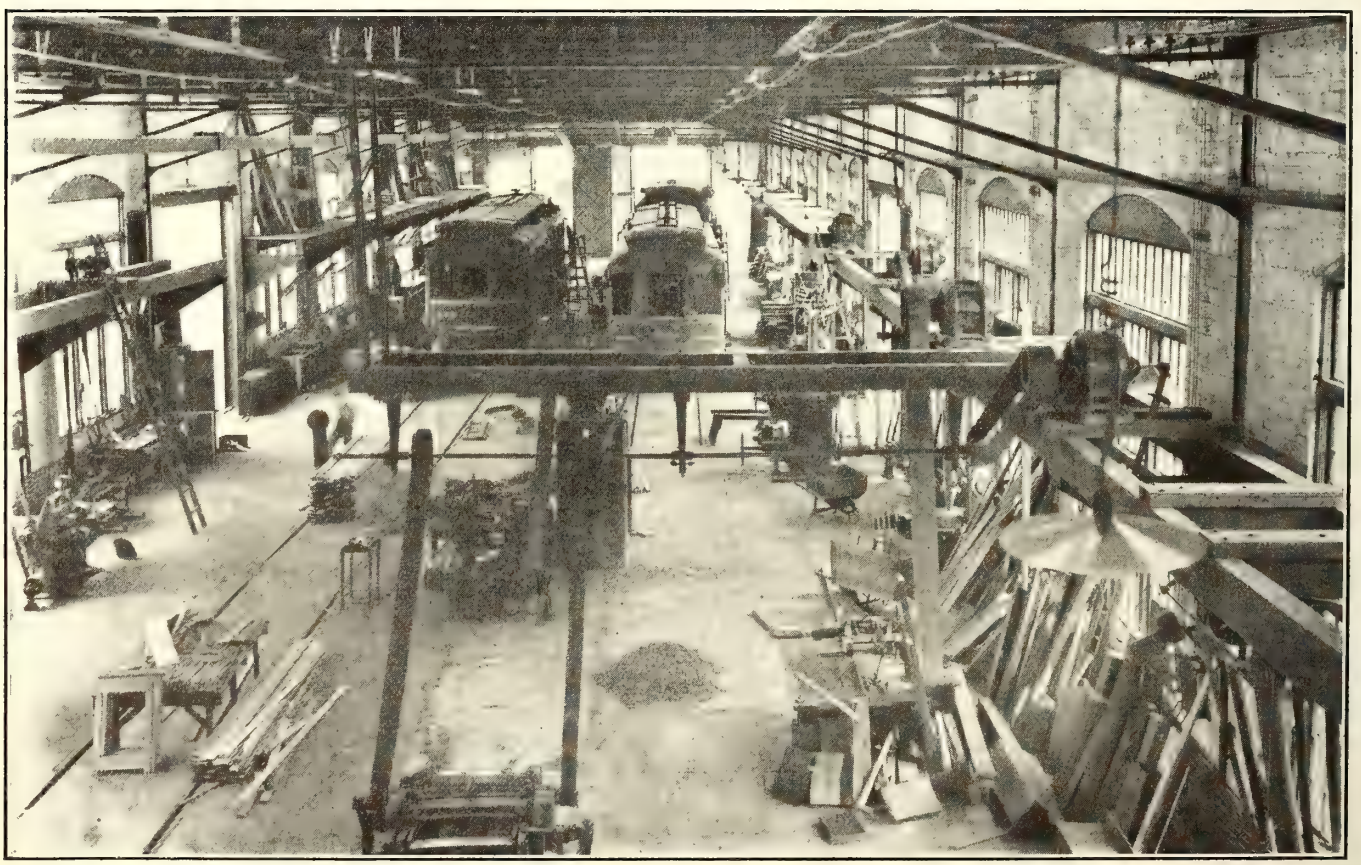
ADDITION TO DECATUR SHOPS ILLINOIS TRACTION SYSTEM

A new carpenter and mill shop has just been completed as an independent section of the main repair shops of the Illinois Traction System at Decatur, Ill. Sections and elevations are shown. The building is 302 ft. long by 50 ft. wide and its interior is clear of columns. With the exception of a two-story portion, 30 ft. x 50 ft., the building is one-story high.



Sections and Elevations of Decatur Shops, Illinois Traction System

Over the two-story section the roof is supported on A-trusses and the larger part of the roof over the single-story section is of the saw-tooth type of construction, with cross trusses 11 ft. deep. This type of roof gives a clear head room of 22 ft. for a height of 11 ft. 6 in. on either side of the main portion of the shop. These galleries also afford room for storage of lumber and materials for general repair purposes without interfering with the full use of the shop.



Interior of the New Wood Shop of the Illinois Traction System at Decatur

the full width of the building, which encloses two tracks. The main portion of the building is used for general repair work and at the rear of this section is the two-story portion subdivided into a cabinet shop on the first floor and pattern and upholstering rooms on the second floor. A freight elevator connects the two floors.

The equipment of tools in this shop has not been completely installed, but at present includes the following: Two Greenlee mortising machines, one horizontal and one vertical; band saw; saw sharpener; universal wood worker; Greenlee tenoning machine; drill press; 48-in. knife grinder; two swinging cut-off saws; four rip saws; surface planer; molding machine and a turning lathe and jig saw installed in the cabinet shop. Each of the wood-shop tools is independently driven by a three-phase induction motor with a General Electric starting compensator. Wherever shafting is necessary it is supported beneath galleries which carried on 4-ft. 6-in. steel brackets at

At the same time the new woodworking shop was being erected a brick storehouse, brass foundry and blacksmith shop building were built nearby. The present equipment of the blacksmith shop includes a Bradley hammer; four oil furnaces; Lane steam hammer; combination punch and shear, and two Ajax forging machines. The new storehouse building carries the necessary supplies for the immediate use of the shop drawing them from the new storehouse of the Illinois Traction

System, which is located on the shop property. The Decatur shop of the interurban railway company is in charge of J. E. Johnson, general superintendent. The designs for the Decatur shop group were prepared under the supervision of J. M. Bosenbury, superintendent of motive power and equipment, Illinois Traction System.

BONDING WITH AN OXY-ACETYLENE TORCH IN MINNEAPOLIS

The Twin City Rapid Transit Company now uses an oxy-acetylene blow torch for applying copper rail bonds. This process is said to give excellent results at a cost for new work no greater than for placing compressed bonds in drilled holes, and at a less cost than for rebonding. A number of bonds have been installed to date and the process is the result of considerable preliminary work and experimentation.

The bonding outfit consists of a commercial oxy-acetylene blow torch supplied with gas from tanks carried on a small portable truck, the outfit complete weighing about 600 lb. The truck as arranged for work on the city streets has wheels without flanges and it may easily be moved along the pavement by two men. While the bonding work is in process the truck stands on the pavement about 6 ft. away from the track and thus does not interfere with street-car traffic.

Two car air-brake reservoirs are used as storage tanks for the oxygen, which either is purchased in flasks under high pressure and discharged into the reservoirs carried on the trucks or is generated by the potassium-chlorate process in a plant at the storehouse of the Twin City Rapid Transit Company. The acetylene is carried on the truck in a pressed-steel flask similar to those used for automobile headlight service.

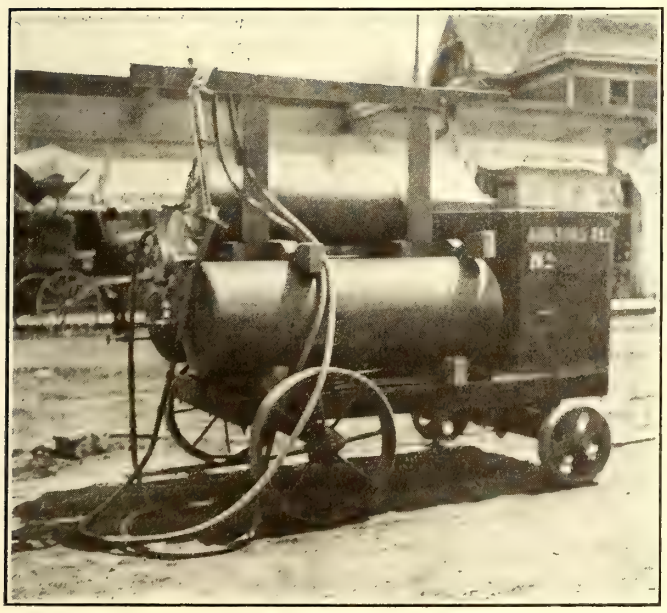
A bonding gang is made up of one man, who operates the torch, his helper and another man who cleans the rail head in advance of the bonders. These three men will apply bonds at an average rate of six per hour in continuous work day in and day out, although but four minutes are required to weld a bond after the rail has been made ready and the torch, with its gas supply car, has been wheeled into place.

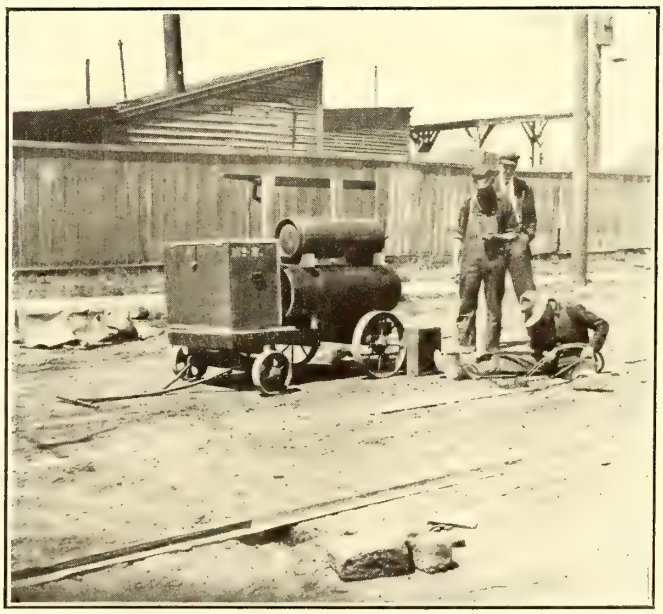
The process of applying the bond is as follows: One man cleans the sides of the rails at the joints, using an emery grinder driven by a motor fed from the trolley. The surface of the steel is ground only enough to remove the scale. When rebonding old track it is not necessary to remove the joint plates.

The bonds used are similar in form to the soldered bond. These bonds are made up of two pieces of wire cable to which T-shaped terminals have been fused. The bond is held against the head of the rail either by a temporary clamp or a rod, and the flame of the blow torch applied. The steel and copper along the top side of the bond are first fused until the joint between the rail and the bond is secure. Then the clamp, if one has been used, is removed. This attaching process takes less than half a minute. Next, a piece of scrap trolley wire is held above the joint between the bond and the rail and enough melted copper is deposited on top of the bond and fused with the bond and the steel of the rail to build up a sloping upper surface about ½ in. higher than the original upper surface of the bond. This additional copper in a sloping form protects the bond from severe mechanical strain caused by vehicle wheels which may run close to the rail. Also, the additional copper assures a fused connection between the rail and the steel about 3 in. long by 1 in. high.



Bonding with Oxy-Acetylene Torch





View of Oxy-Acetylene Tanks and Their Application in Minneapolis

About 100 cu. ft. of oxygen and 75 cu. ft. of acetylene at atmospheric pressures are used in applying 30 bonds to medium-weight rails. With heavier rails more gas is required because the larger body of metal absorbs the heat more rapidly. In

applying bonds the head of the rail is not heated to any degree of redness nor to a temperature sufficient to anneal the steel.

The principal features of this method of bonding are: (1) permanent mechanical and electrical contact obtained by fusing steel and copper; (2) economy due to rapidity of work, small gang and low cost of tools and supplies; (3) non-interference with traffic: a car may be allowed to pass any time during the bonding process; (4) portability of apparatus used in bonding.

SOME NOTES ON RAIL CORRUGATION

BY J. H. M. ANDREWS, ASSISTANT TO CHIEF ENGINEER, PHILADELPHIA RAPID TRANSIT COMPANY.

In the long procession of new conditions and problems with which the street railway engineer has had to deal there is probably no problem which has been so baffling as the curious phenomena known as corrugation. This problem is assuming greater importance every day, and in spite of widespread discussion and investigation, there is no generally accepted theory which will explain all of its varying manifestations. There are several theories which seek to explain the occurrence of corrugation under certain conditions, but there is not, nor does it seem logical that there ever can be, a theory which will cover the occurrence of corrugations under all conditions. In other words, there seem to be several causes which will produce the same effect. Some of the more prominent causes may be briefly outlined as follows:

1.—Chattering action of car trucks on which the two motors are hung outside the axles.

2.—Defects existing in rails when they are put in service, caused by the condition that when the head of the rail is rolled the metal has lost much of its initial heat and the advance of the metal lags materially behind the periphery of the rolls. This causes a series of characteristic marks which under traffic develop into well defined corrugation. ("Recent Report on Rail Corrugation in Europe," Electric Railway Journal, page 317, Aug. 28, 1909.)

3.—When a car is traveling with one side jammed close against the rail there is a tendency for the wheels on that side to ride on the flange fillet instead of on the tread of the wheel, thus increasing the rolling diameter on that side and causing a slipping or skidding action on the other side of the truck. This skidding action is explained by the fact that when the car wheel grinds against the rail on an increased periphery, the axle will be twisted until the torsion is sufficient to make the mate wheel skid on the rail. With clean rails this action is continuous. If, however, the track is dirty, the wheels will advance in a series of jerks at regular intervals. Therefore, the presence of sharp grit, sand, dust, etc., is a prime factor in the production of corrugation. Side pressure of the flanges on straight track is due to irregularities in gauge and surface, which makes the car lunge from side to side. (C. A. Carus-Wilson before the Tramways Congress of the Franco-British Exposition, July 10, 1908.)

4.—Sliding of the wheels on the rails due to rapid and intense braking.

5.—Tight track gage.

6.—Flat spots in wheels.

7.—Too rapid acceleration.

8.—When a wheel rolls on a rail it has a tendency to elongate the upper fibers of the metal and this increased length is pushed ahead of the wheel and compacted until the metal becomes so dense that the wheel cannot force it further. The wheel then rides over this little hump and begins the same process on the other side. (See remarks of C. B. Voynow before American Street & Interurban Railway Association, Atlantic City convention, 1907, Street Railway Journal, page 789, Oct. 19, 1907.)

9.—Corrugation is due to vibration either of the rails or of the whole track structure. There may be lateral bending of the web of the rail under the passing car, the rails may be loose on the ties, the ties may be loose on their foundations or there may be movement of the foundation immediately under the track structure.

There is probably some ground of support for all of the above theories, but as stated before, no one of them will explain all the phenomena of corrugation. Of the theories which will most nearly meet all conditions, the last two are perhaps deserving of more than passing notice. It is not the intention to enter into any extended discussion, nor to present any valuable new material, but merely to note a few points which have occurred to the writer in a more or less superficial examination of corrugation at odd moments. In connection with theory No. 8 it seems a fair assumption that if the metal of the rail is rolled ahead of the wheel there must be force enough applied to overcome the elastic limit of the metal, for otherwise there could be no flow of the metal or permanent set. Do we get such a force under the ordinary car? Unfortunately, there is little information obtainable on the action of metals under moving loads, so we must argue from their behavior under static loads.

The late Prof. Johnson made some experiments on the areas of contact between car wheels and rails and the pressures generated under various loadings. He found that under a maximum loading of 164,000 lb. per sq. in. no permanent set was produced in either wheels or rails and that the "apparent elastic limit" of the material had not been reached for this condition of contact. (Trans. American Society Civil Engineers, Page 270, Vol. 32).

Some further experiments along this same line have been made by Geo. L. Fowler, and have been incorporated in "The Car Wheel" published by the Carnegie Steel Company. If we assume that the loading of an ordinary double truck eight-wheel car is, under maximum conditions, about 8000 lb. per wheel, we find from Mr. Fowler's experiments that the area of contact is about 0.10 sq. in. which gives an average pressure of 80,000 lb. per sq. in. or about one-half the loading under which Prof. Johnson failed to notice any flow of the metal. It is hard to say just what pressure is generated under such a condition of contact with a moving load. It seems natural to suppose that the pressure would be increased with the speed, but on the other hand the metal must have time to flow and the more the speed is increased the less chance there is for movement. Furthermore the occurrence of corrugations does not show the worst cases where the speed and loads are greatest. We might also argue that if this theory were true we would expect the rails showing a variation in hardness would develop corrugations and that the hard spots would be the crests of corrugation waves. Mr. Fowler in the Street Railway Journal, for Oct. 5, 1907, has given the results of some experiments which tend to disprove this idea.

In connection with this theory it is interesting to note that the angle which the corrugation wave makes with the gage line is approximately the angle contact between the wheel tread and the rail head and that the crests of corrugation waves are apparently densest and highest at the bearing point of the wheel and rail and decrease gradually in the direction of traffic from the gage line toward the outer edge of the rail head.

It has been the privilege of the writer to examine many cases of corrugation under many and various conditions. A careful analysis of these cases has led to the opinion that in most instances the trouble is due to a lateral movement or vibration of the rail head caued by the buckling or bending action of the web, which allows the wheels to grind across the rail. In other words, the prime cause of corrugation is defective rail design as regards thickness of the web. When we consider that the webs of girder rails average from ⅜-in. to ½-in. in thickness and that wheel loads of 9,000 lb. and 10,000 lb. are carried on these thin plates stood on edge, we can readily understand how such buckling action can occur. Consider the action of the ordinary girder rail as that of a cantilever loaded at the end. It is evident that the bending moment increases from the head or point of loading to the base or point of support. If we assume that at the strongest point of the web, namely, at the end of the fillet under the head, ⅜-in.

is sufficient thickness, and develop with the cantilever formula, the thickness required for a beam of uniform strength, we find that the web should not be less than ½-in. or 9-16-in. to carry the ordinary wheel loads safely. We can also argue that the point where corrugation is most likely to occur is where the rail will have to withstand the greatest lateral stress or at the outside entering end of curves operated at high speeds with heavy loads. In the light of this deduction it is interesting to note the report of the Maintenance of Way Committee of the American Street and Interurban Railway Engineering Association presented at the Atlantic City convention of 1907. (STREET RAILWAY JOURNAL, page 729, Oct. 19, 1907.) An analysis of this report shows that in 60 per cent of the cases noted corrugations occurred in rails with a 13-32-in. web while the heaviest web on which they occurred was 7-16-in. thick. In 60 per cent of the cases also, corrugation was most frequent on the outer rail of long radius curves operated at high speeds with about 25-ton double truck cars.

To test the thin web theory more thoroughly the writer made a series of measurements in the following manner: A curve was selected where the grade was level and the speed high. The rail in this curve was Lorain section 104-353—a 9-in. guard rail which has a web ⅜-in. thick. A place was selected on the outside entering end of this curve, about the point where the outside leading wheel was reflected from the tangent by striking the gage line and where the radius was 410.19 ft. At this point was inserted an instrument for measuring the vertical movement of the rail head. This instrument which bolts securely to the base of the rail carries a short pin which is held in contact with the outer edge of the rail head by a small spring. This pin moves freely and connects with a pointer which registers to an exaggerated scale a movement of 1-64-in. The instrument described is similar to that devised for this purpose by H. B. Nichols, chief engineer, Philadelphia Rapid Transit Company, and described and illustrated in the STREET RAILWAY JOURNAL of May 18, 1907.

The time of all cars passing over the section was taken with a stop watch and a measured distance of 100 ft. At some distance before entering the measured section the cars were boarded by an observer who counted the passengers and by this means arived at an approximation of the loading. After the car had passed the reading on the instrument was taken by two observers. The results were as follows:

Eight double truck, eight wheel cars with an average load of 46,000 lb. at an average speed of 13.9 m.p.h., caused an average lateral deflection of 7-128-in. an inch.

Nine single truck, four wheel cars with an average load of 20,370 lb. at an average speed of 13.8 m.p.h., caused an average lateral deflection of 1-32-in.

The maximum deflection for the eight wheel cars was 23-128-in. with a load of 45,700 lb. at a speed of 20 m.p.h.

The maximum deflection for the four wheel cars was 13-128-in. with a load of 18,960 lb. at a speed of 17.8 m.p.h.

The rail on which these measurements was taken was badly corrugated. The corrugations were about 3-in. from crest to crest and about 1-16-in. deep, running diagonally across the rail from the gage line in the direction of traffic. The track was correct as regards gage and surface and was laid on ties on well packed gravel. There was no apparent vertical movement of the track under the cars and the whole roadbed seemed to be in first-class condition. From the foregoing observations and experiment, it seems safe to make the following deductions:

1. For average street railway conditions a 9-in. girder rail should have a web at least ½-in. thick.

2. With a web less than ½-in. thick there will be lateral deflection of the rail head and probably corrugations will be formed.

3. The amount of this deflection will be proportional to the speed and load.

The author does not claim that this article offers any new suggestions on this baffling subject. His efforts have been directed toward assembling and presenting the most important records which have been made on the study of the subject, with the belief that in most cases the trouble can be traced to the lateral vibration mentioned above.

C. S. MELLEN DISCUSSES PROPOSED PUBLIC UTILITY LEGISLATION IN CONNECTICUT

A letter addressed by Charles S. Mellen, President of the New York, New Haven & Hartford Railroad, to Everett G. Hill and Arthur S. Barnes, officials of the Connecticut Editorial Association, dated Aug. 26, discusses the proposal to establish a public service commission in Connecticut. In order that there may be an intelligent discussion of remedies, Mr. Mellen asks for precise statements of the abuses in Connecticut which are found to need correction in order that there may be an intelligent discussion of the relief measures which should be applied. Mr. Mellen says in part:

"In the country at large, legislation upon this subject seems to be influenced to a considerable extent by a prejudice against corporations. But a corporation is in general only a financial arrangement adapted to permit many individuals—men, women and children—to use their separate savings in large business undertakings, under a management which they can trust.

"In the country at large there are also appearances indicating the influence of a particular prejudice against railroad companies. I wish very much that every man, before indulging in any vague prejudice of this sort, would stop to think what a railroad really is. In the first place, it is an enormous physical plant specially adapted to the performances of services of great general importance, which has been created by the money investors and the earning of that money. In the second place, it is an enormous and complicated human organization.

"I have a right to hope that the legislation regarding which you inquire will not be promoted or framed in response to any populistic clamor against railroads. Against what or whom would such a clamor be really directed? Against the investors? Over 20,000 stockholders of the New York, New Haven & Hartford Railroad hold less than 50 shares of its stock. None of the investors in the securities of this company receives more than a fair return on the money which has been paid for these securities.

"Is there to be a clamor against the operating organization? I presume that very many can suggest some particular trouble caused by some individual or individuals in this huge organization. Is it fair to hold all the rest of the organization responsible for this? Leaving myself again entirely out of the question, I can testify from personal knowledge that the officers and employees of this railroad company are hard-working duty-performing men.

"Is there to be a clamor against the directors of the corporation? They occupy a position of trust toward all the great interests involved in the general management of a railroad system. No tribunal could be created by law which would be more certain to respond promptly and efficiently to any appeal for the public good than the board of directors of this corporation.

"I think Connecticut people ought to realize that any political action which materially decreases the earning of its chief railroad company will injure the public even more quickly and more seriously than it will the investors in the securities of that company. Any action by the State which lessens the earnings of the corporation will naturally tend to diminish the power of the corporation to improve its railroad, and will result necessarily in less efficient service. Any political action which diminishes the earnings of this corporation will also necessarily tend to impair its ability to pay their fair wages to its employees, and to give those orders for the purchase of supplies upon which the prosperity of so many citizens of Connecticut depends.

"I frankly avow that I am not opposed to any legislation which, after consideration, may seem to be necessary for the correction of any real abuses, actual or threatened. I believe that any such legislation which is really necessary would benefit the railroad as much as the public."

COMMUNICATION

VALUATIONS OF THE DETROIT UNITED RAILWAY

Chicago, Aug. 23, 1910.

To the Editors:

On the 17th inst. I wrote you regarding an article which appeared in your issue of the 13th inst. entitled "Valuations of the Detroit United Railway," and called your attention to the fact that the clause in that article reading, "This valuation was made by Robert B. Rifenberick, assisted by Bion J. Arnold and Horatio A. Foster, consulting engineers," might be misleading and would place me in an embarrassing position if incorrectly understood, and as evidence of this possibility I enclose newspaper clippings quoting remarks made on the 22d inst. in the Chicago city council by certain aldermen, who, for reasons of their own, are opposing a traction franchise measure here.

In view of this misconstruction of your article, and in order that your readers may understand my exact connection with the Detroit valuation, I quote the following letter written by me on July 29, 1909.

"Chicago, July 29, 1909.

"J. C. Hutchins, Esq.,
"President, Detroit United Railway,
"12 Woodward Avenue, Detroit, Mich.

"Dear Sir:

"As I am leaving for the West, to be gone until about Aug. 15, I have thought best to write you what my understanding is of the recent conversation which we had regarding my connection with the valuation of your property.

"I understand that the values which will be submitted by your company, probably through Mr. Brooks, directly to Mr. Barcroft will be accompanied by a written statement to the effect that these figures have been compiled by your company, and that they are the company's figures and not mine. Furthermore, if there is any material difference between the figures submitted by your company and those compiled by Mr. Barcroft, such as to warrant a discussion of them, that I am to be called in to discuss this difference with Mr. Barcroft, and that only the figures which I finally decide upon are to be considered my figures.

"I hope that the figures submitted will be sufficiently close to Mr. Barcroft's idea of the proper valuation so as to make it unnecessary for this discussion, but if necessary I shall take pleasure in taking the matter up at such time as may seem to you advisable after Aug. 15.

"My understanding is also that Mr. Foster will be furnished with a complete list of everything delivered to Mr. Barcroft, so that he may go through them carefully prior to the time that I may be called upon to discuss the figures.

"I leave it to you to make it perfectly clear to the Committee of Fifty and Mr. Barcroft my position in this matter, and our understanding regarding the figures.

"Yours very truly,
(Signed) "Bion J. Arnold."

On Aug. 2 Mr. Brooks of the Detroit United Railway Company wrote to Mr. Hutchins as follows:

"Detroit, Mich., Aug. 2, 1909.

"J. C. Hutchins, Esq., President,
"Building.

"Dear Sir:

"I have noted and herewith return Mr. Arnold's letter of the 29th ult.

"I have explained to Chairman Eddy of the Committee of Fifty, to Chairman Van Husan of the Sub-Committee of Appraisal, to Chairman Conant of the Sub-Committee of Statistics and Regulation, and to Mr. Barcroft, Director of Appraisal, that the inventory, prices and other data that we are furnishing them are being prepared by our own forces, and when the work is complete, under our arrangement with Mr. Arnold, he will review the work for us and also represent us before the committee should there be such differences between our appraisal and the committee appraisal as to require discussion and revision.

"Yours truly,
(Signed) "F. W. Brooks, Gen'l Manager."

On Nov. 5, 1909, Mr. Hutchins wrote Mr. Eddy as follows:

"Detroit, Mich., Nov. 5, 1909.

"Frank W. Eddy, Esq.,
"Chairman, Committee of Fifty,
"Detroit, Mich.

"My dear Sir:

"I do not know that I should be disturbed by some of the reports I read in the newspaper relative to some stated amounts at which the properties of this company are being appraised. It is stated in one newspaper that the values submitted to the committee amount to $12,800,000, and in another at some $10,500,000. Of course, these may be only guesses, and I presume are such, but it rather worries me that such figures are floating around, as they, of course, tend to mislead the public.

"We have been perfectly frank and entirely above board in supplying for the information of the committee all of the data at our command. Our local corps of engineers, headed by Mr. Robert B. Rifenberick, a very competent engineer, has, after a most thorough study of values, reported to us that the cost of reproducing the company's properties in Detroit would amount to $24,708,375.40, exclusive of good will or franchise values.

"From time to time, as this work has been in progress, the same data which have been sent to your committee or its engineers have been sent for their consideration to Mr. Bion J. Arnold and Mr. H. A. Foster, who have been retained as consulting engineers for the company. These gentlemen have not as yet been brought into the situation, except as stated, but it has been our intention, relying upon what we have understood to be the policy of your committee, that after all data should have been collected, if differences should arise between our local corps of engineers, and the engineers of your committee, we would bring in Messrs. Arnold and Foster, engineers of high character and great experience, as our final representatives before your committee. I have no doubt it is the purpose of your committee that such a course shall be pursued. I do not know how far along the committee has proceeded in these matters as to valuations, but am pleased to say to you that we are ready to bring Messrs. Arnold and Foster here at any time that will suit your convenience for a review of the data you have collected respecting values.

"Awaiting advices from you, I am, with great respect,

"Yours very truly,
(Signed) "J. C. Hutchins, President."

Inasmuch as no opportunity has as yet been given me, and I understand this is through no fault of the railway company, to discuss with Mr. Barcroft, or any other engineer representing the Committee of Fifty, the differences between the railway company's figures and Mr. Barcroft's, it should not be assumed by any one that the figures published in your article are, or are not, my figures, because my judgment as to figures which I am to be held responsible for will be exercised at the time of the discussion referred to in the letters of Messrs. Brooks and Hutchins.

I am quoting the above letters with permission of Mr. Hutchins and I ask you to publish this letter in full in order that your readers may understand the matter.

Bion J. Arnold.

A new mechanical device for registering the number of passengers as they pass into the McAdoo Hudson River tunnels is being installed for trial at the Hoboken, N. J., station. By interrupting a stream of compressed air, which holds an electric circuit open in an instrument across the passageway, each person completes the circuit and is registered. If this instrument continues to work successfully it may do away with the ticket chopper. It was invented by H. A. Reishel, who has patented it.

SPECIAL CONVENTION TRAIN FROM CHICAGO

The joint committee on transportation of the American Street & Interurban Railway Association and the Manufacturers' Association has arranged for a special train from Chicago to Atlantic City at the time of the convention next month. The following announcement signed by J. M. Roach, president, Chicago Railways Company and E. C. Faber, general manager, Aurora, Elgin & Chicago Railroad, has been sent to all railway companies in the vicinity of Chicago and in the Northwestern States.

"The train will be operated over the Pennsylvania lines as a second section of the 'Pennsylvania Special,' commonly known as the '18-hour train,' leaving Chicago at 3:00 p. m. Sunday, Oct. 9, and arriving at Atlantic City Monday morning about 10:00 a. m. This schedule will save a day and will not require those living east of the Missouri River to leave home before Saturday night, Oct. 8.

"A rate of one and one-half fare for the round trip has been obtained for the territory of the Central Passenger Association, which will make the round-trip fare from Chicago $29.25. The one-way fare will be $19.50. Tickets good going and returning via the same route only, may be purchased from Oct. 6 to 9, inclusive, and will be good for return, to reach original starting point not later than midnight of Oct. 18. No arrangements for a special train returning will be made. The committee is endeavoring to get the return limit date extended, and in all probability will be successful.

"The Pullman berth fare from Chicago to Atlantic City will be $5; compartment, $14; drawing room, $18.

"Applications for Pullman reservations on this train should be addressed to E. K. Bixby, district passenger agent, Pennsylvania lines, Chicago, Ill.

"The committee in charge is endeavoring to provide attractions and entertainment that will make this year's convention trip more enjoyable than any that has been undertaken heretofore. Full information on these points will be issued from time to time as arrangements are perfected.

"In order to help the committee in making its arrangements for entertainment and accommodation we are anxious to know how many are to be expected, and, therefore, your early reply will be very acceptable."

The members of the joint committee representing the Manufacturers' Association are: J. F. Porter, Electric Service Supplies Company, Chicago, Ill., L. E. Gould, ELECTRIC RAILWAY JOURNAL, Chicago, Ill., and Hiram Kenfield, *Electric Traction Weekly*, Chicago, Ill.

RAILWAY FURNISHES FLOAT FOR GRAND RAPIDS PAGEANT

The accompanying illustration shows a float of the Grand Rapids (Mich.) Railway Company which secured honorable mention in the big civic pageant held in connection with the Grand Rapids Sixtieth anniversary and homecoming celebration on Aug. 25. The float represented the story of Ramona, after whom the company's summer theater and pavilion at Reed's Lake were named. Papier máché Indians supported a large fountain and a young woman dressed as an Indian also was on the float. The float was beautified with paper flowers in the "homecoming" colors which were pink, white and green. Another float for which the railway was responsible, in great measure, was that of the *Grand Rapids Herald*. A huge floral locomotive was built on one of the company's street sprinklers, the tank serving as the boiler. This float was decorated in white and blue and bore the words: "Herald Special."

OPENING OF THE NEW YORK STATION OF THE PENNSYLVANIA AND LONG ISLAND RAILROADS

Upon invitation of the Long Island Railroad, a large party of guests inspected the new terminal station in New York and the tunnels connecting it with New Jersey and Long Island on Aug. 30. Two special trains were run. A trip was first made to the New Jersey side of the river, after which the trains returned to the New York station, and proceeding under the East River, ran to Far Rockaway. Regular service via this route will be begun by the Long Island Railroad Sept. 8, and by the Pennsylvania Railroad early in November. During the rest of this week the company will entertain other parties, principally Long Island business associations.

The station in New York is said to cover more territory than any other building constructed at one time, in the history of the world. The Vatican, the Tuileries, and the St. Petersburg Winter Palace are larger buildings but have taken centuries in their construction. The Pennsylvania station covers 8 acres of ground, and has been erected in less than six years. The station occupies the entire area bounded by Seventh and Eighth Avenues and Thirty-first and Thirty-third Streets. The depth of the property on both streets is 799 ft. 11¼ in., and the length of the building is 788 ft. 9 in., thus allowing for extra-wide sidewalks on both side streets and avenues. Views of the station were published in the ELECTRIC RAILWAY JOURNAL for April 9, 1910.



Four-Team Float "Ramona," Furnished for Civic Pageant by the Grand Rapids Railway

It contains a trackage of 16 miles and an aggregate passenger platform length of 21,500 ft. The total storage capacity of the station tracks is 386 cars and the proposed daily service is 1000 trains, of which 600 will be those of the Long Island Railroad and 400 of the Pennsylvania Railroad.

The station is connected with Long Island by four single track tunnels and New Jersey by two single track tunnels. The single track mileage in tunnels is about 18. The lines are fed by electric power from the power station of the Pennsylvania Tunnel & Terminal Railroad at Long Island City. This station has a capacity of 40,500 kw.

VALUATION OF CHICAGO CONSOLIDATED TRACTION COMPANY

Bion J. Arnold and George Weston, comprising the commission appointed to appraise the property of the Chicago Consolidated Traction Company within the city limits of Chicago, have reported to Alderman M. J. Foreman, chairman of the local transportation committee of the city council, the following valuation as of Nov. 1, 1909:

Track (approximately 128 miles); $1,177,277; electric power distribution, $728,156; rolling stock (344 cars), $204,875; power plant equipment, $438,781; tools, supplies and furniture, $75,600; buildings, $278,688; real estate, $88,439; paving, $459,088; total, $3,450,904.

Percentages on above amount (5 per cent and 10 per cent) as allowed by the ordinance of Feb. 11, 1907, and pending ordinance, $517,635; total $3,968,539.

Messrs. Arnold and Weston state that this is their present appraisement of the property as it would be valued under the terms of the pending ordinance recommended for passage by the committee, subject to the deductions provided for in said ordinance. They continue: "Our previous valuations, based on the same principles as those followed in the traction valuations of 1906 and adopted by the ordinance of 1907, as stated in our letter to you of Aug. 10, 1910, were as follows: Value of physical property with paving, $4,078,057; without paving, $3,446,550; value of intangible property (franchises), with paving, $751,326; without paving, $751,326; total, with paving, $4,829,383; without paving, $4,197,876.

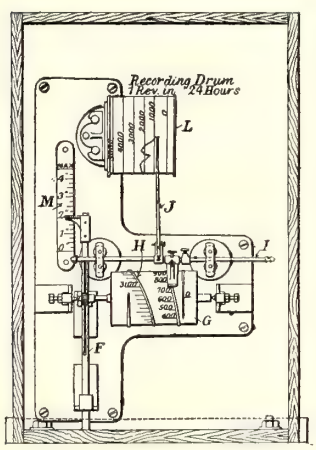
"We also deducted from each of these amounts the sum of $94,341 on account of the isolation of certain tracks due to prior expiration of ordinances, and also on account of the provisions of certain franchise ordinances requiring the removal of the tracks thereunder from the streets at the expiration of their respective franchises, making a total valuation of $4,735,042 including the paving, or $4,103.535 if paving is entirely excluded.

"In the present valuations made as first hereinabove stated, all franchise values have been entirely excluded, and the physical property has been appraised at its value for rehabilitation purposes. In other words, we have fixed such a value for the physical property as, presumably, could be certified to by the board of supervising engineers, on the assumption that the Chicago Railways Company was purchasing the property of the Chicago Consolidated Traction Company, including the paving, under the terms of the pending ordinance recommended by your committee."

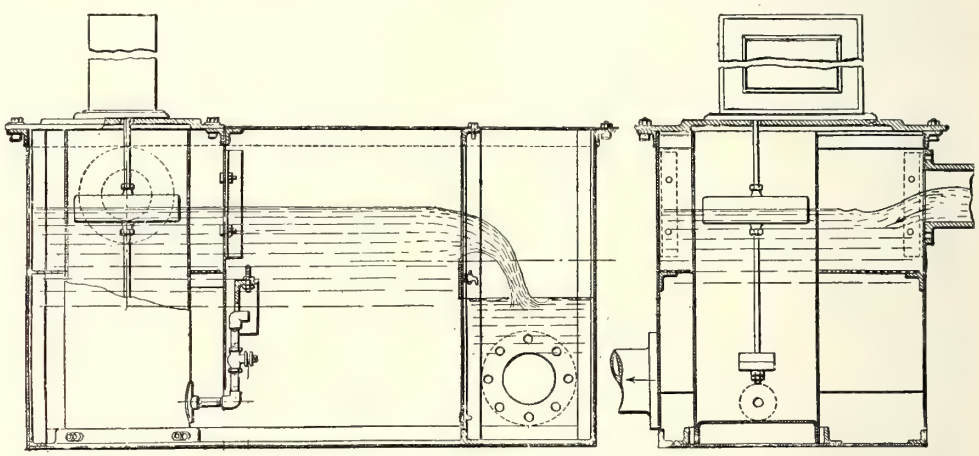
RECORDER OF STEAM AND WATER CONSUMPTION

A comparatively recent device which is being used extensively in British power stations for measuring steam consumption is the Lea recorder. This device actually measures the flow of water, but by applying it to the feed water or condensed steam as it is discharged from the air pump it can be used to test the steam consumption of groups of engines or of individual engines, either instantaneously or over definite periods of time.

The construction of the recorder is very simple. In the simplest form the water to be measured flows into an open tank and out through a V-shaped notch. Within the tank is a separate chamber in communication with still water so that the height of the water in the tank can be registered by a float. The vertical movements of this float are recorded on a clockwork-driven drum by means of a rectifying device so proportioned as to give the gallons or pounds of water passing through the V-shaped slot. Records of the performance of this device in several of the power stations in Great Britain show an accuracy within a fraction of 1 per cent.



Recording Device



Longitudinal and Cross Section of Recorder, Showing Tank and Float

Another feature of the device is that when installed on an engine or engines it gives a continuous record of the steam consumption and so it becomes possible easily and quickly to detect any local cause for high steam consumption, such as defective turbine blades or improper cut-off adjustment. The device is manufactured by the Lea Recorder Company, Manchester, England.

DISTRIBUTION OF ASSOCIATION MEMBERS.

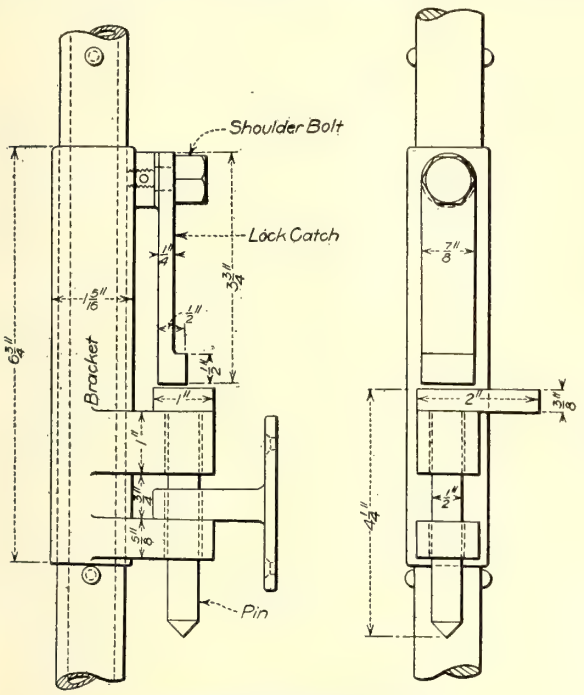
Secretary Donecker, of the American Street & Interurban Railway Association, has compiled the following statistics of the geographical distribution of the member companies of the association:

	1906	1907	1908	1909
North Atlantic	62	71	79	96
South "	20	25	26	35
South Central	25	26	32	35
North "	84	84	91	107
Western	18	19	24	38
Outside of U. S.	5	3	10	14
Total	214	228	262	325

The percentage of member companies represented at the annual conventions from 1906 to 1909 inclusive was as follows: 79.0, 76.3, 78.2, 51.7.

PREVENTING ACCIDENTS FROM OPENING GATES

At one time, the Virginia Railway & Power Company, Richmond, Va., was troubled by platform accidents due to passengers falling off the car by leaning against and thereby opening the old-style folding gates. These accidents were successfully eliminated by devising a gravity gate latch as shown



Richmond Platform Gate

in the accompanying drawing. It will be observed that the gate is held by a pin which is prevented from rising out of the bracket casting by the swinging lock catch above. This lock catch is so placed that it cannot be swung out of position by passengers leaning against the gates so that there is no possibility for the holding pin to be shaken out of the bracket.

MINOR SHOP ECONOMIES

Working experience under the local conditions surrounding a repair shop does much to point the way toward little economies that will benefit each installation. In a recent instance noted the tendency to waste water at a bank of a dozen faucets adjoining the locker division was met by the company by the installation of two neat signs at the ends of the trough, bearing black letters on a porcelain background which called attention to the cost of wasting water for different sized pipes. A circle was printed for each size of pipe from 1 in. to 1/64 in. diameter, and the number of gallons per hour and the daily cost given for each. Thus, the cost of wasting the flowage of a 1-in. pipe for one day was $14, and for the ½-in. pipe $6. In the same shop a wheel-grinding plant was transferred to a new location following an expansion of the property to handle an additional number of cars. The grinding tools were set into a recess below the floor level, bringing the centers of the head and tail stocks about 20 in. above the floor, and short inclined planes were fastened to the rails so that axles carrying wheels and gears could be run up to the centers easily for placing the work in position. The amount of lifting of the axles was thus cut down to the minimum.

In the blacksmith shop there is frequently an opportunity to save labor by arranging the drop hammer so that it can be operated by a treadle from the front side, thus dispensing with the services of one man in certain lighter classes of work. In bending up rods for springs, for example, the diameter of the stock used is ordinarily small enough to enable it to be turned at the hammer by one hand. So much time is unavoidably lost in heating stock in the average forge shop that something is gained if the helper can work continuously at the fire on the lighter hammer jobs. A central location for all power tools which are frequently used in the forge shop not only saves time in walking, but tends to facilitate better work on account of the avoidance of cooling when stock is carried from the fire to the tool.

THE COLUMBUS STRIKE

There is still no indication of a settlement between the Columbus Railway & Light Company and its employees who are on strike. Cars are being operated regularly every day and evening, and people are patronizing them liberally. The men on strike are watching the cars carefully, and are threatening all who ride with dire consequences wherever they feel that they can bring pressure to bear.

On Aug. 27, 1910, the 24 banks of the city promulgated resolutions adopted the day previous, in which they declared for the exercise of personal liberty on the part of the people and denounced any action that would deprive citizens of the use of the cars. They also declared for law and order and the right of any man to accept employment at his will. The declaration of the banks follows:

"The strike of a part of the Columbus Railway & Light Company employees accompanied by violence, disorder and the use of the boycott has developed conditions in Columbus that have become intolerable to all good citizens.

"Therefore, we, the undersigned, declare the following principles:

" 'First—The preservation of law and order, the surest safeguard of true liberty.

" 'Second—Equal rights to all.

" 'Third—We denounce the boycott as tyrannical, un-American and brutal.

" 'Fourth—The right to take employment or leave it.

" 'Fifth—The right to use the street cars as a means of transit without molestation, hindrance or intimidation.

" 'It is no longer a question of opinion as to the merits of either side in the present controversy, but a question of personal liberty and public safety and we urge all law-abiding citizens to stand firm for law enforcement and the immediate abatement of the conditions that now exist.' "

On the evening of Aug. 28 dynamite was found on the West Broad Street tracks. A freight car on the city tracks north of Columbus was dynamited on the evening of Aug. 26. The soldiers have been kept on duty.

On the evening of Aug. 29 rioting was resumed. In almost every part of the city large crowds gathered and attacked the crews of the cars. Many persons were injured. A battalion of troops was sent to Twentieth Street and Leonard Avenue, where a mob had got beyond the control of the police. A crowd of 100 strikers and sympathizers gathered at the Union Station on Aug. 29 and as people alighted from the trains urged them not to ride in the cars. This caused a riot. A policeman sent a call to Police Headquarters and the officer called for troops. Major Goodrich was sent to the scene to investigate, but when he arrived peace had been restored.

The lawless element continued its depredations on the evening of Aug. 30 by dynamiting several cars. At 10 o'clock a car was dynamited at Main Street and Grand Avenue and several persons were injured. This is probably the most serious attack that has been made on the property of the company. On Aug. 30 a number of leaders of organized labor called on General Manager Stewart of the company with a view to having him agree to arbitrate the differences between the company and the men, but he said that there was nothing to arbitrate and referred to the previous official statements of the company. The representatives of labor then arranged for a conference with Governor Harmon to be held on the evening of Aug. 30 for the purpose of trying to induce him publicly to demand the company to arbitrate. The conference with the Governor lasted until midnight, but no statement was made public following the conference, so its import is unknown.

LONDON LETTER

(From Our Regular Correspondent)

The Town Council of Weymouth is at present considering the advisability of providing some means of transportation in its district, and is at present weighing the relative advantages of tramways, motor omnibuses and railless traction methods. It is estimated that the capital cost of motor 'buses would be £10,000, railless traction £12,000, and electric tramways £27,000. The committee has about decided that the only practical solution is to provide electric tramways, and the matter will be decided at an early meeting.

A new departure has just been inaugurated on the Metropolitan Railway, one of the underground railways of London. One of the most important of this company's extensions is that which runs from Baker Street northwest through St. John's Wood, Hampstead, Kilburn and on to Harrow, Rickmansworth, Amersham, Aylesbury and Verney Junction. This has been for some considerable time entirely operated by electricity, and as the districts mentioned are all of a first-class residential nature it has occurred to the Metropolitan Railway to provide Pullman cars on this extension. The company has been running through trains on this line to the city, doing away with the necessity of the tedious change at Baker Street, and now that these Pullman cars have been put on, by arrangement with the Pullman Company, Ltd., a suitable increase is expected in the traffics and the steady building up of these beautiful suburbs as residential districts for London citizens.

J. H. Rider, who for the past nine years has been the electrical engineer for the London County Council Tramways, has resigned his position with the Council, having obtained an important appointment in South Africa as advisory consulting engineer to Messrs. Wernher, Beit & Company (Messrs. H. Eckstein & Company, Johannesburg). When Mr. Rider came to London to occupy the position which he has just resigned, the electrification of the tramways in London was just commencing, and it was under his careful management that the large central station for the Council's tramways was built on the river side at Greenwich. This station has attracted considerable attention, more, perhaps, than it otherwise would have done, as it is built exactly on the meridian, and it will be remembered that a few years ago considerable discussion arose from the fact that it was interfering with the delicate work of the Royal Observatory at Greenwich. At that time it was decided that the smokestacks would not even be completed, and they have never been built up to their full height. In this station at Greenwich, also, were installed, on Mr. Rider's advice, the first and only engines in Great Britain having two vertical and two horizontal cylinders. Even at the time they were installed they were becoming obsolete, turbines at that time developing very rapidly, and since the installation of these engines two very large Rateau turbo-generators have been installed. Mr. Rider has been a popular member of the electrical profession in this country, and his many friends will wish him the best of success in his new field.

The British and American Associations of Mechanical Engineers have had a highly successful meeting in Birmingham and London, which was particularly noteworthy because of the attention given to railway electrification. With the papers by Mr. Westinghouse, Mr. Potter and Mr. Pomeroy the readers of this paper are familiar. One of the most valuable of the British papers was that contributed by F. W. Carter, on "Electrification of Suburban Railways," giving some very valuable information regarding the working of all the electric railways in Great Britain. From his figures it would appear that there are 18 railways in Great Britain, operated wholly or in part electrically, working over an approximate length of 200 miles of route and 410 miles of track. These railways are worked by 87 locomotives and 821 motor coaches. Various figures were given of the City & South London Railway, which is the oldest of the London electrically operated lines; the Central London Railway, commonly called the "Twopenny Tube"; the Great Northern & City Railway, and the various underground electric railways of London which have been constructed in more recent years and which are well known. Interesting figures were also given of the London, Brighton & South Coast electrification scheme, which is the first railway to use the single-phase system in this country and which has been frequently referred to in these columns during the past year. H. M. Hobart also presented some figures on the cost of electrically propelled suburban trains.

Valuable testimony as to the success of linking up tramways has recently been published in the annual report of the West Ham system. The West Ham Corporation has operated a system in its district for some years with marked success, but only recently was it possible to procure the advantage of through-running cars onto the London County Council's tramways at Bow Bridge. From the report it appears that the average receipts in West Ham have been about £250 a week more than those for the corresponding weeks of last year, a result made possible by the fact that passengers are now able to perform without a break the journey from Aldgate in London to the borders of Epping Forest on the outskirts of the West Ham system. Leyton, which is also linked up with the West Ham and the London County Council's systems, has also experienced a big rise in its receipts, these being £150 a week more than they were a year ago before through communication was available.

The Newcastle Corporation is at present considering the question of extending its tramways to the coast by way of Benton. Representations have been made from time to time from outlying districts, but the tramways committee has not considered it advisable. Now, however, that Leeds and Bradford have both obtained Parliamentary powers for the installation of a trackless trolley system, the Newcastle tramways committee has conceived the idea that their city might also be beneficially linked by this means to outlying districts, and doubtless a Parliamentary bill will be introduced next session for powers for extensions, both by trackless trolley and by the ordinary tramlines.

The Cardiff tramways committee is looking for improved methods of running the electric car undertaking, and recently decided to purchase 130 meters at £3 5s. each, to attach to the cars as checks upon the current expended by the drivers. They will be paid for out of revenue in the course of two years. The firm which supplies the meters guaranteed that the cost would be covered out of energy saved in one year, and that if at least 6 per cent of energy were not saved in the first six months they would take the meters back free of cost.

Considerable interest is taken in the announcement that in order to cope with the growing tram-car competition the Great Central, Lancashire & Yorkshire, and London & North-Western Railway Companies are about to start elaborate services of motor trains on many of their lines radiating from Manchester for 10 to 12 miles, dozens of towns and suburbs being tapped in this manner.

Intimation has been received by the Bacup town clerk that the Board of Trade has confirmed the order of the Light Railway Commissioners for a new electric tramway from Bacup to Shawforth, which will be laid at once and will link up the system to Rochdale. The Rawtenstall Town Council has also received sanction to lay a new electric tramway from Waterfoot to Water. A. C. S.

Consul-General Robert P. Skinner, of Hamburg, reports that while there is always a market in Germany for electrical devices not already supplied by domestic manufacturers, or which possess the elements of novelty and practical utility, the condition of the electrical industries in that country is such that German manufacturers are not only able to satisfy nearly all domestic requirements but are also exporting in immense quantities to all parts of the world. For a very considerable period, and until within the last few months, when American manufacturers obtained the benefit of the lowest rates of duty in Germany, electrical supplies from the United States were subject to import duties greatly in excess of those applied to similar goods from other countries. Owing to this and other causes, German concerns, by arrangement, are manufacturing many articles of American invention, so that within the last few months, when the telephone system of Hamburg was reconstructed, with the exception of a limited number of articles imported from the United States everything was supplied by German houses.

News of Electric Railways

Program of Central Electric Railway Association

The following program has been announced for the meeting of the Central Electric Railway Association, which is to be held at the Claypool Hotel, Indianapolis, Ind., on Sept. 22, 1910:

SEPT. 22, MORNING SESSION, 10 A. M.

Business session and reports of special committees.

Talk on large station units, illustrated with lantern slides. Geo. J. Smith, Galena Signal Oil Company.

Paper, "Efficiency and Design of High-Tension Insulation," by A. C. Austin, electrical engineer of the Ohio Insulator Company.

Discussion.

SEPT. 22, AFTERNOON SESSION, 1 P. M.

Report of standardization committee.

Paper, "Track Work," by E. B. Entwistle, chief engineer of the Lorain Steel Company.

Discussion.

Paper, "Destinies of 500-Volt D.C. Motors, 1250-Volt D.C. Motors and 6600-Volt A.C. Motors," by W. E. Davis, vice-president of the Cleveland Construction Company.

Discussion.

Adjournment.

The executive committee of the association will meet in the office of the secretary in the Traction Terminal Building, Indianapolis, on the evening of Sept. 21, 1910, to transact routine business and consider any special matters that may be brought to its attention.

Transit Affairs in New York

Representatives of the Interborough Rapid Transit Company and the Public Service Commission, who have been in conference for more than a year over a $6,000,000 claim by the Interborough Rapid Transit Company for extra work done on the subway, have come to an agreement. It is said that the company will get about 35 per cent., slightly over $2,000,000. The claim covers the entire system from Atlantic Avenue to the termini at Van Cortlandt and Bronx Parks. Any expenditure the company thought represented permanent investment it charged to the city. This includes a heavy claim for construction of the East River Tunnel on which the Interborough Rapid Transit Company submitted a very low bid.

After a conference on forms of subway contracts held in the Mayor's office between Acting Mayor Mitchel, Deputy Comptroller Mathewson, LeRoy T. Harkness, of the counsel to the Public Service Commission, and some of the commission's engineers, Mr. Mitchel stated that the points of difference between the transit committee of the Board of Estimate and Apportionment on the forms of contract for the new subways had been reduced from 44 to four, and that these four points would probably be adjusted eventually, as they all relate to details of engineering. Mr. Mitchel declared himself still in favor of municipal construction, and said that there might be a lively discussion in the Board of Estimate and Apportionment after the advertising for bids should private construction bidders be recommended for awards of contracts. Mr. Mitchel admitted that according to the agreements thus far entered into between the Public Service Commission and the acting Mayor and the Comptroller the commission has reserved the right to permit open cuts in the new subways on Manhattan Island. Furthermore, the understanding between the acting Mayor, the Comptroller and the commission is that the contracts will provide that south of 130th Street tracks shall be under cover, except at all places shown in the detailed plans on file in the offices of the Public Service Commission. The commission also reserves the right to permit open cuts, if it sees fit, wherever they will not interfere with traffic or the public welfare.

Representatives of the Public Service Commission and the Interborough Rapid Transit Company have been in conference recently arranging a settlement of an arbitration relative to claims for extras on the subway operated by the Interborough Rapid Transit Company. It will be remembered that the Interborough Rapid Transit Company claimed something like $6,000,000 for extra work done in the construction of the subway, and the matter went to a board of arbitrators. A compromise will probably be effected by which an amount somewhat in excess of $2,000,000 will be paid. Whatever amount is awarded to the company will be used, according to an arrangement with the commission, for additions to the system.

W. G. McAdoo, president of the Hudson & Manhattan Railroad, has stated that the Thirty-third Street terminal station should be opened about Nov. 1, 1910. The extension to Forty-second Street and connection with the train levels of the Grand Central station should be completed within the three-year limit. Work is being pushed rapidly on the Jersey City-Newark extension, and the new line from the Pennsylvania Jersey City station to Jersey City's business district should be opened by Sept. 6, 1910. Within a year the connection with the Pennsylvania Railroad tracks to Newark should be made.

Action Postponed on Boston & Eastern Railroad Certificate

By a majority report the Massachusetts Railroad Commission has refused at present to issue a certificate of public convenience and necessity to the Boston & Eastern Electric Railroad, which has been before the board for about three years seeking the right to build a high-speed electric railway between Boston, Lynn, Salem and Beverly. Commissioners White and Bishop state that action on the company's petition should be postponed until the Legislature of 1911 has made known its attitude regarding the electrification of steam railroads at Boston, the building of a tunnel between the North and South Stations, and other improvements in the transportation service of the Boston metropolitan district which are to come before it. Chairman Walter Perley Hall has issued a dissenting opinion to the effect that a certificate could be issued to the company at present without prejudicing the solution of the above problems.

The company has filed the following request with the commission, asking that its petition be taken up again.

"The association for the formation of the Boston & Eastern Electric Railroad hereby requests that your honorable body grant to it a further hearing in the matter of its petition for a certificate of public convenience and necessity, and that you reconsider your finding as expressed by a memorandum filed Aug. 22, 1910, for the following reasons:

"First—That the majority of the board in their memorandum of a finding filed Aug. 22, 1910, made a manifest error in law and in the construction of Chapter 630 of the acts of 1910.

"Second—That the finding of the majority of the board in their memorandum filed Aug. 22, 1910, is based upon grounds and raises questions which the counsel for the petitioners have not had opportunity to argue before your honorable board and present their views.

"Third—That the majority of the board of railroad commissioners have ignored the rights of the petitioners under a decision of the board filed Nov. 17, 1908."

Association Meetings

Central Electric Accounting Conference.—Chicago, Ill., September.

Colorado Electric Light, Power & Railway Association.—Glenwood Springs, Col., Sept. 21, 22 and 23.

Central Electric Railway Association.—Indianapolis, Ind., Sept. 22.

Central Electric Traffic Association.—Winona Lake, Ind., Sept. 27.

Oklahoma Public Utilities Association.—Oklahoma City, Okla., Sept. 30 and Oct. 1.

American Street & Interurban Railway Association.—Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

Electrification of Illinois Road Completed.—The work of equipping the Chicago, Aurora & DeKalb Railroad with electricity has been completed and the steam service has been supplanted by electric service.

Suit to Compel Street Repairs in Pittsburgh.—A suit in equity was filed in Common Pleas Court, No. 2, at Pittsburgh, on Aug. 23, 1910, by City Solicitor O'Brien, in behalf of the City of Pittsburgh, to compel the Pittsburgh Railways to repair many miles of streets.

N. E. L. A. to Study Workmen's Insurance.—The National Electric Light Association, in its desire to obtain the very latest information regarding the prevention of accidents and compensation to workmen, has commissioned Dr. Wm. H. Tolman, the director of the American Museum of Safety, to study the German governmental system of workmen's insurance in its threefold aspect, of accident, sickness and invalidity, including old age pensions.

Convention of the Colorado Electric Light, Power & Railway Association.—The eighth annual convention of the Colorado Electric Light, Power & Railway Association will be held at Glenwood Springs, Col., Sept. 21-23. The meetings will be held in Hotel Colorado. In addition to the papers listed below, committee reports on "Grounded Secondaries," "Insurance" and "Meters" will be presented. The subjects covered by papers follow: "Storage Batteries in Street Railway and Central-Station Work"; "Attitude Which Central Stations Should Maintain Toward Their Customers"; "Mazda Series Street Lighting"; "High and Low-Tension Pole Lines"; "High and Low-Pressure Turbines"; "The Place of Rotary Condensers and Induction Generators in Transmission Systems." W. T. Wallace, of the Colorado Light & Power Company, Canon City, is president of the association, and F. D. Morris, of the Colorado Springs Light, Heat & Power Company, is the acting secretary-treasurer.

Railway Electrical Engineers' Convention.—Preparations are under way in Chicago for the forthcoming annual convention of the Association of Railway Electrical Engineers, to be held at the Hotel La Salle, Chicago, Ill., on Sept. 27, 28, 29 and 30. A feature of the convention will be a large display of exhibits, and the roof garden, or 19th floor of the hotel, has been engaged for the exclusive use of the convention. The meetings will be held here, and the remaining space will be used for exhibits. A committee of the Railway Electric Supply Manufacturers' Association, an allied organization, is in charge of the local arrangements for the convention. George H. Porter, Western Electric Company, is chairman of this committee, and the other members have been assigned duties as follows: Exhibits, W. E. Ballentine, Willard Storage Battery Company; entertainment, W. H. Glatt, New York Leather Belting Company; finance, A. C. Moore, Safety Car Heating & Lighting Company; auditing, J. M. Lorenz, Central Electric Company; publicity, Edward Wray, *Railway Electrical Engineer;* membership, J. M. Schilling, Westinghouse Electric & Manufacturing Company.

Extension of Hudson & Manhattan Railroad Service.—Notices have been posted by the Hudson & Manhattan Railroad, New York, N. Y., that service in the Jersey City extension, which extends from Exchange Place to Henderson Street, Jersey City, will be started on Sept. 6, 1910. Through trains will run between Henderson Street and Twenty-third Street, New York, and the Terminal buildings, at Cortland Street, New York. Passengers to and from Hoboken will change at the platform at the station of the Erie Railroad, in Jersey City. Service from Twenty-third Street and the Terminal buildings, in New York, to Hoboken, will remain unchanged. Passengers from the Terminal buildings, Exchange Place, Jersey City, and the Pennsylvania station for Twenty-third Street will change at the Erie station, and passengers from uptown for the Pennsylvania Railroad station, Jersey City, and the Terminal buildings, will change at the Erie Railroad station. In other words, all trains leaving the Terminal buildings and Twenty-third Street will go to Hoboken, and alternate trains from Hoboken will go to the Terminal buildings and Twenty-third Street. At present alternate trains from either Manhattan terminal go to Hoboken and the other terminal.

Financial and Corporate

New York Stock and Money Market

August 30, 1910.

Trading in the stock market has been exceedingly light during the week and has been limited almost entirely to the professionals. While there has been no happening to influence market conditions adversely beyond the general apprehension over the anti-corporation propaganda now being carried on in the West, there has been a general sentiment of apathy. Prices have fluctuated only fractionally and have been little changed in net result.

The money market, too is unchanged. Call loans are remarkably cheap, and money for these is plentiful. Time money is not remarkably cheap.

Other Markets

Tractions in the Philadelphia market have been very little in evidence during the past week. Only small lots have been offered and price changes have been unimportant. Rapid Transit was a trifle lower to-day, but the net change during the week has been only fractional.

In the Chicago market there has been practically no trading in tractions. Series 2 Chicago Railways sold at 16 yesterday, but the transaction was only 25 shares. Subway has been selling at 4⅞.

Both issues of Massachusetts Electric have again been fairly active in the Boston market during the past week. The close to-day was 18 for the common and 82 for preferred. This is a slight gain for the former and a fractional loss for the latter. Other tractions were dull.

In the Baltimore market stock of the United Railways Company has sold at former levels and the bonds have shown no important price changes.

Quotations of various traction securities as compared with last week follow:

	Aug. 23.	Aug. 30.
American Railways Company	a44½	a44
Aurora, Elgin & Chicago Railroad (common)	*50¼	*50¼
Aurora, Elgin & Chicago Railroad (preferred)	*90	*90
Boston Elevated Railway	126	a126½
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	36	36
Brooklyn Rapid Transit Company	75¼	74⅞
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82¼	82¼
Capital Traction Company, Washington	a130	a131
Chicago City Railway	a185	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a71½	a75
Chicago Railways, ptcptg., ctf. 2	a16	a16½
Chicago Railways, ptcptg., 3	a12	a8
Chicago Railways, ptcptg., ctf. 4	a5½	a5½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a103	a103
Detroit United Railways	*45	*45
General Electric Company	144	144¾
Georgia Railway & Electric Company (common)	107½	107½
Georgia Railway & Electric Company (preferred)	*86	*86
Interborough-Metropolitan Company (common)	17¾	17⅞
Interborough-Metropolitan Company (preferred)	48	48½
Interborough-Metropolitan Company (4½s)	79⅛	79
Kansas City Railway & Light Company (common)	a25	a30
Kansas City Railway & Light Company (preferred)	a78	a68
Manhattan Railway	131	*131
Massachusetts Electric Companies (common)	a18	a18
Massachusetts Electric Companies (preferred)	a83	a82
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a65	a62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*69½	68
Northwestern Elevated Railroad (common)	a20	a18
Northwestern Elevated Railroad (preferred)	a60	*60
Philadelphia Company, Pittsburg (common)	a44	a44
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a18¼	17¾
Philadelphia Traction Company	a84	a83½
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a100	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a60	a62
Third Avenue Railroad, New York	*8½	8½
Toledo Railways & Light Company	*7	*7
Twin City Rapid Transit, Minneapolis (common)	*106½	*106½
Union Traction Company, Philadelphia	a43¼	a43½
United Rys. & Electric Company, Baltimore	a15	a15
United Rys. Inv. Co. (common)	*31	*31
United Rys. Inv. Co. (preferred)	56	54
Washington Ry. & Electric Company (common)	a33	a32⅞
Washington Ry. & Electric Company (preferred)	a90	a89½
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*100	*100
Westinghouse Elec. & Mfg. Company	*60½	59
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last Sale

Annual Report of Illinois Traction Company

The sixth annual report of the management of the Illinois Traction Company to the board of directors, covering the calendar year 1909, shows gross earnings of $4,752,082, as compared with $4,415,051 in 1908 and $4,056,582 in 1907. The gain in 1909 over 1908 was 7.6 per cent. Operating expenses and taxes aggregated $2,749,069 in 1909, as compared with $2,522,779 in 1908. A comparative statement for three years follows:

	1909.	1908.	1907.
Gross earnings:			
Interurban	$1,980,779	$1,847,381	$1,610,257
Local street railway	1,371,119	1,283,892	1,226,591
Gas	293,072	277,085	259,572
Electric light and power	961,115	872,394	819,427
Steam heating	138,486	134,285	127,453
Miscellaneous	7,511	14	13,282
Total gross earnings	$4,752,082	$4,415,051	$4,056,582
Operating expenses	$2,585,043	$2,423,757	$2,217,287
†General and overhead expenses	43,150	.....	.....
Taxes	120,876	99,021	78,952
Total operating expenses	$2,749,069	$2,522,778	$2,296,239
Net earnings	$2,003,013	$1,892,273	$1,760,343
Less net earnings of Des Moines property prior to purchase	75,749	147,776	105,643
Total net revenue of Illinois Traction Company	$1,927,264	$1,744,497	$1,650,700
Percentage of operating expenses	57.85	57.14	56.61

†Amounts of general expense included in operating expense totals for years prior to 1909.

From the net revenue of $1,927,264 for the year 1909 there was deducted for interest on bonds $1,258,051, leaving available for dividends $669,213. Dividends on the preferred stock aggregated $259,146, leaving a surplus of $410,067. From this amount there was deducted for depreciation $200,000. The balance sheet surplus as of Dec. 31, 1909, was $1,460,428.

H. E. Chubbuck, general manager, says in part in his report to the president and board of directors:

"With the commencement of 1909 there was in progress the construction of the Mississippi River bridge at St. Louis, the lines of the St. Louis Electric Terminal Railway, the Decatur Belt, the Springfield Belt and later the Edwardsville and Granite City Belts. The question which had been pending for a year as to whether the lines from Peoria to Bloomington and from Mackinaw Junction to Springfield should be changed to direct current was also yet unsettled. These were the more important problems with which we had to deal at the beginning of the year.

"The importance of constructing the bridge of a type and strength commensurate with present steam railroad requirements has been kept constantly in view, and it is a pleasure to the management to be able to say that the bridge will be one that will be thoroughly adequate for handling the heavy modern equipment of steam railroads. The Eads bridge and the Merchants bridge, designed and erected years ago, are understood to be limited to a carrying capacity of 3,500 lb. per lineal ft. of track. Our bridge has been designed to provide a carrying capacity of 5,000 lb. per lineal ft. of track. The Illinois Traction bridge will, in fact, when completed, be the heaviest and strongest bridge of any kind across the Mississippi River at any point. When it is remembered that there are but two bridges across the Mississippi at St. Louis, that these are both heavily overtaxed already, that St. Louis is the fourth city in the United States, and that its trade is steadily and rapidly growing, the future value of such a bridge can hardly be overestimated. It is not unreasonable to assume that some of the steam roads which enter the metropolis will find it to their interest to operate over the bridge.

"Work has progressed rapidly on the trackage in Venice and on the approaches and tracks in St. Louis. One main span of the bridge had been completed when the work of the contractors was delayed, the false work erected by them in connection with the construction of the second main span being destroyed by the unprecedented high water and large quantities of floating ice. Construction work on the main river spans will unfortunately thus be stopped until after the maximum high water, usually taking place in June. It is now confidently expected that the two remaining main spans will be erected and the bridge completed for operation not later than December next.

"The uptown Broadway station, St. Louis, is well under way and will provide for entrance of trains on the second floor. Negotiations for the purchase of the land required for the large downtown terminals are under way.

"The new power plant at Venice, to supply the additional electrical energy required for the increased traffic which will result from the completion of the bridge and the inauguration of service into the heart of St. Louis, was designed early in the year. Contracts have been awarded and construction has progressed rapidly. This power plant, located at the east approach of the bridge and with an initial installation of 4000 kw., commands a strategic position for the development and operation of the St. Louis terminals, and also for the sale of power. Contracts for power have been solicited by manufacturing plants for nearly half of the proposed electrical capacity, and we will probably be able to derive a large income from the sale of power.

"Applications for switching facilities in St. Louis by well-established manufacturing plants have been numerous, which gives promise of a very large measure of interstate traffic between Missouri and Illinois.

"A new line, known as the Danville & Southeastern, seven miles in length, has been established and will be opened early in 1910 to serve the Grape Creek coal mining district, which is tributary to Danville.

"Work has progressed upon the belts as fast as possible in view of the delay caused by the Railroad & Warehouse Commission of Illinois, which controls, under the State law, the placing of crossings with other railroads.

"For the better supervision and development of the interurban lines, the organization has been modified to some extent, the office of general superintendent of interurban lines having been created. Several of the interurban stations have been transferred from the traffic to the transportation department. In lieu of the former system of division superintendents, a chief trainmaster and assistant trainmasters have been substituted. The chief trainmaster reports directly to the general superintendent of interurban lines. This alteration has proved economical and satisfactory.

"The changing of the lines between Springfield, Peoria and Bloomington from alternating to direct-current operation was decided on and taken up actively. This makes it possible without change of cars or equipment to run through service from point to point upon the system, has proven of great advantage in operation.

"A tie renewal fund has been created. This is accumulated by the payment of a fixed sum from the interurban receipts each month which is charged to operation. Creosoted oak ties are now used for all construction and maintenance work.

"The freight equipment has been increased by adding 50 new 40-ton coal cars, 25 new 40-ton box cars, 8 passenger trailer cars.

"The requirements of the interstate commerce laws with reference to safety appliances have led to standardization as rapidly as possible of all rolling stock.

"Traffic agreements have been entered into with the Chicago, Rock Island & Pacific Railway and the Chicago & Eastern Illinois Railroad Company, which should prove an increasingly great factor in augmenting the traffic of the system. A freight claim department has been created.

"The construction of grain elevators along the lines has been encouraged, and several have already been erected, while others are in course of erection. When the belt lines shall have been completed the grain traffic should develop rapidly.

"The sleeper service which has been in operation from Springfield to East St. Louis for a long time has disclosed the desirability of its extension elsewhere. New cars have been ordered for a Peoria-St. Louis service.

"The Interstate Commerce Commission accounting system has been established as standard for interurban lines.

"The controversy with the City of Bloomington over the right of the Bloomington & Normal Railway & Light Company to occupy the streets of the municipality was concluded in June by the grant of a new ordinance for 20 years. This ordinance is considered exceedingly fair in its terms both to the city and company.

"The insurance of the entire system has been placed in charge of the land commissioner.

"A department of publicity has been organized and placed in charge of a trained newspaper man, and all advertising has been transferred to this department.

"The accident association has been enlarged and all of the companies of both the Illinois Traction System and of the Western Railways & Light Company participate therein under the name of the Western Illinois Accident Association. Its scope has been extended to include not only the interurban and street railway lines, but the electric lighting, gas and steam heating properties as well. The contract dated Jan. 1, 1909, has been entered into providing for payment of a fixed percentage of gross receipts to a fund, disbursements from which are made in payment of losses arising from accidents, subject to the conditions of the agreement. The percentage payable by the interurban and street railway lines is 2 per cent; by the electric and steam heating companies, ½ of 1 per cent; and by gas companies, ¼ of 1 per cent. On Dec. 31, 1909, the fund accumulated amounted to $65,351. Payments on account of accidents arising after Jan. 1, 1909, only have been assumed by the association.

"Of approximately 50,000,000 passengers handled during the year not one was killed in an accident.

"The relations between the system and its employees have been very satisfactory.

"The foregoing will afford a general view of the salient features of the year's operations. There has been no untoward occurrence of any kind; there has been efficient maintenance and development of the physical properties; continuous growth in passenger, express and freight traffic, and steady development and extension of railway, electric lighting, gas and heating properties, all of which have contributed to the good record of the year and forecast a bright future."

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—The stockholders of the Aurora, Elgin & Chicago Railroad will vote at the annual meeting of the company on Oct. 18, 1910, on the question of purchasing the Chicago, Wheaton & Western Railway, and on changing and enlarging the objects for which the Aurora, Elgin & Chicago Railroad was organized.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, under foreclosure, has been postponed from Sept. 26, 1910, to Oct. 18, 1910.

Lima & Honeoye Electric Light & Railroad Company, Lima, N. Y.—The Public Service Commission of the Second District of New York has given its consent that the Lima & Honeoye Electric Light & Railroad Company lease to the Lima-Honeoye Light Company its railroad system, electric light plant and other property located in Lima and Honeoye Falls. The Lima-Honeoye Light Company has been authorized to issue $5000 in capital stock to improve and extend the electric distributing system of the company.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Traction & Light Company has declared a quarterly dividend of ¾ of 1 per cent on the $9,000,000 of stock of the company, payable in September, 1910. This dividend compares with the dividend of ½ of 1 per cent paid from June, 1909, to June, 1910.

Ocean Shore Railway, San Francisco, Cal.—A hearing was held before United States District Judge Van Fleet, at San Francisco, on Aug. 19, 1910, to determine the amount of liens against the company that should have priority over the bonds. The matter went over until Sept. 8, 1910. The sale of the property of the company under foreclosure has been postponed from Sept. 1, 1910, to a date which is to be fixed by the court.

St. Francois County Railway, Farmington, Mo.—The property of the St. Francois County Railway was sold under foreclosure recently at Farmington for $25,000 to W. M. Harlan, president of the Bank of Farmington, who is said to represent a syndicate of local people who hold all but about $30,000 of the second mortgage bonds of the company.

Traffic and Transportation

Electric Railway Employees to Assist in Suppressing Reckless Automobilists

The Secretary of State of Connecticut, through his chief clerk, has addressed the following letter to the superintendents of the electric railways operating in Connecticut, in the hope that by their co-operation reckless drivers of automobiles may be apprehended:

"Frequent complaints of a general nature have been received at this office of the violation on the part of motor vehicle operators with especial regard to the reduction of speed upon passing any street car that is stationary or about to stop, on the same side of the car on which passengers are ordinarily received or discharged. The law provides that an excess of 3 m.p.h. shall be prima facie evidence that the driver is operating the machine in a reckless manner and in violation of the law.

"No one is perhaps a more frequent observer of this than the conductor or motorman upon the street car, and it is also important for the interest of the persons whom the street railways serve as it is for the State in determining persons capable of and entitled to receive a license to operate such machines.

"With the co-operation of your service upon the street cars, this office could receive information of the habitual reckless driver, and upon investigating evidence thus given, withdraw the licenses, which such persons are unfit to hold. May we then ask for co-operation in the matter."

The superintendents addressed have in general expressed their willingness to assist the State authorities in identifying the owners of automobiles who wantonly disregard the laws which govern the operation of motor vehicles.

Boston Elevated Railway Asks Permission to Carry Freight in Boston

The Boston (Mass.) Elevated Railway has petitioned the Mayor and City Council of Boston for permission to carry baggage, express matter and freight in Boston. The petition, which was sent to the Mayor by W. A. Bancroft, president of the company, follows:

"The Boston Elevated Railway respectfully represents that, as lessee of the West End Street Railway and the Old Colony Street Railway, it operates a street railway company in Boston and desires to become a common carrier of baggage, express matter and freight.

"Wherefore the Boston Elevated Railway respectfully petitions your honorable board to approve of its becoming a common carrier of newspapers, baggage, express matter and freight in Boston in, along and upon all streets and highways in Boston wherein is now located and maintained or may hereafter be located and maintained the street railway operated by it."

Car Tax in Reading.—Mayor Rick, of Reading, Pa., has signed the ordinance which imposes an annual license tax of $10 on each street car operated in Reading.

Outing of Employees of Milwaukee Electric Railway & Light Company.—The fifth annual outing of the employees of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was held at Waukesha Beach on Aug. 24, 1910.

Through Service Between Marion and Geneva, Ind.—The Marion, Bluffton & Eastern Traction Company, Bluffton, Ind., and the Bluffton, Geneva & Celina Traction Company, Bluffton, Ind., are arranging to operate through cars between Marion and Geneva.

Through Service Resumed Between Dallas and Denison.—The Denison & Sherman Railway, Denison, Tex., has resumed the operation of through cars between Denison and Dallas. Previously passengers riding between Dallas and Denison have been required to change cars at Sherman.

Campaign Against Transfer Abuse in St. Joseph.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is conducting a vigorous campaign to prevent the abuse of transfer privileges by its patrons and to prevent newsboys and street urchins from trafficking in trans-

fers. One of the local papers at St. Joseph has joined issue with the company by refusing to sell papers to boys who are known to trade in transfers.

Preparing for Fair Traffic in Indiana.—The Indiana Union Traction Company, Anderson, Ind., is making special preparations for handling the traffic to the State fair at Indianapolis. The cars are all being overhauled and special schedules are being arranged to accommodate those who attend the fair. Some of the steam railroads are also planning to stop their way trains at crossings so as to pick up passengers, in competition with the electric railways.

Another Business Trip from Indianapolis.—The third trip by electric railway by members of the Indianapolis Trade Association was made recently with a view to still further increasing the influence of merchants in Indianapolis, Ind., with tradespeople and residents of the territory reached by the electric railways operating into Indianapolis. The party comprised more than 100 persons, and three special cars were used. The trip extended as far west as Paris, Ill. The night was spent by the members of the party in Terre Haute.

Suit to Test Jim Crow Law.—Suit has been brought against the Edwards Hotel & City Railroad, Jackson, Miss., to test the validity of the "Jim Crow" law of Mississippi. It is alleged that the company does not separate the races as prescribed by law, and that separate cars should be used, or if one car is used, then it should be partitioned so that the whites shall not be annoyed by coming into contact with the blacks or by having to endure other annoyances to which the petition says they are constantly subjected now on account of the uncleanliness of the negroes.

Autos Supplement Electric Railway Service.—The Greenfield (Ind.) Auto-Traction Company has received two passenger automobiles, which are being operated on an hourly schedule between Greenfield and Maxwell, 9 miles distant, in connection with the Indianapolis, Newcastle & Toledo Electric Railway. The charge is 25 cents for the round trip. The purpose is to extend the service north to Hartville, a distance of 13 miles, to connect with the lines of the Indiana Union Traction Company, and south to Fountaintown to connect with the lines of the Indianapolis & Cincinnati Traction Company.

Anti-Accident Notice.—The Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont., has carried the following sign in its cars for some time: "There's a Reason for Everything Except a Woman Getting off the Car Backwards; That's Foolishness." Hugh C. Nickle, superintendent of the company, says that this sign has done more good in the way of preventing the evil against which it is directed than all of the illustrated notices which the company has tried heretofore. Passengers have memorized it and visitors have spoken of the sign as being the best of the kind that they had seen to attract attention.

Proposal to Limit Car Capacity in Los Angeles—The committee on legislation of the City Council of Los Angeles, Cal., has referred to the City Attorney the question of the advisability of the Council adopting a suggestion made by the Board of Public Utilities that the Council pass an ordinance limiting the number of persons that can stand on a street car to 25 per cent of the seating capacity. The proposal of the Board of Public Utilities would require street railways operating in Los Angeles to display a sign to that effect when the capacity of a car had been reached and would make it a misdemeanor for a passenger to board a car already carrying the limit of passengers prescribed in the ordinance.

Folder on the Berkshires.—The Berkshire Street Railway, Pittsfield, Mass., has issued a booklet giving a running story of the historical associations of various points along the route of the company. The folder contains views of Greylock, Stockbridge Bowl, "The House on the Stairs," Indian Monument at Stockbridge, and other Berkshire scenes. Authentic historical notes of interest are also given about important personages and incidents in the history of Berkshire County. The folder contains a map of the Berkshire region which shows the present and proposed lines of the company, including the Egremont line, the extension to the Connecticut line, the extension to Springfield and the extension up Greylock Mountain, from which a particularly picturesque view is afforded of the surrounding country.

Wisconsin Commission Orders Stop on Interurban Line.—The Wisconsin Railroad Commission has ordered the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to stop certain of its cars at the grounds of the Woodmont Country Club. The club had petitioned the commission for the concession, alleging that its members were compelled to walk nearly a mile from the station known as the county line to the club and that fully 5000 persons visited the club each season. The commission decided that, while it is not policy to order too many stops on interurban railways, this case was an exceptional one, and it was ordered that as soon as permission is secured of the Chicago & Northwestern Railway to cross its right of way and a suitable subway is constructed under its tracks cars of the interurban line of the company shall stop at the point where the line of the Milwaukee Electric Railway & Light Company crosses the property of the club.

Arbitration at Albany.—The board of arbitration which has been considering wages and terms for the service of the employees of the United Traction Company, Albany, N. Y., closed its hearings on Aug. 24, 1910, and has announced its decision. The present wages of the employees are 25 cents an hour, and time and a half for overtime. The men asked 30 cents an hour, with time and a half for overtime. The board has decided that a fair wage is 26 cents an hour, and time and a half for overtime, but has added a recommendation that the company shall petition the Legislature for authority to charge 1 cent additional for each transfer issued. If this should be granted the board recommends that the wages be increased to 27½ cents an hour, with time and a half for overtime. The arbitrators are Rev. Richard J. Nelson, Bishop of Albany; C. Gordon Reel, Kingston, who represented the company, and Joseph McLoughlin, Albany, who represented the employees.

Investigating Accident in Indiana.—The Railroad Commission of Indiana is investigating a collision which occurred on Aug. 14, 1910, between an Indianapolis-Warsaw flyer and a local car of the Indiana Union Traction Company, near Peru, Ind. Two passengers were seriously injured. The local car was running as an extra north toward Peru. Several passengers wanted to get off about 3 miles south of Peru. The trainmen ran past the stop and then backed to the place where the passengers wanted to get off. The Indianapolis-Warsaw flyer, which followed the local closely, was seen to be coming, and the motorman of the local started his car before the passengers alighted and threw them off. He hoped by starting his car promptly to give the motorman of the flyer time to control his train, but the flyer crashed into the rear end of the local before it could be brought to a stop and both cars were damaged. Had the motorman of the local not started his car when the flyer was discovered loss of life would probably have been caused by the collision which would undoubtedly have followed.

Hourly Limited Trains Very Successful in Massachusetts.—The Boston & Worcester Street Railway, South Framingham, Mass., is very well pleased with the results which have attended the operation by the company since June 1, 1910, of limited trains between Boston and Worcester once an hour. The company will continue the hourly limited as long as the traffic demands it and plans are being made to run more frequent limited trips between Boston and Worcester through the winter, making the trip from City Hall, Worcester, to Park Square, Boston, in 1 hour, 55 minutes. It is probable that four or six limited cars will leave either end of the line all through the winter. This summer is the first time that limited trips have been tried on an hourly basis. Up to this year the company operated cars on a 15-minute headway. Regular cars now run twice an hour and the limited cars once an hour. The limited cars stop only at Lake Junction, Lyman Street, Westboro; White's Corner, Framingham Center, Chestnut Hill, Brookline Village and Park Square, Boston. The schedule is so arranged that it does not interfere with the regular traffic of the company.

Personal Mention

Mr. J. H. Bliss has been elected president of the Chicago, Aurora & DeKalb Railroad, Aurora, Ill., to succeed Mr. J. C. Murphy.

Mr. Roy Clark has resigned as general foreman of the car shops of the Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.

Mr. N. J. Hullin has been appointed general superintendent of the Sacramento Electric, Gas & Railway Company, Sacramento, Cal., to succeed Mr. G. W. Merrell, resigned.

Mr. Frank M. Lott has resigned as general foreman of the Ocean City (N. J.) Electric Railroad, to become general foreman of the repair shops of the West Penn Railways, Connellsville, Pa.

Mr. J. J. Haisch, who resigned recently as roadmaster of the Los Angeles-Pacific Company, Los Angeles, Cal., has been appointed superintendent of the Acton Rock Company, which is to operate a quarry at Acton, Cal.

Mr. John W. Andrews, a factory inspector in the employ of the New York State Labor Department, has been appointed an assistant inspector of electric railways by the Public Service Commission of the Second District of New York.

Mr. William Walker, assistant superintendent of the Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway and the Attleboro Branch Railroad, Attleboro, Mass., has been appointed superintendent of these companies.

Mr. J. P. Alexander, whose resignation as purchasing agent of the Wheeling (W. Va.) Traction Company, after five years of continuous service, was mentioned in the Electric Railway Journal of Aug. 6, 1910, has accepted a position in the electrical engineering department of the General Electric Company at Pittsfield, Mass.

Mr. A. J. Winkle has been appointed auditor of the Sterling, Dixon & Eastern Electric Railway, and the Lee County Lighting Company, Sterling, Ill., to succeed Mr. Fred J. Maxwell, who has been appointed auditor of the Eastern Wisconsin Railway & Lighting Company, Fond du Lac, Wis., and the Wisconsin Electric Railway, Oshkosh, Wis.

Mr. H. J. Vance has been appointed general superintendent of the Chicago, Ottawa & Peoria Railway, La Salle, Ill., to succeed Mr. Joseph O'Hara, who has been appointed general manager of the Chicago, Aurora & DeKalb Railroad, Aurora, Ill. Mr. Vance was formerly connected with the operating and claim departments of the Illinois Traction Company, Peoria, Ill.

Mr. W. C. Wishart, formerly of the board of examiners of the Interstate Commerce Commission, has been appointed chief of the division of statistics and accounts of the New York Public Service Commission, Second District, to succeed Mr. William J. Meyers who, as announced elsewhere, has resigned to accept the appointment of statistician of the Interstate Commerce Commission.

Mr. Fred J. Maxwell, auditor of the Sterling, Dixon & Eastern Electric Railway and the Lee County Lighting Company, Sterling, Ill., has been appointed auditor of the Eastern Wisconsin Railway & Lighting Company, Fond du Lac, Wis., and of the Wisconsin Electric Railway, Oshkosh, Wis., the accounting departments of the companies having recently merged, the work to be taken care of at Fond du Lac. Mr. Maxwell has been connected with the Lee County Lighting Company for the last nine years, and for 2½ years he has held the position of auditor of the company.

Mr. M. S. Sloan has been appointed assistant to the president of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Mr. Sloan became connected with the Birmingham Railway, Light & Power Company as chief engineer of the power station for the construction department of the General Electric Company, in July, 1906. In September, 1907, he was made superintendent of power of the Birmingham Railway, Light & Power Company, and in July, 1908, he was appointed superintendent of the business department of the company. On Dec. 22, 1909, Mr. Sloan was appointed superintendent of the lighting department of the Birmingham Railway, Light & Power Company, and was recently advanced from this position to the office of assistant to the president of the company.

Mr. William J. Meyers, statistician of the New York Public Service Commission, Second District, has resigned to accept the position of statistician of the Interstate Commerce Commission, effective on Sept. 1, 1910. The bureau of statistics and accounts of the Interstate Commerce Commission is divided into two divisions, of which Mr. Meyers will be charged with the division of statistics. Mr. Meyers was appointed chief of the division of statistics and accounts of the New York commission upon its organization in 1907. Previous to that he had been for a long time chief assistant to the statistician of the Interstate Commerce Commission. He has taken a leading part in the compilation of uniform systems of accounts for public utility corporations, a work which has engaged the attention of accountants of companies and of United States and State commissions in conformity with recent laws.

Mr. Joseph O'Hara, general superintendent of the Chicago, Ottawa & Peoria Railway, La Salle, Ill., has been appointed general manager of the Chicago, Aurora & DeKalb Railroad, Aurora, Ill., the motive power of which has just been changed from steam to electricity, to succeed Mr. W. C. Cram, Jr., resigned. Mr. O'Hara served in various capacities with the Grand Rapids (Mich.) Railway for about five years, and was previously connected with the Pere Marquette Railway for two years, and as superintendent of the Eastern Ohio Traction Company, Cleveland, Ohio, for four years. Mr. O'Hara also was superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Chicago, Ill., from August, 1903, to October, 1907, when he resigned to become superintendent of transportation of the Washington, Baltimore & Annapolis Electric Railway. Mr. O'Hara resigned from the Baltimore, Washington & Annapolis Electric Railway on June 1, 1908, and shortly thereafter became connected with the Illinois Valley Railway, which has been succeeded by the Chicago, Ottawa & Peoria Railway, La Salle, Ill.

Mr. H. Askin, who has been appointed general manager of the Bartlesville (Okla.) Interurban Railway, was educated in the public schools of Rahway, N. J., and in the high school at that place. He received his technical training in the laboratory of the United States Electric Company, Newark, N. J., supplementing his work with technical studies at night. When the United States Electric Company was absorbed by the Westinghouse Electric & Manufacturing Company, Mr. Askin became connected with the Westinghouse Electric & Manufacturing Company, and assisted in installing plants in different parts of the country. When the alternating current department of the Ft. Wayne Electric Company was organized, Mr. Askin entered the employ of that company, as an expert in installation work. Subsequently he became superintendent of the Reno Water, Land & Light Company, Reno, Nev., and continued in that capacity for eight years, when the property was sold. Mr. Askin then rebuilt the property of the Barnes Electric Light & Power Company, Maquoketa, Ia. After being connected with the Barnes Electric Light & Power Company for three years Mr. Askin changed the power system of the Atchison Railway, Light & Power Company, Atchison, Kan., from 133 cycles to 60 cycles for the General Electric Company. He was appointed superintendent of the Atchison Railway, Light & Power Company after completing this work. He resigned from the Atchison Railway, Light & Power Company to become general manager of the Bartlesville Interurban Railway.

OBITUARY

Charles T. Porter, one of the inventors of the Porter-Allen high-speed engine, died at his home in Montclair, N. J., on Aug. 29, 1910. Mr. Porter was born in 1825, and was graduated from Hamilton College in 1845. He began the practice of patent law but later abandoned the legal profession for that of mechanical engineer. In connection with Mr. John F. Allen he perfected the first high-speed steam engine, which revolutionized power-generating machinery. Mr. Porter received the John Fritz medal in 1909 for his work in advancing the knowledge of steam engineering and in improving steam engine construction.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Denver (Col.) Tramway Terminals Company**—Incorporated in Colorado in the interest of the Denver City Tramway to build a terminal for the Denver City Tramway. Two loop lines are being constructed. Capital stock, $1,400,000.

***Millville, Tuckahoe & Ocean City Electric Transportation Company, Millville, N. J.**—Incorporated in New Jersey to build a freight and passenger electric railway between Millville and Ocean City. Capital stock, $100,000.

***Tennessee Rapid Transit Company, Nashville, Tenn.**—Application for a charter has been made in Tennessee by this company to construct 110 miles of interurban electric railway to connect Nashville with Lewisburg, Springfield and Clarksville, Tenn., with an extension to Adairville, Ky. Capital stock, $3,500,000. Incorporators: Robert L. Burch, Richard T. Wilson, Joe Frank, John M. Gray, and R. M. Wilson, all of Nashville, and J. Parks, Franklin.

***Cache County Amusement Company, Logan, Utah**—Incorporated in Utah to build an interurban railway through Cache County, Utah, to Preston, Idaho. Capital stock, $100,000. Incorporators: Leo Nielson, Logan; F. J. Gustin, J. H. Garrett and Finlay Brooks, Salt Lake City.

FRANCHISES

Nettleton, Ark.—Preston Thatcher, of the Home Telephone Company, in the interests of a number of capitalists, has applied to the City Council for a franchise to build an electric railway in Nettleton. This is part of a plan to connect Nettleton and Jonesboro, a distance of 3 miles. [E. R. J., Aug. 27, '10.]

Oakland, Cal.—The Southern Pacific Company, San Francisco, has been granted a 50-year franchise by the City Council for an extension of the lines of the Central Pacific Company, a subsidiary corporation of the Southern Pacific, from their present Melrose terminus to Stanley Road, Elmhurst. This line forms part of the electric railway of the Southern Pacific Company in Oakland, Berkeley and the surrounding territory.

Quincy, Ill.—The St. Louis, Terre Haute & Quincy Interurban Railway has been granted an extension of its franchise for one year by the City Council to build a railway in Quincy. Edward Yates, Pittsfield, president. [E. R. J., May 23, '08.]

Fort Wayne, Ind.—The Fort Wayne & Toledo Electric Railway has applied to the commissioners for a new franchise to build an electric railway through Allen County. This proposed 42-mile railway will connect Fort Wayne and Maysville, Ind., and Hicksville, Bryan and Toledo, Ohio. R. T. Bastress, Harlan, general manager. [E. R. J., Sept. 23, '09.]

Cosmos, Minn.—The Electric Short Line Railroad, Minneapolis, has asked the Town Council for a franchise to build an electric railway in Cosmos. A similar franchise has been asked by this company to build a railway in Cedar Mills. Frank E. Reed, Glencoe, secretary. [E. R. J., Aug. 29, '08.]

Madison, N. J.—The Morris County Traction Company, Morristown, has asked the Common Council of Madison for a franchise to build a railway to connect Madison, N. J., with Pennsylvania across northern New Jersey via Chatham and Morristown. This company has been granted a franchise in Chatham.

Charlotte, N. C.—The Piedmont Traction Company, Gastonia, N. C., has asked the Board of Aldermen for a franchise to build a railway in Charlotte. This proposed 13-mile railway will connect Mount Holly, Charlotte and Gastonia. T. C. Lee is engineer in charge. [E. R. J., Jan. 29, '10.]

Charlotte, N. C.—The Charlotte Rapid Transit Company has asked the Board of Aldermen for a franchise to build a street railway in Charlotte. Cameron Morrison and Paul Chatham, Charlotte, are interested. [E. R. J., Aug. 27, '10.]

Stratford, Ont.—The Stratford Street Railway has been granted a 25-year franchise by the Council to build a railway in Stratford. Surveys have been made between Stratford and St. Mary's. [E. R. J., Aug. 6, '10.]

Welland, Ont.—C. J. Laughlin, Toronto, Ont., has been granted a franchise by the township of Crowland to build an electric railway from Welland to Welland Junction. [E. R. J., June 18, '10.]

Dallas, Tex.—George Works and associates have been granted a franchise by the Board of Municipal Commissioners to construct and operate a street railway on Ross Avenue and Henderson Avenue. This proposed line will connect at Garrett and Ross Avenues with the Dallas Consolidated Electric Street Railway and extend eastward 900 ft. over Ross Avenue to Henderson Avenue and north on Henderson Avenue 700 ft. to the city limits. [E. R. J., Aug. 13, '10.]

***Logan, Utah**—Leo Nielsen has asked the County Court for a franchise to build an electric railway to connect Wellsville, Hyrum, Paradise, Millville, Providence, Logan, Greenville, Hyde Park, Smithfield, Richmond and Lewiston.

Logan, Utah.—The Logan Rapid Transit Company has applied to the County Court for a franchise to build an electric railway in Logan City. This proposed railway will extend from the county boundary in Wellsville Canyon via Wellsville, Hyrum, Millville, Providence and River Heights to Logan, thence to Greenville, Hyde Park, Smithfield and Richmond to the state northern boundary. Ultimately this line will connect with the Ogden Rapid Transit Company into Ogden via Brigham City. David Eccles, president. [E. R. J., Feb. 5, '10.]

***Logan, Utah.**—The Cache County Amusement Company has been granted a 50-year franchise by the County Commissioners to build an electric railway through Cache County to Preston, Idaho. The terms of the franchise state that the company must begin construction before July 1, 1911, and that 10 miles of railway must be built during the first year.

Provo, Utah.—Abel J. Evans and associates have been granted a franchise by the County Commissioners to build an interurban railway through Utah County. The terms of the franchise state that the company shall elect within one year what streets and highways it will use and shall build 25 miles of road and have it in operation within three years. [E. R. J., Aug. 27, '10.]

Morgantown, W. Va.—The Morgantown & Dunkard Valley Railroad has accepted the franchise granted to it recently by the City Council to build an extension in Morgantown.

TRACK AND ROADWAY

Central California Traction Company, San Francisco, Cal.—This company, it is reported, will extend its tracks to make connections with the Oakland-Antioch Railway at Lodi and give through service to San Francisco Bay.

Athens Railway & Electric Company, Athens, Ga.—This company is building a new line around Lumphin Street, Athens, to afford a ready means of access to the State College of Agriculture.

St. Louis & Eastern Traction Company, East St. Louis, Ill.—This company is securing right-of-way for its proposed railway from Granite City to Greenville via Collinsville, Troy, St. Jacob, Highland, Pierson and Pocahontas. A. W. Crawford, Hillsboro, is interested. [E. R. J., Aug. 13, '10.]

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company is said to be considering plans to extend its Martinsville interurban line from Martinsville to Bloomington and ultimately to French Lick via Bedford, Mitchell, Orleans and Paoli.

Adel City Railway, Des Moines, Ia.—This company is said to have let the contracts for grading and bridge work to Railroad Contractor Kuhn, Omaha, Neb. This projected 29-mile interurban railway will connect Des Moines and Adel. F. F. Flynn is interested. [E. R. J., Nov. 27, '10.]

Red Oak & Northeastern Railway, Red Oak, Ia.—This company has secured most of the right-of-way for its proposed 110-mile interurban electric railway to connect Red Oak, Winterset, Greenfield and Des Moines. W. L. Sonntag, general manager. [E. R. J., July 16, '10.]

*Waterloo, Ia.—H. R. Mosnat, Belle Plaine, Idaho, is promoting a double-track interurban railway from Waterloo to Keokuk, a distance of 175 miles, and two branches, one to connect Belle Plaine and Grinnell, and the other through Keystone, Vinton and Independence to Elkader.

Winnipeg (Man.) Electric Railway—This company expects to extend its railway in Winnipeg on Grey Street, Carter Street and Chalmer Street.

Metropolitan Street Railway, Kansas City, Mo.—Press reports state that this company is making preliminary plans for extending its Brooklyn Avenue, Indiana Avenue and Twenty-seventh Street lines in Kansas City. John M. Egan, president.

Springfield & Central Illinois Traction Company, St. Louis, Mo.—This company advises that as soon as the preliminary work is done it will begin construction on its proposed interurban railway to connect Springfield, Paronee, Morrisonville, Hillsboro, Coffern, Greenville, Carlyle, Centralia, Flora, Mt. Carmel, Edwardsville and East St. Louis. It will also furnish power for lighting headquarters, Security Building, St. Louis, Mo. Isaac A. Smith, Security Building, St. Louis, Mo., promoter. [E. R. J., July 30, '10.]

Corning & Painted Post Street Railway, Corning, N. Y.—This company, it is said, is considering plans for extending its line from its present terminus at the head of Bridge Street, Corning, to the new yards and shops of the New York Central & Hudson River Railroad at North Corning.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.—This company has been authorized by the Public Service Commission of the Second District to exercise a franchise granted by the Common Council of Amsterdam permitting it to construct and operate a double track along East Main Street in Amsterdam and an extension of a single track line to the Eighth Ward.

Bennington & North Adams Street Railway, Hoosick Falls, N. Y.—This company states that the Fred T. Ley Company, Pittsfield, Mass., has just commenced the reconstruction of all the bridges on its lines. New abutments and piers will be put in to strengthen the bridges where necessary. Geo. E. Greene, superintendent.

Niagara Falls, Welland & Dunnville Electric Railway, St. Catharines, Ont.—F. E. Misener, Wainfleet, says that this company will have Roberts & Abbott, Cleveland, Ohio, make a report on the Niagara Falls, Welland & Dunnville Electric Railway, which is designed to provide service through the fruit belt of the Niagara peninsula.

Moose Jaw (Sask.) Electric Street Railway, Ltd.—This company advises that it has started construction on its proposed 7-mile railway in Moose Jaw. It has awarded the contract for rails to the Lorain Steel Company, Johnstown, Pa., and it is now placing orders for ties, rails, etc. The power house will contain 2 150-kw. d. c. generators, 500-600 volts, operated by Diesel oil engines. The car houses, repair shops and power house will be located on Manitoba Street near Fifth Avenue. It will operate 6 cars at the start. Capital stock authorized, $400,000. Issued, $200,000. Officers: A. A. Dion, 35 Spark Street, Ottawa, president; Newton J. Ker, vice-president; Douglas R. Street, secretary and treasurer; A. Hector Dion, P. O. Box 213, Moose Jaw, Sask., resident electrical engineer, and John B. McRae, Citizen Building, Ottawa, Ont., chief engineer. [E. R. J., Aug. 6, '10.]

Corpus Christi & Interurban Railway, Corpus Christi, Tex.—It is reported that this company is considering plans to extend its railway to the Epworth encampment grounds and south of Corpus Christi to the Alta Vista Hotel. V. S. Heinly, Corpus Christi, secretary.

*South Bend, Wash.—J. B. Crary, Aberdeen, is reported to be promoting the construction of an electric railway to connect South Bend and Raymond.

Badger Railway & Light Company, Milwaukee, Wis.—This company, recently incorporated, advises that it is surveying and securing right of way for its proposed railway from Whitewater to Lake Geneva. Gustav Pickhardt is interested. [E. R. J., Aug. 13, '10.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is considering plans for enlarging its waiting-room at Sixth Street and Main Street, Los Angeles. The cost of the improvements is estimated to be about $15,000.

Denver (Col.) Tramway Terminals Company.—This company has started the construction of a 2-story reenforced concrete car house, with street entrance to each floor and all tracks inclined to street level. An eight-story administration building, also of fireproof construction, adjoins the car house on the east and repair shops are immediately west. Mission style waiting rooms are also under way. William E. Fisher, architect.

Evansville & Southern Indiana Traction Company, Evansville, Ind.—Plans are being considered by the Murdock interests, which control the Evansville & Southern Indiana Traction Company, and other companies, to erect a terminal station at Lafayette, Ind., and to concentrate the offices of the several properties at that place.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company has completed the construction of its car houses in Breckenridge. F. L. Strum, Wahpeton, general manager. [E. R. J., March, '10.]

Nebraska Traction & Power Company, Omaha, Neb.—This company advises that during the next four weeks it will place contracts for constructing a new car house and repair shops. Arthur English, president.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company is said to have awarded the contract to P. Peterson, Council Bluffs, for the construction of its new car house, 100 ft. x 250 ft., to be located between Avenue B and Avenue C, on Twenty-eighth Street, in Omaha. The new building will replace the old structure and will be of reinforced concrete and steel construction. Estimated cost is $18,000. [E. R. J., Aug. 27, '10.]

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—This company, it is said, has submitted plans for building a passenger station at Rochester, which will be practically fireproof. C. D. Beebe, Syracuse, general manager.

POWER HOUSES AND SUBSTATIONS

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has awarded the contract for building its new power house on Tenth Street and White River, Indianapolis, to the Bedford Stone & Construction Company. The structure will be in several sections, 160 ft. x 94 ft., 84 ft. x 193 ft. and 121 ft. x 77 ft., respectively. The smokestack will be 18 ft. in diameter and 278 ft. high. The plant will be equipped with automatic stokers. The estimated cost is $280,000. [E. R. J., May 7, '10.]

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company expects to build a substation, and it will purchase two substation outfits of 400-kw capacity from the Westinghouse Electric & Manufacturing Company. Frank Arnold, Boone, superintendent.

Mount Vernon Railway & Light Company, Mount Vernon, Ohio.—This company advises that it expects to place contracts during the next two weeks for motor generators, pumps, piping, heater, etc., for a new power house. The contract for turbines of 800-kw capacity has been let. A. J. Darrah, superintendent.

Nebraska Traction & Power Company, Omaha, Neb.—This company reports that it expects to place contracts during the next four weeks for building a new substation. Arthur English, president.

Grand Valley Railway, Brantford, Ont.—This company will place contracts during the next two weeks for building a substation at Paris, Ont., and for equipping an 8-mile, 40,000-volt, three-phase transmission line. It will also purchase two 300-kw generating sets. William P. Kellett, general manager.

Sarnia (Ont.) Street Railway.—This company states that it expects to purchase during the next few weeks a 350 to 500-kw generator. H. W. Mills, Sarnia, general manager.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa.—This company reports that Kellogg & Company will build a brick chimney 9 ft. x 175 ft., for its power house. It has ordered Babcock & Willcox boilers, of 2000 hp., to be delivered in September. Thomas A. Wright, Wilkes-Barre, general manager.

Manufactures & Supplies

ROLLING STOCK

Lehigh Valley Transit Company, Allentown, Pa., has ordered four long-broom snow sweepers from the J. G. Brill Company.

Stockton Terminal & Eastern Railroad, Stockton, Cal., which is building a 28-mile line from Stockton to Jenny Lind, is planning to purchase 20 cars.

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio, will purchase 10 cars for use on its line now being built from Uhrichsville, Ohio, to Wheeling, W. Va.

Birmingham Railway, Light & Power Company, Birmingham, Ala., has ordered, through Ford, Bacon & Davis, New York, N. Y., nine cars from the McGuire-Cummings Manufacturing Company.

Pittsburgh (Pa.) Railways has ordered 50 trucks of special design from the Standard Motor Truck Company, on which will be mounted the steel car bodies being built by the Standard Steel Car Company.

United Traction Company, Reading, Pa., noted in the ELECTRIC RAILWAY JOURNAL of Aug. 20, 1910, as being in the market for 10 cars, has placed an order with the J. G. Brill Company for 10 30-ft., 8-in., semi-convertible, pay-as-you-enter cars, mounted on Brill No. 39-E trucks.

Mahoning & Shenango Railway & Light Company, New Castle, Pa., reported in the ELECTRIC RAILWAY JOURNAL of Aug. 20, 1910, as having ordered six interurban cars from the Niles Car & Manufacturing Company, has specified the following details for these cars:

Seating capacity 56	Curtain material...pantasote
Weight .....26,000 lb.	Destination signs....Hunter
Wheel base .....6 ft. 4 in.	Fenders .....pilots
Length of body..39 ft. 5¼ in.	Gongs ....pneumatic
Over vestibule...49 ft. 5¼ in.	Hand brakes.....Lindstrom
Length over all..50 ft. 9¼ in.	Heaters .....Consol.
Width over all.....8 ft. 6 in.	Motors .....West
Body .....wood	Sanders .....O. B.
Underframe .....composite	Seats .....H. & K.
Air brakes....Westinghouse	Steps .....Universal
Couplers .....Tomlinson	Trucks .....Stand. C-60
Curtain fixtures, Forsyth No. 88	

TRADE NOTES

David W. Pye has been elected president of the United States Light & Heating Company to succeed the late William H. Silverthorn.

Economy Oil Cup Company, Augusta, Ga., has appointed Thornton N. Motley & Company, 50 Church Street, New York City, as Eastern representative.

Indian Refining Company, Cincinnati, Ohio, announces that it has secured the services of Dalton Risley, who was formerly connected with the National Refining Company.

Railway Steel Spring Company, New York, N. Y., has elected W. H. Marshall, president of the American Locomotive Company, a director and a member of the executive committee.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., for the four months to Aug. 1, 1910, is said to have booked orders for between $12,500,000 and $13,000,000. The company has in its employ 19,000 persons, an increase of 2500 in the past three months.

Toledo-Massillon Bridge Company, Toledo, Ohio, announces that M. A. Beck, formerly chief engineer of the Pawling & Harnischfeger Company for a number of years, has allied himself with the Toledo-Massillon Bridge Company, in the capacity of consulting engineer and representative in the Milwaukee district.

Duncan McDonald and Thomas W. Casey, of the Pay-As-You-Enter Car Corporation, New York, N. Y., sailed for Europe on Aug. 31, 1910, on the *Mauretania.* While abroad they will attend the exposition at Brussels, where they plan to exhibit a pay-as-you-enter platform. Their European headquarters will be the Grand Hotel, Paris, France.

Wonham, Sanger & Bates, New York, N. Y., who are American agents for the H-B lifeguard, are constantly receiving evidence of the efficiency of this device from all parts of the world where it is in use. In a recent report, transmitted to the Bureau of Manufactures and printed in the daily consular and trade *Reports,* the American Consul at Belfast, Ireland, refers to the accident record of the Belfast Municipal Tramways for the past year as follows: "There have been two fatal accidents during the year. There would have been many others had it not been for the care and skill of the motormen, and the perfect way in which the Hudson & Bowring lifeguard acts. The ratio of fatalities to passengers was 1 in 23,173,795."

ADVERTISING LITERATURE

Chicago Bearing Metal Company, Chicago, Ill., has issued No. 3 of the *Graphose Age,* dated August, 1910. This publication is distributed semi-occasionally by the company to call attention to its products, among which are brass castings for steam and street railways and general machinery.

McGuire-Cummings Manufacturing Company, Chicago, Ill., has issued catalog No. 121 of snow plows and sweepers manufactured by it. Types of sweepers and plows as supplied to the Chicago & Milwaukee Electric Railroad, Peoria Railway Terminal Company, Gary & Interurban Railway and the Ft. Dodge, Des Moines & Southern Railroad are illustrated and described. The publication also contains a number of letters from users of McGuire-Cummings products.

The J. G. Brill Company, Philadelphia, Pa., in the *Brill Magazine* for August, publishes the twentieth in the series of articles describing the tramway system of some important city of the world with particular reference to the type of car which is used. Brussels, Belgium, is the city selected for the subject of the article in the current issue of the magazine. Among the other articles are: "Single-End Pay-As-You-Enter Cars for Wichita, Kan.," "Equipment for the Hawaiian Islands," "Cars for the Northern Ohio Traction & Light Company," "Prepayment Cars for Mexico," and "One-Man Pay-As-You-Enter Cars." The subject of the biographical sketch in the current issue is Preston S. Arkwright, president of the Georgia Railway & Electric Company, Atlanta. The cover contains a view taken at the Bourse, Brussels.

General Electric Company, Schenectady, N. Y., has recently issued Bulletins Nos. 4746, 4758, 4761, 4762 and 4764. In Bulletin No. 4746 is described a portable sub-station for the supply of intermittent power for electric roads, and to provide for a temporary supply of power in case of accidents at sub-stations equipped with only one rotary converter unit. Bulletin No. 4754 describes the company's continuous current and alternating current motors for use in steel mills, and similar places, in connection with cranes, hoists and other apparatus. In bulletin No. 4758, the mazda sign lamps are described. Bulletin No. 4761 on the type M control supersedes the company's previous bulletin on this subject. In Bulletin No. 4762, the Thomson polyphase watthour meters, made to measure energy in any two-phase, three-phase or monocyclic circuit, are described. In Bulletin No. 4764 a line of mazda compensator and low volt lamps is described.

MacGovern, Archer & Company, New York, N. Y., have issued their list of electrical and steam machinery, power house equipment, cars, etc., for September, 1910. They call attention particularly to 6 15-bench Jackson & Sharp cars, made by the American Car & Foundry Company, Wilmington, Del.; 15 10-bench Stephenson cars, 30 22-ft. body closed cars, 12 20-ft. body single truck closed cars with Diamond trucks, 10 18-ft. body single truck closed cars with Peckham trucks, and 20 semi-convertible interurban double truck cars made by the J. G. Brill Co. One of the 32-ft. closed cars is illustrated on the inside of the back cover. MacGovern, Archer Company also illustrate on the back cover a 750-kw. Stanley 60 cycle, 2400-volt, 90 r.p.m. (2 phase or 3 phase) generator, direct connected to 24-in. and 48-in. x 48-in. cross compound Corliss engine made by the Penn. Iron Works. There are also included in the list about 40 direct current 550 volt railway units for small roads.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. ‡Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., July '10	$262,020	$131,938	$130,082	$43,357	$86,725
	1 " " '09	227,012	115,650	111,361	43,391	67,970
	7 " " '10	1,349,355	756,168	593,187	303,273	289,914
	7 " " '09	1,200,954	669,016	531,938	306,711	225,227
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., June '10	45,707	21,990	23,717	13,071	10,646
	1 " " '09	43,865	21,190	22,675	13,014	9,661
	12 " " '10	555,937	243,968	311,969	157,279	154,690
	12 " " '09	522,329	248,333	273,994	149,765	124,231
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., June '10	8,942	5,824	3,118	1,945	1,173
	1 " " '09	7,748	6,171	1,577	1,930	†353
	6 " " '10	52,083	33,823	18,260	.....	.....
	6 " " '09	45,468	34,718	10,750	.....	.....
BELLINGHAM, Wash. Whatcom Co. Ry. & Lt. Co.	1m., June '10	30,460	18,220	12,240	8,472	3,768
	1 " " '09	30,605	18,039	12,566	8,085	4,481
	6 " " '10	200,379	120,864	79,515	51,862	27,653
	6 " " '09	189,029	111,192	77,837	50,096	27,741
BINGHAMTON, N. Y. Binghamton St. Ry	1m., June '10	31,869	16,692	15,177	9,784	5,393
	1 " " '09	31,758	18,757	13,001	8,935	4,066
	12 " " '10	348,786	200,253	148,533	108,428	40,105
	12 " " '09	341,776	203,518	138,258	107,549	30,709
CHICAGO, ILL. Aurora, Elgin & Chicago Railroad	1m., June '10	151,851	76,794	75,057	34,467	40,590
	1 " " '09	142,568	71,332	71,236	28,981	42,225
	12 " " '10	1,596,777	885,891	710,886	375,395	335,491
	12 " " '09	1,458,998	796,127	662,871	337,776	325,095
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., July '10	41,880	*17,041	24,840	9,201	15,639
	1 " " '09	38,026	*16,249	21,777	8,324	13,453
	7 " " '10	195,459	*96,156	99,303	61,999	37,304
	7 " " '09	174,456	*88,004	86,452	58,492	27,959
Lake Shore Electric Ry	1m., July '10	132,032	*60,084	71,948	34,751	37,196
	1 " " '09	121,185	*55,650	65,534	33,786	31,748
	7 " " '10	658,759	*358,782	299,978	243,362	56,616
	7 " " '09	595,862	*334,027	261,835	240,436	21,399
DALLAS, TEX. Dallas Electric Corporation.	1m., June '10	114,514	81,445	33,069	26,605	6,464
	1 " " '09	103,593	67,711	35,882	28,833	7,050
	12 " " '10	1,394,814	906,477	488,337	323,780	164,557
	12 " " '09	1,245,732	786,143	459,589	342,819	116,771
DETROIT, MICH. Detroit United Ry.	1m., July '10	951,279	586,726	364,553	183,757	.....
	1 " " '09	784,123	466,319	317,804	155,754	.....
	7 " " '10	5,369,414	3,357,510	2,011,904	858,050	.....
	7 " " '09	4,494,262	2,717,679	1,776,583	688,199	.....
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., July '10	103,532	52,994	50,538	‡19,934	30,595
	1 " " '09	91,658	47,536	44,122	‡18,417	25,705
	7 " " '10	615,174	358,009	257,165	‡136,711	120,454
	7 " " '09	544,149	327,285	216,864	‡128,917	87,947
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1m., June '10	200,553	112,875	87,678	50,121	37,557
	1 " " '09	164,887	93,604	71,283	49,522	21,761
	6 " " '10	1,119,353	606,065	513,288	300,517	212,271
	6 " " '09	957,216	547,356	409,860	297,371	112,489
EL PASO, TEX. El Paso Elec. Co.	1m., June '10	45,224	27,409	17,815	8,195	9,620
	1 " " '09	47,075	27,701	19,375	7,943	11,432
	12 " " '10	626,631	361,273	265,358	101,169	164,188
	12 " " '09	557,317	372,033	185,284	91,267	94,017
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., July '10	57,488	19,042	38,446	12,610	25,836
	1 " " '09	43,589	13,356	30,233	12,310	17,923
	7 " " '10	327,264	119,909	207,355	87,905	119,450
	7 " " '09	255,881	90,642	165,239	86,183	79,456
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	1m., June '10	125,267	73,109	52,157	44,812	7,345
	1 " " '09	115,981	70,688	45,293	43,110	2,183
	6 " " '10	723,619	416,140	307,478	269,380	38,098
	6 " " '09	648,655	390,835	257,820	249,046	8,773
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., June '10	120,964	64,701	56,263	20,162	36,101
	1 " " '09	103,308	57,028	46,280	17,190	29,091
	12 " " '10	1,350,515	729,163	621,352	215,216	406,136
	12 " " '09	1,176,360	662,191	514,169	199,085	315,085
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., June '10	109,083	67,027	42,056	17,729	24,327
	1 " " '09	105,803	57,806	47,997	21,418	26,578
	12 " " '10	1,242 948	762,457	480,491	268,846	211,646
	12 " " '09	1,155,391	664,337	491,054	251,832	239,223
GRAND RAPIDS, MICH. Grand Rapids Ry. Co.	1m., June '10	99,952	47,677	52,275	19,745	32,520
	1 " " '09	91,764	42,838	48,926	19,137	29,779
	6 " " '10	530,823	264,537	266,286	119,055	147,231
	6 " " '09	479,809	233,758	246,051	113,711	132,340
HARRISBURG, PA. Central Penn. Trac. Co.	1m., June '10	73,952	51,111	22,841	.....	.....
	1 " " '09	67,257	51,578	15,679	.....	.....
	6 " " '10	393,747	288,132	105,615	.....	.....
	6 " " '09	358,107	272,356	85,751	.....	.....
HOUGHTON, MICH. Houghton County Trac. Co.	1m., June '10	26,752	14,578	12,174	6,317	5,857
	1 " " '09	27,583	13,183	14,355	6,242	8,114
	12 " " '10	320,847	170,159	150,688	76,158	74,530
	12 " " '09	294,379	160,970	133,410	66,336	67,074
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., June '10	46,409	24,592	21,816	9,344	12,472
	1 " " '09	38,391	21,447	16,944	9,288	7,656
	12 " " '10	536,117	281,066	255,051	112,377	142,674
	12 " " '09	454,335	258,544	195,791	111,018	84,774
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., June '10	$617,264	$373,655	$243,609	$185,432	$58,176
	1 " " '09	562,795	323,124	239,671	171,754	67,917
	12 " May '10	7,178,441	4,153,250	3,025,191	1,911,535	1,113,656
	12 " " '09	6,629,195	3,766,788	2,862,407	1,889,742	972,664
LIMA, O. Western Ohio Ry.	1m., May '10	46,134	24,524	21,610	15,445	6,165
	1 " " '09	40,011	21,510	18,501	15,394	3,107
	11 " " '10	473,920	251,238	222,692	169,564	53,128
	11 " " '09	419,699	231,464	188,235	167,947	20,288
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., July '10	400,922	276,206	124,716	48,113	76,603
	1 " " '09	361,915	229,692	132,223	45,339	86,884
	7 " " '10	2,684,139	1,901,862	782,277	326,499	455,778
	7 " " '09	2,400,421	1,586,947	813,473	326,689	486,784
Milwaukee Lt., Ht. & Traction Co.	1m. July '10	171,332	66,647	104,685	55,775	48 910
	1 " " '09	158,632	56,592	102,040	51,350	50,690
	7 " " '10	913,825	362,919	550,906	387,929	162,977
	7 " " '09	815,163	301,779	513,384	356,029	157,355
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., July '10	682,611	318,594	364,018	140,112	223,905
	1 " " '09	640,094	277,571	362,523	140,251	222,273
	7 " " '10	4,264,859	2,066,722	2,198,137	981,254	1 216,883
	7 " " '09	3,890,160	1,900,053	1,990,107	968,009	1•022,099
MONTREAL, CAN. Montreal St. Ry.	1m., July '10	398,847	215,224	183,623	69,250	114,372
	1 " " '09	345,574	177,412	168,161	52,884	115,278
	10 " " '10	3,490,646	2,021,516	1,469,130	446,854	1,022,277
	10 " " '09	3,137,547	1,866,015	1,271,531	388,575	882,957
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., July '10	144,548	84,134	60,414	33,390	27,024
	1 " " '09	140,887	85,548	55,339	33,023	22,316
	7 " " '10	1,032,501	600,722	431,779	235,477	196,302
	7 " " '09	972,590	579,163	393,427	229,236	164,191
NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1m., June '10	496,391	283,568	212,823	176,526	36,297
	1 " " '09	479,030	277,498	201,532	171,955	29,577
	6 " " '10	3,160,552	1,674,128	1,486,424	1,060,028	426,414
	6 " " '09	3,041,984	1,630,194	1,411,790	1,035,834	375,956
PHILADELPHIA, PA. American Railways Co.	1m., July '10	382,493	.....	.....	.....	.....
	1 " " '09	348,491	.....	.....	.....	.....
PENSACOLA, FLA. Pensacola Electric Co.	1m., June '10	21,763	12,808	8,955	5,053	3,903
	1 " " '09	20,126	11,292	8,834	4,263	4,571
	12 " " '10	257,715	150,138	107,577	56,102	51.475
	12 " " '09	229,151	136,471	92,681	51,961	40,719
PADUCAH, KY Paducah Trac. & Lt. Co.	1m.' June '10	19,740	11,685	8,055	' 6.989	1,065
	1 " " '09	18,101	10,614	7,488	6,631	856
	12 " " '10	238,066	143,301	94,766	82,012	12,753
	12 " " '09	222,535	130,560	91,975	82,381	9,594
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., June '10	10,418	7,485	2,934	1,760	1,174
	1 " " '09	12,557	9,755	2 802	1,672	1,130
	12 " " '10	125,089	91,010	34,078	21,007	13,071
	12 " " '09	126,271	86,522	39,749	24,114	15,635
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m. July '10	490,724	205,731	284,993	148,154	136.839
	1 " " '09	424,815	195,140	229,675	123,392	106,283
	7 " " '10	3,136,336	1,335,498	1,800,838	944,927	855,911
	7 " " '09	2,697,592	1,267,565	1,430,027	857,430	572,597
ROCKFORD, ILL. Union Ry. Gas & Elec. Co.	1m., June '10	219,137	124,143	94,994	65,614	29,380
	1 " " '09	205,894	106,519	99,375	64,154	35,221
	6 " " '10	1,431,020	817,743	613,277	392,476	220,801
	6 " " '09	1,347,801	684,822	662,979	338,426	279,550
ST. JOSEPH, MO. St. Joseph Ry., Lt., Ht. & Power Co.	1m., July '10	90,928	46,689	44,239	22,874	21,365
	1 " " '09	85,393	43,767	41,626	21,636	19,990
	7 " " '10	584,942	320,590	264,352	157,417	106,935
	7 " " '09	543,987	289,454	254,443	148,263	106,180
SAN FRANCISCO, CAL. United Railroads.	1m., July '10	618,635	353,762	264,873	.....	.....
	1 " " '09	621,753	356,225	265,528	.....	.....
	7 " " '10	4,373,496	2,532,709	1,840,787	.....	.....
	7 " " '09	4,190,658	2,441,558	1,749,100	.....	.....
SAVANNAH, GA. Savannah Elec. Co.	1m., June '10	53,610	35,596	18,014	18,008	7
	1 " " '09	52,134	33,386	18,748	17,343	1,405
	12 " " '10	611,836	398,959	212,877	212,444	433
	12 " " '09	605,976	376,034	229,942	209,377	20,565
SEATTLE, WASH. Seattle Electric Co.	1m., June '10	447,676	261,337	186,339	109,704	76,634
	1 " " '09	522,470	313,014	209,456	105,093	104,363
	12 " " '10	5,985,590	3,463,580	2,522,011	1,285,844	1,236,166
	12 " " '09	4,955,754	2,955,392	2,000,361	1,179,602	820,760
SYDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m. June '10	25,755	14,990	10,765	6,144	4,621
	1 " " '09	22,788	15,023	7,766	6,144	1,622
	12 " " '10	308,419	170,395	138,024	74,083	63,941
	12 " " '09	279,857	166,551	113,307	73,476	39,831
TACOMA, WASH. Puget Sound Electric Ry.	1m., June '10	166,278	101,327	64,951	50,597	14,354
	1 " " '09	162,057	106,187	55,870	48,291	7,578
	12 " " '10	1,944,834	1,284,636	660,199	596,532	63,666
	12 " " '09	1,716,331	1,159,030	557,301	537,360	19,941
TAMPA, FLA. Tampa Elec. Co.	1m., June '10	49,895	29,308	20,587	4,533	16,054
	1 " " '09	46,639	28,473	18,165	4,709	13,457
	12 " " '10	615,182	351,219	263,963	55,299	208,664
	12 " " '09	574,121	354,919	219,203	54,132	165,070
TOLEDO, OHIO. Toledo Rys & Lt. Co.	1m., July '10	239,906	154,022	85,884	78,202	7,682
	1 " " '09	226,832	134,222	92,610	75,507	17,103
	7 " " '10	1,702,250	1,041,959	660,291	534,329	125,962
	7 " " '09	1,529,691	884,407	645,011	501,076	143,935

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, SEPTEMBER 10, 1910 No. 11

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand. London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico. $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 10, 1910.

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The Exhibits at Atlantic City

In number of exhibitors and in exhibit space occupied, the Atlantic City exhibition will exceed any previously held under the auspices of the American Street & Interurban Railway Association. This means that it will be the largest and most comprehensive exhibit of electric railway apparatus ever assembled under one roof, and that it will rival if not exceed in extent and in variety of exhibits any made to represent a single manufacturing industry at the large international expositions. A list of exhibitors with the space to be occupied by each is published elsewhere in this issue, and reflects great credit on the Manufacturers' Association, particularly the committee of exhibits which has direct charge of the exhibition, and the membership committee, which has been most assiduous in gaining new members. The Atlantic City convention promises to be more largely attended than any previously held by the electric railway interests, and while it is late now to make space arrangements, manufacturers who have not done so should send their applications promptly to the Manufacturers' Association.

Putting Wage Increase Up to the Legislature

The decision of the board of arbitration in the Albany wage case is one that may prove to be of far-reaching significance to electric railways in New York State. It holds in effect that while the general increase in the cost of living justifies an advance in wages, the earnings of the United Traction Company do not warrant the full increase asked by trainmen and that the fair remedy lies in the passage of an act by the Legislature that will enable the company to charge 1 cent for each transfer. While therefore recommending the 4 per cent increase, which is all that the earnings for the last year appear to warrant, the arbitration board suggests the substitution, if the Legislature should pass the enabling act, of a 10 per cent increase. Thus the decision puts the problem up to the Legislature. If the action of the arbitrators in the Albany case leads to legislation of the character indicated, it will undoubtedly initiate a movement in New York State for increased revenue which will correspond with the fight for higher freight rates, upon which the steam railroads of the country have entered, and will receive public consideration as one of the great business questions of the times. A charge for transfers has been successful in Massachusetts as a solution of difficulties arising from dangerous approximation of revenues and expenses, and a trial in New York State may prove its advantage as a remedy in another section of the country. Such a charge serves a two-fold purpose. It increases the railway revenue in a perfectly logical manner because, theoretically, there is an appreciable expense to the railway company every time a person transfers, and it should materially decrease the reasons for abusing the transfer privilege, because it reduces the margin between the cost of a fare when paid in cash and when paid by a free transfer.

Diplomacy in Negotiation

Undoubtedly many of the complaints brought against public utility companies by municipal politicians are made for political effect. To have a real abuse corrected is far less important in the minds of these men than to attract public attention to themselves as defenders of the community against alleged wrong or imposition. To such persons no discomfiture is so great as to have the tables so suddenly turned that instead of posing as the champions of the people they appear as if anxious to secure cheap political notoriety at the expense of the public. Such a case recently occurred in Jersey City, where the Hudson & Manhattan Railroad, after constructing a commodious entrance to one of its stations, was forbidden by the municipal authorities to open it until the company had agreed never to charge more than 5 cents from Jersey City to New York. Although the present fare is 5 cents, the company naturally did not want to bind itself forever to that rate, but the demand seemed a popular one to the Mayor, so he insisted upon it. The company replied with the counter proposition that the entrance should remain open as long as the fare remained 5 cents, but that it could be closed by the city whenever the fare was raised. This put the responsibility for the absence of a commodious entrance directly where it belonged. If the public is deprived of a convenience provided by the railway company the only ones to be blamed are the political officers who are trying to hit the company over the heads of the people.

Centers of Power Distribution

The location of power plants close to distribution centers is a well-established principle of engineering methods. In practical cases, however, it is frequently necessary to depart considerably from what is theoretically desirable, not only in original locations of power plants, but also when extensions of generating capacity are being made. The cost of locating a station a mile or two away from the load center is usually higher than is apparent on the surface, particularly in electric railway systems in which direct current is generated and transmitted at about 600 volts. In a recent instance the company's engineers determined that the line losses in a feeder transmission of only 2 miles from the generating plant to the distribution center amount to $40,000 per year, the cost of current at the station switchboard being but 0.75 cent per kw-hour. This means that upward of 1,000,000 fares must be wholly devoted to paying for the unfavorable location of the plant each year before the rolling stock can be supplied efficiently with power from the proper point on the system to secure a minimum investment in subdivided feeders. With alternating current systems the restrictions of plant location are much less. The problem is complicated by the necessity for balancing many factors; but so far as the actual geographical distribution center is concerned the engineer has a pretty free hand in plant location. Even at the low potential of 2300 volts it is perfectly feasible to locate central stations of moderate size on the outskirts of a town; while the use of from 13,000 volts enables the plant to be placed from 5 to 10 miles away from the congested district without much difficulty. For this reason the company owning the direct-current plant mentioned above is enlarging its system by a new station three times as far away from the urban center as the existing plant is, but the use of alternating-current transmission at 13,200 volts, combined with a substation at the distribution center, solves the problem on the basis of good practice.

THE BROOKLYN RAPID TRANSIT REPORT

A review of the annual report of the Brooklyn Rapid Transit Company for the fiscal year ended June 30, 1910, shows a further increase in gross earning power and other facts, which suggest a consideration of the great changes effected in recent years in the financial results of operation of this large system.

From a comparative statement of construction expenditures for the fiscal years 1909-10 published in the report, it is evident that there has been a cessation in the heavy additions to capital investment which marked the early and middle years of this period. In the eight years beginning July 1, 1902, and ending June 30, 1910, a total of $39,251,820 was expended for construction purposes, of which all but about $3,000,000 was put into the property during the first six years. While the total expended in eight years, therefore, averages $4,900,000 annually, the average for the last two years was but $1,500,000 a year and the actual expenditure in 1910 fiscal year was $1,181,000. About this amount was added to the floating debt as bills payable, which were $3,400,000 on June 30, 1909, and were $4,500,000 one year later.

A table in the report showing these large expenditures indicates that a little over three-quarters of the amount devoted to construction during the eight years was invested in track and roadway, power plant and cars and electrical equipment. The total of $39,000,000 was divided among the different classes of property as follows: Right of way, 2.3 per cent; track and roadway, 19.8 per cent; electric line, 6.7 per cent; real estate, 2.9 per cent; buildings and fixtures, 10.1 per cent; power plant, 24.3 per cent; shop tools and machinery, 0.8 per cent; cars and electrical equipment, 32.2 per cent; miscellaneous equipment, 0.4 per cent; miscellaneous, 0.5 per cent.

Passenger earnings increased from $12,321,265 in the 1902 fiscal year to $20,477,145 in the last year, or an aggregate of 66.2 per cent. The largest increase in one year during the period was in 1906, when there was a gain of 12.38 per cent over 1905; the smallest was in 1909, when the gain was 0.68 per cent. No year failed to show an increase. Sixty per cent of the total passenger earnings in 1910 was received from the surface division, but in 1902 this division contributed 73 per cent. The elevated division has made much greater traffic gains than the surface division. It showed in 1910, as compared with 1902, an increase of 148 per cent in gross earnings, while the surface division gained in the same period 36 per cent. The actual relative importance of the changes in the two parts of the system is shown by the fact that of the gain of $8,155,880 in total passenger earnings for 1902 to 1910, the elevated division furnished $4,858,784 and the surface division $3,297,096.

These changes in earnings do not measure the extent of the total traffic growth. The total number of passengers carried in the 1910 fiscal year was 569 438,773, a gain of 77 per cent over 1902. But of this amount 151,279,806 represented transfers redeemed and the increase in the traffic of this character in the same period was 123 per cent. If the transfer traffic is deducted from the total, the increase in the remainder of the traffic is found to be 64.8 per cent, or practically the same increase as shown in passenger earnings. Expressed in another way, the rate of increase in transfer passengers has been about double the rate of increase in revenue passengers.

Apart from these statements of general results, details of the disposition of operating earnings are given by percentages in an illuminating table. Of unique interest are those which pertain

to the costs of damages. In 1902 these costs amounted to 6.88 per cent of operating earnings, and in 1910 the expense chargeable to this cause had been lowered to 2.66 per cent of total operating earnings, a reduction in percentage which is rendered more impressive when placed in juxtaposition with the gain of 68 per cent in total earnings which took place during the period. President E. W. Winter comments in his remarks to stockholders on the decrease in damage and legal expenses and states that a further reduction also took place last year in the number of suits brought. Barring slightly over $25,000 in judgments on appeal there is no outstanding judgment against any company in the system, a fact which is remarkable in so large a property.

The proportion of operating earnings expended last year in "general operating" expense as differentiated from repairs and renewals, damages and legal expense, was 35.52 per cent. This is the lowest rate of any year in the period under review and it is a material decline from the high point, 42.85 per cent, shown in the fiscal year 1902. Likewise, the total operating ratio of 56.09 per cent is the lowest of any year in the period, while the highest, 65.41 per cent, was reached in 1902.

Maintenance expenditures were the largest for any year and amounted to 16.16 per cent of operating earnings. This figure compares with 13.81 per cent in 1902 and with the low mark of 9.85 per cent in 1903. Total maintenance costs of $3,377,990 for 1910 were divided between $1,309,719 for way and structures and $2,068,271 for equipment. The increase in maintenance expenditures in 1910 as compared with 1909 was $493,000.

Charges for taxation are set forth in a separate table, which shows the payments for the different classes of assessment—real estate, special franchise tax on earnings, car licenses, capital stock, bridge licenses and Federal tax. The latter amounted to $46,997, and the total for the year was $1,454,213. This amount is equal to 6.8 per cent of total earnings for the year and is 96 per cent greater than the tax charges for 1902.

The report of the Brooklyn Rapid Transit Company stands as an exponent of a determined policy of publicity which we commend to other companies.

UNEQUAL BRAKE SHOE WEAR

The unequal rate of wear shown by brake shoes apparently exactly alike and operating under the same running conditions may be ascribed chiefly to two causes: inequalities in the shoe material and incorrect adjustment of the brake rigging. The variations in life are often of the most extraordinary character. Thus one company, with the same style of chilled shoes on a double-truck, double-end car, secured a life of fully 11,000 miles from one shoe and only 1900 miles from another. In this case the brake rigging had been very carefully adjusted so that the blame was placed on the foundry, and probably the assumption was correct, because for the price paid for these particular shoes the manufacturers could hardly have afforded to supply that homogeneity in structure which is the ideal of rail, wheel and gear makers. A remedy for this trouble, perhaps the only practicable one, is for the customer to buy his brake shoes on a straight mileage basis. Even this policy will not avoid the inconvenience of removing all of the shoes on a car while some are still useful, but it will avoid the waste of scrapping partly-worn shoes bought by the pound.

Nevertheless, it would be unfair to put all the onus for unequal brake shoe wear on the manufacturer. How many railways have taken the pains to prepare brake leverage diagrams covering their different equipments and have made up corresponding tables of the permissible stresses on the rods, levers and pins? It is erroneous to suppose that great engineering ability is necessary for these calculations for the leverage problems involved can be worked out by simple formulas. The trouble is that most of the smaller railways ignore the whole question of brake rigging. The cars may be received from the car builder with the rigging exactly right, but before long the conditions of service bring about a maladjustment of parts and leverage ratios which leads to poor distribution of braking effort. It is, therefore, essential that the braking rigging should not only be properly proportioned in the first place, but that it should be properly maintained. The latter work can be most effectively aided by the use of jigs to avoid all guesswork on the part of the shopmen in determining the proper distances between certain points on the braking levers. It should hardly be necessary to add that the safety of car operation is greatly enhanced when the brake rigging is given the right kind of attention in design and maintenance.

AVOIDING ELECTRICAL ACCIDENTS DURING CONSTRUCTION

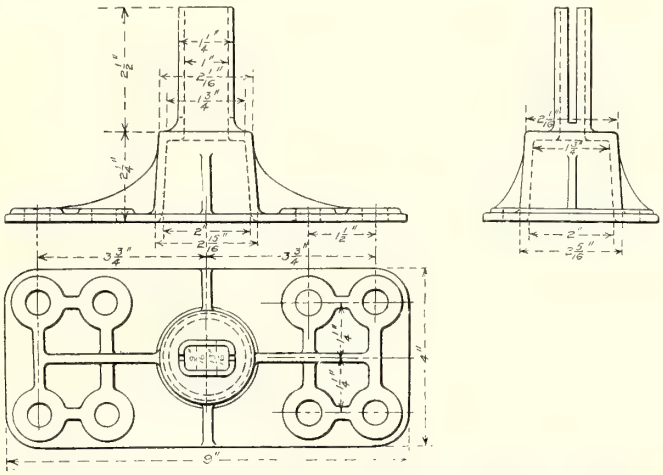
At no time is it more difficult to maintain safe and continuous service in a modern power plant than when portions of the building or equipment are undergoing changes during reconstruction or extension. When changes of this sort are under way, particularly in a plant where one side of the circuit is grounded, it may easily happen that an accident will occur through careless work, sometimes in the very act of trying to insulate apparatus for the protection of the construction force.

In a typical accident of this kind a new switchboard was being erected in a large railway plant on a gallery above the engine room floor. The old board was located on the floor and the two were tied together electrically by a strip of copper joined to each positive bus-bar. Some of the old panels were removed to the new gallery and additional panels were erected on the same site. About 50 lead-covered feeder cables were run out of the building from the positive bus-bars. To lessen the danger of shock from contact with the lead covering the live parts of the positive circuit to members of the construction force working around the plant the removal was directed of sections of the lead sheathing about 6 in. long from the cables run through the basement. This removal was accomplished by cutting circular channels around the cable coverings, connecting them with a horizontal cut, splitting down the lead and knocking off with a hammer. Upon the substitution of a screw driver for the hammer the former short circuited the conductor and sheath, with serious results.

It is important to realize that sometimes even cables and terminals which have been disconnected from a live circuit will for a time retain a sufficient charge through electrostatic capacity to render severe shocks to careless persons. The stators of high-tension alternators are particularly susceptible to this condition, as are long cables of the armored type, the latter frequently retaining charges for several hours after disconnection. Extreme care in handling all high-tension circuits and apparatus, whether connected to live lines or not, is enjoined by the conditions of modern service.

BROOKLYN LINE DEPARTMENT—THIRD RAIL MAINTENANCE, HIGH-TENSION WORK, FEEDERS AND MISCELLANEOUS FEATURES

The preceding articles* on the line department of the Brooklyn Rapid Transit System have dealt with the different types of overhead construction and their maintenance. However, the activities of the line department also embrace the maintenance of a large mileage of third-rail construction; all high-tension and feeder wiring outside of the power plants and substations; all lighting and auxiliary circuits such as those used for signaling, telephoning and telegraphing; and the manufacture



Brooklyn Line Department—Base for Third-Rail Insulators on Brooklyn Bridge

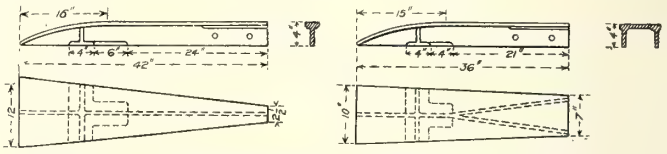
and testing of line materials. All of these additional subjects except the last will be treated in this article.

DETAILS OF THIRD-RAIL CONSTRUCTION AND REPAIRS

One of the accompanying drawings shows the standard third-rail base used on both the elevated and surface rapid transit lines. The base is made of malleable iron with an insulator of reconstructed granite or semi-porcelain secured to it with Dyckerhoff cement. The cement named has given much better results than compounds containing sulphur or similar ingredients. Attention is called to the use of eight holes in this base. This number is required in order to secure a fastening whether the base is turned cross-wise to the tie or in any other direction. Usually only two lag screws are needed, but the variations in the position of the guard rails on the elevated structure call for many different methods of lagging the base to the tie. The insulator cap is of cast iron with wrought-iron prongs cast into place. These prongs are seldom bent over, as it has been found unnecessary, and frequently such bent prongs would retard the natural movement of the rail.

A side approach combined with a pair of "nosings," as shown on this page, is installed in some locations where it is not desired to cut the third rail and leave a gap. Gaps in the third rail are objectionable for many reasons, as they call for extra bonding and protection, and are points at which a defective contact shoe can begin to overthrow the third rail. The drawing on page 391 shows both right- and left-hand third rail switch wings (with extensions) used for side approaches at places where it is not desirable to cut the rail. The offsets can be cut away at the end with a chisel if the curve is concave or at the middle if the curve is convex. Wooden approach blocks are spiked to the ties at the ends of the rail so that defective shoes cannot get under the third rail.

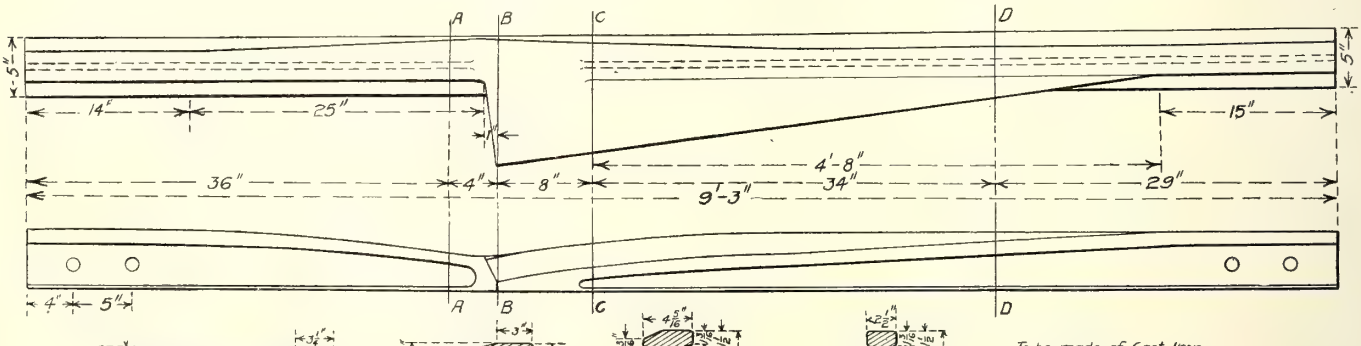
Another drawing on page 391 shows the scheme used where gaps are not so objectionable. It will be observed that the third rail has been bent and dropped so as to provide clearance between the top of the rail and the lowest position of the contact shoe. The rail is then bent up to get into alignment with the standard location. This avoids costly bonding and still provides a very rigid type of construction. This scheme is not applicable, of course, to places where there are switch rods or other obstructions to prevent the rail being dropped so close to the ground. A peculiar form of nosing



Brooklyn Line Department—Standard Duck Bills for Single and Double Rail

called a duck bill and made to receive one or two rails is illustrated in the small engraving in this column.

The third rail emergency work at the Brooklyn Bridge is done by four men, two during the day and two during the night. At the East New York junction one man is on 12 hours and another 10 hours, and the same practice is followed at the Thirty-sixth Street junction. In addition, there is a floating gang of five men for construction throughout the system. This crew has a wagon for additional supplies, as it is impracticable to carry supplies on the elevated structure. This latter practice involves the liability of interfering with the regular movement of passenger trains. While it does cost a little more to have one man stay in the street to watch the supplies and hoist them up on the structure, there is less danger of dropping things into the streets and there is no interference with trains or loading up of platforms.



Brooklyn Line Department—Combination Third-Rail Wing and Nosings Used to Avoid Gaps at Side Approaches

HIGH TENSION OPERATING RULES

The standard high tension transmission voltage of the Brooklyn Rapid Transit System is 6600 volts, three phase, 25 cycles. The company has in effect the following tag system

* See Electric Railway Journal June 11, June 18, July 23 and Aug. 20, 1910.

to protect employees working on high tension or low tension circuits:

Any employee desiring to work on the high tension lines or apparatus must notify the chief power operator, stating exactly what he wishes to do. The chief operator then takes up the matter with the man in charge of the power or substation in connection with which the work is to be done. If, in the opinion of the chief operator, the work will interfere with the proper operation of the system, and if the party desiring to do the work so requests, he will take the matter up with the superintendent of power.

If the work is to be done, the chief operator calls up the man in charge at each power and substation where precautions should be taken to prevent injury to the men who are to do the work. The chief operator instructs these men to fill out and attach in a substantial manner a tag to all switches, by which it would be possible to make alive the circuit or apparatus on which the work is to be done.

The man who makes out the tag must write on it the following information:

Name of power or substation.

Name of man requesting that tag be put on.

Name of man who puts the tag on.

Date, hour and minute when tag is put on.

The chief operator must be notified as soon as the tags are in place. On being informed that the circuit or apparatus has been properly tagged, the chief operator notifies the man ordering on the tags that the circuit or apparatus, specifying the name and number, has been tagged in his name, stating the points where the tags have been put on.

To avoid mistakes, those who put on the tags must inform the party ordering on the tags that they have tagged a circuit or apparatus of certain number in his name, also stating at what points this was done. For the proper operation of this rule it is necessary that the party ordering on the tags, after having first advised the chief operator of his desire to work on the circuit or apparatus, shall not mention the number of circuit or apparatus until the chief operator and the parties putting on the tags have advised him that the circuit or apparatus of certain number has been tagged in his name and the same has been found to agree with his request to the chief operator.

The man in charge of the work to be done, after having been advised by both the chief operator and the party tagging the circuit or apparatus that the same is dead and properly tagged in his name, proceeds with his work, first taking the precaution to test and discharge the circuit or apparatus. While working on the same, if practicable, the three phases are jumped together and grounded by a jumper of at least a No. 4 B. & S. wire.

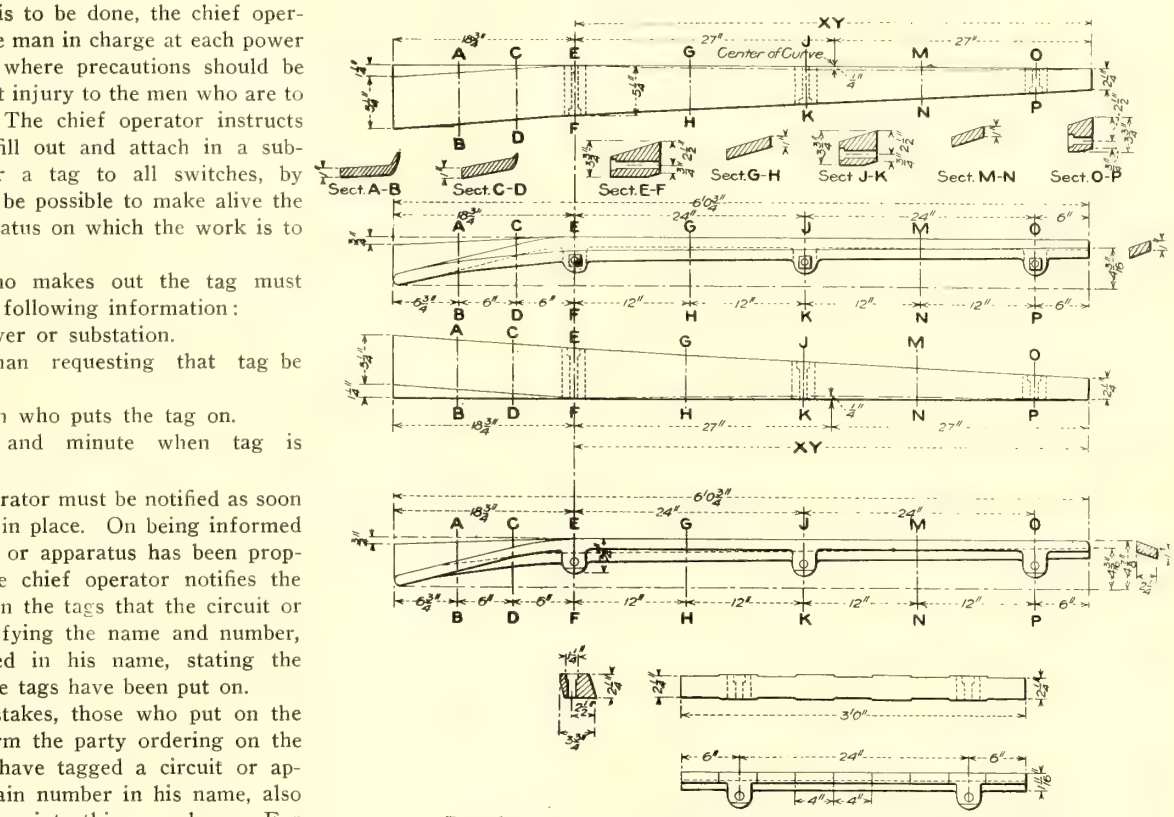
As soon as the work is completed the man (only the man whose name appears on the tag) ordering on the tags instructs the chief operator and man in charge at the points tagged that the work is complete and the circuit or apparatus is clear and ready for service, but no tags must be removed until ordered off by the chief operator. The chief operator then notifies the man in charge of the power or sub-station at the points where the circuit or apparatus is tagged to remove the tag as soon as it has been ordered off by the party who ordered it on originally.

When the tag thus has been removed and the order has been approved by the chief operator, the man in charge removes the same, writing on it plainly the following:

Name of man by whom the tag was ordered off.

Name of the man who removed the tag.

Date, hour and minute when tag was removed.

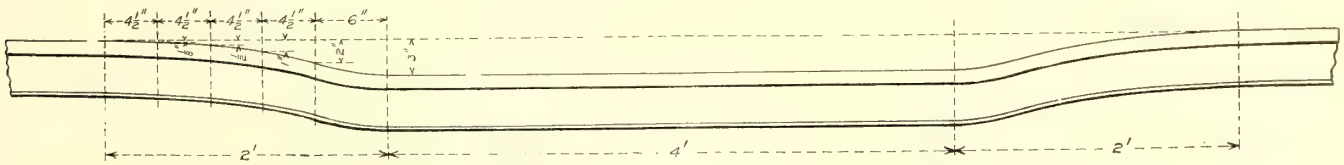


Brooklyn Line Department—Third-Rail Switch Wings, Right and Left

Upon this, the chief operator is advised of the time of the removal.

All tags must be removed as soon as possible, and under no conditions must any circuit or apparatus be left tagged when in condition for service, except when work is actually being done upon it. If necessary for the party ordering on the tag to leave the job and turn the work over to another he must see before leaving that his successor orders on his tags, after which he orders removed the original tags in his name, i. e., no one must leave any circuit or apparatus, which could possibly be used in case of emergency, tagged in his name except when he may be reached by the chief operator by telephone. On each Sunday the tags that have been used during the previous week are sent to the chief operator's office for checking and filing.

For ordinary work on circuits or apparatus, where the same must not be made alive at any time, a "red tag" is used; i. e., the circuit or apparatus is not to be made alive under any conditions, and any number of men can work on the same at one time, having first ordered on their "red tags" as provided.

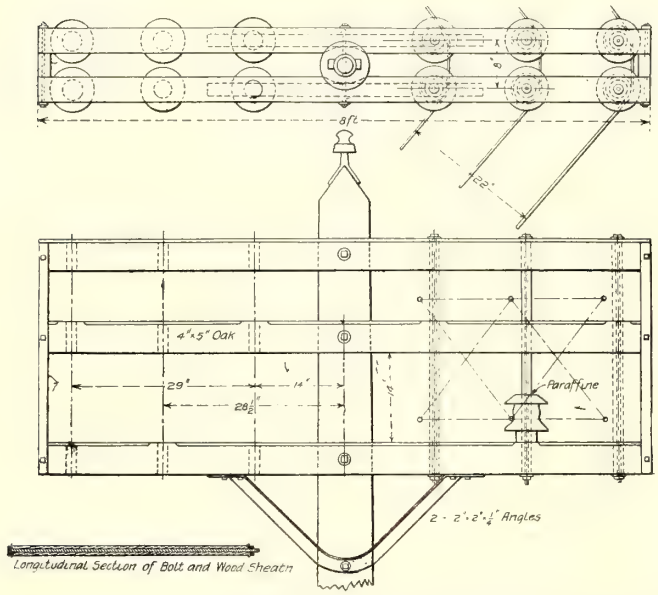


Brocklyn Line Department—Method of Bending Down Third Rail at a Cross-Over

For high-tension tests of any work, where it is necessary to make the circuit or apparatus alive, either with high-tension or low-tension current, a "blue tag" is used. When a "blue tag" appears on a circuit or a piece of apparatus it is considered alive at all times, except by the party whose name appears on the tag, who has exclusive use of the same.

No "blue tag" can be ordered on a circuit or apparatus already tagged with a "red tag" or "blue tag."

No "red tag" can be ordered on a circuit or apparatus already tagged with a "blue tag."



Brooklyn Line Department—High-Tension Pole Head at Canarsie Substation

However, a "red tag" may be ordered on a circuit or apparatus already tagged with a "red tag."

The superintendent of power, superintendent of line department and general foreman of power and substation construction must furnish the electrical engineer with a list of the men under them who are authorized to order circuits or apparatus tagged, and must certify that all of the men on the list have received a copy of these rules with a print of the high-tension feeder system, and that they understand the same. These lists, after being approved by the electrical engineer, are furnished to the chief operator, and only the men who have been approved by the electrical engineer have the right of ordering the feeders tagged.



High-Tension Lines and Pot-Head

The chief operator must immediately cross from the list of those authorized to order circuits or feeders tagged the name of anyone failing to strictly comply with the foregoing rules, and must at once notify, in writing, the electrical engineer and the head of the sub-department in which the party belongs. Any name cut from the list, as provided for above, can only be restored by order of the electrical engineer. Failure to comply with the high-tension rules is a cause for immediate discharge from the service of the company.

In case an unauthorized party desires to work on a circuit or piece of apparatus, his tag may be ordered on by any authorized party, who is responsible for him; but in no case must his tag be removed, except on his own order to the chief operator and the parties tagging the circuits or apparatus.

In all work on low-tension circuits or apparatus, the same are considered alive at all times, or in case this is not practicable, the rules covering high-tension circuits or apparatus apply and must be strictly complied with. The following form relative to the receipt and understanding of the rules is signed by every man working on high-tension and low-tension circuits, and is certified by the superintendent of power, the superintendent of the line department or the general foreman of power and substation construction:

TRANSIT DEVELOPMENT COMPANY
ELECTRICAL DEPARTMENT

.....19..

This is to certify that I, ...
employed as ..... at the .....
have received a copy of the Rules for the Protection of B. R. T. Employees Working on H. T. and L. T. Circuits or Apparatus, effective Nov. 1, 1906, which I have carefully read and fully understand.

Signed:

.....

I hereby certify that I have examined the party named above and find that he fully understands and is familiar with the rules referred to.

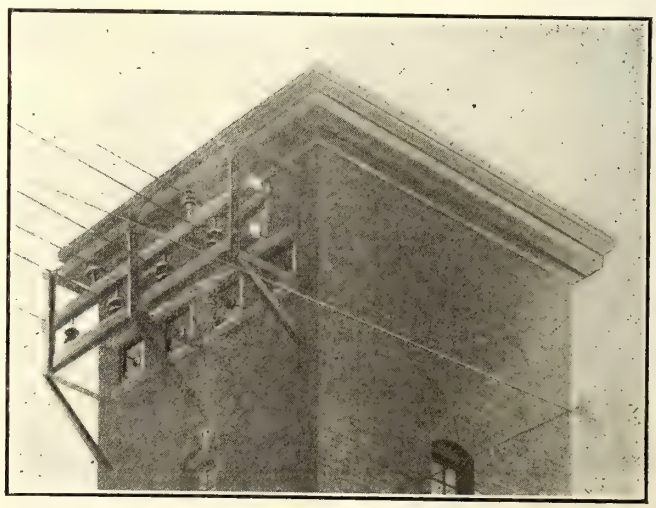
Signed:

.....

HIGH-TENSION CONSTRUCTION FEATURES

The half-tone in the opposite column shows one of the methods used to bring three-conductor, 6600-volt No. 0000 paper-insulated and lead-covered cables up a pole for connection to aerial transmission lines. For a distance of about 7 ft. from the ground, the wires are encased in wrought iron pipe and then are brought to a lead pothead which is wiped to the sheath. From the top of this pothead, rubber-covered leads are taken and connected to the aerial lines. The lead sheaths of the individual leads are wiped securely to the potheads to make a water-tight joint. The lead is stripped back a liberal distance from the point of contact with the aerial lines and the rubber is served with layers of gum tape and a good insulating varnish. This arrangement has proved very satisfactory. The lightning arresters at the installation illustrated are of the G.E. type; they are mounted in a box on the platform.

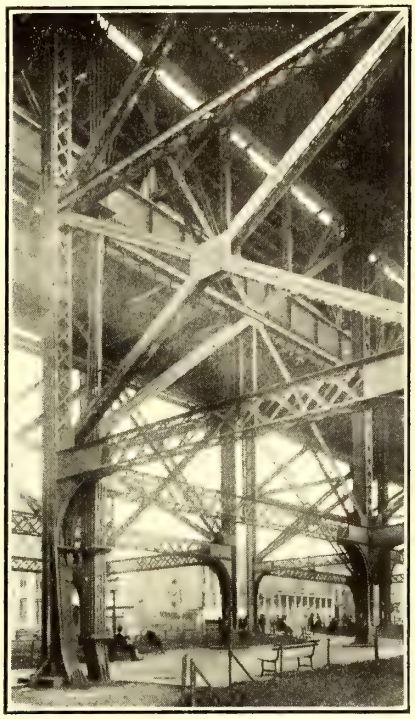
The drawing on this page shows the standard high-tension pole head for turning corners. It is made long enough to provide the same space between the wires as exists on tangents after the arms have been placed at the proper angle to resist equally the stress from the wires turning the corners. It will be noted that ½-in. iron bolts have been inserted in the wooden pins which pass through the middle of the cross arms to tie them together top and bottom. This makes an exceptionally



Brooklyn Line Department—High-Tension Entrance at Coney Island Substation

strong construction. The insulators are inserted as shown, and the space between the pin and the insulator is filled with hot paraffin.

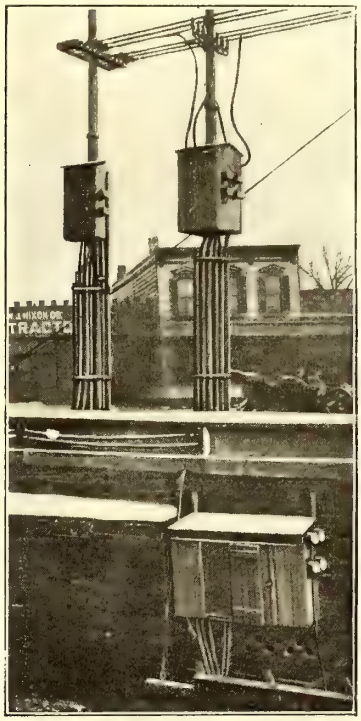
The standard entrance for high-tension wires is presented in the view of the Coney Island substation tower on page 392. It consists of a steel frame supporting cross arms between which insulators are set, as shown, so as to take the strain of the wires. The latter are then led directly through the center-perforated double glass windows of the tower. The lightning arresters are mounted inside the tower, and the wires are brought together in a lead-covered cable terminating into a pothead at both ends and leading into the substation and oil switches.



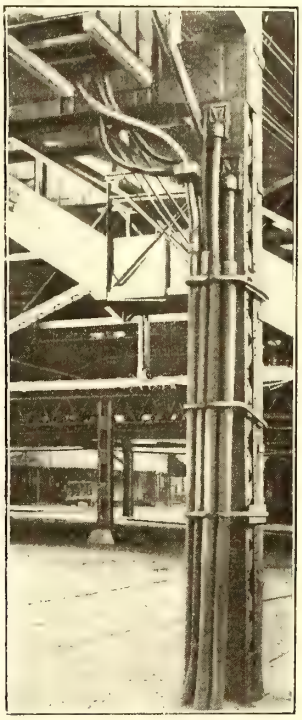
Vertical Feeder Run Under the Williamsburg Bridge

SOME D.C. FEEDER INSTALLATION FEATURES

Where d.c. wires are brought out underground from the substations to the aerial feeders, they are protected in their course up the pole by means of iron pipe to a height of 12 ft. to 15 ft. above the sidewalk level, and bushings are provided at the end of the pipe. The cables are carried across the street and vertical jumpers are installed to connect the longitudinal feeders on the street with the transverse feeders from the substations. This permits any desired rearrangement to be made at small expense. The Hudson Avenue substation, whose feeder arrangements are shown in one of the illustrations on this page, has provision for an ultimate capacity of 10,000 kw. plus the overload ability of the machinery. At the Bridge substation there are outlets for a rated capacity of 13,000 kw. In this location, cut-out switches are provided a short distance away, so that the cables may be tested regularly. These switches are placed in a dry spot, where they can be readily inspected and manipulated. In order to handle the switches safely under the elevated structures, that is, without using a ladder, a small platform is provided except in rare cases, where it would be impossible to install one. The drawing on page 394 illustrates how a cast-iron joint is made between the underground tile ducts and iron feeder pipes run up a column of the elevated structure or elsewhere. The square tile duct costs only 5 cents per foot, whereas iron pipe costs 30 cents per foot. Thus the duct permits a saving.

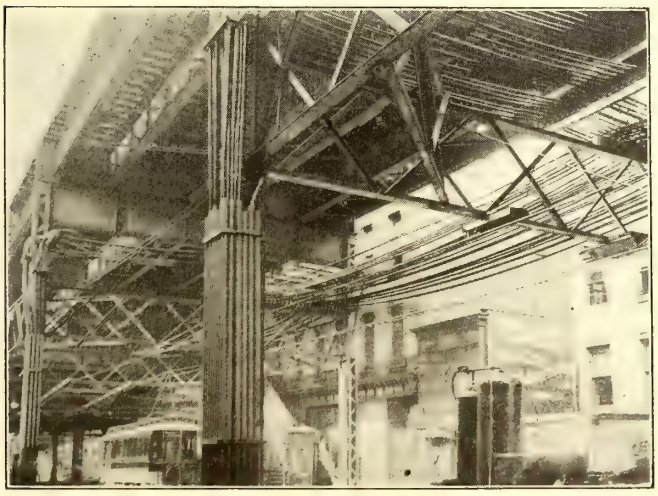


Aerial and Third-Rail Feeders, Brighton Beach Cut



Negative Feeder Cables on "L" Structure

One of the illustrations on page 394 shows a concrete duct line at the central power station on Second Avenue. This comprises 72 3½-in. ducts from the substation equipment and four additional high-tension ducts, which are installed at the top of the old run to receive the high-tension power cables from the power station and the adjoining substations. The end manhole shown opens into these four ducts only. The portion of the runway illustrated is fully 110 ft. long.



Brooklyn Line Department—Feeders in Front of Bridge Substation



Brooklyn Line Department—Feeders Led up Pillars on Both Sides of the Street at Hudson Avenue Station

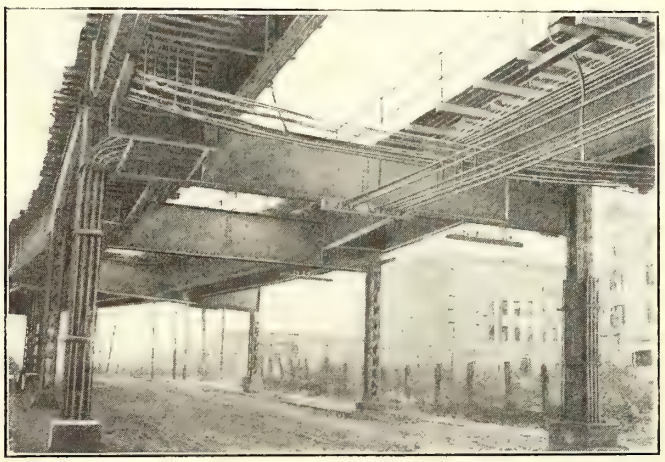
The center view at the top of page 393 pictures the method used near the Prospect Park substation for bringing out feeders from the substation to reach the aerial line and the contact rail of the Brighton Beach line in the cut below. A separate manhole is located at the foot of each pole. The cables are

brought up through pipes into the pole boxes and thence joined to the aerial feeders. The contact rail feeders are brought directly to the boxes in the retaining wall, as shown. The trolley switches are mounted in the boxes just above the cables. These boxes contain the necessary switches for disconnecting and testing the feeders. The view opposite the one described shows the manner of connecting negative cables to the elevated structures. The cables are soldered into a



Brooklyn Line Department—Side Feed on Flatbush Avenue

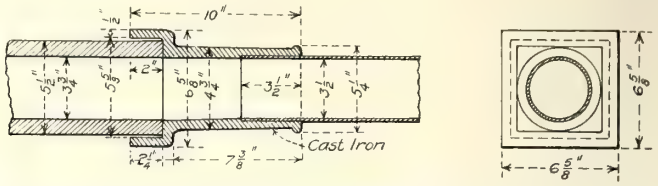
large terminal of copper, which metal is used in preference to brass because of its higher conductivity for a relatively small additional cost. The terminals are sweated to the elevated columns, which have previously been cleaned and tinned; they are bolted to the columns and soldered while hot, the whole forming a very durable and satisfactory connection. It has been found that the riveting between the elevated columns and the girders is in itself sufficient to carry the return current with no perceptible heating of the conductors.



Brooklyn Line Department—Transverse and Longitudinal Feeders with Jumpers and Switch-Box Platform

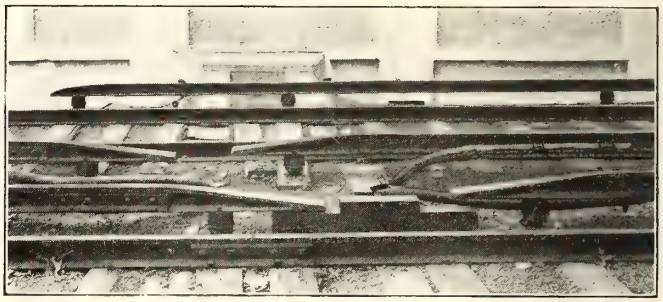
The unusual vertical d.c. feeder installation under the Williamsburg bridge is shown on page 393. The cables, which are of varnished cambric, are brought for one-half mile underground in clay ducts from the Eastern power station of the Brooklyn Rapid Transit System, and are carried up for about 90 ft. They are encased in metal pipe for about 15 ft. above ground. There is also cleated to one of the bridge columns a 6600-volt cable which is served with asbestos and steel tape.

One of the cuts on this page shows the feeder connection from the Parkville substation to the third-rail on the Brighton Beach line. The cables, which are of braided, varnished cambric, are brought out in wooden boxes filled with tar. Connection is made to the third-rail by a copper terminal, which



Brooklyn Line Department—Cast-Iron Joint for Wrought-Iron Pipe and Tile Duct

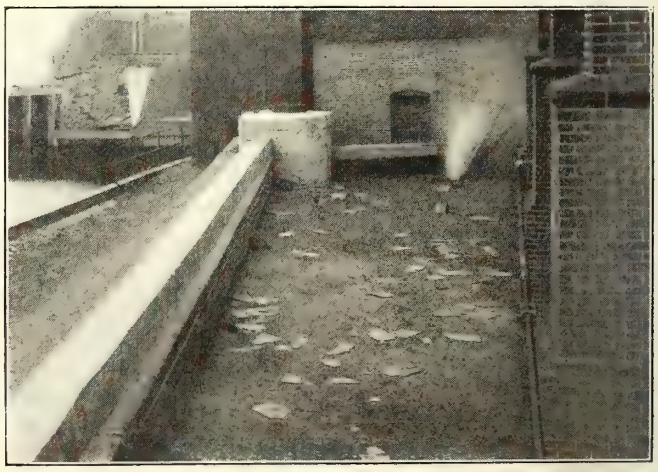
is bolted and sweated to the rail and bolted and sweated to the cable. The third-rail is sectionalized opposite the substation. The small rail appearing in the background is a con-



Brooklyn Line Department—Feeders from Parkville Substation to the Third Rail

tact signal rail which has nothing whatever to do with the feeder connections, but is used for station signals.

The Flatbush Avenue view shown on this page represents the standard method of attaching a side-feed to the trolley wire. This differs from the common practice of making a side-feed act also as a span wire. The latter method is unsatisfactory because the strands have the tendency to break at the connections. Again, in case the trolley wire breaks and comes in contact with the rails, the short-circuit will often heat the



Brooklyn Line Department—Combined Low-Tension and High-Tension Concrete Duct at Second Avenue Plant

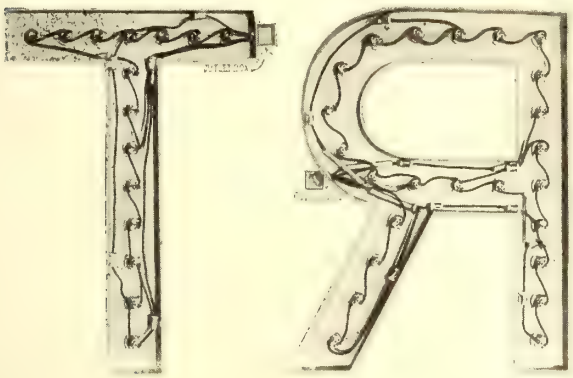
wire, and, combined with the mechanical load of the trolley wire, will cause the side-feed to fall, thereby dropping more wire to the streets and causing a further loss. With the Brooklyn type of construction, which is being applied on all new work and replacements, the side-feed performs no other

function than that of supplying current to the trolley. The ultimate cost, considering maintenance, is believed to be less with this type of construction than with the other. The connection between the underground cable and the feeder is made by a small quick-break knife switch, so that the underground cables may be easily disconnected for inspection and testing. In case the cable feeder gives trouble, it can be quickly cleared from the trolley wire.

THE REPAIR OF LIGHTS AND AUXILIARY CIRCUIT WORK

An emergency branch of the line department is organized to take care of the lights. All outside incandescent lamps, such as those which are suspended over the tracks, on platforms, over crossings, in terminals and yards where extension ladders are required, are maintained by a crew of three men, which usually is on duty from 6:30 a. m. to 5:30 p. m., but longer in bad weather. Emergency calls for the repair of lights are always answered as soon as possible, and are not allowed to go over until the next day. The crew is furnished with an automobile of the type illustrated, which enables it to cover 80 to 90 miles a day, with runs extending between such distant points as Bowery Bay and Coney Island, which are about 25 miles apart. The automobile has proved a great success in this service, as formerly four men, two wagons and four horses were needed, and even this force was unequal to the task in hot weather and when repairs were heavy.

Ordinarily, the arc lamps are maintained by two men, but in the summer, when extra lights are used at the beaches, more hands are employed. In all, the department maintains 57,000 incandescent lamps and 425 arc lamps. Its policy is to light the yards and buildings so well that not only are the employees enabled to do good work at night, but night prowlers are also deterred from stealing material. There are 6900 lights on the elevated stations, which are cared for by two men, on duty from 12 noon to 12 midnight. Care has been taken to have separate sources of supply in the lighting of all important localities. Thus, at the Brooklyn Bridge power is



Brooklyn Line Department—Wiring of Coney Island Terminal Sign Letters

REPORT ON LIGHTS

INSTALLED

FROM ..... TO ..... 19....

LOCATION	AUTH. OR REQ. NO.	SINGLE LIGHTS	5 LIGHT CLUSTERS	10 LIGHT CLUSTERS	ARC LIGHTS

REMOVED

Total Lights Connected on System. Incandescent. .....

Arc. .....

Lights Removed on Account of Breakage. .....

" Burned Out.

" Stolen. .....

SUP'T OF LINE DEP'T

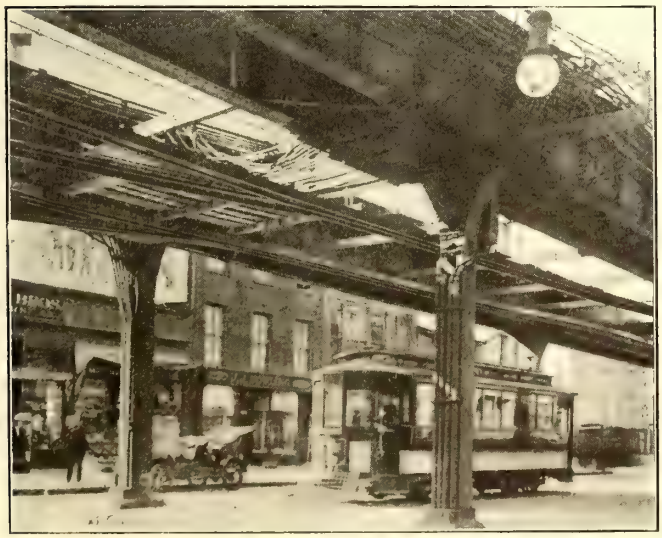
Brooklyn Line Department—Lighting Crew's Report Blank

TELEPHONE CALL SHEET, FOR TROUBLES ON ELECTRIC LIGHT, SIGNALS, TELEPHONE AND TELEGRAPH

WEATHER..... A. M. P. M. DATE..... 19

No.	LOCATION	NATURE OF TROUBLE	CALLED BY	ANSWERED BY	REPAIRED BY	TIME REC'D	TIME REP'D	REMARKS
1								
2								

Brooklyn Line Department—Portion of Sheet Used at Nostrand Avenue Headquarters for Emergency Calls



Brooklyn Line Department—Iron Bar and Feeder Construction on Flatbush Avenue



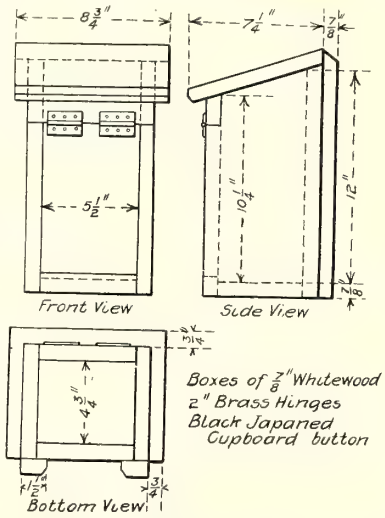
Brooklyn Line Department—Automobile for the Lighting Repair Gang

available from three independent sources, and there are two separate circuits at all other stations.

The lighting force of the line department also takes care of the display signs at the Coney Island terminal. All of these signs are of metal, and are grounded. There are many difficulties in properly maintaining them because they are operated on a 550-volt railway circuit in the damp, salt air near the seashore. It is therefore necessary that they should be made with a high-grade insulation, which is of the Brooklyn Heights standard 600-volt grade.

The ease of repair must also be considered, as the sockets are liable to burn out, and the signs must be as nearly water-tight as possible, to avoid short-circuits. The lamps can be twisted and taken out from the front of the sign. Wherever possible, each letter of the sign is provided with a suitable outlet box and cut-out. All inflammable material is excluded. The lamp bases are of porcelain.

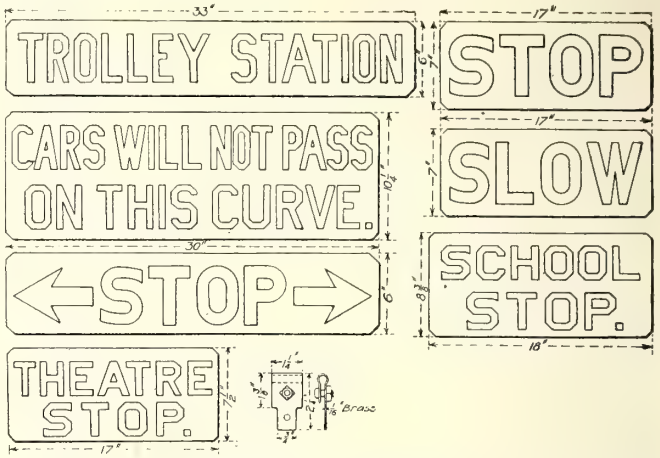
The drawing herewith shows the standard pole switch-box for street lights and clusters. The boxes are not insulated inside, as they never are used inside of buildings. While it is believed that cast-iron boxes could be made which would give as long life, the difficulty of insulation and the danger of injury to persons handling the switches is practically eliminated by using wood. Whitewood boxes of the size shown, fitted with brass hinges, are made for $1.25 each. The boxes are mounted on the



Brooklyn Line Department—Pole Switch Box

the main office, dispatcher's office and the principal elevated stations. All of the instruments are operated through a bank of multiple-series lamps from 550 volts, thus doing away with the maintenance of bluestone batteries and giving an extremely reliable method of operation.

The emergency calls for all telegraph, telephone, signal and third-rail work are assigned by the telephone operator at the line department headquarters, who is furnished with a record sheet similar to that used for the emergency line work. A

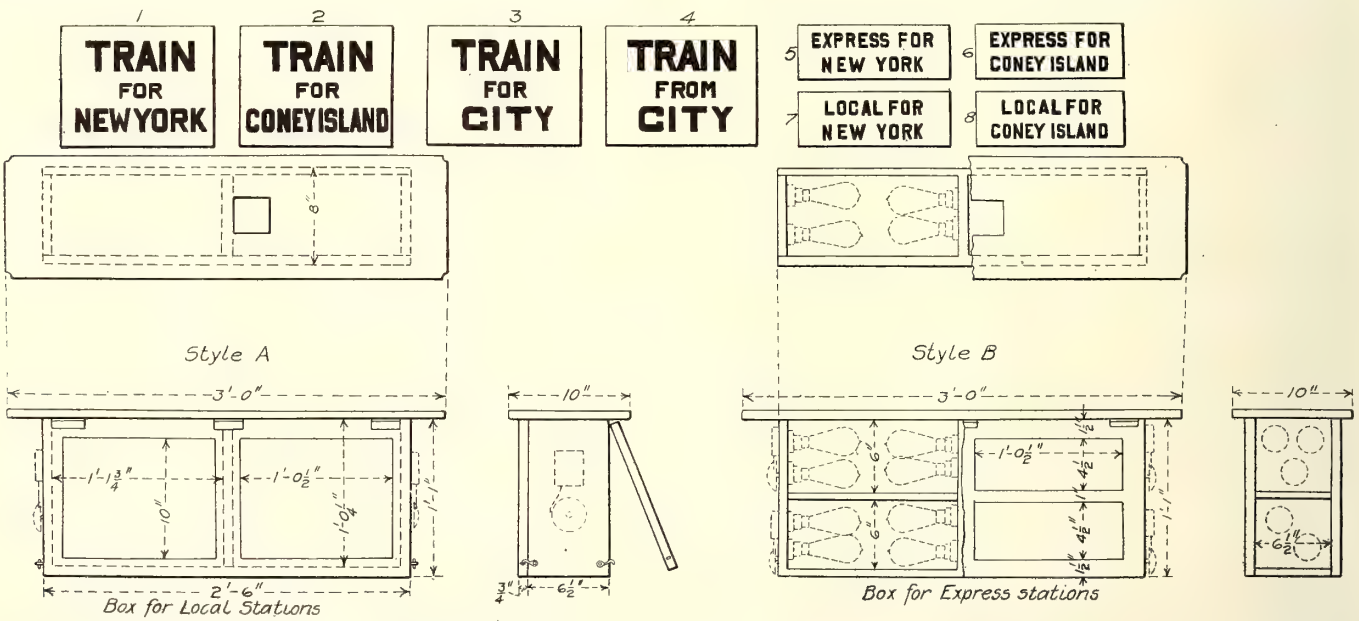


Brooklyn Line Department—Enameled Trolley Signs with Non-Rusting Fittings

record book at the line headquarters contains full details of bells and lights and highway crossing track signals, etc., so that supplies for a given point can readily be furnished without mistake. There is also a permanent light and inspection form for all lights outside of power and substations, including switch-box covers, etc.

OVERHEAD LINE SIGNS

The company has recently given up the use of painted sheet-



Brooklyn Line Department—Electrically Illuminated Train Announcers Used in Connection with Gongs at the Stations on the Brighton Beach Line

poles about 5 ft. to 6 ft. above the sidewalk, and therefore are out of the reach of children.

AUXILIARY CIRCUITS

A crew of four men cares for the telegraph and telephone circuits; also signals, such as train announcers, warning bells and the waiting room indicators, like those used on the Brighton Beach line showing the destination of the approaching train. The same gang looks after the fire alarm circuits. Telegraph instruments are used on the Brooklyn system in

iron signs for line marks, such as theater stops, school stops and the like. It is now using for this purpose heavy enameled signs which have white letters on a blue background on both sides. Brass hangers and bolts are used, so that there is no rusting to disfigure the signs after they have been in use for some time. The signs are fastened to the spans, so as to avoid swinging, thereby preventing the wearing off of the span galvanizing and the consequent streaking of the sign by rust. Enameled ware of this kind can be bought in the open market.

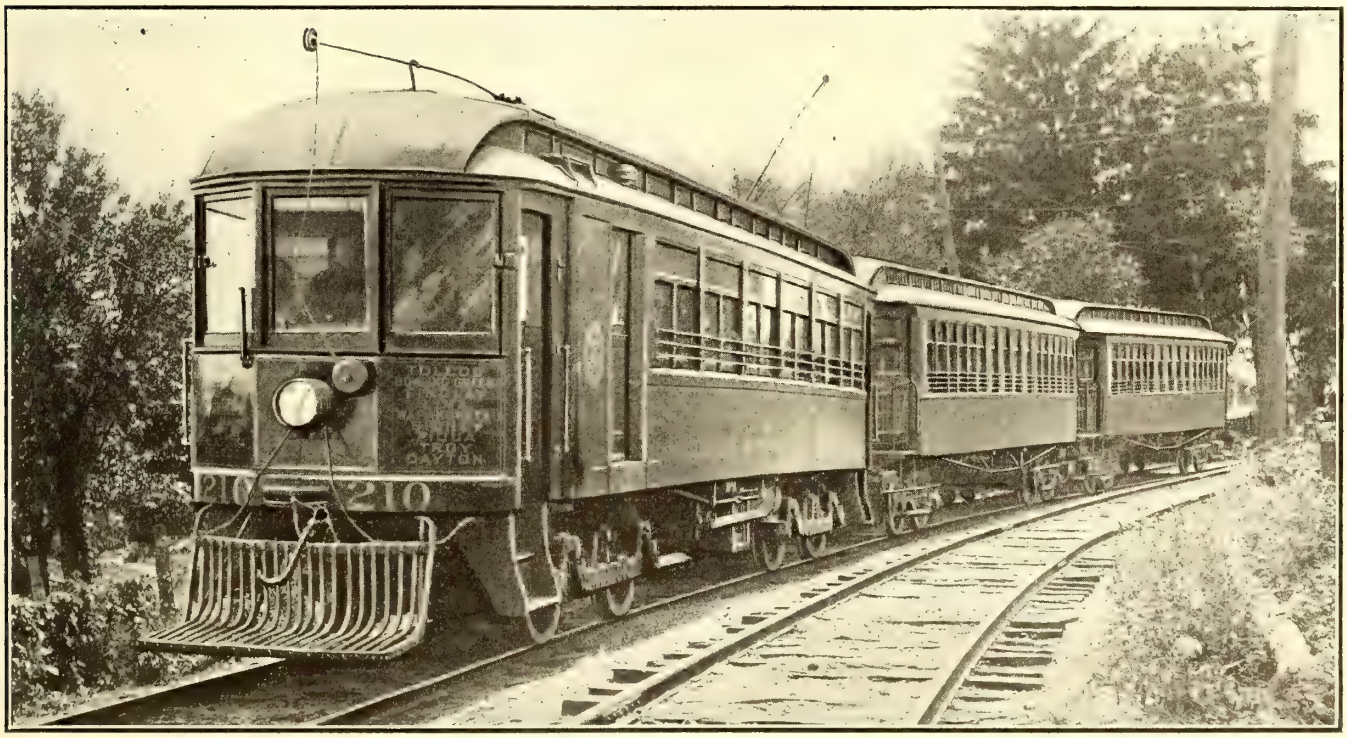
TRAIN OPERATION ON THE DAYTON & TROY

The Dayton & Troy Electric Railway Company operates a high-speed interurban road between Dayton and Piqua, Ohio. This line is 32 miles between terminals and is double-tracked for approximately one-half the distance. The service includes eight limited trains daily, which are operated in connection with the Western Ohio Railway and the Toledo, Bowling Green & Southern and make the 162-mile run between Dayton and Toledo in six hours. Hourly local service is given on the Dayton & Troy in addition to the limiteds and the company is building up a substantial freight traffic.

The growth of the passenger business has brought about the need for shortening the headway, which now averages 45 minutes, or increasing the number of cars in the trains as now scheduled. The alternatives which presented themselves were either to increase the number of trains so that they would operate on a 25-minute headway or run two-car trains. Because of the operating economy in the latter course, as well as the reduction in hazard on account of fewer trains, it has been decided to attach trailers to the present trains. Accordingly five single coaches formerly operated on the New York, New Haven & Hartford Railroad were purchased recently and have been rebuilt for trailer service. These coaches are practically the same size as the present interurban car bodies which will haul them. C. M. Paxton, general manager of the Dayton & Troy, states that if the experiment with these coaches warrants continuation of the service new equipment specially designed for train operation will later be purchased.

In overhauling the coaches preparatory to putting them into trailer service the platforms were rebuilt and four angles 4 in. x 3 in. x 5/8 in. in section were added to the old structure for carrying the couplers, which are of the Tomlinson M. C. B. type and weigh about 450 lb. each. The couplers are so installed that there is a space of 12 in. between the buffer bands. New steel body bolsters were placed under the cars and the bodies were raised to conform to standard steam coach height. In addition to rebuilding the platforms and adding the couplers, the interiors of the cars were overhauled and the bodies were painted. In all about $500 was expended in preparing the old steam coaches for interurban trailer service.

The interurban motor cars which pull the trailers are equipped with four Westinghouse Nos. 76 or 112 motors and Westinghouse schedule AMM automatic air-brake equipment with graduated release. These cars are being operated on a schedule requiring a run of 31 miles in 1 hour and 25 minutes, and making 12 station stops in addition to country pick-up stops. A crew of three men is used in handling a train. The trailers are connected with the motor cars by an electric signal circuit so that no cords are used, and a lighting bus is provided for furnishing current to the lamps in the trailer. The seating capacity of a train of one interurban motor car hauling one of these rebuilt trailers is 97 passengers and the trailers have a large capacity for standing passengers. The operation of these two-car trains has shown that the time lost in accelerating with a trailer is more than made up by the time gained in loading with two entrances; and ordinarily the two-car train makes the run as quickly as a single interurban unit.



Train of One Motor Car and Two Trailers on the Dayton & Troy Electric Railway

TRAUMATIC NEUROSIS

This subject was discussed in an address by Hon. Henry J. Booth, chief counsel, Columbus Railway & Light Company, before the North Side Medical Research Society several months ago. The address has been reprinted by Secretary Donecker under the title of "Street Railway Accidents" and has been sent to all members of the Claim Agents' Association. Mr. Booth laid down the following conclusions which he had reached in regard to traumatic neurosis:

1. Such claims are more frequently made in connection with injuries to women than in connection with injuries to men.

2. These symptoms are far more common and more lasting when the accident results in litigation than when it does not.

3. When such symptoms are made the basis of a claim for damages they almost invariably disappear when the claim is settled or the litigation ended.

4. Such symptoms are far more persistent when the patients are under known observation than when they are not.

5. Neurasthenic patients are extremely susceptible to the suggestions of physicians, friends and attorneys, and sometimes the border line between the conscious and unconscious acceptance of such suggestions is extremely difficult to define.

6. Osteopaths do far more to remove such cases from the domain of "the vague, the mysterious and the obscure" and bring them into the light of real scientific diagnosis and treatment than the old-line physicians.

THE SOCIAL AND ATHLETIC ACTIVITIES OF SAN FRANCISCO ELECTRIC RAILWAY EMPLOYEES

On Jan. 1, 1909, the employees of the United Railroads of San Francisco organized the United Railroads Athletic Club to promote amateur athletic contests and entertainments. Later the club was incorporated as the Railroad Athletic Club. The officers are: H. T. Jones, president, superintendent of the Fillmore division and also of the employment bureau; vice-president and treasurer, G. F. Chapman, superintendent McAllister division; secretary and match maker, W. A. Nugent, assistant to Mr. Jones; physical instructor, Professor G. W. Braun, champion professional welterweight wrestler of the world. In addition, the club also has a referee and judges. Salaries are paid only to the physical director and the janitor. The membership is composed of a large percentage of the 3000 employees of the railroad company, but there are also a few outsiders. The initiation fee is $1, with monthly payments of 50 cents. Each member has a monthly membership card and also a pass key to the clubhouse. The officers of the United Railroads of San Francisco are honorary members. Three of the car houses have auxiliary organizations, one of which is known as the Geneva Athletic Club. All of these organizations are devoted to both social and athletic purposes, boxing and dancing being among the principal entertainments.



San Francisco Employees—The Shop Team and Its Kid Mascot



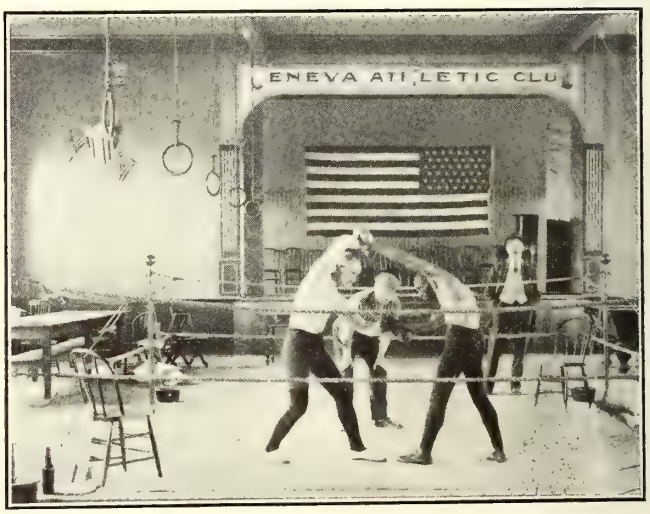
San Francisco Employees—Baseball Team of the Geneva Division Car House

The Railroad Club is centrally located at Turk and Fillmore Streets, on the upper floor of a large two-story wooden building owned by the United Railroads. The company gives the free use of these quarters, as well as light, heat and water. The large, well-ventilated club rooms were fitted up at a cost of $4,500. They include a combined reading and writing room, with a library of about 300 volumes and files of the popular magazines and newspapers. A piano is also placed in this room for the use of musically inclined members. Other rooms are used for pool and billiard games, for hot and cold water tub, shower or needle baths, for massage tables, for a gymnasium and for a handball court. A constant supply of fresh air is supplied to the gymnasium by a 4-ft. fan driven by a 10-hp motor. The club rooms are appropriately furnished with pictures of noted atheles and with advertising placards for which a rental charge is made by the club.

In the center of the gymnasium, which is turned into an arena on show nights, there is a 24-ft. Queensbury elevated boxing ring which is said to be the finest on the Pacific Coast. The seating capacity of the gymnasium arena is 1500, but the exhibitions given have proved so popular that, during the past year, it was found necessary to hold the bouts at Dreamland Pavilion, where there has been an average attendance of 3000. When the boxing shows were first given the admission fee was 50 cents and reserved ringside seats cost $1 each, but these prices have been raised owing to the popularity of the club. Those who participate in the bouts are either amateurs or semi-professionals, most of the boxers being bonafide members. As a general rule, the contests are restricted to three or four rounds. Cash prizes are prohibited, but the winner of a boxing contest is given a merchandise order not to exceed $35. These prizes are sometimes divided as per agreement between the contestants. These boxing contests are held in accordance with the monthly license practice which prevails in San Francisco.



San Francisco Employees—The Brass Band Preparing to Entertain at a Baseball Game



San Francisco Employees—A Friendly Bout Between Black and White

Banners, medals and cups are presented to winners of

contests in wrestling, running, baseball, basketball and pool. It is an interesting fact that many of the club's best athletes are among the most reliable employees of the company. The division superintendents say that they have less trouble with their pugilistic platform men than with most of the others. Several good Marathon runners have been developed by the club, the foremost being a Greek. During this season two pool tournaments were given by the club and two large silver cups were presented to the winners.

The railroad company has manifested a great deal of interest in the club's welfare, so much so that the president, Patrick Calhoun, has favored the building by the company of



San Francisco Employees—An Inter-Department Baseball Game

a new clubhouse with a finer gymnasium and auditorium. A year ago the club was presented with a billiard table by Dr. W. B. Coffey, chief surgeon of the United Railroads Hospital Association.

During the winter free dances have been given by the club at its gymnasium, the music being furnished by an orchestra composed of employees of the United Railroads. Baseball is a favorite pastime. All items of the equipment, such as uniforms, bats, balls and bases, are furnished by the company. Even special cars are supplied to transport the teams and rooters to the ball grounds. Nine divisions, including the general offices and shops of the company, send strong teams into the field to compete for the championship of the United Railroads baseball league. These inter-department games are keenly fought. Every team has a mascot and plenty of loyal followers with cheering choruses, just like the college baseball and football clubs. An all-star team is selected from the com-

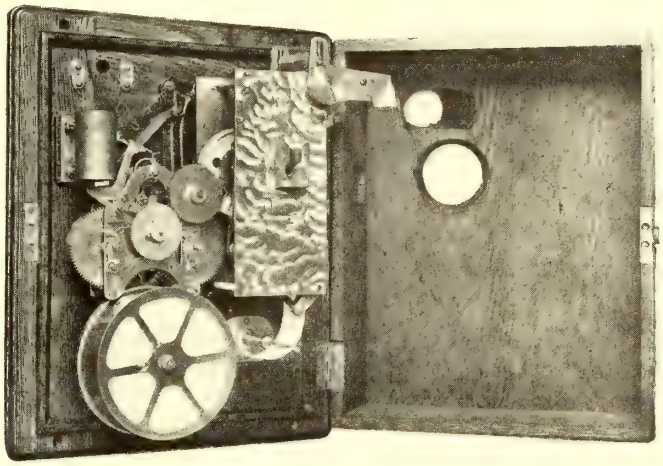


San Francisco Employees—Special Baseball Excursion Car Provided by the Railway

pany's nines to enter the Bay Cities League, a San Francisco organization of high-class amateur baseball teams. The pennant prize in this league last year was a large silk banner contributed by a prominent sporting goods manufacturer. It was won by the electric railway team. The presentation was made at one of the monthly shows of the Railroad Club, where the banner was handed over to the victors by general manager Charles N. Black. The railroad men's band, which consists of 40 pieces, has frequently furnished music at the ball games, besides giving concerts on other occasions.

COASTING REGISTERS AND CURRENT CLOCKS

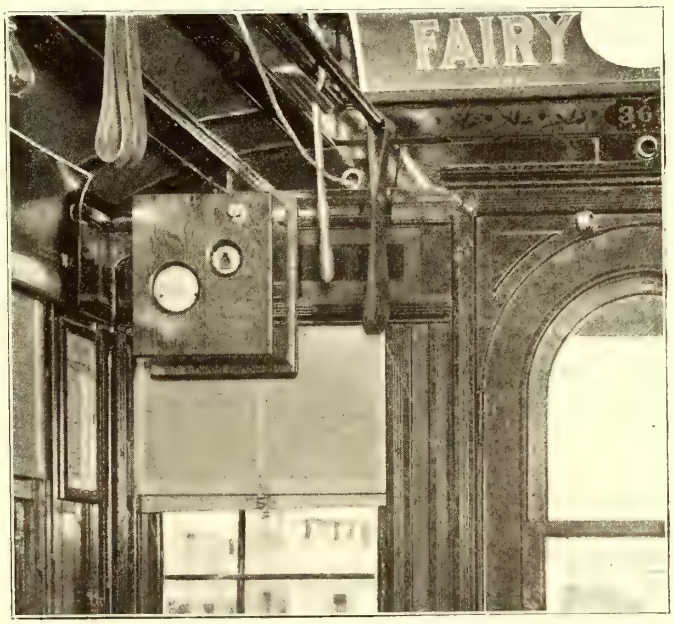
An account was published in the ELECTRIC RAILWAY JOURNAL of Oct. 30, 1909, of the working of a coasting register, invented by Frank Hedley, vice-president and general manager, and J. S. Doyle, superintendent of car equipment, of the Interborough Rapid Transit Company, and then being tested on the Second Avenue elevated line in New York. In the issue of July 9 an article by H. S. Putnam gave the results secured by the use of this register. The Railway Improvement Company, 165 Broadway, New York, has recently been organized, with Frank Hedley as president, and A. J. Pizzini as vice-president



Interior of Coasting Register

and general manager, to place this register on the market. Several important and large electric roads have already ordered the machines because of the large saving in the consumption of electric power.

Briefly, the object of the register is to obtain a comparative

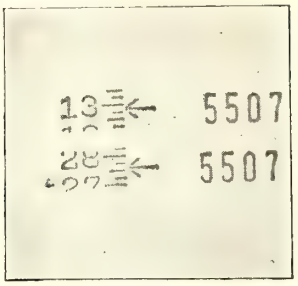


Coasting Register in Position

record of the efficiency of motormen in operating cars or trains. It was found during the trials on the Manhattan Elevated Railway with these registers and also with wattmeters that the differences in kw-hours used by different motormen, on the same line and running the same train, varied from a few per cent to as high as 30 per cent. The high figures were caused by carelessness in manipulating the controller and brakes, especially in not coasting as far as possible. Further investigation showed that a record of the time spent in coasting possesses certain advantages over the record of time spent in accelerating,

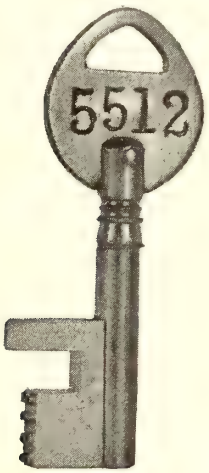
partly because it concentrates the attention of the motorman upon the importance of increasing the period during which the train is in motion without taking power from the line, and partly because it measures both the efficiency of accelerating and the efficiency of braking.

The accompanying illustrations show the construction of the device. The time mechanism, which is manufactured by the International Time Recording Company, consists of a double-spring, marine-movement time clock of special design, constructed to withstand excessive vibration and climatic changes, and with a capacity for running six weeks without rewinding. Attached to the escapement wheel of this clock is a braking device, automatically controlled by an electric magnet so arranged that the escapement wheel operates only when the car is coasting. From the diagrams on this page it will be seen that the magnet controlling the stopping and starting of the clock movement is interlocked with the master controller and the brake mechanism; consequently the clock will start only after the power has been turned on and then turned off, and it will stop as soon as the air brakes are operated. To start the clock again after applying the brakes, the motorman must again apply the current and cut it off with the brake in the off position.

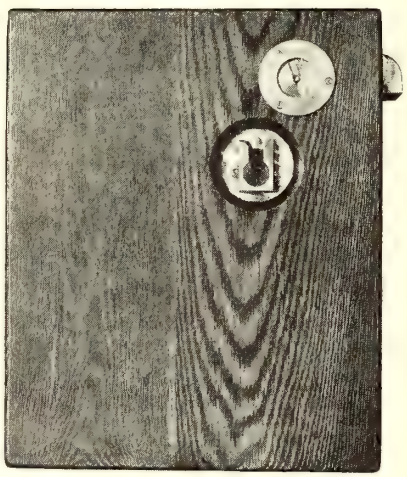


Record

Each motorman is furnished with a numbered key, and on starting on his run he inserts this key in the register and then turns the key around. This records his numeral on the paper ribbon within the register. The motorman then operates his car or train in the usual way. During each interval of coasting his clock operates, but the ribbon remains stationary. At the conclusion of his trip the motorman again inserts the registering key in the device and turns it. This stamps the paper ribbon with the final reading of the clock. A facsimile of the record made is given above. It shows that the motorman, 5507, during his total run coasted from 13 minutes to 28 minutes, or



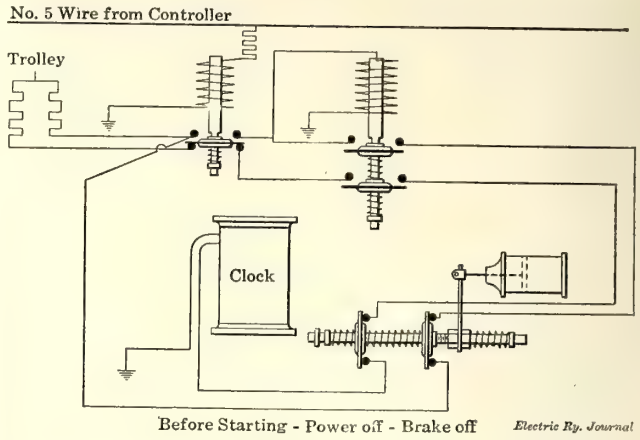
Recording Key

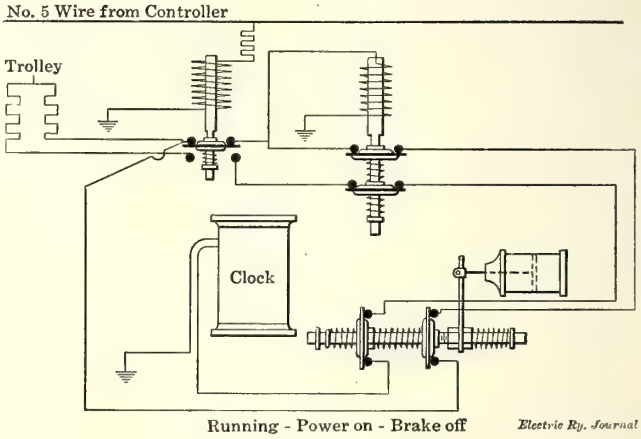


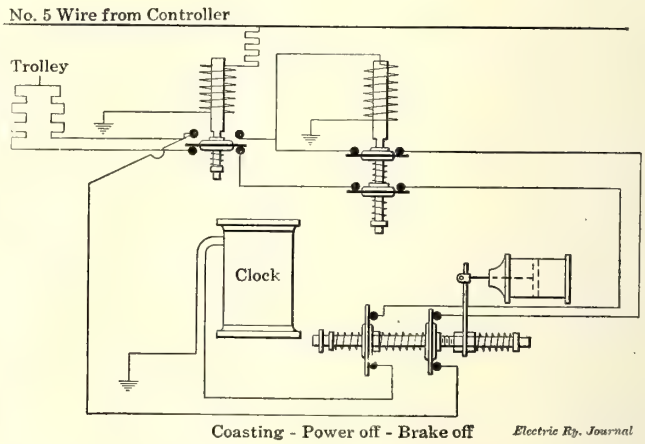
Exterior of Register

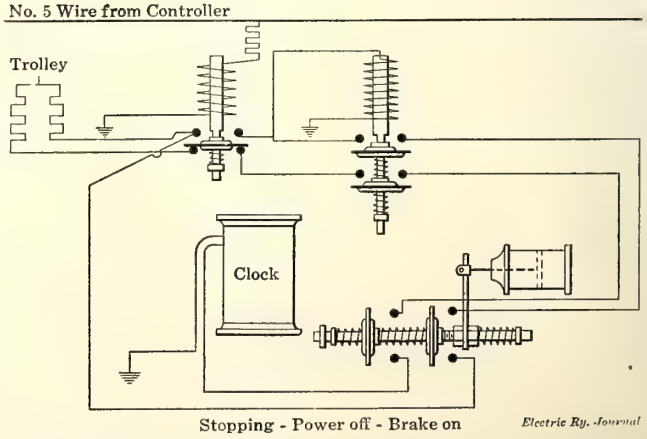
that the total coasting time for that particular trip was 15 minutes. The paper ribbon strips are turned in by each motorman at the end of each trip or day's work. They are added to give the total coasting time of each man and from them the superintendent can see who are the efficient operators and who the inefficient operators.

In addition to this register, the Railway Improvement Company is selling instruments, made in Germany, for measuring the time spent in accelerating. This device is a clock supplied with two magnets which are connected by a shunt coil from the controller and so arranged that when the current is applied









Wiring Diagrams, Showing the Connections of the Coasting Clock for Different Conditions

the magnets will lift a braking device on the balance wheel of the clock. The clock then starts running and continues until the controller is shut off, when the brake on the balance wheel is again applied. The clock requires winding only once a month, and has been adopted extensively in Germany and other European countries for obtaining comparative records of the time used in accelerating for different runs.

TRANSFER RULE BOOK IN UTICA

The operating department of the Utica & Mohawk Valley Railway has recently compiled and had printed in pamphlet form for the use of its conductors a hand-book of transfer rules and regulations. The object of the book is to give in one place and in clear language all of the information needed by conductors in issuing and accepting transfers. The first page is devoted to "transfer information." The second and third pages give the rules in regard to issuing transfers and the fourth in regard to accepting them. Then follow 19 pages showing in tabular form the transfer points on the system and the lines to which each line issues and receives transfers at these transfer points. As a book of this kind is quite novel in railway work, the matter on the four introductory pages is reproduced herewith with a page showing the method of tabulating the information in regard to transfer points. A sample transfer is also reproduced.

As already explained in this journal, the company uses different colors for a. m. and p. m. transfers, the a. m. transfer being printed on red paper and the p. m. on blue paper. The date of the month is printed on each transfer, but the name of the month itself is punched.

The company keeps a record of the transfers issued and returned by the different conductors and also compiles a daily report of the total number issued to passengers and collected from them on different routes. The conductors are also supplied with blanks of the kind illustrated on page 938 of the ELECTRIC RAILWAY JOURNAL for May 28, 1910, which explain to passengers that the conductors are not authorized to change the rules of the company relating to transfers. They are also provided with a package of blanks illustrated in the same issue upon which reports are made to the company of all cases where wrong transfers have been presented for payment of fare.

TRANSFER INFORMATION

A transfer is a ticket for the continuation of a ride and is not a stop-over ticket nor a return trip ticket and should not be used nor accepted as such.

A transfer is good for a ride only in the direction to which it is punched, viz.: a transfer punched to South on Genesee is good on any car going south over Genesee St., or one punched to West on Lafayette is good on any car going West over Lafayette, etc.

Transfers are printed in two colors, red for a. m. and lavender for p. m., and also show a. m. and p. m. on the face of the transfer.

The names of the different months are printed on the top edge of the transfer and will be cut out by the Dispatcher before they are issued to the conductor. The day of the month is printed on the face of the transfer in large type.

The transfer carries no conductor's number.

The serial number is printed on each transfer and they will be charged to the conductor by this number.

The line "to" and the time table, which shows the time of day, are shown on the face of transfer and are the parts of the transfer which require punch marks.

The transfer points are also shown in small type, on the face of the the line to be transferred to, are shown on the back in such a manner that the same punch mark which cancels the line "to" will cancel the proper transfer point.

The transfer points are also shown in small type, on the face of the transfer, for the guidance of the conductor.

The "Common Center" is the space between Blandina and Genesee Sts. and Bagg's Square for north and southbound cars, and between Mohawk and Bleecker Sts. and West Ave. and Whitesboro St. for east and westbound cars.

A transfer to a north or southbound car will be accepted at any point between Blandina and Genesee Sts. and Bagg's Square, if the transfer point cancelled on the back is within the Common Center.

A transfer to an east or westbound car will be accepted at any point between Mohawk and Bleecker Sts. and West Ave. and Whitesboro Sts., if the transfer point cancelled on the back is within the Common Center.

All transfer points outside of the "Common Center" will be positive points, and transfers punched to show these points will not be accepted at any other point, except that Eagle and Elm and Oneida Square will be considered as one point and transfers will be accepted at either point, or between these points

The conductor issuing transfer will punch it to show the time it will expire by adding a half hour to the time you will arrive at the transfer point.

TRANSFER RULES

HAVE ENOUGH TRANSFERS

Before starting your day's work be sure you have a sufficient quantity of both a. m. and p. m. transfers with the "month" properly cut out.

RIGHT DAY OF MONTH

Be sure that your transfers show the right "day of month."

RECORD OPENING NUMBER

Be sure to place the opening number (which is the number of the first transfer on pad) in proper space on your trip card at the beginning of each half trip.

NOTE.—If you use both a. m. and p. m. transfer during a half trip, place both opening numbers in proper place.

ISSUING

TIME TO ISSUE

Issue transfer at time of payment of fare

WHERE NOT TO ISSUE

Do not issue transfers to a line after having passed the transfer point (which is the first point of intersection with the line to be transferred to), except in the Common Center, and time then from the first point of intersection.

Transfers must never be issued to passengers if the car to which they wish to transfer passes the point where they boarded your car.

NO TRANSFERS ON A TRANSFER

Do not issue transfer on a transfer *except* where a Deerfield car or the Mohawk Street transfer car is involved, or upon an emergency transfer.

SHOW LINE "TO" AND TIME OF DAY

In issuing transfers be sure that they are correctly punched to show the line "to" and time of day (which are the only two punch marks required).

NOTE.—On special occasions conductors will also punch "month."

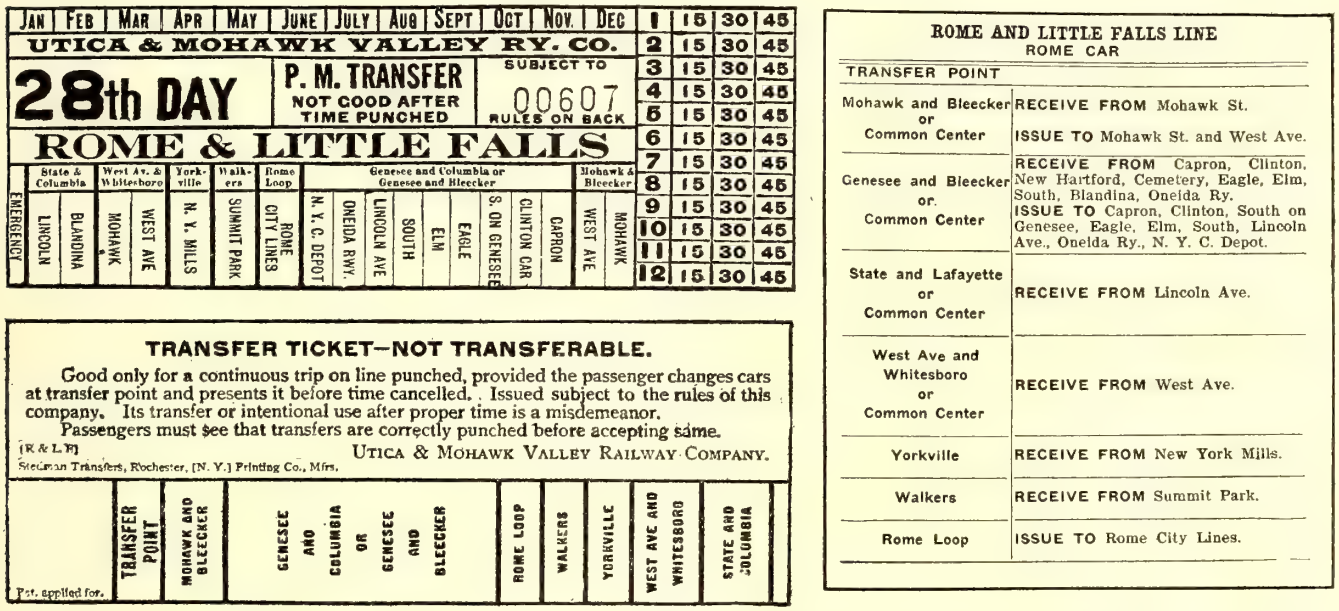
REISSUE IF DELAYED

In case of serious delay, blockade or derailment, the issuing conductor will take up transfers he has issued and issue properly punched ones.

TIME TO PUNCH

In punching the "time of day" add a half hour to the time you will arrive at the transfer point.

If you will arrive at transfer point between 8 minutes before and 7



ROME AND LITTLE FALLS LINE
ROME CAR

TRANSFER POINT	
Mohawk and Bleecker or Common Center	RECEIVE FROM Mohawk St. ISSUE TO Mohawk St. and West Ave.
Genesee and Bleecker or Common Center	RECEIVE FROM Capron, Clinton, New Hartford, Cemetery, Eagle, Elm, South, Blandina, Oneida Ry. ISSUE TO Capron, Clinton, South on Genesee, Eagle, Elm, South, Lincoln Ave., Onelda Ry., N. Y. C. Depot.
State and Lafayette or Common Center	RECEIVE FROM Lincoln Ave.
West Ave and Whitesboro or Common Center	RECEIVE FROM West Ave.
Yorkville	RECEIVE FROM New York Mills.
Walkers	RECEIVE FROM Summit Park.
Rome Loop	ISSUE TO Rome City Lines.

Front and Back of Utica Transfer Ticket and Page from Transfer Rule Book

minutes after the hour punch 30 minutes; between 7 minutes and 22 minutes after the hour punch 45 minutes; between 22 minutes and 37 minutes after the hour punch the hour; between 37 minutes and 52 minutes after the hour punch 15 minutes after the next hour.

If you arrive at exactly 7, 22, 37 or 52 minutes after the hour, give the passenger the extra 8 minutes.

CHANGE A. M. TO P. M.

Beginning at 11:22 a. m. use your p. m. transfers.

RECEIVING

LOOK AT TRANSFERS

In receiving transfers, look at color to see if it is an a. m. or p. m. transfer, look at "day of month" to see if it is the right day, look at line "from" to see if it is from your own line (if it is do not accept it unless it is an emergency transfer), look at line "to" to see if passenger is going in right direction, and look at time of day to see if time has expired. *Do not accept it after time cancelled nor in wrong direction.* An a. m. transfer, with the proper date and time, if presented before 5:00 o'clock p. m., will be treated as defective.

WHERE TO ACCEPT

Do not accept transfers at any place but transfer point cancelled on back of transfer unless transfer point cancelled is within Common Center.

DEAD TRANSFERS

In case a transfer is presented for transportation at any place other than the proper transfer point, or one is presented for transportation in a direction other than that indicated on the transfer, or one upon which the time has expired, explain to the passenger, *in a polite manner,* that under the rules of the company you are not allowed to accept the same, and request the passenger to pay fare. If the passenger does not pay fare, eject in the manner prescribed by the rules, making full report in writing on the blank furnished for that purpose.

DEFECTIVE TRANSFERS

A defective transfer is one upon which any of the required punch marks are lacking, or one punched ahead of time. In case a defective transfer is offered for transportation *do not* eject passenger, but lift transfer and turn it in to Dispatcher in separate envelope with full report.

MISTAKE IN PUNCHING

In no case will a conductor destroy any transfer. If you make a mistake in punching a transfer for a passenger, issue a new transfer, take up the one you made the mistake on and turn it in with your unused transfers.

LONG HEADWAY CARS

Conductors on cars which are running at one-half hour, or longer, intervals, will accept transfers punched to their line on the next connecting car after time punched if passenger has not had an opportunity of getting a car on line punched.

CALL TRANSFER POINTS

Conductors MUST call all transfer points, and every line which can be transferred to at each point.

In announcing transfer points, speak loudly and distinctly enough so that passengers in every part of the car can hear and understand every word said.

IN CASE OF DELAY

In case of serious delay, blockade or derailment, conductor will accept transfers upon which the time limit has expired until they know, or are informed by Inspector or Dispatcher that the schedule has been resumed.

REVENUE FROM THROUGH TICKETS IN ENGLAND

References were made in the issues of the Electric Railway Journal for May 7, 1910, page 824, and July 23, 1910, page 154, to the establishment of through tickets between the London County Council Tramways and the Croydon Corporation Tramways. The arrangement became effective as of July 31, 1909, and through the courtesy of T. B. Goodyer, tramways manager, of Croydon, figures are available showing the results of operation for the first year. The number of through tickets issued by the London Tramways was 508,504, as compared with 569,548 by the Croydon Tramways, a total of 1,078,052, or an excess of 61,044 by the Croydon system. Values of the through tickets issued by the London Tramways reached £6,025, as compared with £7,111 for the Croydon system, or an excess of £1,086 for the latter. Revenues from this business were apportioned, under the agreement, "in accordance with the fare stages traversed in the area of each authority," as follows: To London County Council, £8,948; to Croydon corporation, £4,188; total, £13,136.

SPECIAL RATES FOR THE ATLANTIC CITY CONVENTION

H. C. Donecker, secretary of the American Street & Interurban Railway Association, has announced that a special rate of one and one-half fare for the round trip to Atlantic City, N. J., and return, at the time of the convention next month, has been granted from all points in the territory of the Trunk Line Association, the Central Passenger Association and the New England Passenger Association. The Southeastern Passenger Association has also granted special rates and has issued a supplementary tariff covering the rates which will be in effect at the time of the convention. The Southwestern Passenger Association, in line with its established policy, has refused to grant special rates from points in its territory, but the special rates of the Central Passenger Association will apply from St. Louis. The Western Passenger Association has made no special rates, but the usual transcontinental excursion rates can be obtained from all western points.

COMMUNICATION

VENTILATOR ORDINANCE IN DETROIT

Detroit United Railway

To the Editors: Detroit, Mich., Sept. 1, 1910.

The courts have recently declared invalid the ventilator ordinance passed by the Common Council of this city and that body proposes to pass another ordinance that will permit the use of any ventilating device of proved merit, thus enabling us to go into the general market for such a device. We are willing that manufacturers should install their device on one or more of our cars, with the understanding that the same shall be tested by the Department of Public Health. When we have thus ascertained what ventilators are satisfactory we shall equip our cars.

Will you kindly notice this in an early edition of your paper in order that manufacturers may take the matter up with us if they so desire.

F. W. Brooks, General Manager.

TEMPORARY INJUNCTION GRANTED IN COLUMBUS

The Columbus Railway & Light Company applied, on Sept. 3, to E. B. Dillon, judge of the common pleas court at Columbus, for a temporary order restraining the striking trainmen in some measure from active interference with operations. Judge Dillon granted an order, which is directed against the local union, its officers and many individual members. The order was made effective from Sept. 3 to 10, covering the week of the state fair. Upon application of F. S. Monnett, the defendants were granted until Sept. 8 in order to present law and evidence. The case is assigned for hearing on Sept. 10.

The temporary restraining order forbids the strikers or any one acting for them to circulate printed matter warning people not to ride on the car or that it is dangerous to do so; to aid or abet any person in circulating such matter; to patrol or picket the various steam railroad and interurban stations and State Fair grounds and vicinity; to make threats against persons at these places, or to attempt picketing or the persuasion of people at the stations or fair grounds. Peaceful persuasion or picketing at other points is not prohibited. The company is restrained from keeping men at the stations to advertise its service.

In addition to the points on which an injunction was secured the company asked for an injunction against interference with the conduct of its property, against the employment of pickets of the streets, against the insult or intimidation of passengers, against the use of missiles or the placing of explosives on car tracks and against the aid of mob violence. Judge Dillon, however, did not enjoin activity in these matters. He said: "The defendants have a right to be heard and their rights to be adjudged. In the meantime I have granted such an order as will protect people who visit the State Fair."

The petition for injunction filed by the company charges conspiracy. It says that to have granted the union demands would have been to turn over the company's business to the union, whose men are declared to be unfit and incapable of conducting the company's business.

The company says that about 330 conductors and motormen are on strike, about half its regular force. It gives instances of mob violence in which cars were stoned, shot at and dynamited. Exhibits of warning cards and "unfair" lists are given.

The company charges that agents of the union have gone over the state declaring the city unsafe and stating that it was dangerous to visit the State Fair, all for the purpose of injuring the company's business.

The petition says that part of the company's men went out on strike on July 24 "and by malicious design to injure and annoy said plaintiff and cripple it in its business, and to incommode the public, said strikers in a very large measure stopped the operation of said street railway and have ever since and continu-

ously impeded and interfered with the traffic thereon, thereby reducing the revenue arising from said traffic and greatly incommoding the public, which otherwise would have patronized said railway."

Would-be employees have been threatened with bodily harm and intimidated, even in their homes. Cars have been stoned, made targets for bottles and acid and missiles have been thrown at passengers, causing great fear and death and injury.

The company complains of circulars scattered broadcast which read: "Attention! The strike is not over," and "Warning! Conditions are worse than reported by newspapers. There will be great danger in riding cars during fair week."

A reference to the police department is as follows:

"Owing to the friendly and partial attitude of the police department toward the defendants, the plaintiff has received slight protection at its hands and in many instances some of the patrolmen have violated their duty to the public by refusing and neglecting to put down said disturbances, or to protect the property of said plaintiff, but on the contrary have on numerous occasions joined with said strikers and their confederates in assaults and intimidations upon those operating the cars of said plaintiff and others guarding its property, and have made arrests of the crews operating the cars of said plaintiff in order to pull them from said cars and thereby interrupt plaintiff's business and turn over the crews to the mobs incited by said defendants and their confederates and in some instances have permitted passengers of said cars to suffer violence at the hands of the mob."

The petition adds that "owing to the fact that this plaintiff has received but slight protection and in most instances no protection from the police force of the city of Columbus," the company has been compelled to keep private guards on hand at great expense to protect its own property and the traveling public "from the depredations brought about and incited by said defendants and those acting with them."

T. J. Keating, attorney for the company, in an interview in the *Ohio State Journal* for Sept. 4 is quoted as follows: "This suit is the forerunner of other suits, in which the union and the union men will be made defendants for all damage done during the strike. All those whose names are included in the 'unfair' list have rights of action against the strikers and they may recover if the men have anything upon which courts may levy."

The evening of Aug. 30 was made memorable in the history of the Columbus strike by the partial destruction of three cars and the injury of seven persons by dynamite explosions. The most deadly explosion of the three was at the corner of Main and Seventh streets, where almost the entire floor of a car was blown out and the wheels were shattered.

Another car at Long Street and Monroe Avenue was blown from the tracks and the equipment crippled. It is said that the explosion in this case occurred near the rear truck, indicating that the dynamite had been thrown under the car.

The third car was wrecked by an explosion under the forward trucks at a Sandusky Street crossing. Two women passengers were injured and the car was badly damaged, but the crew escaped. This trouble was preceded on the evening of Aug. 29 by the destruction of a car on Leonard Avenue in the same way. The first mob demonstration which has taken place for some days occurred at this point, but the rioters were driven from the street by policemen and a detachment from Battery C, which had supposedly been relieved from duty some days previously. When the rioters discovered that they had to contend with the state troops they fled. Riot clubs were used by both the policemen and the soldiers and several arrests were made.

General Manager E. K. Stewart met a committee of labor leaders of the State on Aug. 30, when he was asked to submit the matter to arbitration. Mr. Stewart replied that the only difference between the men and the company is the question of recognizing the union and that that question could not be arbitrated. He made it plain that the company stands on this proposition just where it did in the beginning and that the men will be taken back in their individual capacity only.

This committee later held a conference with Governor Harmon and asked that he take steps to force the company to arbitrate. On Sept. 3 Governor Harmon stated that he could not accede to the wishes of the union men, as this would be practically taking sides, something that he has avoided all along. This was followed by a request from the Governor to the Attorney-General that he conduct a special investigation with a view to apprehending those persons who have been guilty of dynamiting and stoning cars or taking part in riots in other ways. The Governor then issued a statement to the public asking that people attend the State Fair and assuring them that there will be no danger in doing so. He ordered six more companies of the State troops to be on duty in Columbus during the week and the cars on lines reaching the State Fair grounds will be protected.

Labor organizations in several cities have adopted resolutions declaring that Governor Harmon has allied himself with the railway company by refusing to use his office to force arbitration.

The Chamber of Commerce has offered rewards as follows: $250 for the conviction of persons guilty of stone throwing; $500 for the arrest of persons for shooting at cars, and $1,000 for the apprehension of persons who dynamite cars. The company has also offered rewards for the arrest of persons guilty of these crimes.

Both the police department and Sheriff Sartain have been searching for several days for Albert Strader, who is accused of placing the dynamite which wrecked the three cars on the evening of Aug. 30. Since that evening the city has been comparatively free from trouble.

The cars are liberally patronized through the day and some business is done in the evening. It is believed that the rapidly increasing patronage induced the resort to dynamite.

A sympathetic strike in other industries has been threatened, but doubts are expressed as to whether this would be successful.

COUPLERS DISCUSSED BY THE STANDARDIZATION COMMITTEE OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION.

The standardization committee of the Central Electric Railway Association met at Fort Wayne, Ind., on Sept. 1, and considered recommendations for standardizing couplers and other car details which it will present at the meeting of the association to be held in Indianapolis, Ind., on Sept. 22. The following members of the committee were present: H. H. Buckman (chairman), master mechanic Indianapolis & Louisville Traction Company; L. D. Jacques, master mechanic, Fort Wayne & Wabash Valley Traction Company; R. N. Hemming, assistant superintendent Ohio & Southern Traction Company, and W. P. Graydon, master mechanic, Western Ohio Railway. The coupler manufacturers were represented by Messrs. W. T. Van Dorn and C. H. Tomlinson. Morning and afternoon sessions were held and at noon the committeemen were the guests of the Fort. Wayne & Wabash Valley Traction Company at luncheon.

The chairman announced that a copy of the Car Builders' Dictionary had been purchased and was now available for reference at the office of the association at Indianapolis. Mr. Hemming read the minutes of the last meeting of the committee, the substance of which appeared on page 30 of this paper for Aug. 27.

DRAWBAR ANCHORAGE

Mr. Buckman first directed the attention of the committee to the need for recommendations as to controlling dimensions for that part of the drawbar anchorage to which the coupler tail piece is attached. Each road would have to supply detail drawings for the rest of the anchorage but the parts into which the tail piece fitted should be standardized so that new couplers could readily be inserted in place of those damaged while cars were on foreign roads. An important point in designing the anchorage was to keep the line of pull as straight as possible and the swivel connection as close as possible to the sills. Also

it was necessary to limit the depth of the anchorage so that it would not interfere with large motor frames which project above the top of the trucks.

After consideration of the severe demands imposed on the anchorages of interurban couplers, some of which must regularly withstand the strains of pushing 62-ft. cars with 37-ft. truck centers around 35-ft. radius curves, the committee decided to recommend the following controlling dimensions for a standard anchorage which would accommodate all standard coupler tail pieces:

(1) Depth of anchorage casting below sill to be 12 in., maximum.

(2) Distance from bottom of sill to center of coupler tail piece at swivel pin anchorage maximum 6 in.; minimum 5 in.

(3) Vertical opening in anchorage for tail piece, 4 in.

(4) Depth from center of swivel pin to back end of opening in jaw in anchor casting, 5 in.

It was decided to recommend that the "Tail piece of coupler must be interchangeable and inter-operative with drawbar anchorage." To provide for this interchangeability the following dimensions were suggested for a standard drawbar tail piece:

(1) Diameter of straight swivel pin 2 in.

(2) Distance from center of swivel pin of tail piece to back end of tail piece, 4½ in.

(3) Vertical thickness of tail piece, 3½ in.

(4) Diameter of hole through tail piece, 2 1/16 in. for vertical height of 1½ in. and tapered to 2 5/16 in. diameter at ends of hole.

(5) Diameter of bosses on anchorage casting and on tail piece, 4 in.

(6) Bosses to be ¼-in. thick.

The location of the coupler with reference to the buffer face was next discussed and the committee agreed to recommend that the "Pulling face of the coupler should project 6 in. beyond the face of buffer at the maximum swing of the drawbar." This distance was agreed upon to provide for the close intercoupling of cars with and without radial buffers and to make possible the use of high coupler knuckles and gravity knuckle locks.

It was suggested that the manufacturers of couplers should confer regarding the selection of some type of radial coupler interlocking device that would provide for universal intercoupling of different designs of radial couplers such as are now used on interurban cars and also permit intercoupling of these with steam road couplers.

After a lengthy discussion on the proper length for drawbars the committee decided to recommend that the length from the center of the swivel pin to the pulling face of the coupler should be 4 ft. 8 in. This was a compromise between the 4 ft. 6 in. and 5 ft., two dimensions now commonly used. If drawbar carriers are used the opening for the coupler stem should be 6½ in. wide and 8½ in. high, thus providing for 1¼ in. horizontal play and 2¾ in. vertical play before the carrier would need to move.

President Shaw, of the American Street and Interurban Railway Association, has addressed a letter to the presidents and general managers of the railway companies urging attendance at the next convention. He states that the programs of the various associations have now been practically completed, and that the meetings will undoubtedly exceed in interest those of previous years. To insure this result, however, will require a representative attendance from member companies, and the president asks each company to see that as many representatives attend the convention as possible.

As an aid in securing the best results from the meeting, the letter suggests that each company have a staff meeting of the heads of departments, prior to the convention, to discuss there the problems which will have to be met during the coming year, and to go to the convention prepared to seek and find the answers to these problems.

DECISION OF WISCONSIN COMMISSION CONSIDERS THE RATE OF RETURN

In reaching a decision in the case of Frank B. L. Fullmer versus the Wausau Street Railroad Company the Railroad Commission of Wisconsin valued the property, analyzed the earnings, re-distributed some of the charges for expenditures and applied allowances for depreciation with the object of determining the net rate of return secured. A summary of the conclusions reached by the commission follows:

"The testimony on the re-hearing and the investigations of the commission following the same revealed a situation with respect to respondent's business somewhat different from that which was assumed in the first proceeding. Material changes have taken place in the business. The railway system has been extended. An unusual advance in traffic and revenues has resulted, and the annual rate of profits has greatly increased.

"The rate of profits shown by respondent's reports was higher than the rate found by the commission, on account of the respondent company's former practice of charging numerous items of operation and maintenance to the construction account. This practice has apparently ceased, and the company seems to be endeavoring to comply with the uniform accounts required by statute.

"A new and simpler schedule of rates has been proposed by respondent and put into effect March 10, 1910. This schedule is approved, subject to such changes as may be made hereafter in accordance with law. The order re-affirms the original order with respect to combination or joint tickets, with respect to separate accounts showing the operation of the park and also separate accounts for each class of passenger fares."

These conclusions were reached by the commission after a re-hearing on petition of the company alleging numerous grounds of error in a previous decision of the commission, dated May 22, 1909.

In the decision, of which an abstract is published herewith, the commission calls attention to an erroneous assumption to the effect that the previous order fixed 6 per cent annually as the maximum permissible rate of return on investments in such properties. The commission has not proclaimed such a doctrine. If the commission erred in its previous order with respect to the rate of return it did so, the decision says, solely because the company represented its business in a more favorable light than the facts warranted.

Reviewing the testimony on the subject of a fair rate of return and allowance for depreciation the decision says:

"Respondent's officers and others urged that the assumed intimation by the commission, that 6 or 7 per cent might, in certain cases, be sufficient, had already discouraged capital to some extent. This assumption has already been disposed of. It was further pointed out that the regular rate of interest on ordinary security loans, in the community in which respondent is operating, is from 6 to 7 per cent; that the profits in ordinary commercial ventures range from 10 to 40 per cent; that in some cases, notably in real estate transactions, profits run up into hundreds of per cents; and that Wisconsin River valley banks pay from 10 to 15 per cent on their stock. For these reasons it was urged that a public service corporation, entering upon a more or less hazardous venture, in order that it may be able to secure the necessary capital, must be able to hold out to investors a more liberal rate of return than 6 or 7 per cent. The president of the respondent company believed that the company ought to be allowed at least 10 per cent, particularly in view of the fact that all the services and work necessary in promoting the company and managing the same at the time of its inception were donated; and further in view of the fact that at the present time the officers of the company are not receiving adequate compensation.

"Testimony was also given as to a proper allowance for depreciation and contingencies. One witness, an expert in constructing and operating street railroad systems in this section of the country, testified that from 5 to 8 per cent of the value of the plant should be set aside for depreciation,

and 5 per cent of the gross earnings should be set aside for contingencies."

The decision also reviews the testimony as to the operation of parks by street railways, as follows:

"Concerning the general question of parks and amusement resorts operated by street railroad companies, officers of the company practically admitted that, as a general thing, it is not the best policy for street railroad companies to engage in amusement resort ventures on a commercial basis, especially in competition with private enterprises of a similar character. In the present case, however, it was pointed out, the park was improved and maintained, and the line extended to that point only in answer to an overwhelming public demand. Without such created traffic, it was claimed, the line could not be made to pay.

"In support of the claim that the operation of a small system is unprofitable without created traffic, the experience of another Wisconsin city is cited, in which it was found that the system was unprofitable until an amusement resort was established, when the gross revenues increased 15 per cent the first year, 12 per cent the second, and 8 per cent the third."

The commission concludes that the total reduction of fare involved in its previous order would probably not exceed $4,000, or about two-fifths of the reduction claimed by the company.

Based on valuations made by the engineer of the commission, the value of the transportation department plant of the company as of June 30, 1908, was $144,643. After deduction of the value of non-depreciable property—land at $3,904 and stores and supplies at $123—and of 12 per cent allowed for engineering and contingencies, $14,505, the value of the depreciable property is $126,111. Classification of the items of property into twelve different groups, according to the life of the different classes and deduction of the estimated scrap value from the cost new is followed by an estimate of the amount of annual reserve which must be set aside to meet the depreciation of the plant. The amount as calculated on the value of the depreciable property is equal to an annual rate of 5.34 per cent. Based on the composite lives of numerous electric plants in the State it is found that a rate of 5.75 per cent on the value of the depreciable property will supply an adequate depreciation reserve for the light and power department. Water powers also comprise part of the property of the company, but the commission concludes that the information before it is insufficient for the establishment of closely accurate valuations of water powers.

With some allowances for that part of the plant which was installed new and estimating the value of the water powers at $100,000 the commission computes the light and power department at, say, $100,000, and the transportation department at $130,000, a total of $330,000 as of July 1, 1908. Subsequent additions increased the investment, according to the figures of the commission, to $436,774 as of Jan. 1, 1910.

A comparative table, showing the earnings as compiled by the commission for the 12 months ended June 30, 1909, and by the company for the 15 months ended on that date, is published. While the revenues are in substantial agreement important differences are found in the expenses. The decision says that the fact that the expenses, as ascertained by the commission, do not run as low as those reported by the company, "is due to the practice of the respondent to charge to its construction account items representing maintenance or repair expenses." Such items were redistributed by the commission. In compilation of the income account interest on the funded debt and dividends were distributed on the basis of 60 per cent to lighting and 40 per cent to the transportation department, according to the relative plant values. Interest on the floating debt, which appeared to be chargeable mostly against the light and power department, was distributed on the basis of 80 per cent and 20 per cent, respectively, a ratio which coincides with the current consumed by the respective departments. The surplus reported by the company for its entire operation would appear to be about $27,000, while the commission found a surplus of only $20,000.

In a similar compilation of figures for the calendar year 1909 expenses were found to be higher than for the fiscal year, but revenues were considerably higher. Interest on the funded debt, taxes and dividends was apportioned on the basis of 2/3 to lighting and 1/3 to transportation. Interest on the floating debt was apportioned on the same basis as for the fiscal year. The final surplus was shown to be over $32,000. By application of the depreciation figures shown in the foregoing and accepting the expenses and earnings as determined by the commission, the net rate of return is computed in the decision as shown in the accompanying table.

NET RATE OF RETURN OF WAUSAU STREET RAILROAD COMPANY AS COMPILED BY RAILROAD COMMISSION OF WISCONSIN.

	Fiscal year, June 30, 1909			Calendar year, 1909		
	Light and power.	Transportation.	Total.	Light and power.	Transportation.	Total.
Revenues	$53,444	$39,348	$92,792	$59,582	$48,622	$108,204
Operating expenses	$16,072	$25,188	$41,261	$18,150	$24,594	$42,745
Taxes	965	1,337	2,302	1,812	902	2,714
Depreciation	5,464	6,731	12,194	8,682	7,445	16,127
	$22,501	$33,256	$55,757	$28,644	$32,941	$61,586
Net income	$30,943	$6,092	$37,035	$30,938	$15,681	$46,618
Net rate on return on average investment for year, per cent	13.4	4.3	9.96	11.9	10.2	11.3

Commenting on these figures the commission says that the expenses of the company as a whole were reduced somewhat by improper charges to construction so that the real net rate of return for the fiscal year was, in reality, not as high as is indicated, but that for the calendar year the net rate of return indicated is probably accurate, at least so far as the transportation department is concerned.

In its conclusion the commission says:

"With reference to the undue augmentation of the construction account, it should be pointed out that this practice has a tendency to cause the apparent total liabilities of a plant largely to exceed even a liberal valuation of all its physical properties. A careful appraisal of such physical properties is likely to establish the extent of the excess, if any excess exists. This situation generally does not develop into an acute stage until after a plant has reached some degree of maturity in years, and long after those who have encouraged such practices have disposed of their holdings. In the past it has been a matter of common financial history to have promoters of utility properties employ improper accounting methods in order to inspire confidence in and arouse enthusiasm for their securities. The experiences of the investing public resulting from such methods on the part of promoters, have doubtless caused much of the suspicion with which the securities of public utilities have sometimes been regarded, to the loss and inconvenience of properly conducted enterprises.

"However, we desire to state expressly, and with emphasis, that while the respondent company has followed incorrect accounting practices in the past, it is now making an honest effort to comply with the uniform accounts prescribed by the commission, in conformity with the requirements of the utilities law. The results of operation of the last six months show a remarkable increase in traffic and a corresponding increase in gross and net revenues, sufficient to yield a liberal return on the investment. Under these circumstances we think that this property of the respondent company is entitled to the confidence of the investing public."

In a paper presented on Sept. 9, before the Central Railway Club, Buffalo, N. Y., by E. M. Tewkesbury, general superintendent of the South Buffalo Railway, the writer stated that he was installing about 1 mile of test track in which 90-lb. rails made of Bessemer steel with an alloy of ferro-titanium are laid on oak ties, hook shoulder tie plates, Abbott joint plates and stone ballast. It is expected that the heavy traffic over the trial section will soon show the possibilities of ferro-titanium for decreasing rail wear.

POWER DEVELOPMENT FOR WORCESTER CONSOLIDATED SYSTEM

On account of the necessity of an additional power supply for car service the Worcester Consolidated Street Railway Company is preparing to build as an addition to its equipment a turbine plant which will have an initial rating of 5500 kw. The new apparatus will be installed in the Millbury power station of the Worcester & Blackstone Valley Street Railway Company, which, with the Worcester Consolidated system, is one of the properties under the control of the New England Investment & Security Company. Power will be transmitted to the heart of Worcester by two high-tension alternating-current circuits and distributed from a substation to the feeder lines supplying the cars within the city. The new service will supplement that of the existing generating station of the Worcester company at Fremont Street, in the southern part of the city.

Since the earliest days of electric railway service in Worcester the supply of power to the local lines has been on a direct-current basis. The electrical supply for car operation has largely been drawn from the power plant at Fremont Street, about 2 miles south of the center of distribution. The latter point is in the vicinity of the Worcester City Hall. The Fremont Street station began work as a belted plant about 20 years ago, and has from time to time been extended by the installation of generating equipment direct-driven by vertical cross-compound condensing engines. The boiler plant has been extended to meet the requirements of the engine installation, and a few years ago an elaborate system of coal storage and handling by an electrically operated bridge was placed in service. The station is located on the side of the Boston & Albany Railroad and has excellent facilities for the delivery of fuel. At present it has about reached the limit of its capacity, which is 6500 kw, and its location so far south of the center of distribution is unfavorable to the most economical service.

The Millbury station has been in service about seven years supplying power to the car service in the Blackstone Valley, and is a modern reciprocating-engine plant with direct-connected generators wound for direct-current delivery. The station is a brick and steel structure located on the south side of the town, about 6 miles south of Worcester, and it now contains two 300-kw generating sets, each consisting of a Westinghouse 550-volt dynamo direct connected to a horizontal compound condensing Hamilton-Corliss engine. The station equipment also contains a water wheel belted to a 500-kw generator, the water supply being drawn from a canal connected with the Blackstone River. The station building is about 106 ft. long x 102 ft. wide outside the walls, and it is divided into the conventional boiler and engine room, each room occupying practically half the ground area of the plant. The steam supply for the existing units is furnished by three 150-hp boilers of the horizontal return tubular type operating at 160 lb. steam pressure. The draft for the boilers is provided by a brick stack 145 ft. high and 6 ft. in diameter, and coal is supplied by a side track of the New York, New Haven & Hartford Railroad.

The turbine equipment will be installed in the engine room of the present Millbury station, and the existing boilers will be taken out and four 800-hp Edgemoor water-tube boilers installed. It is probable that the new boilers will be provided with temporary stacks, in order to enable service to be kept up from the present boilers while the new equipment is being installed. A coal pocket will be built in front and above the site of the new boilers, and mechanical methods of handling the fuel will be installed in the plant. Duplicate boiler feed pumps of a size to supply double the feed water demands of the installation will be placed in the station. The ashes will be dropped through hoppers below the boiler room floor level and removed by cars or wagons, according to the present plan. The operating steam pressure of the turbine will be 200 lb., with 150 deg. superheat. Each boiler will be equipped with a Foster superheater. The turbine is to be of the Curtis horizontal type, with a normal speed of 1500 r.p.m., and it is to be of the two-stage design. Feed water for the boilers will be drawn from the present source, which is a stream about 1000 ft. away from the plant which discharges into the Blackstone River. Gravity delivery of the water to the feed pumps will be employed. The turbine will be provided with a General Electric 75-kw turbo-exciter, wound for 125 volts. This exciter will be sufficient to handle two turbines when necessary. When the plant is enlarged, if the present line of equipment is followed, a motor-driven exciter will be installed for continuous operation. The station has been equipped with a 20-ton hand-operated crane. An interesting feature of the plant will be the absence of any circulating pump in the condensing system. Circulating water will be drawn from the canal, which has a cross-section of about 16 ft. x 7 ft. and the head upon the condenser tubes will be about 11 ft. This canal leads to the plant from a dam belonging to the company about 1500 ft. from the plant. The present condensing equipment is of the jet type, one unit being installed for each engine. As the Blackstone River contains a considerable part of the sewage discharge from the purification works of the city of Worcester, the water is unsuited for boiler feeding, but satisfactory for condensation purposes.

If the station is extended it is planned to install all high-tension busbars, oil switches, lightning arresters, etc., in a fireproof building on the opposite side of the canal from the station, giving a clear distance of about 50 ft. between the switch house and the station proper. The operating switchboard in such event will be located inside the turbine room, and the high-tension apparatus will be provided with remote control mechanism. From the station two three-phase, 13,200-volt, 25-cycle transmission lines will be run to the Worcester substation. It has not yet been settled whether the line will be run underground, on steel towers, or on wooden poles. The size of wire used will probably be No. 0 copper. As there is no alternating-current apparatus in the Fremont Street station, and as the Millbury turbine addition is to supply the service in the city of Worcester, the alternating lines will be carried direct to the Worcester substation. The latter will be connected with the Fremont Street station by 12 direct-current feeder lines averaging 500,000 circ. mils individual area of cross-section. These lines are already up, and will connect the direct-current buses of the substation and the power house at Fremont Street.

The Worcester substation will be a fireproof structure, containing an initial installation of two 1500-kw General Electric rotary converters and six 550-kw air-cooled General Electric transformers. The rotaries will be started from the alternating-current side. The substation will contain the usual complement of switchboard equipment for 13,200-volt service, and the building will be large enough to contain an ultimate installation of five 1500-kw rotaries. The direct-current feeder switchboard of the substation will contain 24 panels. At present the average load upon the Fremont Street station is about 4500 kw, and the maximum load is about 8500 kw. About 300 cars are now operated on the city and immediate suburban lines at Worcester and are supplied by the existing plant. It is anticipated that the installation of the turbine at Millbury and the substation at Worcester will improve the voltage conditions very materially in the portions of the city which are at present remote from the Fremont Street plant, while in the neighborhood of the plant the conditions will be maintained well. The plan of operation now under consideration is to operate as much of the Worcester service as possible on the turbine at Millbury, taking the balance of the load on Fremont Street station. It is expected that this plan will result in an excellent load factor at Millbury, and the machinery of older type or relatively poor efficiency at Fremont Street will be operated only in emergencies.

STEAM TURBINES FOR HIGH AND LOW PRESSURE SERVICE

The De Laval Steam Turbine Company has adapted its high-pressure single-stage impulse turbine for both high and low-pressure service. In this turbine the complete expansion of the steam takes place in a single nozzle. Steam entering at full pressure expands in the nozzle to the final or condenser pressure, thus converting all the heat energy between the two temperature limits into energy of velocity. A nozzle for receiving high-pressure steam and exhausting into a condenser is shown in Fig. 1. Fig. 2 shows a nozzle for receiving exhaust steam and discharging into a condenser or for receiving live steam and discharging against atmospheric pressure, both cases involving about the same expansion ratio. It is possible, by utilizing the full periphery of the wheel, to place enough nozzles of various ratios of expansion to suit a variety of conditions. For instance, one set of nozzles can be provided to receive high-pressure steam and exhaust to a condenser and one set to receive low-pressure steam and exhaust to a condenser.



Fig. 1—High-Pressure Nozzle



Fig. 2—Exhaust Steam Nozzle

It might appear that in a mixed-flow turbine of this type the efficiency would be sacrificed when operating on either high or low pressure, since the velocity of steam issuing from the nozzle would be different in the two cases while the velocity of the wheel must remain the same. It is asserted, however, that the proportion of the total work abstracted from the steam is not much different in the two cases. A wheel speed suitable for one ratio of expansion will serve fairly well for all other ratios encountered in high or low-pressure work, it being necessary only to modify the nozzles in order to obtain the best conditions. A machine of this design is shown in Fig. 3. This turbine which generates 150-hp for two 16-in. centrifugal pumps connected in service, was installed in a large steel mill to receive the exhaust from several hydraulic-pressure pumps and other auxiliary machines, all exhausting into a common header. Because of the feasibility of using live steam in a separate set of nozzles to supplement any deficiency in power from the exhaust steam, it was not considered necessary or advisable to install a regenerator or other means for storing heat, nor was a reducing valve fitted to supply steam at low pressure from the boiler. The turbine exhausts into a large central condensing plant, in which the vacuum varies from 18 in. to 27 in., averaging about 22 in. There is also a possibility of losing this vacuum entirely at times, due to troubles with the engines or to air leaks, making it necessary to operate the turbine non-condensing. The requirements of the specifications, which were fully met under test, were as follows:

"To carry full load when using steam at atmospheric pressure exhausting into a vacuum of 22 in.; also to carry full load when receiving steam at 120 lb. and exhausting into a vacuum of 22 in.; also to operate condensing with steam at 90 lb. pressure, exhausting into a vacuum of 22 in. and in an emergency to operate non-condensing with steam at 90 lb. pressure, all changes to be carried out automatically by the turbine itself, with the exception of the change to the non-condensing condition."

The turbine has two governor valves and two governors, one for high-pressure steam and one for low-pressure steam, the high-pressure governor being set at a few revolutions below normal speed and above this speed the high-pressure valve is kept tightly closed. The low-pressure governor is set for normal speed, but on the failure of the low-pressure steam supply the machine will drop a few revolutions, less than 2 per cent, whereupon high-pressure steam is admitted to the high-pressure nozzles. At the same time the low-pressure nozzles continue to utilize any exhaust steam available, the pressure limits varying in practice from 2 lb. above atmosphere to 5 in. of vacuum. To provide against runaways, as in case the high-pressure valve should leak when the turbine was lightly loaded, an emergency stop is provided consisting of a butterfly valve in the exhaust pipe controlled by a piston but normally held open by a spring. In case of excessive speed, air is admitted behind the piston, closing the butterfly valve. As soon as the speed is normal again, the governor closes the air valve and air leaks into the vacuum, the butterfly valve in the exhaust pipe again restoring normal conditions. Unlike the usual vacuum-breaking device, this method does not interrupt the condenser service.

Another machine made by this company was built for 1½ lb. steam pressure when exhausting into a 26-in. vacuum, under which conditions the steam consumption does not exceed 32 lb. per brake hp-hour. With the same steam pressure and a 28-in. vacuum the steam consumption drops to 30 lb. per brake hp-hour. When using live steam at 120 lb. pressure and exhausting into a 26-in. vacuum, the steam consumption is 19.2 lb. per brake hp-hour and with the same steam pressure and a 28-in. vacuum it is 17.5 lb. per brake hp-hour. This machine is also required to run with 100 lb. steam pressure non-condensing.

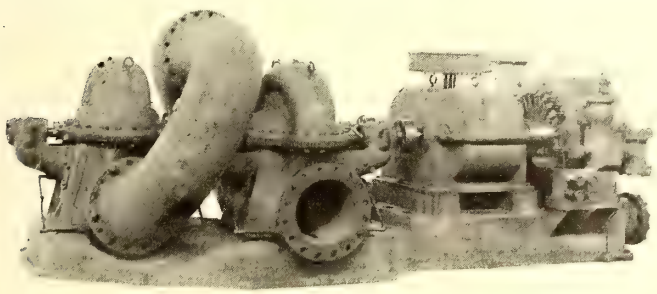


Fig. 3—A 150-hp Low-Pressure Turbine Direct-Connected to Two 16-in. Centrifugal Pumps

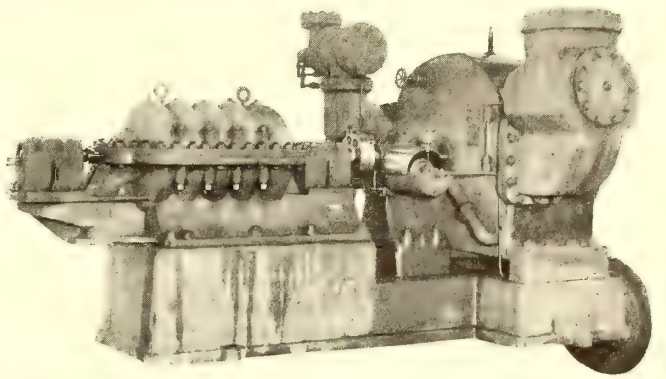


Fig. 4—Turbine Operating a Pump Delivering 500 Gal. per Minute Against 1400-ft. Head

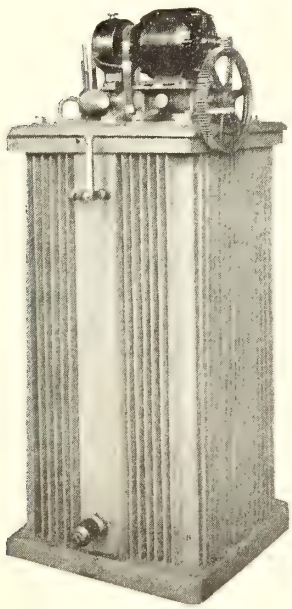
The turbine shown in Fig. 4 differs from those described in that the impellers of the directly connected centrifugal pumps run at the same speed as the impulse wheel of the turbine itself. This unit operates with steam at atmospheric pressure, exhausting into a 24-in. vacuum, or with 120 lb. steam exhausting into the same vacuum, or running non-condensing. The pump delivers 500 gal. per minute against 1400 ft. head. Another interesting machine has recently been installed in a manufacturing plant. It is a mixed-pressure turbine, designed to develop 350 hp when receiving exhaust steam at 2 lb. gage and exhausting into a 27-in. vacuum, under which conditions the steam consumption does not exceed 31 lb. per brake hp-hour. This turbine develops 300 kw when receiving steam at 140 lb. and exhausting into a 27-in. vacuum on a steam consumption of

18.5 lb. per brake hp-hour, which, considering the size of the unit, is better than could be obtained with many reciprocating engines. A mixed-flow turbine of this type is especially advantageous where it is desired to increase the output of an existing plant and where steam is required for other purposes in addition to power production.

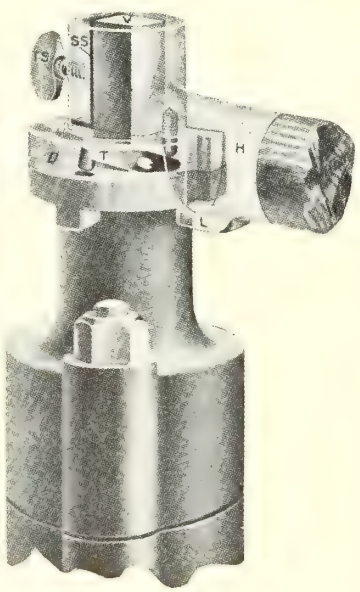
The auxiliary power required for the condensing plant by an exhaust turbine is small, the current consumed by the electric-driven auxiliaries amounting to not more than 3 per cent of the current developed by the turbine itself. Due to the possibility of shutting off nozzles as the load decreases, the De Laval turbine has a flat efficiency curve, giving remarkably good performances even at quarter load. This efficiency is retained indefinitely, as there is no leakage past valves or piston rings due to wear.

INDUCTION TYPE POTENTIAL REGULATORS

The motor-operated single-phase induction regulator shown in the accompanying illustration embodies the several improvements recently made in this line by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. Although the general design of these regulators remains unchanged, modifications have been made to insure a higher degree of satisfactory operation and longer life. The skeleton frame construction of the new type single-phase potential regulator permits the use of a "cast-in" corrugated sheet metal tank which affords a larger and more efficient radiating surface than the cast-iron tanks used with the earlier regulators, thereby insuring a low operating temperature. This type of tank is also less liable to give trouble from oil leakage, which sometimes occurs with the cast-iron tanks on account of unavoidable defects in the castings. In the latter the leaks usually developed after the punchings and windings had been placed in position, thus causing considerable loss of labor in rectification, while it is noteworthy that in the case of the "cast-in" tank a defective tank entails no other loss than the tank itself. In the earlier designs the cast-iron tank was bored out to receive the stator punchings. As this tank was open only at the top, difficulty was sometimes experienced in obtaining an inner cylindrical surface which would be in perfect alignment with the rotor bearings in the cover and bottom of the tank.



Induction Type Potential Regulator



Automatic Air-Brake Lock and Handle

Up to and including the 95-kw size, the polyphase regulators have "cast-in" corrugated sheet metal tanks. They are similar to and possess all the advantages of the "cast-in" type of tank. They possess great strength mechanically, have large radiating surfaces and dirt and dust-proof qualities. An oil gage at the top and a valve as oil drain at the bottom are provided. The regulator is shipped assembled in its case. Above 95 kw the regulators are usually oil-insulated and water-cooled. Boiler iron cases with cast-iron bases and covers are generally used. The single-phase regulator has inherent tendency to vibrate, but this has been overcome in the Westinghouse regulator by a careful design of the bearings and shaft. The moving element is so centered that a uniform air gap is secured. Furthermore, the tendency to vibrate is reduced, due to the low point on the saturation curve at which the magnetic circuit of the regulator is worked. A very agreeable result of the elimination of the vibration is the noiseless operation of the regulator.

ANTI-FRICTION BEARINGS IN PHILADELPHIA

As a result of its tests with anti-friction bearings, as described in Arthur B. Stitzer's article in the Electric Railway Journal of Aug. 27, 1910, the Philadelphia Rapid Transit Company has decided to equip 20 additional cars with Hess-Bright ball-bearing armatures and the Railway Roller Bearing Company's roller bearing journals. Ten of these cars have Brill No. 27-G double trucks and 10 have Brill No. 39-E single trucks. The pioneer installations as described in Mr. Stitzer's article comprise the following: Car No. 2140 with No. 27-G trucks and both types of anti-friction bearings, car No. 2130 with No. 27-G trucks and roller bearings only and No. 1967 with No. 39-E trucks and roller bearings only.

AUTOMATIC AIR-BRAKE LOCK.

An automatic air-brake lock has recently been put on the market by W. R. Kerschener, of New York. The object of the device is to prevent the rear-end valve-stem on a car being turned by a passenger, either by accident or design, thus disarranging the air-brake system and making it impossible for the motorman to operate the brakes from the forward end of the car.

The lock consists of a flat brass washer *D* with an opening in the center, which fits the valve-stem and is held in place by a concealed screw. There are two washers, one for the air valve at each end of the car. There is but one handle, which is used at either end of the car, like the ordinary handle. To apply the lock the washer *D* is put down over the valve-stem at each end of the car and fastened by the concealed screw. The thumbscrew *TS* clamps the handle tightly to the valve-stem, taking up any lost motion. To prevent the screw from denting or marring the valve-stem, a steel shield *SS* is inserted to take the pressure.

From the illustration it will be seen that the handle controlling the air valve can be removed only when the washer is in the proper or neutral position, as the lug *L* must pass through the opening in the rim of the valve casing. Then, as the handle is lifted, the tumbler *T* enters the corresponding hole in the casing, thus firmly locking the valve-stem. The steel shield *SS* prevents the valve-stem from being damaged or battered by nails or wedges and takes up all play or lost motion in the handle, making the valve respond instantly to the slightest movement. With the automatic air-brake lock the motorman cannot take his handle off without locking the valve in the right position.

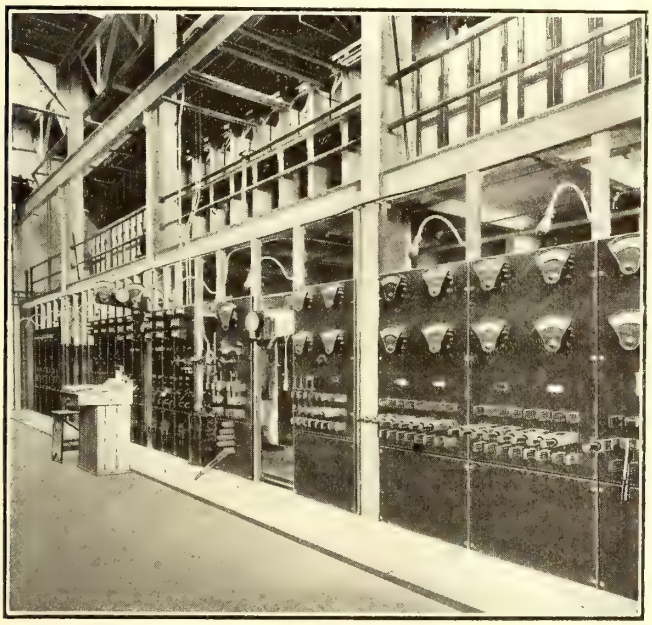
During the end of August the Philadelphia Rapid Transit Company placed in service 10 pay-within cars having twin folding doors instead of sliding doors to close the platforms. If the latter design proves better in operation, all future pay-within cars will have the folding doors. A description of the latter door arrangement was printed in the Electric Railway Journal of Jan. 22, 1910. All of the pay-within cars are being fitted with metal rods for the hand straps and vertical hand posts. The latter are screwed to the longitudinal seating at intervals of about 5 ft. These posts will offer a convenient support for standing passengers who are not holding straps.

FLAMING ARC LAMPS FOR TRACTION COMPANIES

The development of the economical and highly efficient flaming arc lamp has done much to solve for electric traction companies the problem of cheaper outdoor lighting in car yards and of illuminating large indoor areas. A flaming arc lamp gives a light the equal in intensity to 10 ordinary arc lamps. From this it can be seen that the flaming arc means a great saving in the number of lights to be installed. An American flaming arc lamp known as the "Hawthorn" has recently been developed and placed on the market by the Western Electric Company. This lamp has about 3000 cp and is especially advantageous for installations where single light units are required for large areas. The economical installation cost of these lamps is also an important point in their favor. As only one outlet is required for 3000 cp as against 5 to 10 for the same amount of light from enclosed arcs, the initial saving in wiring alone pays for these lamps. Compared with incandescent lamps, the difference in favor of the flaming arc is much greater.

EBONY ASBESTOS-WOOD SWITCHBOARDS

The accompanying illustration shows an ebony asbestos-wood switchboard which was installed by the Johns-Manville Company in Station I of the Pacific Gas & Electric Company, San Francisco. The characteristics asserted for this material are



Ebony Asbestos-Wood Switchboard in a Power Station of the Pacific Gas & Electric Company

that it has high permanent insulating qualities; that it is fireproof and capable of sustaining high temperatures without disintegration; that it possesses ample mechanical strength, is easily machined and can take a pleasing finish; that it is free from the breakage and defacement incident to stone panels; and that it is impervious to moisture or oil. This material is employed for switchboard panels, high-tension switch tops, switch or fuse bases, barriers and other switchboard fixtures. The usual external finish is a dead black varnish. It is reported that two years' service experienced with this asbestos-wood for electrical work has developed no signs of electrical or mechanical deterioration.

In a test of some 2-in. asbestos-wood switch tops for 60,000-volt switches, 2-in. x 4-in. metal plates were placed on the surface 6 in. apart and the potential raised to 40,000 volts before there was any apparent surface leakage, nor would this voltage puncture those tops which were 2 in. thick. It is asserted that under like conditions marble would have failed at about 10,000 volts to 12,000 volts.

PROPOSED COLLAPSIBLE SEAT CAR

George C. Wing and Frederick W. Hempy, Cleveland, Ohio, have patented a novel combination of collapsible and fixed car seating arrangements whereby the ratio between the seating and the standing capacities can be varied to suit the traffic conditions. The principal feature of the invention is the use of seats, either transverse or longitudinal, on hinges and springs so that they can be folded into a vertical position. In the latter position they will serve as convenient supports for the standing passengers and also as barriers to avoid jostling. A car with such seating could not only carry away the maximum number of passengers from a congested point but it would also provide seats for the long-haul passengers as the load gradually decreased. The locking and unlocking of the seats would, of course, be under the control of the conductor. The invention also includes claims for using other means for the support of the passengers if no seats of any kind are provided.

The inventors suggest that under certain conditions some railways might find it advisable to offer a reduced fare on these cars inasmuch as rolling stock of this kind would carry more riders than the permanent seat types and would cost less to maintain. This suggestion is in line with the European class-fare system because in the fourth-class cars in Germany and some other countries most of the passengers have to stand. The inventors believe that the same plan might be tried in this country for workingmen's cars in the morning and evening rush hours, excursion parties, baseball crowds and the like.

DEPRECIATION OF CARDIFF PROPERTIES

A report made by John Allcock, city treasurer of Cardiff, to the finance and electric light and tramways committees on the subject of depreciation states that the importance of the question is apparent from the fact that the capital expenditure on March 31, 1909, reached £768,088, an expenditure, having regard to the mileage, greatly in excess of any similar undertaking in the United Kingdom. In the case of 67 other tramway undertakings, the capital expenditure averages £12,583 per mile of single track, while in Cardiff it is £24,138. The loan period for the money spent on track construction extends to 30 years, and the city engineer has already advised that the average life cannot be considered to be more than about 15 years, and this advice has been strengthened by the fact that the Inland Revenue authorities have recently fixed periods ranging from 12 to 16 years as a basis for the allowance of depreciation in assessing electric tramways for income tax purposes. There is at present a tramways depreciation fund of £19,004, and a tramways reserve fund of £9,952, making a combined total of £28,956. These funds would be used as a nucleus toward making provision for the £89,320 which will be required by the city engineer on account of truck renewals, viz., £7,160 in 1912, £35,320 in 1914 and £46,840 in 1917.

The city engineer contemplates spending additional money to the extent of £127,360, as follows: £14,000 in 1920, £19,320 in 1922, £35,320 in 1926 and £58,720 in 1932. Mr. Allcock thinks it is unnecessary to provide for the expenditure of £58,720 in 1932 by accumulating a depreciation fund, as at the time this particular money is required the original loan will have been repaid. It will, however, be necessary to set aside during the period ending March, 1926, an annual sum of £6,946, which, together with the present funds in hand and compound interest at 2½ per cent per annum, will provide the money as required The foregoing requirements are exclusive of the annual outlay for repairs as distinct from renewals.

Mr. Ellis, the electrical engineer and manager, is now of the opinion that a depreciation fund is not necessary except for the tramway track as the other plant is likely to last over the periods during which the loans on it must be repaid. But as regards the track, Mr. Ellis says it is simply a question how much it is necessary to put aside each year. Mr. Allcock says that the fear that the rates of the city might be called upon to assist in building up depreciation funds has been discussed by the Council, but that

the source from which the money is derived does not operate upon the abstract question of depreciation. It is either a fact that the wear and tear of the machinery, etc., is greater than that represented by the amounts set aside for sinking funds—in which case extra provision should of necessity be made—or it is not a fact, and until this question is definitely agreed upon he cannot complete his report.

The committees recommended that £6,904 be set aside annually for track renewals. They also agreed that no special depreciation allowance was required for machinery.

CONVENTION NOTES

The following list gives the names of all companies which had made application for exhibit space at the Atlantic City convention up to Sept. 2, 1910, together with the number of square feet of space which has been assigned to them by the committee on exhibits of the Manufacturers' Association:

Name of Exhibitor.	No. of Sq. Ft. of Space.
Acme Indicator Co., Cleveland, Ohio	150
Adams-Bagnall Electric Co., Cleveland, Ohio	198
Adams & Westlake Co., Chicago, Ill	162
Anderson Mfg. Co., A. & J. M., Boston, Mass	198
Anglo-American Varnish Co., Newark, N. J	150
American Mason Safety Tread Co., Boston, Mass	150
American Brake Shoe & Foundry Co., Mahwah, N. J	400
Archbold-Brady Co., Syracuse, N. Y	150
Atlanta Car Wheel & Mfg. Co., Atlanta, Ga	162
Atlas Railway Supply Co., Chicago, Ill	150
American Railway Guide Co., Chicago, Ill	168
American Railway Supply Co., New York City	150
Allis-Chalmers Co., Milwaukee, Wis	3367
American General Engineering Co., New York City	162
Automatic Ventilator Co., New York City	198
American Steel & Wire Co., Chicago, Ill	600
American Hoist & Derrick Co., St. Paul, Minn	1358
Black Diamond Boring Machine Co., Monongahela, Pa	162
Barber Car Co., York, Pa	40 ft. track
Badger Fire Extinguisher Co., Boston, Mass	168
Bayonet Trolley Harp Co., Springfield, Ohio	162
Buda Co., Chicago, Ill	500
Berry Brothers, Ltd., Detroit, Mich	150
Brown, Harold P., New York City	324
Baldwin Locomotive Works, Philadelphia, Pa	162
Brill Co., The J. G., Philadelphia, Pa	1220
Buckeye Engine Company, Salem, Ohio	166
Carbolineum Wood Preserving Co., New York City	330
Carnegie Steel Co., Pittsburgh, Pa	1800
Cooper Heater Co., Carlisle, Pa	162
Coleman Fare Box Co., Buffalo, N. Y	300
Chicago Varnish Co., Chicago, Ill	300
Coin Counting Machine Co., New York City	324
Curtain Supply Co., Chicago, Ill	300
Cleveland Frog & Crossing Co., Cleveland, Ohio	810
Consolidated Car Fender Co., Providence, R. I	396
Columbia Machine Works & Malleable Iron Co., Brooklyn, N. Y	675
Consolidated Car Heating Co., Albany, N. Y	450
Chicago Pneumatic Tool Co., Chicago, Ill	486
Dearborn Drug & Chemical Works, Chicago	608
Duplex Metals Co., New York City	162
Dossert & Co., Inc., New York City	150
Dixon Crucible Co., Jos., Jersey City, N. J	324
D & W Fuse Co., Providence, R. I	198
Duff Manufacturing Co., Pittsburgh, Pa	340
Eclipse Railway Supply Co., Cleveland, Ohio	162
Economy Oil Cup Co., Augusta, Ga	162
Edwards Co., The O. M., Syracuse, N. Y	300
Egry Register Co., Dayton, Ohio	150
Eureka Tempered Copper Works, North East, Pa	
Emery Pneumatic Lubricator Co., St. Louis, Mo	168
Edison Storage Battery Co., Orange, N. J	162
Electric Storage Battery Co., Philadelphia, Pa	324
Elliott Co., The, Pittsburgh, Pa	198
Electric Omnibus & Truck Co., New York City	486
Electric Railway Equipment Co., Cincinnati, Ohio	375
Electric Railway Improvement Co., Cleveland, Ohio	300
Electric Service Supplies Co., Philadelphia, Pa	2024
Flood & Conklin, Newark, N. J	500
Forsyth Brothers Co., Chicago, Ill	500
Ford & Johnson Co., The, Michigan City, Ind	648
Galena Signal Oil Co., Franklin, Pa	960
Garlock Packing Co., Palmyra, N. Y	150
Goldschmidt Thermit Co., New York City	396
Grip Nut Co., The, New York City, Chicago, Ill	162
Gold Car Heating & Lighting Co., New York City	198
Globe Ticket Co., Philadelphia, Pa	400
Gould Storage Battery Co., New York City	198
General Electric Co., Schenectady, N. Y	2280
Hale & Kilburn Manufacturing Co., Philadelphia, Pa	450
Home Rubber Co., Trenton, N. J	162
Heywood Bros. & Wakefield Co., Wakefield, Mass	460
Hunter Illuminated Car Sign Co., New York City	168
Hess-Bright Manufacturing Co., Philadelphia, Pa	324
Heany Fireproof Wire Co., New York City	150
International Register Co., The, Chicago, Ill	398
Indianapolis Brass Co., Indianapolis, Ind	102
Indian Refining Co., Cincinnati, Ohio	162
Jeandron, W. J., New York City	162
Johns-Manville Co., H. W., New York City	594
Jones & Laughlin Steel Co., Pittsburgh, Pa	324
Kenfield-Fairchild Publishing Co., Chicago, Ill	
Lagonda Manufacturing Co., Springfield, Ohio	162
Lord Manufacturing Co., New York City	150
Lorain Steel Co., Johnstown, Pa	1500
Massachusetts Chemical Co., Boston, Mass	198
McConway & Torley Co., Pittsburgh, Pa	450
McGraw Publishing Co	
McVicker & Co., W. P., New York City	162
Midvale Steel Co., Philadelphia, Pa	
Nachod Signal Co., Philadelphia, Pa	162
National Car Advertising Co., Chicago, Ill	225
National Carbon Co., Cleveland, Ohio	297
National Brake & Electric Co., Milwaukee, Wis	648
National Lead Co., New York City	
National Brake Co., Buffalo, N. Y	324
National Lock Washer Co., Newark, N. J	324
New York Switch & Crossing Co., Hoboken, N. J	324
Niles Car & Manufacturing Co., Cleveland, Ohio	162
Nuttall Co., R. D., Pittsburgh, Pa	504
Ohio Brass Co., Mansfield, Ohio	594
Ohmer Fare Register Co., Dayton, Ohio	864
Pay-As-You-Enter Car Corporation, New York City	
Philadelphia Electrical & Manufacturing Co., Philadelphia, Pa.	162
Pyrene Manufacturing Co., New York City	150
Poole Bros. Co., Chicago, Ill	162
Pennsylvania Steel Co., The	1531
Pantasote Co., New York City	830
Presto Co., The, New York City	198
Q M S Co., The, Plainfield, N. J	200
Rail Joint Co., New York City	675
Railway Roller Bearing Co., Syracuse, N. Y	324
Ramapo Iron Works, Hillburn, N. Y	150
Rooke Automatic Register Co., Providence, R. I	150
Reiter, G. C., Canton, Ohio	115
Recording Register and Fare Box Co., New Haven, Conn	198
Roebling's Sons Co., John A., Trenton, N. J	396
Selah & Hoopes, Philadelphia, Pa	162
Smith-Premier Typewriter Co., Syracuse, N. Y	300
Sterling Varnish Co., Pittsburgh, Pa	300
Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y	300
Standard Steel Works Co., Philadelphia, Pa	486
Standard Underground Cable Co., Pittsburgh, Pa	324
Standard Coupler Co., New York City	300
Standard Paint Co., New York City	150
Symington Co., T. H., Baltimore, Md	200
Star Brass Works, Kalamazoo, Mich	150
Southern Exchange Co., New York City	
Speer Carbon Co., St. Marys, Pa	396
Standard Motor Truck Co., Pittsburg, Pa	324
Sherwin-Williams Co., Cleveland, Ohio	198
Smith Heater Co., Peter, Detroit, Mich	324
Templeton, Kenly Co., Chicago, Ill	
Torner Automatic Switch Co., Ft. Smith, Ark	486
Titan Steel Casting Co., Newark, N. J	710
Trolley Supply Co., Canton, Ohio	198

Tool Steel Gear & Pinion Co., Cincinnati, Ohio..... 150
Transportation Equipment Co., New York City..... 150
Taylor Electric Truck Co., Troy, N. Y..... 810

Underwood & Co., H. B., Philadelphia, Pa..... 162
U. S. Electric Signal Co., West Newton, Mass..... 486
U. S. Metal & Mfg. Co., New York City..... 198
Under-Feed Stoker Co., Chicago, Ill..... 450
Universal Safety Tread Co., Boston, Mass..... 150

Van Dorn Co., W. T., Chicago, Ill..... 216

Watson-Stillman Co., New York City..... 300
Williams & Co., J. H., Brooklyn, N. Y..... 198
Warren Webster & Co., Camden, N. J..... 162
Whitmore Manufacturing Co., Cleveland, Ohio..... 324
West Disinfecting Co., New York City..... 150
Wallace Supply Co., New York City..... 340
Wheel Truing Brake Shoe Co., Detroit, Mich..... 150
Walker & Bennet Manufacturing Co., New York City..... 210
Westinghouse Companies, East Pittsburgh, Pa.....2750
Western Electric Co., New York City..... 594
Whipple Supply Co., New York City..... 300
Wonham, Sanger & Bates, New York City..... 340
Wharton, Jr., & Co., Wm., Philadelphia, Pa..... 996

Yale & Towne Manufacturing Co., New York City..... 324

The right to exhibit space is limited to members of the American Street & Interurban Railway Manufacturers' Association. Those manufacturers of electric railway apparatus who are members of this association and have not yet engaged space, or who wish increased space, should apply to K. D. Hequembourg, vice-president in charge of the exhibits, Walker & Bennett Manufacturing Company, Dunkirk, N. Y. Manufacturers who are not members of the Manufacturers' Association should apply for membership to Charles C. Castle, vice-president in charge of membership, U. S. Metal & Manufacturing Company, 165 Broadway, New York.

PROGRAM OF THE CONVENTION

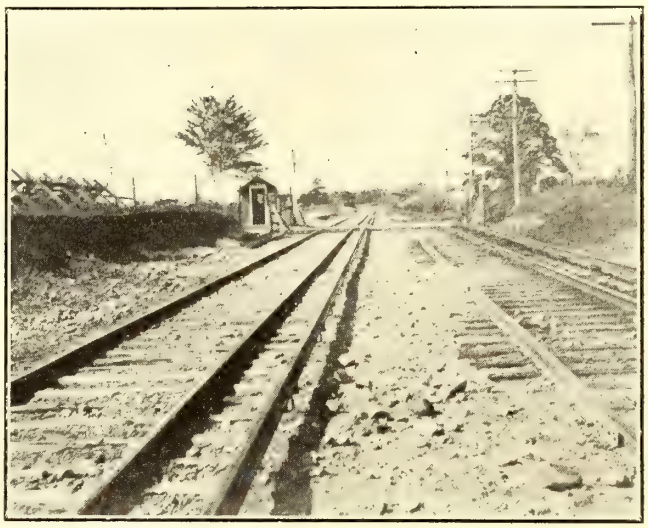
The program of the papers and reports of committees to be presented at the sessions of the different associations was published on page 304 of the ELECTRIC RAILWAY JOURNAL of Aug. 20.

DOUBLE TRACKING THE ALBANY SOUTHERN RAILROAD

The Albany Southern Railroad, which was the pioneer third-rail interurban line in New York state, has been double-tracked this year from the east end of the Rensselaer viaduct south to Electric Park on Kinderhook Lake, a distance of 17 miles. Work was commenced in November, 1909, and was prosecuted continuously through the winter in order to have the second track completed in time for handling the heavy summer excursion business. The work was finished on July 3. The second track is located to the west of the original single track for most of the distance, but in several places the original track was shifted to the east or entirely abandoned and both tracks laid on new right of way to eliminate sharp curves and steep grades. About 3½ miles of the old track was moved from its original bed.

The preparation of the sub-grade for the second track and the shifts of the original track were carried on without any interference with traffic. This was particularly difficult because there are no over-head feeder cables and the third-rail could not be disconnected or moved without shutting down the entire section between substations and delaying regular cars. Each move had to be planned ahead and before the third-rail was disconnected a temporary jumper cable was strung on the high-tension poles. Owing to the severe freezing weather which prevailed while the heavy grading was in progress most of the excavation in dirt and gravel banks was blasted out in front of the steam shovels.

The new track is laid with 80-lb. O. S. C. E. rails and Continuous joints bonded with brazed binds installed by the Electric Railway Improvement Company. The third-rail, which is placed between the old and the new track, is a 60-lb. section of low carbon steel. It is supported at every sixth tie by composition insulators resting on malleable iron supports. The old third-rail, which is on the outside, is supported on wooden insulators. At road crossings the new third-rail is connected by underground cable jumpers of 750,000 cir. mil capacity. When the new third-rail was installed both the old and the new were sectionalized and cross-connected at two points between substations and section break switches were installed so that in the event of grounding or disconnecting one third-rail the other rail can be used for carrying current around the fault.



Albany Southern Railroad—Double Track Near Sweet's

One of the accompanying engravings shows a bonding car supplying current for two presses working simultaneously on opposite ends of one section of the third-rail. The old single-track plate girder bridges were originally designed for a 97-ton locomotive loading. To accommodate the second track the abutments were extended out and a new heavy center girder put in after one of the original girders had been moved out to form a side girder. A number of the smaller stations and road crossing shelters were moved across the track over the old third-rail without breaking it. Since the double track has been in service, the running time of limited trains between Albany



Albany Southern Railroad—Bonding Third Rail of Second Track

and Electric Park, 18 miles, has been reduced to 41 minutes as against 1 hour under the single-track schedule. A marked increase in traffic has been noted since the second track was put in service, the running time reduced and all delays at sidings eliminated.

The reconstruction was done under contract by the construction department of J. G. White & Company.

News of Electric Railways

Bids Asked for Construction of Subways in New York

On Sept. 1, 1910, the Public Service Commission of the First District of New York began advertising for bids for the Tri-Borough Subway System, which will cost, it is estimated, more than $100,000,000, probably in the neighborhood of $120,000,000 or $125,000,000. The bids for construction, equipment, operations and maintenance, all by private capital, will be opened on Oct. 20, 1910, and the bids for construction alone by sections, with city money, will be opened on Oct. 27, 1910.

The Tri-Borough System includes the Broadway-Lexington Avenue Subway, with elevated extensions in the Bronx, one to Pelham Bay Park and the other out to Jerome Avenue, also the Canal Street crosstown subway, and the Broadway-Lafayette Avenue loop in Brooklyn, crossing the Williamsburg and Manhattan bridges and connecting with the Centre Street subway in Manhattan, now almost completed, also two extensions to the Fourth Avenue subway, Brooklyn, one from Forty-third Street south to Fort Hamilton and the other from Fortieth Street by way of New Utrecht Avenue to Coney Island.

The bids to be opened on Oct. 27, 1910, are asked for construction alone with municipal money of certain portions of the system. The commission states that the Board of Estimate has indicated that it can spare only $60,000,000 for construction work this year. Consequently, as it is important that the entire system should be completed at the same time, the commission now asks bids only on those sections which will take the longest time to construct. There are the principal portions of the Broadway-Lexington Avenue route, the Canal Street route and the Broadway-Lafayette route in Brooklyn. These comprise 21 sections and bidders for construction may bid on any one or more of them.

If an acceptable bid is not obtained for construction, equipment and operation of the Tri-Borough System, involving the use of private capital, it will become necessary to accept bids for municipal construction only to the extent of $60,000,000. In this event, it is stated, the commission next year will invite bids for the remaining sections of the system to the extent to which the Board of Estimate and Apportionment feels that it can go in making appropriations for rapid transit work, and in the year following will invite bids for the remaining parts of the work.

The contractor must bid for the right to the possession of the railroad for a term of years. The term of operation begins when any part of the railroad is declared by the commission to be completed and ready for operation.

From any income and increase derived by the contractor in constructing, equipping, maintaining and operating the railroad he will deduct annually:

(1) All expenses for administration, maintenance and operation.

(2) All taxes, rates and assessments except special assessments.

(3) For the first three years of the term, the contractor shall pay all expenses of maintenance as part of the operating expense. After that he shall set aside a depreciation fund to be fixed by the commission.

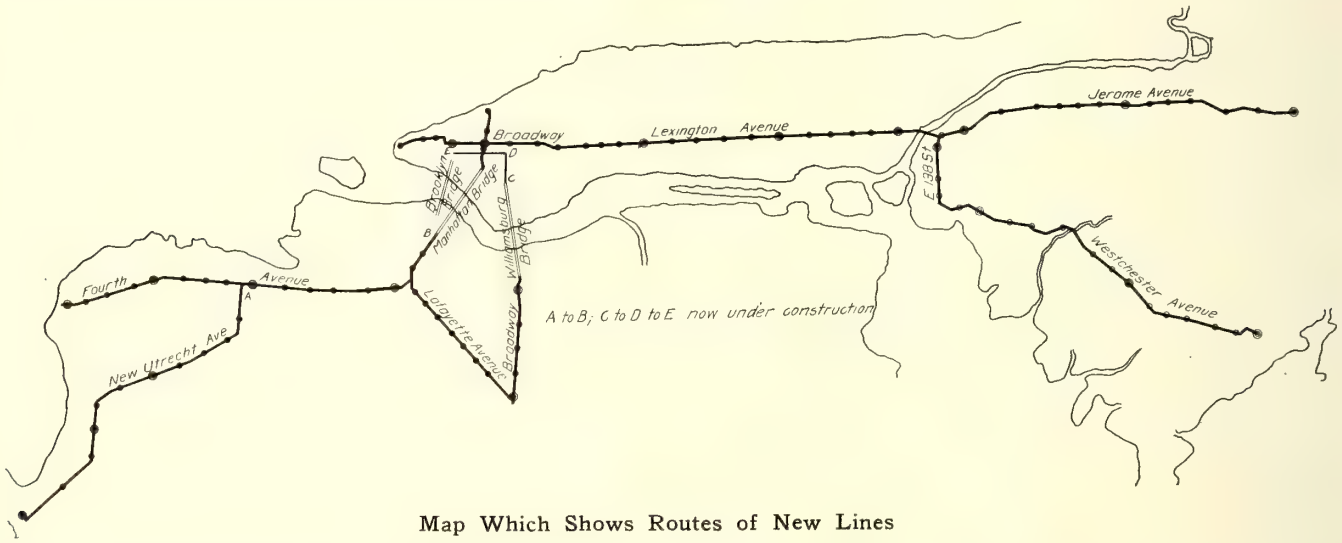
(4) .. per cent of the cost of construction to be set aside quarterly as an amortization fund. (The contractor to name the rate in his bid.)

(5) An amount sufficient to pay off within 10 years any discount on bonds issued to pay the cost of construction and equipment.

(6) One-quarter of 1 per cent of the revenue as a contingent reserve fund until such fund reaches 5 per cent on cost of construction and equipment. This fund to be used to meet deficits in operation, and any surplus is to be shared with the city.

(7) .. per cent, not to exceed 6 per cent per annum, payable quarterly to the contractor and to the city as interest on cost of construction, real estate, etc.; and interest at 4½ per cent to the city prior to the beginning of operation.

(8) After such payments are made, all amounts remaining shall be divided share and share alike between the contractor and the city.



Map Which Shows Routes of New Lines

The contractor must set aside every year the amounts for amortization and invest and reinvest the amortization fund. He is obliged to pay interest on bonds or other evidence of indebtedness issued by him and pay and discharge the cost of construction at the specified rate. The motive power shall be electricity, so used as to involve no combustion in the tunnels nor any injury to the purity of the air. The commission, in future, may permit the introduction of any superior method of generating or transmitting power if such may be invented.

With the consent of the commission, the contractor may begin the operation of a portion of the road before the whole is completed.

The right is reserved by the commission to allow other railroads to use the tracks of the railroad if the contractor shall not require the use of such railroad to its full capacity.

The rate of fare to be charged is fixed by the following provisions:

"The contractor shall not during the time hereof charge for a single fare upon the railroad to exceed the sum of 5 cents unless otherwise permitted by the commission."

No part of the road or stations may be used for advertising purposes and no trade shall be allowed except such sale of newspapers and periodicals as may be permitted by the commission.

The contractor is obligated to keep up the road and its equipment.

On giving one year's notice in writing to the contractor, the city may terminate the contract at any time after the expiration of 10 years from the date of first operation.

Situation in Detroit

The traction settlement in Detroit is being complicated by the introduction of irrelevant issues by the candidates in the municipal election. George P. Codd has refused to be a candidate for the Republican nomination for Mayor. William B. Thompson, formerly Mayor of Detroit, who was defeated two years ago by Mr. Breitmeyer, the present Mayor, has announced his candidacy for the nomination for Mayor on the Democratic ticket, and he has publicly stated the platform which he will advocate. He favors municipal ownership of street railways; the continuance of the Hally ordinance suit, which involves a judicial determination of the value of the property of the Detroit United Railway, and the acceptance of the proposal of the Michigan United Railways to build a north and south belt line, to be purchased by the city at will.

In May an ordinance was introduced in the Council to revoke the franchises of the lines now being operated by the Detroit United Railway at a 3-cent fare, because it was said that the company was not complying with the terms of the grants to the company. The resolution was referred to the committee on franchises of the Council, where it has since remained. Recently an effort was made by Alderman Garvey to bring the ordinance before the Council again, but the sentiment of those in attendance at the session was against further pyrotechnics of this kind.

On Aug. 31, 1910, Mayor Breitmeyer was reported to be preparing a final proposition for submission to the Detroit United Railway. The Mayor says that if a franchise settlement ordinance is not passed he will advocate the passage by the Legislature of a law permitting the condemnation of property with a view to taking over the Detroit United Railway. The Mayor will rely on the Council to pass his proposal to revive the committee of fifty franchise, and prepare it for submission to the voters at the November election; to pass on a street car heating and ventilating ordinance as recommended by Corporation Counsel Hally; to submit to the people the proposal of the Michigan United Railways to build a north and south belt line. The Mayor has also announced that he will urge the Council to refuse the request of President Hutchins of the Detroit United Railway to add the cost of a new appraisal of the property of the company instead of having the company bear this expense.

In reply to the suggestion made on Aug. 2, 1910, by Mayor Breitmeyer that the Detroit United Railway accept the committee of fifty franchise with a "fair" valuation, President Hutchins of the company, under date of Aug. 30, 1910, said:

"Your favor of Aug. 2, 1910, came during my absence. When received upon my return I learned you were absent, and for that reason have delayed a reply until now.

"We are in the attitude of having promised that we would operate our railways in Detroit at the bare cost of operation, including the legal rate of interest upon their present actual value. And we have agreed that this value may be determined by a high court of arbitration, composed of three of the most distinguished judges in the country. I am convinced from past experiences that such conditions as we may know to be equitable, if named by ourselves, would result only in controversy, political and otherwise, and I therefore believe it to be altogether best that we should adhere to the principle enunciated by yourself and outlined above. I therefore again urge that steps be continued for ascertaining the present value of our railway properties in Detroit by such public methods as will win the confidence both of the public and of the owners of these properties. In the meantime, we are expending this year for extensions and for the acquirement of additional equipment and other betterments more than $1,500,000, a sum which includes not only the company's entire earnings from all sources, but such additional capital besides as we have been able to control during the present agitation of our affairs.

"It may be mentioned that there has been instituted in the United States Circuit Court some litigation under what is known as the 'Hally ordinance,' which involves a judicial determination of the value of our properties. Possibly you may think it unnecessary, in view of this action, to continue an inquiry under the plan now in contemplation by the Common Council, thus avoiding duplication of labor and expenses; but whatever way the facts are ascertained, whether by court proceedings or by a continuance of your inquiry through the Common Council and a high court of arbitration, we reiterate our adherence to the principle that we will operate at any rate of fare necessary to provide the service and a fair rate of interest on the value of the property. With such a principle once established, it would be possible to meet all reasonable demands for extensions."

Plans of the Philadelphia & Suburban Elevated Railroad.

S. S. Neff, president of the Philadelphia & Suburban Elevated Railroad, Philadelphia, Pa., has addressed to the Mayor of Philadelphia and the citizens of that city a letter in which he submits a plan for the development of high-speed rapid transit lines between downtown Philadelphia and outlying sections of the city, with particular reference to high-speed operation east and west of the business center of the city, which is to be separate and distinct from the high-speed lines to operate north and south of Market Street. The subway lines of the Philadelphia Rapid Transit Company run practically in a straight line east and west, and serve the territory between Sixty-ninth Street and the Delaware River, a distance of about 7 miles. Mr. Neff suggests that elevated lines should be constructed on Lancaster Avenue and Woodland Avenue, with additional elevated tracks between Thirty-second Street and the Schuylkill River Bridge, dispensing with the service of the surface car lines now operated in the subway and around the City Hall, and in their stead to operate elevated trains from Lancaster Avenue and Woodland Avenue around the City Hall, and thus provide for the construction of an east and west subway under the City Hall for the straight movement of trains between Sixty-ninth Street and the Delaware River.

It is proposed by the Philadelphia & Suburban Elevated Railroad, first, to build two subway tracks under Broad Street, extending from the City Hall to York Street, with a loop terminal under the Parkway at City Hall; an incline approach from York Street to connect with elevated lines extending west of Strawberry Mansion, northeast to Frankford and north to Wayne Junction, with possible steam railroad connections in the vicinity of North Philadelphia and Wayne Junction. The plan submitted shows the location of the several suburban steam roads from Germantown, Chestnut Hill, Roxborough and Manayunk, which can be used for through service over the lines proposed to be built by the Philadelphia & Suburban Elevated Railroad. The plan also shows how, in the event of the steam roads not desiring to turn their local traffic over to the subway, elevated extensions could be made through Germantown and Chestnut Hill from Wayne Junction and to accommodate Roxborough, Manayunk, Conshohocken and Norristown by an extension from Twenty-ninth Street and Lehigh Avenue.

The company, in its application to City Councils, has asked for a right extending over a period of 50 years, which time is necessary for the accumulation of a sinking fund to pay off the bonds.

Association Data Sheet on Education

The committee on education of the American Street & Interurban Railway Association has sent a letter to member companies of this association referring to the previous reports on education and summarizing briefly the suggestions contained in them. This year the committee is planning to submit a progress report and asks for the following information: (1) Have you tried any new experiments this year in training your young employees? (2) What are the results? (3) Have you any suggestions to make to the committee regarding its work? The letter and report are signed by the committee on education, Prof. H. H. Norris (chairman), Prof. A. S. Richey, Prof. D. C. Jackson, R. E. Danforth, J. F. Calderwood and W. F. Kelly.

Interstate Line Completed.—The Wahpeton-Breckenridge Street Railway has been completed and placed in operation between Wahpeton, N. D., and Breckenridge, Minn.

Office in New York for Second District Commission.—The Public Service Commission of the Second District of New York, the jurisdiction of which extends to the public service corporations in New York State outside of Greater New York, has established an office in New York City in the tower of the Metropolitan Life Insurance Company's building, which is located at Twenty-third Street and Madison Avenue.

Hearing on Extension of Riverbank Subway.—A hearing was given by the Boston Transit Commission, on Sept. 2, 1910, upon the proposal to extend the westerly terminus of the Riverbank subway in Boston from the Charlesgate east to the junction of Commonwealth Avenue and Beacon Street. Property owners in the vicinity appeared to be about evenly divided upon the matter. President Bancroft, of the Boston Elevated Railway, said that the extension proposed was 1700 ft. long, that it would cost $250,000, and save only a minute in the running time. The company preferred the terminus which was orginally planned on account of its lower cost and greater simplicity of operation. The railroad commission has taken the case under advisement.

Appointments to National Stock and Bond Commission.—On Sept. 3, 1910, President Taft announced his appointments to the new stock and bond commission, which will investigate the question of bringing future issues of railroad securities under the supervision and control of the Interstate Commerce Commission. Arthur T. Hadley, president of Yale University, is named as chairman of the commission. The other members are Frederick N. Judson, St. Louis; Frederick Strauss, New York; Walter L. Fisher, Chicago, and Prof. B. H. Meyer, Madison, Wis. In discussing his appointment as chairman of the commission, Mr. Hadley said: "I do not care to go into details in regard to the matter at the present time. I presume that the work will take through the fall and well into the winter. About the work of the commission, I do not care to say anything until after I have met the other members. If the position on the commission would in any way interfere with my duties as president of Yale I would have declined the appointment. However, it will not interfere and arrangements have been made to carry on both."

Report on Municipal Subway System for Toronto.—James Forgie, of Jacobs & Davies, New York, N. Y., who were engaged by the city of Toronto to report upon a proposed system of underground and surface railways for Toronto to relieve congestion in the business district and afford rapid transit to the outlying districts, submitted the report of the firm to the Mayor and Board of Control of Toronto on Sept. 1, 1910. In brief the report recommends the construction of a complete rapid transit system at a cost of $23,000,000, and a temporary system at a cost of $9,375,000. The complete system would be 11.64 miles, and the cost per mile would be, approximately, $2,000,000. The ideal system as dealt with by the engineers consists of the following underground system: From Front Street and Yonge Street northeast to Broadview Street and Danford Street; from Front Street and Yonge Street northwest to Keele Street, West Toronto; from Front Street and Yonge Street north to St. Clair Avenue. All these lines should be connected with surface lines on the north, so as to form a circular belt. The estimated cost of the entire system in accordance with this suggestion is $23,000,000. Such a system would be operated at a loss during the first few years, but would be self-sustaining by 1921. If the subway system, which the engineers consider ideal, was operated in connection with the Toronto Railway, the entire system would be self-sustaining. The report recommended that the question of subways east and west, or northeast and northwest, should be left in abeyance until some decision has been reached regarding the diagonal streets. The report proposed for temporary relief and as part of a system to be completed later a subway north and south, from the Union Station to St. Clair Avenue, to cost $5,540,000 via Bay Street, $6,762,000 via Yonge Street, and $6,825,000 via Victoria Street.

Financial and Corporate

New York Stock and Money Market

September 6, 1910.

After the three days' holiday the stock market resumed operations to-day in the old half-hearted way that has characterized it for several weeks. Under the pressure of a moderate volume of offerings the market sold off an average of a point on active issues. The trading was very light and was almost entirely professional. There was practically no outside interest in the market and little or no buying of securities for investment. Interborough stocks continue to be among the most active in the market and to show less inclination than many others to decline.

The money market is in the same easy condition. Rates quoted to-day were: Call, 1¾ to 2 per cent; 90 days, 3¾ to 4 per cent.

Other Markets

Trading in the Philadelphia stock market has been dull, but tractions have had their full share of attention. Rapid Transit and Union Traction have both been fairly well offered but prices have remained unchanged.

In the Chicago market there has been practically no trading in tractions. A few shares of Chicago Railways Series 2 have been offered, and the price has remained steady at about 16. Elevated stocks have not been in the market.

Massachusetts Electric continues to be fairly active in Boston, with prices for both issues a trifle under those prevailing before the holiday. There has been no other trading in tractions.

The interest in tractions in Baltimore has been confined to the bonds of the United Railways. These have sold fairly well, but prices are not changed.

Quotations of various traction securities as compared with last week follow:

	Aug. 30.	Sept. 6.
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	*50¼	*50¼
Aurora, Elgin & Chicago Railroad (preferred)	*90	85
Boston Elevated Railway	a126½	a126½
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	36	a37
Brooklyn Rapid Transit Company	74⅞	74
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82¼	82
Capital Traction Company, Washington	a131	*131
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a16½	a16½
Chicago Railways, ptcptg., 3	a8	a8
Chicago Railways, ptcptg., ctf. 4	a5½	a5½
Cleveland Railways	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a103	a103
Detroit United Railways	*45	*45
General Electric Company	144¾	140⅞
Georgia Railway & Electric Company (common)	107½	109
Georgia Railway & Electric Company (preferred)	*86	*86
Interborough-Metropolitan Company (common)	17⅛	18⅝
Interborough-Metropolitan Company (preferred)	48½	49⅜
Interborough-Metropolitan Company (4½s)	79	79¼
Kansas City Railway & Light Company (common)	a30	a25
Kansas City Railway & Light Company (preferred)	a68	79½
Manhattan Railway	*131	133
Massachusetts Electric Companies (common)	a18	a18
Massachusetts Electric Companies (preferred)	a82	a81¾
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a62	62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68	68
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	*60	a60
Philadelphia Company, Pittsburg (common)	a44	a44¼
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	17¾	17½
Philadelphia Traction Company	a83½	a84
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a62	60¾
Third Avenue Railroad, New York	8½	8⅞
Toledo Railways & Light Company	*7	*7
Twin City Rapid Transit, Minneapolis (common)	*106½	108
Union Traction Company, Philadelphia	a43¼	a49
United Rys. & Electric Company, Baltimore	a15	a15
United Rys. Inv. Co. (common)	*31	*31
United Rys. Inv. Co. (preferred)	54	54
Washington Ry. & Electric Company (common)	a32⅞	*32⅞
Washington Ry. & Electric Company (preferred)	a89½	*89½
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*100	*100
Westinghouse Elec. & Mfg. Company	59	59
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last sale.

Annual Report of the American Cities Railway & Light Company

The gross income of the American Cities Railway & Light Company for the year 1909 was $714,245, as compared with $547,897 for 1908, a gain of $166,348, or 30.4 per cent. The increase was due to higher dividend receipts from the stocks of local companies. A statement of the income account for two years follows:

Income.	1909.	1908
Dividends on stocks of local companies	$701,334	$533,031
Interest on loans to local companies	5,965	13,474
Interest on bank balances	6,946	1,391
Income from other sources	.....	1
Total income	$714,245	$547,897
Expenses, including taxes	28,082	29,501
Net earnings	$686,163	$518,396
Dividend on preferred stock	414,366	414,366
Dividend on common stock	269,028	.....
Surplus	$2,769	$104,030
Previous surplus	304,155	200,125
Special income from earnings of previous year	250,000	.....
Total surplus, Dec. 31	$556,924	$304,155

Combined gross earnings of the local companies amounted to $5,801,238 for the year, a gain of $365,744, or 6.7 per cent. A comparative statement of the income account of the local companies for two years follows:

	1909.	1908.	Increase.
Gross earnings	$5,801,238	$5,435,494	$365,744
Operating expenses and taxes	3,360,945	3,280,248	80,697
Net earnings	$2,440,293	$2,155,246	$285,047
Interest charges	1,251,542	1,228,215	23,327
Balance	$1,188,751	$927,031	$261,720
Sinking funds	25,500	25,500	.....
Surplus over sinking funds	$1,163,251	$901,531	$261,720
Dividends paid	799,433	617,175	182,257
Surplus	$363,818	$284,355	$79,463

From the surplus the local companies set aside as reserve funds for renewals, betterments and contingencies, $170,741 in 1909, as compared with $158,141 in 1908.

The American Cities Railway & Light Company now owns in the aggregate 84.1 per cent of the preferred stock and 89.4 per cent of the common stock of the following companies: Birmingham Railway, Light & Power Company, Memphis Street Railway Company, Little Rock Railway & Electric Company, Knoxville Railway & Light Company and Houston Lighting & Power Company.

J. K. Newman, the president, says in the report: "The results of the operations of the several companies during the past year have been gratifying to the management. The improvement to which your attention was directed in the last annual report as taking place at the beginning of the year was continued throughout the later months. As a result, an increase of $365,744 in gross earnings, accompanied by an increase of only $80,697 in operating expenses and taxes, produced an increase of $285,047 in net earnings.

"One of the serious problems in recent street railway management has been the increasing tendency of damage costs due to accidents. During the past year the Birmingham Railway, Light & Power Company installed gates on all its cars, to be closed by the motorman before starting the car. By the use of these gates, the so-called 'platform accidents' have been almost entirely eliminated, and the expense to the company correspondingly reduced. The success achieved in Birmingham will lead to the installation of similar devices in the other properties in which your company is interested.

"Your company has never had occasion to borrow any money to finance its own requirements or to assist the local companies. The latter are all in excellent financial condition, none of them experiencing any difficulty in selling treasury bonds as fast as the proceeds are required for construction expenditures. As a result, none of the companies has any floating indebtedness, except such as may have been incurred temporarily, pending the sale of the treasury bonds reserved for construction requirements.

"Your company endeavors, as far as practicable, to keep its surplus funds employed by making advances to the local companies as temporary loans; such loans being liquidated when the companies dispose of their bonds."

A compilation giving the results of operation for the years 1903 to 1909, inclusive, shows the following percentages of increases in this period: Gross earnings, 93.8 per cent; operating expenses and taxes, 100.4 per cent; net earnings, 85.3 per cent; interest, 78.6 per cent; surplus, 92.8 per cent; surplus after provision for sinking funds, 88.7 per cent.

Descriptions of the operating companies contain the following information in relation to expenditures for improvements:

"Birmingham Railway, Light & Power Company.—The company has expended over $6,000,000 in the reconstruction and extension of its property within the past six years. Its physical condition is excellent and the capacity of the property is sufficiently great to handle a large increase in business.

"Memphis Street Railway.—The company has expended within the past five years over $3,600,000, thereby putting its property in excellent physical condition and providing sufficient capacity to care for a large increase in business.

"Little Rock Railway & Electric Company.—It has expended more than $1,500,000 upon its property within the past six years. The plant and equipment are consequently in the best of condition and adequate to handle a large increase in business.

"Knoxville Railway & Light Company.—The company has expended for reconstruction and extension within the past six years $1,900,000. In consequence, the physical condition of the property is the best that can be had and its capacity is sufficient to take care of the growth of business which is assured in the immediate future.

"Houston Lighting & Power Company.—It has expended more than $400,000 on its property within the past five years, placing the property in excellent physical condition and of sufficient capacity to handle a largely increased business."

American Light & Traction Company, New York, N. Y.—It has been reported in St. Louis that the American Light & Traction Company and the North American Company are likely to be merged soon. James Campbell, St. Louis, is president of the North American Company, and Emerson McMillan, New York, is chairman of the board of directors of the American Light & Traction Company. Mr. McMillan was formerly president of the Laclede Gas Light Company, St. Louis.

Chicago (Ill.) Railways.—On Aug. 20, 1910, the receipts of the Chicago Railways from passengers were more than $43,000. Up to Aug. 20, 1910, the receipts of the company showed a daily average of $39,000, indicating a total of $1,200,000 for the month, an increase of 13 per cent over August, 1909. The extraordinary increase in gross earnings for August is attributed to three causes, namely: The rapid growth of population in the territory traversed; the presence of many visitors attending conventions, and the continued improvement in the company's facilities, represented by the approaching completion of rehabilitation and by the delivery to the company of a large consignment of new cars, which were made available upon some of the West Side lines.

Interstate Railways, Philadelphia, Pa.—It is stated that the plan to issue preferred stock of the Interstate Railways to take up the defaulted bond interest which was made in April, 1910, is again being considered and may be presented in definite form in the near future. Bondholders who favor the plan as being the most expeditious and feasible means of relieving the company from its embarrassment are said to believe that the objections of estates holding the bonds can be overcome, the plan being to purchase at a concession from the estates the preferred stock received in exchange for the overdue coupons. It is thought that there will be no difficulty in finding a sufficient number of individual bondholders willing to take over the preferred stock held by estates in order to assure the success of the plan.

Lancaster County Railway & Light Company, Lancaster, Pa.—The Lancaster County Railway & Light Company has taken over the property of the Columbia (Pa.) Gas Company.

Long Island Railroad, Long Island City, N. Y.—The Public Service Commission of the First District of New York has authorized the Long Island Railroad to issue its

4 per cent 10-year gold debenture bonds to the Pennsylvania Railroad to the amount of $2,000,000, in payment of money advanced by the latter, which the Long Island Railroad used for the acquisition of property and the construction of additions and betterments. Main line improvements between Winfield and Dunton, for which the Long Island Railroad also asked the commission's authority to reimburse the Pennsylvania Railroad, are left for future decision by the commission.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has decided that a committee under an agreement signed by certain minority stockholders of the Metropolitan Street Railway, owning about 5000 shares of stock, shall not be permitted to intervene in the suits of the Pennsylvania Steel Company and the Morton Trust Company against the Metropolitan Street Railway and the New York City Railway. Judge Lacombe referred to his opinion of more than two years ago in a similar request, in which he said that to grant the permission would be contrary to the practice of the court. One large holding by a committee was represented in the suit, the court said, and whatever the result was as to this committee would apply to all others.

Montreal (Que.) Street Railway.—Patrick Dubee, secretary of the Montreal Street Railway, has sent to the stockholders of the company a letter referring presumably to the Canadian Light & Power Company, in which he says: "Owing to the persistent rumors regarding a proposed amalgamation of this company with a new hydro-electric company, your directors would ask the shareholders to withhold any proxies or pledges without the most careful investigation into the merits of the proposed scheme. Your directors have not sufficient knowledge of the rumored deal at this time to pass judgment on the same, but as they have under consideration certain negotiations and plans affecting the future of the company, which will shortly be laid before the shareholders, they would ask that no pledge or proxy be given by the shareholders until such time as the directors lay their ideas before them."

Pennsylvania-New Jersey Railways, Easton, Pa.—The Pennsylvania-New Jersey Railways has been organized under the laws of Delaware with an authorized capital stock of $5,500,000, of which $500,000 is 5 per cent preferred stock to hold the capital stock of the Northampton Traction Company and the Easton & Washington Traction Company, for which it has exchanged its own shares. The Northampton Traction Company and the Easton & Washington Traction Company preserve their separate corporate existence and have united in authorizing an issue of 5 per cent. bonds dated May 1, 1910, and due May 1, 1950, secured by a first mortgage on the property of the Easton & Washington Traction Company, located in New Jersey. After the retirement of the $350,000 remaining first mortgage bonds of the Northampton Traction Company the new bonds will also be a first lien upon the property of this company. The authorized amount of the new bonds is $5,000,000. Of this amount $550,000 are to be sold at once for the financial purposes of the company and for carrying out certain physical additions and betterments.

Third Avenue Railroad, New York, N. Y.—At a recent sale of securities of the New York City Railway, aggregating $4,000,000, which was held to satisfy a judgment by the Pennsylvania Steel Company and the Degnon Contracting Company, attorneys for the receiver of the Third Avenue Railroad purchased the securities which were offered for $800.

Tri-City Railway & Light Company, Davenport, Ia.—At the annual meeting of the stockholders of the Tri-City Railway & Light Company, to be held on Sept. 15, 1910, action will be taken on the question of authorizing an issue of $20,000,000 of first and refunding mortgage 5 per cent gold bonds.

West Penn Traction Company, Connellsville, Pa.—The stockholders of the West Penn Traction Company on Sept. 1, 1910, approved the issue of a mortgage to secure $25,000,000 of bonds, and the agreement with the West Penn Railways and the American Water Works & Guarantee Company. The stockholders of the West Penn Railways also ratified the plan to increase the indebtedness of the company from $6,000,000 to $12,000,000.

Traffic and Transportation

Finding of Arbitrators in Connecticut.

The board of arbitration, consisting of Judge William F. Case, Clarence Deming and David F. Fitzgerald, which has been considering the wages and the terms of service of the employees of the Connecticut Company, made public its findings on Sept. 1, 1910. Mr. Deming was chosen by the company to represent its interests. Mr. Fitzgerald was chosen by the men to represent them, and Judge Case was selected by Mr. Deming and Mr. Fitzgerald as the third member of the board. Judge Case and Mr. Fitzgerald signed the findings. Mr. Deming submitted a minority report. The employees of the company are given an advance in wages ranging from one-quarter of a cent an hour in the first year to one cent an hour at the beginning of the sixth year over the rate established by the company on April 9, 1910. The rate for overtime work of five cents an hour above the regular wage remains unchanged.

The new scale dates from June 1, 1910, and is binding on both sides until June 1, 1912. There were formerly two divisions of employees. The men in New Haven, Hartford, Waterbury and Bridgeport were included in the first division, and the employees in the other cities and towns of the State were included in the second division. The wages of the employees in the second division were slightly less than those of the men in the first division. The arbitrators have divided the system into three divisions with New Haven and Hartford in the first division, Waterbury and Bridgeport in the second division and the other cities and towns in which the company operates in the third division. It was decided that the flat rate of 30 cents an hour demanded by the men was not justified, even in New Haven and Hartford.

The sliding scale of wages is mentioned as a system calculated to maintain high efficiency among the employees and was continued for this reason. The conclusion of the report by Judge Case and Mr. Fitzgerald, together with the rates of wages as established by them, follows:

"After a careful review of the situation, therefore, and for the main reasons briefly outlined, we are convinced that the men are entitled to an advance in wages and that the companies have failed to show their inability to pay it, that no economic principle so far unearthed in our proceedings at all disturbs the balance indicated by this conclusion, and that—except in so far as the evidence on the point has been fairly weighed in its bearing directly upon the question of fair and liberal compensation—the conduct and attitude of some of the men during the period of negotiations is removed from our consideration by the explicit terms of the final agreement to arbitrate.

"Two questions remain to be disposed of: (1) The demand of the men for a flat rate, rather than one based upon pay increasing as the term of service increases, and (2) the definite schedule of wages to be fixed.

"We are satisfied that the demand for a flat rate should be denied. The present system of the company is one of obvious merit, if the public right to a carefully maintained standard of efficiency is to be respected, and methods calculated to maintain it and to encourage a recognition of it on the part of the men are to be approved.

"As to the other and final matter with which we are concerned, we submit the accompanying schedule as fairly determining the rates of wages in its respective classes which should be established; and, under the terms of the submission, we so establish these rates as the wages of the motormen and conductor on the respective divisions for the period of two years from June 1, 1910:

	First year.	Second year.	Third year.	Fourth year.	Fifth year.	Sixth year.
New Haven	21¾	22¼	23	24½	26	27
Hartford	21¾	22¼	23	24½	26	27
Bridgeport	21½	22	22¾	24	25½	26½
Waterbury	21½	22	22¾	23¾	25	26¼
New London	21	22	22¾	23½	24½	26
Stamford	21	22	22¾	23½	24½	26
New York & Stamford	21	22	22¾	23½	24½	26
Meriden	21	22	22¾	23½	24½	26
Derby	21	22	22¾	23½	24½	26
New Britain	21	22	22¾	23½	24½	26
Norwalk	21	22	22¾	23½	24½	26
Putnam	21	22	22¾	23½	24½	26
Middletown	21	22	22¾	23½	24½	26
Torrington	21	22	22¾	23½	24½	26

"In the matter of pay for overtime work, we approve and therefore leave undisturbed the existing regulations of the companies."

Mr. Deming in his minority report says that the objective work of the arbitrators was complicated by two extraneous factors—the arbitrators found in operation an increase in wages as the sequel of previous negotiations between the company and its employees and had before it the moral issue raised by the company of a broken agreement. He says that if the subject of the arbitration had been economic and had dated back entirely to an original, instead of a secondary, wage schedule matters would have been greatly simplified. Mr. Deming considered the subject under three groupings—economic, fiscal and moral. In regard to the first he says that by comparing the pay of the employees of the separate companies in 1904, when the Connecticut Company was organized, with the pay which the men receive at present wages have been increased so as nearly, if not quite, to equate the increase in the cost of living, and that the present wage scale is a fair one. His discussion of the fiscal question is concerned largely with the reports made by the company to the Railroad Commission of Connecticut. In regard to the violation of the agreement between the company and its employees, dated April 9, 1910, to which reference was made in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, page 162, Mr. Deming says that this phase of the controversy must be deemed vital, and its facts and elements analyzed, as it properly is an integral part of the case. In regard to this Mr. Deming concludes:

"To summarize very briefly this moral and fundamental aspect of the case before the arbitrators, eclipsing all other features, there was a definite and precise contract with the company, subsequently confirmed by the men as principals and on which the counsel for the men offered no refuting evidence before the arbitrating board, and let this whole branch of his case collapse. Practically then the duties of the arbitrators were merely the ascertainment of the immoral breach of the contract, and, if so found, ratifying the wage scale for which the contract provided. On that point, resting on the sanctity of contract the dissenting arbitrator holds the evidence conclusive and refuses to set the seal of arbitration on broken faith.

"And in conclusion he must express his deep sorrow at what he must regard as the moral failure of the arbitration. The board of arbitrators, a pioneer one of its kind in this State, and representing an agency for the adjustment of one of the most serious labor disputes in New England history, has had a great opportunity to which it has failed to respond. By sustaining the agreed scale it could have allowed for the men a handsome increase of their wage; it could have asserted the force that obligation of contract which the constitution of our country denies the right of even a State to impair; it could have impressed on the unions the value of good faith in an epoch when their habit of bad faith has so often—and it is to be feared too justly—been charged by the corporations, and it could have warned the union employees to watch and ward more carefully against bad leadership, and select for their captains men of integrity, intelligence and conservatism. Looked at in its broader sequels with what confidence after such an experience can a corporation failing in this arbitration, with an impregnable moral case and one also with economic strength, appeal hereafter to arbitration on economic grounds alone? An arbitration which might have been epochal for our community has proved far worse than negative in its value as precedent and example.

"It is with profound regret that on such a proposition of the highest moral altitude and import one of the three arbitrators must stand alone."

Finding of Board of Arbitration in Albany Wage Controversy

Reference was made in the ELECTRIC RAILWAY JOURNAL of Sept. 3, 1910, page 381, to the decision of the board of arbitration which has been considering the wages of the employees of the United Traction Company, Albany, N. Y. The decision was signed by Rev. Richard H. Nelson and by C. Gordon Reel, who represented the company. Joseph F. McLoughlin, who represented the employees, refused to sign the decision. The finding of the board was addressed to the United Traction Company and the employees of the company, and the full text of the finding, as made public on Aug. 30, 1910, follows:

"The undersigned were appointed by you to consider the question of an advance in wages to be paid to the employees of the company on and after July 1, 1910.

"We find that the principal ground on which the employees base their request for a 20 per cent advance over the wages paid up to June 30, 1910, is the general increase in the cost of living, and we are of the opinion that this advanced cost of the principal necessities of life should lead employers of labor to make the largest possible addition to the wages paid. If there were no other considerations to be observed, this commission would unhesitatingly recommend that the 20 per cent increase asked by the men should be granted, because we are led to believe that this would not overcome the advance in the cost of living since 1907. But there are other considerations which must be taken into account by those who are to do justice to all parties; and, first, we should ask whether the company is able to pay such an additional amount without injury to those who have invested their money in its stock.

"The commission cannot undertake to express an opinion as to the rightfulness or the wisdom of the course by which the United Traction Company came to be burdened with the large amount of capital stock on which it must now pay interest. We must confine ourselves to facts which have been presented to us and which, to the best of our knowledge, represent the present financial condition of the company.

"We find that, after deducting a sufficient sum to pay 4 per cent on the capital stock of the company, there will remain as a surplus for the year ending June 30, 1910, a sum approximating $23,900, and we find that this is the only amount known to us from which an increased wage may be drawn. We cannot advise an increase in wages which would make it impossible for the company to pay the regular 4 per cent dividend on its stock, because we hold that such an act would penalize citizens who have invested their money in good faith, and we believe it is contrary to the best interests of any city to discourage the investment of local capital in local industries. We are therefore forced to regard the above-named sum of (about) $23,900 as representing the fullest present ability of the company to meet the demands of its employees.

"The commission, therefore, recommend, that beginning with July 1, 1910, the company should pay to all of its employees an increase of 4 per cent over the wages paid up to June 30, 1910, and that such rate shall continue until June 30, 1911, except as hereinafter provided—namely: The commission recommend that application should be made by the United Traction Company to the Legislature of New York for the passage of an act to enable the company to charge 1 cent for each transfer issued within the limits of the cities in which the company operates. We have calculated that such an additional charge for transfers would enable the company to pay its employees a 10 per cent increase over the wages paid up to June 30, 1910, and we agree that such a 10 per cent advance should take the place of the 4 per cent increase herebefore awarded as soon as such an act of the Legislature shall become effective.

"In reaching this conclusion we point to the fact that the 4 per cent increase from July 1, 1910, would make the wages of motormen and conductors 26 cents an hour, irrespective of length of service, and that this is a more favorable rate than is paid in those cities of the State in which the conditions of labor and the cost of living may be compared fairly with those in the cities under consideration. If, as we hope, the Legislature should enable the company to pay this 10 per cent increase motormen and conductors of the United Traction Company would receive 27½ cents an hour, which is equal to the highest wage paid in New York City to men who have served five years or more.

"We do not hold that this award establishes ideal conditions, and we are of the opinion that causes far-reaching in their nature must be removed before the workingmen of this country can receive for their services a compensation which will meet the requirements of a progressive civilization, but we offer our decision as representing the best that can be done under present conditions, and we ask the company, its employees and the general public to co-

operate sympathetically in this effort to distribute a burden which should be borne by the many and not by the few. We do not ask the contending parties to bind themselves by an agreement extending beyond June 30, 1911, because we have good hope that conditions affecting both parties may improve before that time, and we believe that with such improvement the company will take steps to meet the just requirements of its employees."

Collision on Lake Shore Electric Railway—More than 20 persons were injured about 10 a. m., on Sept. 4, 1910, when an east-bound limited and a west-bound local collided head-on on the Lake Shore Electric Railway near Allen's Corners, two miles east of Norwalk.

Baseball Signs on Cars.—To advertise the baseball games in Toronto, the Toronto (Ont.) Railway uses a metal sign about 2 ft. wide and 9 in. high, attached to the fender. In Chicago a curtain in one of the car windows is used to display signs announcing baseball games between teams in the American and the National leagues of baseball clubs.

Lenox Fares to be Investigated—The Selectmen of Lenox, Mass., have petitioned the Railroad Commission of Massachusetts to investigate the fares in force on the Berkshire Street Railway within the town. The petitioners ask that a 5-cent fare be established between all points in the municipality and that half-hourly service be instituted by the company.

Meeting of the Central Electric Accounting Conference—It has been decided that the meeting of Central Electric Accounting Conference shall be held in Chicago, Ill., on Sept. 24, 1910. The meeting will convene at 10 a. m. in a Chicago hotel, which is still to be selected, to discuss such matters as may come before the conference. At 1 p. m. those in attendance at the meeting will leave for Milwaukee as guests of the Chicago & Milwaukee Electric Railroad.

Objects to Transfer Provision of Albany Company.—Samuel D. Miller, Rensselaer, has filed a complaint with the Public Service Commission of the Second District of New York regarding rules and regulations of the United Traction Company, Albany, N. Y., which govern the issuance of transfers between Albany, Troy and Rensselaer. He recites two instances where, because of a change in conductors en route, he was unable to secure a transfer to his destination and objects to the provision of the company that transfers should be asked for at the time fare is paid. Mr. Miller contends that a passenger should be entitled to a transfer at any time prior to arrival at the point where he desires to transfer.

Chicago Traffic Statistics.—Traffic statistics of the Chicago (Ill.) Railways for the fiscal year ended Jan. 31, 1910, as compared with the previous fiscal year, follow: Passenger car-miles, 45,993,236 in 1910 and 43,857,066 in 1909; mail car-miles, 164,763 in 1910 and 164,388 in 1909; total car-miles, 46,157,999 in 1910 and 44,021,454 in 1909; revenue passengers carried, 245,510,655 in 1910 and 217,400,335 in 1909; free passengers, 4,303,145 in 1910 and 2,947,287 in 1909; transfer passengers, 177,324,580 in 1910 and 153,295,766 in 1909; total passengers carried, 427,138,380 in 1910 and 373,643,388 in 1909; percentage of revenue and free passengers who used transfers, 73.98 in 1810 and 69.57 in 1909.

Outing of Brooklyn Employees—The second annual picnic of the employees of the Brooklyn (N. Y.) Rapid Transit Company, who are members of the Brooklyn Rapid Transit Employees' Benefit Association, was held at Glendale, Long Island, on Sept. 1, 1910. Unfortunately the weather was inauspicious, but, despite this fact, a goodly number of persons was in attendance. In the afternoon a number of athletic contests were held, and the men, the ladies and the children all participated. In the evening there was a dance. The committee in charge of the picnic announced that the proceeds of the picnic would be devoted to the entertainment of the members of the Brooklyn Rapid Transit Employees' Benefit Association, their wives and friends during the fall and winter months, when it is proposed to give a series of theatrical performances and band concerts in the main club rooms of the association, which are located in East New York.

Personal Mention

Mr. L. F. Vosburgh has been appointed general passenger agent of the New York Central lines.

Mr. Aldis E. Hibner has resigned from the engineering department of the Rochester Railway & Light Company, Rochester, N. Y., to become assistant power engineer of the Toronto (Ont.) Electric Light Company.

Mr. William McDaniel has been appointed superintendent of construction of the Mexico, Santa Fé & Perry Traction Company, Mexico, Mo., which is building an electric railway to connect Mexico, Fulton, Columbia and Hannibal.

Mr. D. B. Rose, for the last four years trainmaster of the Puget Sound Electric Railway, Tacoma, Wash., has resigned to engage in business for himself in Spokane, Wash. Mr. Rose entered the service of the company as a dispatcher.

Mr. J. L. Millspaugh has resigned as superintendent of transportation of the Michigan United Railways, Jackson, Mich., to become connected with the public service properties controlled by W. N. Coler & Company, New York, N. Y., under Mr. J. P. Clark, formerly vice-president and general manager of the Michigan United Railways.

Mr. Jacob Furth, president of the Seattle (Wash.) Electric Company, was selected as one of the delegates of the Seattle Chamber of Commerce to visit China as a guest of the associated commercial bodies of that nation, and sailed from San Francisco for the Orient on Aug. 23, 1910.

Mr. D. T. Pierce has resigned as executive assistant to Mr. Charles O. Kruger, president of the Philadelphia (Pa.) Rapid Transit Company. Mr. Pierce was well known in Philadelphia through his connection with the Pennsylvania Railroad. He has had a long daily newspaper experience, and for seven years was editor of *Public Opinion.* Among his other duties with the Philadelphia Rapid Transit Company Mr. Pierce had charge of the relations of the company with the daily press.

Mr. J. C. Rothery, formerly general manager of the Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio; the East Liverpool Traction & Light Company, East Liverpool, Ohio, and the Ohio River Passenger Railway, East Liverpool, Ohio, has been appointed general manager of the Monterey Railway, Light & Power Company, Monterey, Mexico. Mr. Rothery was connected with the railway and lighting properties at Steubenville and East Liverpool for five years, and during that time what is known as the Ohio Valley Scenic Route was built between Steubenville and Beaver, a distance of 44 miles.

Mr. Theodore Stebbins, of Herrick & Stebbins, New York, N. Y., has contracted with the directors of the Springfield Light, Heat & Power Company, Springfield, Ohio, to manage the business of that company. Mr. Weare Parsons has been appointed general manager of the company. A new 6000 hp steam turbine station will soon be completed for the company. Mr. Stebbins has also accepted the management of the Mount Vernon Railway & Light Company, Mt. Vernon, Ohio, and Mr. A. J. Darrah has been appointed superintendent of that company. These contracts do not interfere with the connection of Mr. Stebbins with the firm of Herrick & Stebbins.

Mr. Charles A. Brooks has resigned as assistant general manager of the South Shore Traction Company, Patchogue, N. Y. Mr. Brooks has been engaged in electric railway work about seven years. He had two years of practical shop work, both mechanical and electrical, and then acted for a year as assistant superintendent of equipment of an electric railway in Ohio. For two years Mr. Brooks was chief clerk to the superintendent of equipment of the Third Avenue Railroad. He has for the last year been assistant general manager of the South Shore Traction Company, part of whose line is completed and in operation. The operation and purchasing and a part of the construction for this company came under the supervision of Mr. Brooks.

Mr. R. C. Taylor has resigned as superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind., a position which he has held since the fall of

1906. Mr. Taylor has been engaged in electric railway work about 15 years. He was born in Brechin, Scotland, 46 years ago, and was graduated from the science and art school at South Kensington, London. He came to America when a very young man, and was for five years master mechanic of the West Superior Iron & Steel Company. Subsequently he acted for six years as mechanical engineer of the Robinson & Cary Company, Minneapolis, Minn. Mr. Taylor was also connected with the mechanical department of the Twin City Rapid Transit Company and was superintendent of rolling stock equipment of the Brooklyn (N. Y.) Rapid Transit Company.

Mr. J. F. Reardon has been appointed general superintendent of the Salt Lake & Ogden Railway, Salt Lake City, Utah. Mr. Reardon was formerly general superintendent of the Lehigh Valley Transit Company, Allentown, Pa. He was born in Northern Michigan about 37 years ago and entered street railway work when he was about 17 years old with the Twin City Rapid Transit Company, Minneapolis, Minn., and remained with the company for 10 years. After resigning from the Twin City Rapid Transit Company Mr. Reardon became master mechanic of the Everett Railway, Light & Water Company, Everett, Wash., and later was made superintendent of the company. He resigned from the Everett Railway, Light & Water Company to accept the position of superintendent of the Lehigh Valley Transit Company.

Mr. W. H. Evans, who became connected with the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to assist in the development and to supervise the construction and equipment of that company's comprehensive new construction and repair shops, has been appointed superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind., to succeed Mr. R. C. Taylor, resigned. Mr. Evans was formerly master mechanic of the International Railway, Buffalo, N. Y., and at one time was master mechanic of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. He entered electric railway work with the Twin City Rapid Transit Company, Minneapolis, Minn. Subsequently he was connected for a short time with the Chicago City Railway. Mr. Evans was first vice-president of the American Street & Interurban Railway Engineering Association in 1908-1909, and acted as chairman of the committee on standards of that association one year. Mr. Evans also served for a time as chairman of the standardization committee of the Central Electric Railway Association.

OBITUARY

Horace G. Platt, president of the Geary Street, Park & Ocean Railroad, San Francisco, Cal., is dead.

Gross earnings of the Kansas City Railway & Light Company for the year ended May 31, 1909, were $6,627,977, as compared with $6,175,796 for the previous year and $5,715,339 for 1907. Operating expenses were $3,764,788, as compared with $3,228,174 in 1908 and $2,909,136 in 1907. Net earnings from operation amounted to $2,863,189 in 1909, as against $2,947,622 in 1908 and $2,806,203 in 1907. Other income of $5,642, received in 1909, made the total income $2,868,831. The following deductions from income were made: Taxes and licenses, $461,743; interest, $1,424,860; repairing flood damage, etc., $3,139; sinking fund provision of Corrigan Consolidated Street Railway bond issue, $55,000; discount on Metropolitan Street Railway Consolidated bonds, issued to retire Grand Avenue Railway bonds, $60,000; total, $2,004,742. The net income was $864,089. This amount, added to the balance of $680,621 remaining as of June 1, 1908, made a total of $1,544,710, from which dividends of $476,105 were paid and $400,000 appropriated for depreciation and accrued renewals, leaving a final surplus of $668,605. Following are various traffic results of the last year: Revenue—passengers, 104,950,526; transfer passengers, 45,356,172; gross earnings per car-mile, 22.18 cents; operating expenses per car-mile, 12.75 cents; gross earnings per car-hour, $2.036; operating expenses per car-hour, $1.171.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Ohio State Interurban & Electricity Promoting Company, Millersport, Ohio.**—Incorporated in Ohio to build an electric railway from Lake Erie to the Ohio River, with a branch to the Indiana State line. The road will pass through 29 counties, and the company will have the right to furnish heat, light and fuel. Capital stock, $99,000. Incorporators: Albert E. Boone, H. A. Axline, Lawrence S. Climer, Levi Bright and E. O. Boone.

***Buckhannon, Weston & Glenville Electric Railway, Buckhannon, Va.**—Incorporated in Virginia to build a railway from Sago to Buckhannon, via Weston and Glenville. Capital stock, $5,000. Incorporators: S. C. Ruamiselle, L. H. Morrison, H. G. Hall, L. H. Trepett, W. H. Gaston, G. F. Day, C. E. White, D. C. Hall, all of Buckhannon.

Sheridan Railway & Light Company, Sheridan, Wyo.—Application for a charter has been made in Wyoming by this company to build a 13-mile interurban railway in Sheridan. Capital stock, $800,000. Albert Emanual and William Sullivan, Dayton, Ohio, promoters. [E. R. J., July 30, '10.]

FRANCHISES

***Montgomery, Ala.**—C. F. Woodward and associates have applied to the City Council for a franchise to build a street railway in Montgomery from the railroad depot to the city limits.

Little Rock, Ark.—The Orgenta Street Railway, Orgenta, has asked the City Council for a 50-year franchise to use the Free Bridge and build its tracks on Main Street and Markham Street, in Little Rock.

Sheffield, Mass.—The Berkshire Street Railway, Pittsfield, will ask the Council for a franchise to build a railway in Sheffield.

Milford, Mass.—The Milford, Attleboro & Woonsocket Street Railway, Milford, has been granted a franchise to extend its line in Milford.

***Kalamazoo, Mich.**—George Bardeen, Otsego, will ask the City Council for a franchise to build an electric railway in Kalamazoo. This is part of a plan to connect Otsego and Kalamazoo.

New York, N. Y.—Frederick W. Whitridge, as receiver of the Union Railway, New York, has been granted the right by the United States Circuit Court to obtain a franchise to build a double track extension from Westchester Avenue at East 167th Street to connect with the existing tracks of the company in Jerome Avenue.

Southport, N. Y.—The Elmira Water, Light & Railway Company, Elmira, will ask the Common Council for a franchise to extend its Pennsylvania Avenue line in Southport.

Charlotte, N. C.—The Piedmont Traction Company has been granted a franchise to build a railway in Charlotte. This projected 13-mile railway will connect Mount Holly, Charlotte and Gastonia. T. C. Lee, engineer in charge. [E. R. J., Sept. 3, '10.]

Brownsville, Ore.—The Albany Interurban Railway has been granted a franchise to build an electric railway over certain streets in Brownsville. This projected 85-mile railway will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. P. A. Young is interested. [E. R. J., July 30, '10.]

Columbia, S. C.—The Columbia Electric Street Railway, Light & Power Company has been granted a franchise by the City Council to double track and extend some of its lines in Columbia. It is said that construction has already begun on the company's 1-mile extension to Shandon.

Seattle, Wash.—The Seattle Electric Company has been granted a franchise by the City Council to extend its tracks on North Fortieth Street, Wallingford Avenue and other streets in Seattle.

TRACK AND ROADWAY

Montgomery (Ala.) Traction Company.—This company has ordered from the Lorain Steel Company 89-lb 9-in. rails for 1 mile of track which it expects to lay within 30 days. W. J. Ginnian, general manager.

Hanford & Summit Lake Railway, Hanford, Cal.—This company has begun work on its proposed 18-mile electric railway between Hanford and Summit Lake. John B. Rogers, 52 Eleventh Street, San Francisco, chief engineer. [E. R. J., Aug. 6, '10.]

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—This company has awarded the contract to Ahern Brothers, Plymouth, N. Y., for building its 40-mile railway between Hartford and Norwich, Conn. Construction has been started near Hartford. (E. R. J., Aug. 13, '10.)

St. Johns Light & Power Company, St. Augustine, Fla.—This company, it is said, will soon rebuild its street railway system in St. Johns with heavier rails. T. R. Osmond, general manager.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company has awarded P. W. Ryan, Janeville, the contract for grading its proposed 12 miles of railway between Waukegan and Rockford. J. D. Pope, Waukegan is interested. [E. R. J., Aug. 13, '10.]

Indiana Northwestern Traction Company, Indianapolis, Ind.—This company is said to have secured all necessary franchises and rights-of-way and it is reported that construction will soon start on the proposed interurban railway, which is to connect Cedar Lake, Hammond, Crownpoint and Chicago. Eugene Purtelle, 222 La Salle Street, Chicago, president.

Plymouth, Ind.—Surveys are being made for the proposed electric railway from Bremen to Mishawaka. Neff Bros., Bremen, are interested. [E. R. J., May 14, '10.]

Charles City & Western Railway, Charles City, Ia.—It is said that this company has begun grading near Nora Springs on its proposed railway between Charles City and Rockford. C. W. Hart, president. [E. R. J., May 7, '10.]

***Davenport, Ia.**—The Walsh Construction Company has completed preliminary surveys for a proposed interurban railway to connect Blue Grass, Stockton, Durant, Wilton, Moscow, Atalissa, West Liberty, Downey and Iowa City.

Iowa City (Ia.) Electric Railway.—This company has closed a contract with the Cedar Rapids & Iowa City Electric Light Company to furnish power for the operation of its street cars in Iowa City. J. O. Schulze, general manager.

***Coffeyville, Kan.**—F. S. Hathaway, Coffeyville, has completed surveys for a proposed electric railway between Coffeyville and South Coffeyville, which are about two miles distant.

New Orleans Railway & Light Company, New Orleans, La.—This company has begun work on its extension of the West End line to Spanish Fort, a distance of 1½ miles. A sea wall will be built at a cost of $50,000.

Maryland Electric Railways, Baltimore, Md.—It is reported that this company will extend its tracks from Marley Station, Baltimore, to a point on the Magothy River in Anne Arundel County. J. F. Heyward, Baltimore, general manager.

Blue Ridge Railway, Hagerstown, Md.—This company is now having surveys made by Crum & Davidson, York, Pa., for its proposed 3-mile railway from Pen-Mar to Monterey, via Highfield and Blue Ridge Summit. R. D. Sefton, Waynesboro, Pa., is interested. [E. R. J., April 23, '10.]

Plymouth & Sandwick Street Railway, Manomet, Mass.—This company is said to contemplate constructing a line to connect Plymouth and Sandwick. The company now operates as far as Manomet. N. H. Dunbar, Manomet, superintendent.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company reports that it has completed 1½ miles of new track with 60-lb. T rails to Henes Park, in Menominee.

Nebraska Traction & Power Company, Omaha, Neb.—This company will place contracts during the next month for 10 to 25 miles of grading and overhead electric construction. It will also let contracts for ties and rails. Arthur English, president.

New York, Auburn & Lansing Railroad, Auburn, N. Y.—This company is said to be arranging for the construction of a third-rail electric railway which the Ithaca-Auburn Power Company recently made a part of its application before the Public Service Commission, Second District. H. A. Clark, Auburn, general manager.

***Chenango (N. Y.) Railway.**—Application for a charter will soon be made in New York by this company to build an electric railway from the end of the Binghamton Railway lines in Port Dickinson through Hillcrest Park and thence northward to Chenango Bridge. Frederick W. Parsons, promoter.

North Carolina Traction Company, Danbury, N. C.—This company advises that it will let contracts before Oct. 1 for road construction, bridge work, concrete work and buildings. The main line will be built with 90-lb. steel rails. Twenty miles are now ready for ties and rails. This proposed railway will connect Winston-Salem, Rural Hall, Quebec, Capella, Gap, Vade Mecuni and Campbell, N. C., and Stuart, Floyd and Christiansburg, Va. Headquarters, Southern Pines. H. P. MacKnight, Southern Pines, N. C., general superintendent.

Piedmont Traction Company, Gastonia, N. C.—It is reported that this company will soon let contracts for building its line from Mount Holly to Gastonia, a distance of 16 miles, and also from Charlotte to Mount Holly, a distance of 16 miles. T. C. Lee, engineer in charge. [E. R. J., Sept. 3, '10.]

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—This company is reported to have completed surveys for its proposed 11-mile extension from Woodsville to Elmore and Grand Rapids.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—This company is said to have arranged to begin the construction of its 5-mile extension from Fishinger's Bridge, 8½ miles north of Columbus, to Dublin. C. W. Van Gundy, Columbus, purchasing agent. [E. R. J., Apr. 30, '10.]

Muskogee (Okla.) Electric Traction Company.—This company has announced that it will extend its lines to Fort Gibson if the citizens of Fort Gibson build a bridge across the Arkansas River at or near Hyde Park

Coffeyville-Nowata Railway & Power Company, Nowata, Okla.—This company is said to have completed arrangements for beginning construction work this fall on its proposed 23-mile electric railway to connect Coffeyville, Kan., and Nowata, Okla. W. V. Thraves, Nowata, general manager. [E. R. J., Nov. 2, '09.]

Grand Valley Railway, Brantford, Ont.—This company advises that during the next two weeks it will place contracts for building 2 miles of single track with 80-lb. rails and 12-in. concrete foundation. William P. Kellett, Brantford, general manager.

Cumberland Railway, Carlisle, Pa.—This company announces that its new line from Carlisle to Newtonville, a distance of 12 miles, will be opened to traffic on Sept. 10. W. F. Pascoe, Carlisle, general manager.

Chambersburg & Western Electric Railway, Chambersburg, Pa.—The officials of this company are said to have decided to proceed at once in the building of this proposed electric railway to connect Chambersburg, St. Thomas and Edenville. It is intended to build the line entirely on private right of way. (E. R. J., Aug. 20, '10.)

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company is reported to be extending its Second Street line in Harrisburg to Riverside. The line will be double-tracked to Division Street.

Greenville (S. C.) Traction Company.—This company advises that it has let a contract for paving 5000 ft. of its tracks on Main Street, and expects soon to relay its tracks with new rail and put in new cross ties throughout the territory paved. E. F. Taylor, general manager.

Tennessee Rapid Transit Company, Nashville, Tenn.—This company, it is said, will build six bridges in connection with the construction of its proposed 110-mile railway

to connect Nashville, Lewisburg, Springfield and Clarksville. Robert L. Burch is interested. [E. R. J., Sept. 3, '10.]

SHOPS AND BUILDINGS

Old Colony Street Railway, Boston, Mass.—This company has begun the construction of its new car house at Brockton.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company has built an addition to its car house in Menominee.

North Carolina Traction Company, Danbury, N. C.—This company advises that during the next two months it will place contracts for building two new car houses, depot and freight houses, a repair shop and two steel and concrete bridges. H. P. MacKnight, Southern Pines, N. C., general director.

Montreal (Que.) Street Railway.—This company is said to have begun work on its new car house and repair shops at Youville. The structure will be of plastic bricks and limestone. Messrs. Marchand & Haskell, 164 St. James Street, Montreal, are the contractors. W. A. McNaught, purchasing agent.

Cleburne (Tex.) Street Railway.—This company, it is said, has awarded the contract to J. A. Thomas, Cleburne, for building a brick car house in Cleburne.

POWER HOUSES AND SUBSTATIONS

Montgomery (Ala.) Traction Company.—This company expects to purchase turbines and other equipment for its power plant in Montgomery. W. J. Ginnivan, purchasing agent.

Power, Transit & Light Company, Bakersfield, Cal.—It is stated that this company will soon build in Bakersfield a new reinforced concrete power plant with a capacity of 2000 hp. H. J. Jastro, purchasing agent.

San Diego (Cal.) Electric Railway.—Press reports state that this company will award the contract to the Electric Security Construction Company, Los Angeles, for 750 tons of structural steel for its new power house in San Diego. The capacity of the plant will be 35,000 kw. The engine room will be 160 ft. x 75 ft. and two new engines of the vertical type will be added to the present equipment. The boiler room will contain 48 oil burning boilers in batteries of 6 boilers each.

Federal Light & Traction Company, Denver, Colo.—Sanderson & Porter, New York, have recently contracted with the Westinghouse Electric & Manufacturing Company for two 1250-kva. turbo-generators to be used by this company in its power plant. The generators have the following characteristics: 3-phase, 60-cycles, 2300-volts, 3600 r.p.m. Two La Blanc condensers will be used in connection with the steam turbines. The generator fields will be excited by two 50-kw., 125-volt, 2250 r.p.m., d.c. turbo generators to be used in connection with a Tirrill regulator. The order also includes the necessary transformers, lightning arresters, disconnecting switches and switchboard.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company is installing 660 hp of new boilers, an overhead coal bunker, a coal and ash conveyor, a large feed-water heater and mechanical stokers under 2000-hp boilers. It is also arranging plans for cooling towers, condensers, pumps and generating machinery to be installed next year. All communications for this apparatus should be addressed to T. C. Roberts, Pueblo, superintendent.

St. Johns Light & Power Company, St. Augustine, Fla.—This company contemplates installation additional machinery at its power plant, and will install an electric motor at the draw-bridge over which it operates.

Bartlesville (Okla.) Interurban Railway.—This company is building an electric light plant. All material has been purchased and construction is almost complete. The equipment will consist of a 400-kw. generator, direct connected to a compound condensing Chalmers-Corliss engine, and 400 hp. in Babcox & Wilcox water tubular boilers. H. Askin, general manager.

Wheeling (W. Va.) Traction Company.—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company for one 1875-kva low-pressure turbo-generator, 2300-volt, three-phase, and two 500-kw motor-generator sets, 600 volts d.c., and all necessary switchboard panels and instruments.

Manufactures & Supplies

ROLLING STOCK

Frederick (Md.) Railroad expects to purchase six passenger cars and an electric locomotive.

Interurban Railway & Terminal Company, Cincinnati, Ohio, expects to purchase two snow sweepers.

City Railway, Dayton, Ohio, will probably purchase in the near future 20 double-truck prepayment cars with 40-ft. bodies.

Columbus Railway, Light & Power Company, Columbus, Miss., expects to purchase two sets of double trucks with 33-in. wheels and 4-in. axles.

Third Avenue Railroad, New York, N. Y., has ordered a double-truck derrick car from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Michigan United Railways, Lansing, Mich., has ordered 20 No. 10A double trucks from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Capital Traction Company, Washington, D. C., has recently placed an order for 20 Westinghouse two-motor equipments and 20 equipments of double-end, K-27 control.

Connecticut Company, New Haven, Conn., has ordered two standard steel underframe long-broom sweepers from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Cleveland (Ohio) Railway has placed an order with the McGuire-Cummings Manufacturing Company, Chicago, Ill., for two of that company's standard steel underframe long-broom sweepers.

Nebraska Traction & Power Company, Omaha, Neb., has not yet contracted for the cars for which it was reported to be in the market in the ELECTRIC RAILWAY JOURNAL of June 4, 1910.

Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio, has placed an order with the G. C. Kuhlman Car Company, Cleveland, Ohio, for a long-broom snow sweeper, to be delivered by Oct. 15, 1910.

Lexington & Interurban Railways, Lexington, Ky., have placed an order with the McGuire-Cummings Manufacturing Company, Chicago, Ill., for one of that company's standard steel underframe, long-broom sweepers.

Grand Valley Railway, Brantford, Ont., which was reported in the ELECTRIC RAILWAY JOURNAL of Feb. 19, 1910, to be in the market for equipment, will purchase eight single-truck city cars, two double-truck city cars and a single-truck snow sweeper.

United Railroads, San Francisco, Cal., have awarded the Jewett Car Company, Newark, Ohio, the order for the 80 pay-as-you-enter cars for which it was reported in the ELECTRIC RAILWAY JOURNAL of Aug. 6, 1910, to have issued specifications through Ford, Bacon & Davis, New York, N. Y.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia., reported in the ELECTRIC RAILWAY JOURNAL of May 21, 1910, to have under consideration the purchase of additional heavy electric freight locomotives, has ordered two Baldwin-Westinghouse electric locomotives, each equipped with four 125-hp Westinghouse commutating pole motors.

Mahoning & Shenango Railway & Light Company, New Castle, Pa., reported in the ELECTRIC RAILWAY JOURNAL of Aug. 20, 1910, to have ordered 12 city cars from the Niles Car & Manufacturing Company, has specified the following details for these cars:

Seating capacity.....48	Brakes ..... Ackley
Weight. .....16,500 lb.	Couplers .....Niles
Wheel base .....5 ft.	Curtain material...Pantasote
Length of body.30 ft. 10⅜ in.	Gongs .....pneumatic
Over vestibule....4 ft. 1⅝ in.	Heaters .....Consolidated
Length over all..42 ft. 3⅝ in.	Sanders .....O. B.
Width over all....8 ft. 1¾ in.	Seats,
Height sill to trolley base, 9 ft. ⅞ in.	longitudinal rattan spring
Body .....wood	Trucks, type and make, Stand. O-50
Underframe .....composite	Signs .....Hunter
Air brakes .....Nat'l	

TRADE NOTES

American Concrete & Steel Railroad Tie Company, St. Louis, Mo., will build a plant in St. Louis for the manufacture of concrete railway ties. The plant is designed to turn out 2,000 ties daily.

Perry Ventilator Corporation, New Bedford, Mass., has received the order for equipping with its ventilators the 50 cars now being built for the Pittsburgh (Pa.) Railways at the works of the Standard Steel Car Company at Butler, Pa.

Improved Block Railway Signal System, Hammond, Ind., has been incorporated with a capital stock of $50,000 to promote the company's improved block railway signal system. The directors of the company are, Charles D. Anderson, Howard Rose and C. S. Beneppe.

Schroeder Manufacturing Company, Newark, N. J., has been incorporated to conduct a mechanical and electrical engineering business. It is capitalized at $200,000, and the incorporators are: John E. Heim, Arthur A. Schroeder, Hugo Beopple, Jr., all of Newark, N. J.

H. M. Byllesby & Company, Chicago, Ill., have purchased the Sapulpa Electric Company, which operates the central station business at Sapulpa, Okla., and will hereafter operate and manage the property. Byllesby & Company will install a 500-kw generating unit, which will more than double the capacity at the station.

Electrical Utilities Corporation, New York, N. Y., has been incorporated to do a general contracting business and electrical work of all kinds. It is capitalized at $10,000, and the incorporators are: Nathan Cohen, 27 West Twenty-seventh Street, New York, N. Y.; G. Cohen, 269 West 153d Street, New York, N. Y., and Norman S. Risenfeld, 141 Broadway, New York, N. Y.

Northwestern Electric Equipment Company, New York, N. Y., which will do electrical work of all kinds, act as electrical engineers and deal in dynamos, motors, etc., has filed articles of incorporation. It has an authorized capital stock of $10,000, and the incorporators are: Charles I. Taylor, Frank H. Parcells and Robert G. Redlefsen, all of 54 Wall Street, New York, N. Y.

Edison Storage Battery Company, New York, N. Y.— W. W. Wheatly, who recently resigned as general manager of the Kansas City Railway & Light Company, Kansas City, Mo., has taken the western representation of the Edison Storage Battery Company and the Edison-Beach storage battery car. Mr. Wheatly has taken headquarters in the McCormick Building, 193 Michigan Avenue, Chicago, Ill., and will represent these companies in all the territory west of the Mississippi River, and also in Michigan, Indiana, Illinois, Wisconsin and Minnesota. He is enthusiastic over the future of storage battery car operation with the new Edison battery.

ADVERTISING LITERATURE

Pay-as-You-Enter Car Corporation, New York, N. Y., has issued a 12-page folder in which several types of pay-as-you-enter cars are described and illustrated. The text is printed in English, French, Spanish and German.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has issued a series of illustrated blotters, calling attention to its double-beam section insulators, elephant strain insulators, Anderson trolley wheels and Anderson wood strain insulators.

Westinghouse, Church, Kerr & Company, New York, N. Y., have issued a 62-page booklet in which the work done by the company in connection with the New York passenger terminal and the improvements of the Pennsylvania Railroad and the Long Island Railroad is described and illustrated.

Triumph Electric Company, Cincinnati, Ohio, has issued Bulletins Nos. 391 and 411. Bulletin 391 is entitled "Direct Current, Steel Frame Motors, Type F" and supersedes Bulletins Nos. 271 and 311. Bulletin No. 411 is entitled "Small Direct-Connected Generating Sets," and supersedes Bulletin No. 291. The company also calls attention in a circular printed on one side only to its small generating sets for private lighting.

Heath & Milligan Manufacturing Company, Chicago, Ill., in *Co-Operation and Expansion* for September, 1910, call attention to the closing, on Oct. 1, 1910, of the contest started on Jan. 1, 1910, to determine the 50 representatives from each State and territory who have made the best showing in sales since the contest was begun. The publication contains several articles of importance to those interested in paints and painting, and also contains an announcement of an increase in the price of Heath & Milligan paints of 20 cents per gallon, with the reasons for the increase.

Underfeed Stoker Company of America, Chicago, Ill., in the August issue of *Publicity Magazine,* which is No. 4 of Vol. IX, publishes a list of recent sales of Jones underfeed stokers aggregating 26,200 boiler hp. Among the railway orders was one from the Toledo, Port Clinton & Lakeside Railway for 1600 hp, Georgia Railway & Electric Company, sixth order, for 1800 hp and Toledo Railways & Light Company, second order, for 800 hp. The latter company began its experiments with this type of stoker by buying stokers from plants which were being dismantled. It now has in service Jones stokers supplying boilers aggregating 2200 hp.

Barrett Manufacturing Company, New York, N. Y., has issued a publication entitled "The Great Pennsylvania Terminal—What Keeps It Dry? A Correction," prompted by the previous publication of the company, entitled "What the Pennsylvania Railroad Thinks of Coal Tar Pitch and Felt," in which the statement was made that "a new and costly kind of waterproofing material was tried in the first section as a substitute for coal tar pitch." The Barrett Company says that the engineer in charge states that the decision regarding the materials was reached in advance of actual construction and was not the result of experiments after the work was started. The following is published as a correction: "Before construction was commenced, a careful study and investigation was made by the chemists of the Pennsylvania Tunnel & Terminal Company of many waterproofing compounds, with the result that it was decided to use coal tar pitch instead of asphalt as a binder between layers of felt, and this decision was not changed during the entire work."

Mead-Morrison Manufacturing Company, Cambridge, Mass., has issued a very handsome album containing views of some of the more important installations of its coal and ash conveyors. The volume is standard size, 9 in. x 12 in., is substantially bound in cloth and is termed "Catalogue 16." The engravings are for the most part interiors of power stations, and are remarkably good, considering the disadvantageous circumstances with regard to the absence of light under which most of them must have been taken. Among them are views of the Interborough and Manhattan power stations in New York city, and stations in Denver, Dubuque, Minneapolis, Louisville, Omaha, London, Kansas City, St. Louis, Washington, Anderson, Cleveland, Brooklyn and Chicago. The illustrations show the wide variety of types of conveyors and methods of their application and thus indicate the adaptability of this type of conveyors to various services and locations. In all of the plants described there are over 28 miles of McCaslin conveyors, or 112 miles of conveyor chains. A feature of the book is that all of the photographs are recent and practically the entire book has been compiled and printed during the present calendar year, so that it is up to date.

In commenting on the affairs of the Coney Island & Brooklyn Railroad, S. W. Huff, president of the company, is reported to have said: "We are spending all of our surplus cash on our property. In some ways the past year has been a good one for us and in others it has not been so good. But we are fast getting on our feet. We expect to hear of a court decision in the Coney Island parkway suits next month, and are now proceeding slowly in our repairs to the Franklin Avenue line. The Public Service Commission of the First District allowed us a bond issue for Coney Island Avenue, but said that we would have to fix up Franklin Avenue largely out of our earnings. Naturally these improvements cannot be made as fast under existing circumstances as they could have been had our application for a bond issue been favorably acted upon."

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, SEPTEMBER 17, 1910 No. 12

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 17, 1910.

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The Convention Papers

Very tangible evidence of the valuable work done by the members of committees of the different associations which will meet in Atlantic City next month is available this week through advance copies of the reports. These reports were mailed on Wednesday to those who are entitled to receive them, and include practically all of those which will be presented at the meetings of the Engineering, Accountants' and Transportation & Traffic Associations. To all who are acquainted with the problems which are now predominant in electric railway operation these reports are the best evidence of the value of association work. Practically every one of them is the result of the combined judgment not only of members of the committee who are experts in the subjects discussed by them, but of all of the members of the association whose replies to data sheets were used in the preparation of the report. As a whole they constitute the most valuable set of papers on electric railway topics ever compiled under the auspices of the association and presage a most attractive series of meetings at Atlantic City.

While Mob Violence Continues

The correspondence between Governor Harmon, of Ohio, and Mayor Marshall, of Columbus, in reference to the strike in that city is neither edifying nor satisfying. The Mayor, plainly seeking to divert criticism from himself, urges the Governor to call a special session of the Legislature to pass laws requiring compulsory arbitration and prohibiting overcapitalization. The Governor retorts that the Mayor seeks to make up for lack of efficiency in enforcing existing laws by fertility in the recommendation of new laws. This may be an interesting side play in the tragedy which residents of Columbus have been forced to observe, but it is not a diversion which will secure a long-needed protection for cars and passengers in the strike-ridden city. Although neither the Governor nor the Mayor has prevented mob violence, any honors that are due either of these officials for effort to quell riot rest with the Governor, whose state troops have managed at least to check the disorder. No one of the issues involved in the strike or the incidental questions arising therefrom which may affect political futures is so important to the public as a whole as a rigorous policy of repression of disorder.

Weight of Car Paint and Varnish

In one or two recent studies of the weights of cars careful determination of the weights of all the detail parts as the cars were being erected has revealed some surprising facts about the paint and varnish used. On a 12-bench open car, finished for the most part with varnish, the paint and varnish used weighed 180 lb., almost as much as the two center sills. The paint and varnish used on a 14-bench car built at the same

time weighed 221 lb., while on a double-truck closed car with prepayment platforms the weight of the finishing surface applied was nearly 600 lb. An advance estimate of the weight of a new design of car should not omit a liberal allowance for the paint. To prepare properly the surface of wood for painting it is loaded with filler, literally as heavy as lead, and this is followed with two or more color coats of heavy oils and pigments, on top of which the varnish coats are applied. It would be foolish to sacrifice the thoroughness of the painting for the sake of reducing the weight of the car. The alternative is to minimize the area of surfaces to be painted by substituting wherever possible a varnish finish. Thus a wood veneer headlining for a double-truck car weighs nearly 100 lb. less than painted composite board, and most of this difference is accounted for by the paint which is used.

Depreciation Charges in Kansas City

Continuing its practice of making some provision for depreciation and accruing renewals other than that contained in current expenditures for repairs, the Kansas City Railway & Light Company appropriated from surplus for this purpose in the fiscal year ended May 31, 1909, the sum of $400,000. This sum is equal to 6.04 per cent of gross earnings and it represents a little more than the final surplus available for the year. That is to say, the net divisible income as shown in the report to stockholders was $864,089 and against this amount there was charged $476,105 for dividends and the depreciation allowance stated, making a total of $876,105, thus leaving $12,016 to be charged against the surplus carried over from the previous year. In the issue of the Electric Railway Journal for Nov. 7, 1908, attention was directed to the fact that during the five years ended May 31, 1908, this company set aside $829,814 on account of depreciation, or an average for this period of $165,963 annually. In the judgment of Dickinson, Wilmot & Sterrett, certified public accountants, who examined the accounts for the company, this amount "was not adequate for the maintenance of the property over a series of years." The larger appropriation made in the ensuing fiscal year by the company is a satisfactory effort to meet more nearly the requirements of proper accounting.

Proposed Change of Association Name

The proposed change of the name of the American Street & Interurban Railway Association to the American Electric Railway Association is a good move. The present name is cumbersome and far from euphonious. Moreover, it does not properly represent the field of the association, because it does not include the companies operating electric trunk line service which are seeking the association for assistance in the solution of their electrical problems. The only two objections which have been raised to the name are: (1) that all of the association pins would become obsolete; (2) that the new name excludes other motive powers than electricity. Both arrangements have been made by which holders of the association pins can exchange them for new pins with the proper initials without expense, and the objection in regard to some other motive power is largely theoretical. Electricity promises to be the predominating power for a long time of the companies which would naturally affiliate with the association, and the name would not prevent a consideration by the association of gasoline cars or any possible substitutes for electricity. The same general situation was presented to the publishers of this paper when its name was changed two years ago to the Electric Railway Journal, and the conclusion was reached that the arguments in favor of this change, as in the case of the association, outweighed the disadvantages.

AN INTERESTING FARE DECISION

The Public Service Commission of New York, Second District, recently decided that under certain circumstances an electric railway company is warranted in charging a higher through fare between two points than the sum of the local fares between those points. The practice of charging more for a through ride than the sum of the local fares seems peculiar and a reversal of the usual custom, but under some circumstances such a plan may be perfectly proper and desirable. Indeed, several cases of this kind relating to steam railroad freight rates have been considered by the Interstate Commerce Commission and have been upheld. The case in question concerned the interurban fare between Albany and Troy over the lines of the United Traction Company, which also operates the local cars in each city. The fare charged on the through cars between the two cities is 10 cents for a ride of approximately 7½ miles, and for this fare a passenger is entitled to ride from the center of one city to the center of the other and also to a transfer between the local cars in either city and the through cars. But a transfer is not given to a passenger from the through car to the local cars in the city to which he is traveling if he has already used a transfer at the beginning of the journey, under the rule of the company that "no transfers are issued on a transfer." Hence, to ride from any point in one city to a point beyond the terminus of the through cars in the other city passengers on through cars are required to pay a fare of 15 cents.

The city limits of Troy and Albany are not contiguous, but the railway company some time ago voluntarily extended the 5-cent local fare limits in each city to a point about half-way between the two cities. The result is that a passenger can board a car at any point in one city, pay a 5-cent fare, obtain a transfer and ride to the zone limit; then by taking another car, and paying another 5-cent fare, which entitles him to a transfer, he can ride to any point in the other city. In this way, by changing from one local car to another, at the zone limit, a passenger may ride for 10 cents over the same route and get on and off at the same points as the through rider who is compelled to pay 15 cents.

A complaint lodged against the company said that the through fare should be revised downward to eliminate this discrepancy, but the commission ruled that the only grounds on which the 15-cent fare could be ordered reduced were that it was unreasonable. Such a view was hardly warranted, as the maximum distance from any part of Troy to any part of Albany is approximately 20 miles. The only course open by which the two fares could be harmonized was to revise the local fares upward by introducing a local 5-cent zone between the two cities, a plan which the commission intimated the company had the right to follow, although it would cause many passengers to pay increased fares. The only criticism that the commission made of the practice of the company was that its regulation of "no transfer issued on a transfer" hardly covered the situation, because as the zone system of fare collection is used on

the through cars the passenger at the midway point actually pays a second cash fare. At the suggestion of the commission, the company has changed the wording of its rule, so as to explain clearly that on through cars a passenger who has already used a transfer in either Albany or Troy will not be entitled to another when he reaches the other terminus of the through cars. With this alteration in the rule put into effect, the commission dismissed the case.

THE DETROIT FAILURE

It is unfortunate that the negotiations between the Detroit United Railway and the representatives of the city of Detroit have resulted in so large a loss of labor, time and money. Upon the appointment of the Committee of Fifty a year and a half ago to investigate the street railway situation hopes were entertained of a settlement of the question of renewal of franchises, but these expectations have not been near realization from that time to the present.

The committee, composed of representative citizens from all walks of life, began its consideration of the problem with an evident desire to formulate a satisfactory settlement of the issues which had furnished a succulent bone of contention for the politicians and agitating newspapers. As one feature of the investigation an appraisal was undertaken. It appears that the Committee of Fifty, because of its inexperience in such matters, regarded this phase of its work simply as a detail in the entire investigation with which it was charged. Certainly, the full committee, in entrusting to a small sub-committee the prosecution of this most important feature of its program, failed to appreciate the vital and delicate nature of the issues involved in valuation. If the figures offered by the sub-committee and its engineer should be adopted as a basis of settlement, a severe loss would be inflicted upon the company.

When it was found that an independent appraisal on behalf of the company indicated values equal to double those declared by the sub-committee and its engineer, a proposal to arbitrate the differences was made. It was a fair proposal and should have been carried to some conclusion, either with such a board of able jurists as was selected but somewhat ignominiously disbanded or with a board of competent engineers, experienced in the appraisal of property of this character. The company would have defended its figures, but the committee was presumably a non-partisan body working for a settlement in the interest of the city and its figures should have been as open to criticism as the totals of the company.

The failure of the Detroit plan dispels an illusion as to the value of investigations and appraisals of this type. In Detroit the Committee of Fifty was regarded by some as practically an official body representing the Mayor and by others as a private organization without authority. But its work has aroused controversies concerning the values of property which have suggested to the radical element a wholesale slaughter of securities. These securities are undoubtedly in the hands of purchasers who, if they considered the question at all, believed that a reasonable settlement would be reached. The complete failure of negotiations shows that either the Committee of Fifty should have been appointed with some power or its work should have been regarded from the outset as one of merely incidental interest, which could lead to no solution of the problems concerned.

A MODERN CAR HOUSE AND TERMINAL

The Park Terminal car house of the United Railways & Electric Company of Baltimore, Md., described elsewhere in this issue, is a splendid example of the best modern practice in structures of this kind. It is not merely a storage place for rolling stock, but a building which combines durability, ornament and convenience. Considered simply from an architectural standpoint, this structure proves that the buildings of a street railway system can be made as much a cause for civic pride as those erected by a municipality. It is usually assumed that the embellishment of a utility building necessarily involves large additional cost. This is not true. In Baltimore the only extra expense was that required on account of the use of parapets and a few ornamental columns. The materials used in the general construction of the building are of the most approved fire-resisting character, but, in spite of this fact, the company did not hesitate to install complete hose and sprinkler systems, underground oil storage, conduit wiring, rolling steel shutters and other protective features which would make a disastrous fire almost impossible.

In this connection one should not underestimate the effect of good lighting in helping to avoid conflagrations. Both the natural and artificial illumination are so good in this building that no dark corners or pits have been left for the accumulation of oil-soaked packing or other rubbish which would furnish ready fuel for a fire. In general, one could truthfully say that this car house represented the last word in safety and operating flexibility if it had been possible to build the structure with exits at both ends. Unfortunately such a construction was not practicable. It is doubtful, however, whether it would be found possible to design any other form of single-end car house in which so much storage room is combined with ample facilities for other purposes.

A very interesting feature is the lay-over area which was provided because this car house is the terminus of five important lines leading to Druid Hill Park. This area is advantageous in several ways. Thus, it is now possible always to have available a reasonable number of cars to handle the crowds from the park without blocking up the streets or disturbing the cars in the storage bays. In stormy weather this section offers a good place for clearing cars of snow and mud before they proceed on their trips. Furthermore, the danger from fire is diminished because the doors of the storage bays can be kept closed nearly all the time. In other car houses the shutters must nearly always be kept open because many of the storage tracks are also used for lay-overs. The accessible locations to all of the entering lines of such important facilities as the sand and signal-lamp rooms are typical instances of the forethought exercised by the designers to see that both the lay-over and storage inspection work could be carried out conveniently and quickly.

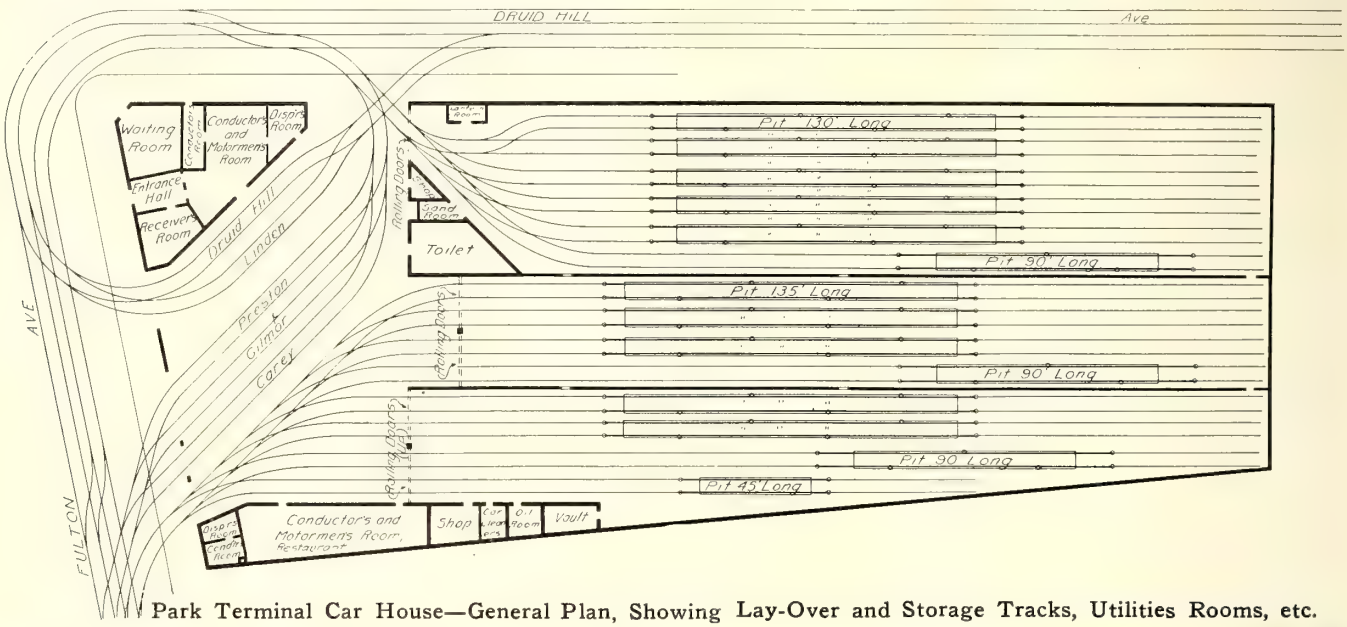
Equal attention was paid to making this building a most attractive rendezvous for the large number of men who are employed on the Park Terminal lines. The assembly room, bowling alleys, reading room, lounging room, toilet, lockers and restaurant afford conveniences which are far more characteristic of a high-class club than of the average street railway car house. It is but natural that very few of the employees to whom are offered such surroundings as these will be tempted to spend their free time in liquor saloons. The uplifting influence thus brought to bear on the men must react favorably both on their home lives and on their attitude toward their employers.

PARK TERMINAL CAR HOUSE, BALTIMORE

The United Railways & Electric Company of Baltimore has recently placed in service its Park Terminal car house, which forms a noteworthy addition to the group of splendid car-storage structures built by this company. It is the sixth of this class of reinforced-concrete construction. The new building is directly opposite Druid Hill Park, one of the handsomest public grounds in Baltimore. It houses the rolling stock of the five car lines which run by the main gateway. Because of its proximity to the park and in line with the construction

GENERAL CONSTRUCTION

Not only is the building a departure from conventional lines in its design, but it possesses many advantages that set it in the fore rank of structures used for similar purposes. In the first place, it is absolutely fireproof. Reinforced concrete is used throughout for the walls, roofs and columns—for everything, in fact, except the exterior walls, which are of brick and ornamental terra cotta. Even the stairways are of concrete covered with Mason safety tread. A metal cement finish is used for the round columns shown in the Fulton Avenue view of this building. The desire for neatness and perma-



Park Terminal Car House—General Plan, Showing Lay-Over and Storage Tracks, Utilities Rooms, etc.



Park Terminal Car House—General View, Showing the Parapet Style of Construction

policy followed by the Baltimore management, the straight utilitarian lines generally observed in car-house building were ignored and by more ornamental architecture there was erected a structure in perfect harmony with the surroundings. As a matter of fact, the new car house was erected on a site hitherto taken up by a number of frame sheds and buildings in rather poor condition, so that the improvement of the district has been decidedly marked.

nence may be appreciated from the fact that copper instead of galvanized iron has been used for the flashing on the roof and sides. The car-house floor is composed of a 6-in. cinder foundation covered by 5 in. of concrete and topped by a cement finish 1 in. thick. Cement floors are also laid in the various shop utilities rooms and main toilet, but wooden floors are laid in the offices, waiting room and employees' quarters. The partitions between the first class of rooms are of brick and

between the latter of steel lath and cement. The liberal skylight area provided, together with the spotlessly white walls and ceilings, gives the interior of the car house a remarkably cheerful appearance. The trolley troughs, which are painted drab-gray, are suspended through pairs of strap irons from the reinforced-concrete roof girders.

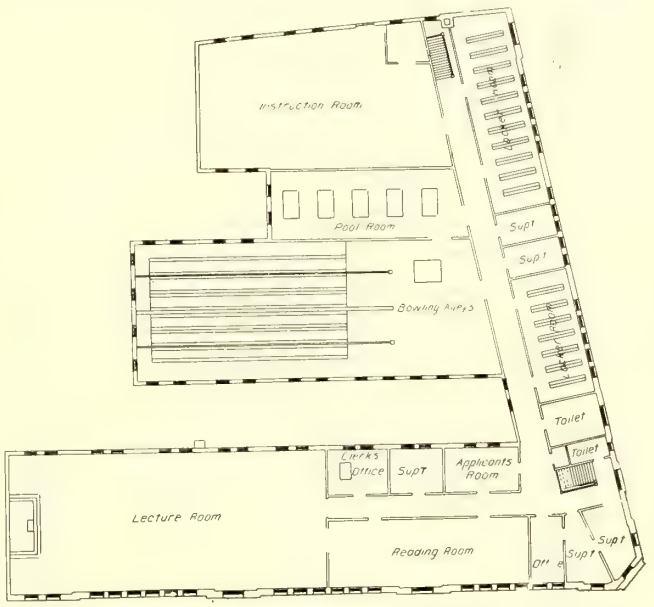
In addition to being constructed of fireproof materials, the entire structure is provided with an elaborate fire-protection system, including the General Fire Extinguisher Company's dry-valve system, Grinnell aisle and roof sprinkler heads, and alarm gongs with a master indication board. An ample supply of water can be brought into play instantly at the fire points from one 50,000-gal. gravity tank and four 7500-gal. pressure tanks. The four pressure tanks are located in a reinforced-concrete enclosure, the supporting columns of which are extended to carry the gravity tank. All the tank piping is carried in magnesia covering to avoid danger from freezing. The gravity fire doors are not of the ordinary sheathed type, but are made of an approved fireproof composition called Sagax. The swing doors also are fireproof and all are provided with pneumatic checks.

AREA AND TRACK LAYOUTS

As shown in the accompanying plan, the structure is located at the intersection of Druid Hill and Fulton Avenues. Its frontage on the first avenue is 472 ft. 1 in., on the second avenue 190 ft. 9½ in., on Florence Street 433 ft. 1 in., and it is 146 ft. wide at the rear, where it adjoins a substation. A portion of the building is two stories high with a row of parapets, as illustrated. The main parapet is 50 ft. high. In general, the building is one of the largest put up by the company. The ground floor area is approximately 76,000 sq. ft., and some idea of its capacity may be obtained by bearing in mind that there is sufficient floor space to store at one time 100 45-ft. cars and still leave ample space for their proper handling. As explained hereinafter, the necessity of having cars standing on the streets has been overcome by so arranging the tracks that the lay-over of the cars occurs within the car-house structure.

Broadly speaking, the car house proper is divided into three bays separated by 13-in. brick walls with fire-door openings. The first bay contains six tracks, the second four tracks and the third four tracks. Each bay is provided with repair pits of both the depressed and flush aisle types. It will be observed that the division walls of the three storage sections do not extend all the way to Fulton Avenue, but only to the rolling steel doors, the locations of which are indicated on the plan. Consequently, there exists a large area under shelter through which cars from the different lines may be brought directly into the storage bays, be looped around the utilities rooms or be kept on the tracks for lay-overs. The lay-over area is furnished with drains to carry off dripping rain or snow from the cars.

The track layout shows that cars from the Preston, Gilmor and Carey lines can be switched on to storage tracks 7 to 14 inclusive, or can be made to circle back to Fulton Avenue via Druid Hill Avenue. Similarly, Druid Hill Avenue and Linden Avenue cars can go through the front of the building around the transportation department's rooms to Fulton Avenue and return up Druid Hill Avenue or else can be switched over to storage tracks 1 to 6. These combinations are the usual ones, although a car from any line could be brought to



Park Terminal Car House—Plan of the Second Floor



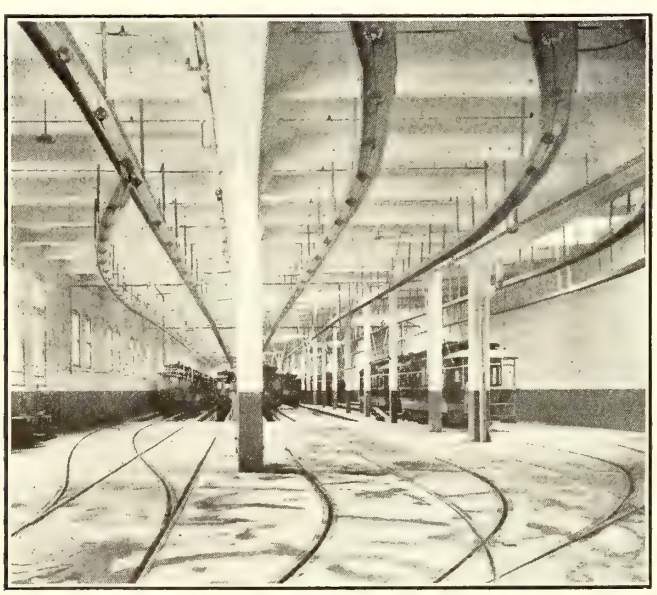
Park Terminal Car House—View Along the Fulton Avenue Side

any track. It will be understood that the cars of all five lines pass the waiting room. The latter is commodious and well-lighted and is located at the corner, where every car must pass. A handsome metal awning or marquise is suspended in front of this waiting room to afford further comfort and protection to the public when large numbers of people are driven out of the park by sudden storms. A clock is to be placed by the company in the terra-cotta panel over the marquise.



Park Terminal Car House—Pumping Oil Into the Signal Lamp Room

The general plan also shows the convenient location of the sand room, the small locked storerooms for brake shoes, register fixtures, etc., from the shop department and the main

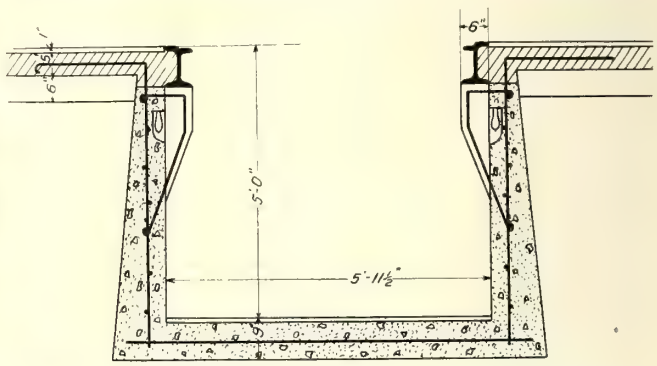


Park Terminal Car House—Sprinkler Piping, Trough Suspension, etc.

employees' toilet room, all placed in a triangular section between the first and second bays. The toilet room hoppers are provided with exhaust pipes to remove foul air, while the urinals are continually flushed. The first bay also contains a lantern room with iron shelves where all signal lamps and signal oils are kept. The oil is stored underground outside the car house and is obtained as required through the Bowser oil pump illustrated. The oil room in the third bay contains three pumps from the same manufacturer for bringing motor oils from as many underground storage tanks. This method avoids waste of oil and fire danger. Both oil rooms are protected by double fire doors. The third bay also contains a storeroom, car cleaners' room and a shelved transfer vault with mezzanine floor and dumbwaiter for one month's transfers and other cashier's supplies.

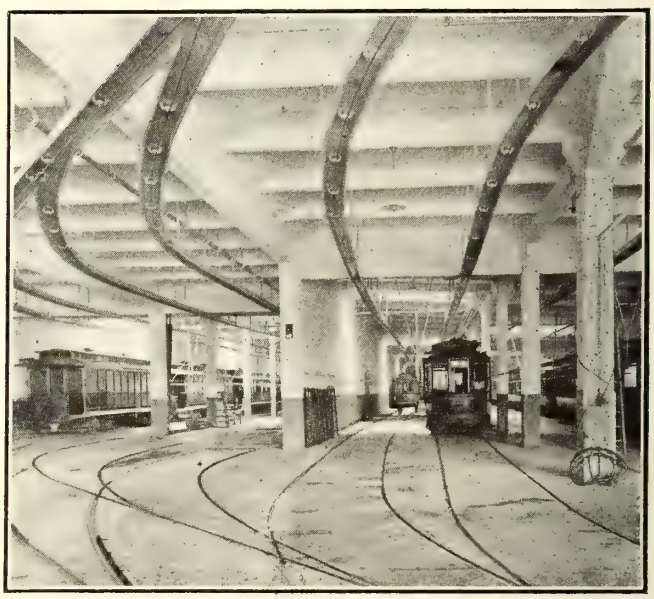
PIT CONSTRUCTION

The three storage bays have repair pits of both the depressed and flush aisle type. There are two depressed aisle pits 130 ft. long and four which are 135 ft. long; and of the other type there are one 45 ft. long, three 90 ft. long, three 130 ft. long and one 135 ft. long. The depressed aisle pits are particularly convenient for doing such work as the drawing down of pedestal bolts on some types of the company's trucks. The floor of the depressed aisle is 18 in. below the head of the rail. These pits are of the same general design used in the other Baltimore car houses. The 9-in. girder rails are carried on columns made up of two 5-in. channels spaced 10 ft. centers. Each rail is riveted to these channels through steel



Park Terminal Car House—Section of New Standard Design of Flush-Aisle Pit

tie plates at the sides and a 6-in. x 6-in. angle between the channels under the rail base. The flush-aisle pits are 5 ft. deep from the pit floor to the top of the car-house floor and



Park Terminal Car House—Interior View, Showing Construction, Fire Gong, Hose Pipe, etc.

are 5 ft. 11½ in. wide. The rails are not carried on stringers, but on steel brackets spaced 5 ft. 2 in. and set at such a height in the pit walls that the top of the rail is flush with the car-house floor. These brackets replace the reinforced-concrete pilasters used for the same purpose in the earlier car houses. All pits have well-drained concrete floors and concrete stairways which are reinforced with an angle at the edges to prevent chipping. They are lighted with 16-cp lamps set in screened recesses in the pit walls at intervals of 10 ft. Blocks for these recesses were furnished and set with the lamp bases

and conduit as the walls were being built. To minimize fire risk, only one portable cluster is used throughout the entire car house.

EMPLOYEES' CONVENIENCES AND GENERAL UTILITIES

In the arrangement of this car house a great deal of thought has been given to the comfort of the transportation employees, both to enable them to perform their lay-over duties most conveniently and to spend their free time in the most agreeable manner. The plan of the first floor on page 426 will show that two sets of utilities rooms have been provided for the despatchers, receivers and platform men, including special quarters where conductors can make out their trip reports. A portion of the platform men's room on the Florence Street side has been converted into a restaurant with tables and a lunch counter where sandwiches, coffee and other refreshments can be purchased by the men for little more than cost, inasmuch as the company has supplied the kitchen outfit, besides furnishing the room, light and heat.



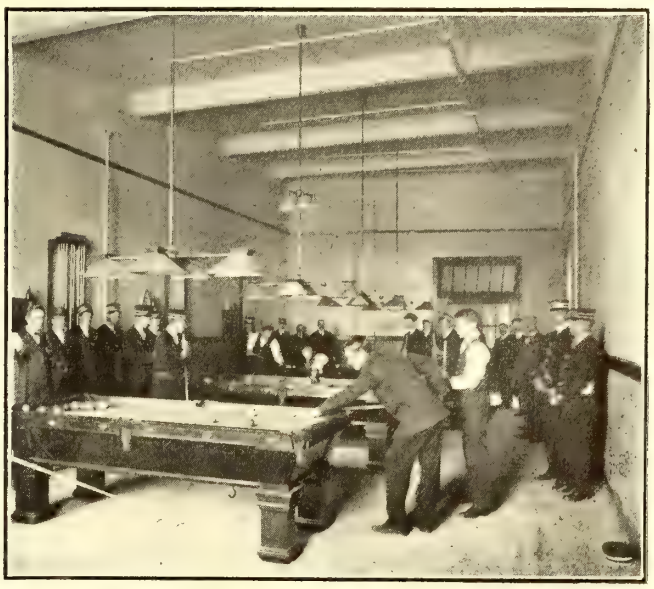
Park Terminal Car House—Part of the Main Toilet on the First Floor



Park Terminal Car House—Conductors and Receivers' Quarters

Upon the second floor of the building accommodations have been arranged in the way of a large reading room, which is also supplied with materials for table games; an assembly room, holding about 750 people; a splendidly equipped bowling alley with six alleys, and a pool and billiard room with four pool tables and one billiard table. In a room on the Florence Street side there will be installed an elaborate instruction outfit, consisting of multiple-unit and air-brake equipments and the rear section of a car for conductor's instruction. To enable heavy parts to be brought into this room a short hoisting track has been erected to reach a pair of doors overlooking an adjoining alley.

On the second floor there are two locker rooms which contain 600 individual metal lockers furnished with top and bottom louvers for ventilation. There is also provided on this floor, next to the reading room, a set of three intercommunicating rooms for examining applicants for employment. In the first the candidates wait; in the second they are interviewed, and in the third their pedigree is recorded. The front rooms on the Fulton Street side are used for the offices of the four local division superintendents, toilets, locker equipments, etc.



Park Terminal Car House—A Lively Evening in the Pool and Billiard Room

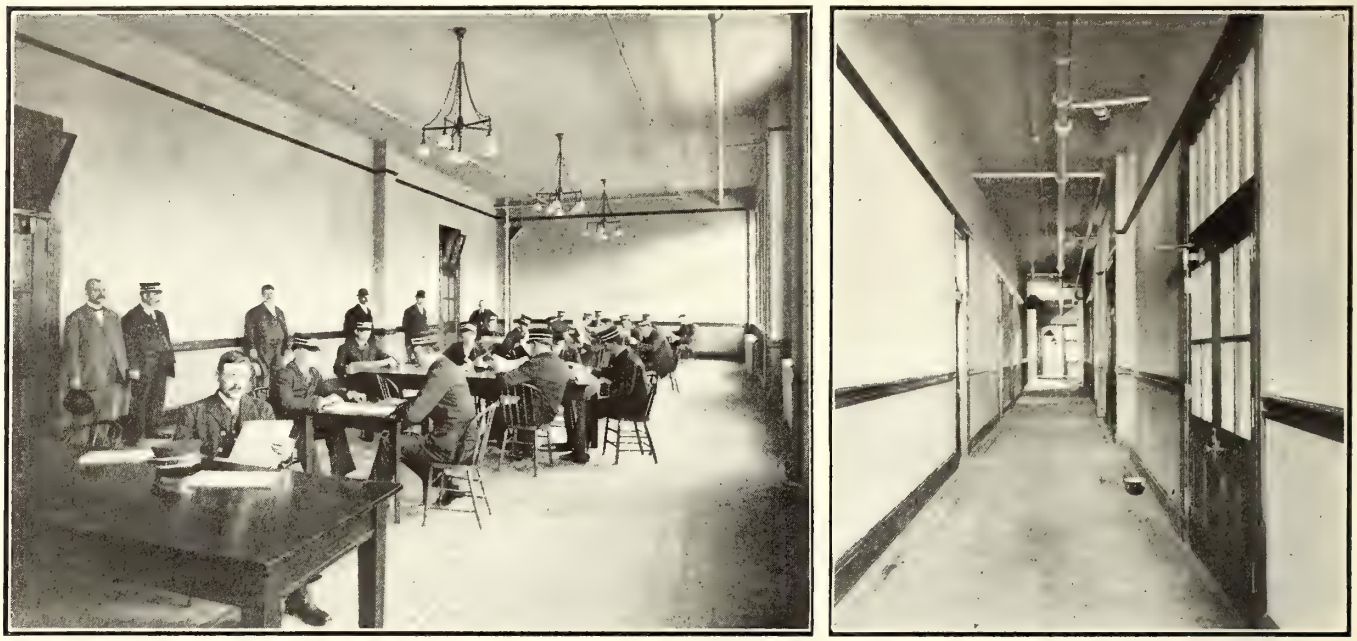


Park Terminal Car House—Concrete Stairway from Crew Room to Upper Floor

LIGHTING, HEATING, ETC.

All of the lighting circuits are in conduit. The lighting in the car house, except the pits, consists principally of 550-volt Benjamin wireless clusters with 20-in. tin shades. All three sections of the car house are controlled from a main cabinet which contains a master switch and three individual switches

for each of the three sections. In addition, there is a panel box in each bay. The rest of the building is lighted by 110-volt tungsten lamps, which are controlled by chains or by push-button switches in the different rooms. These lighting fixtures are of handsome and ornamental design, as illustrated. The general illuminating effect is enhanced by the light cypress finish of all of the offices and welfare rooms. The car house proper is heated by steam pipes and the rooms by radiators supplied from a boiler which is located in a basement at the Florence Street corner of the car house.



Park Terminal Car House—One of the Two Division Crew Rooms on the First Floor and a Corridor Between the Offices and Welfare Rooms on the Second Floor



Park Terminal Car House—The Bowling Alley, Showing Also the Concrete Beam Construction on the Second Floor and Lighting Scheme

GENERAL

The rolling stock and shops departments have a large force of car repairmen at this point to take care of minor repairs to some 228 cars that are stored or have their lay-over at the Park Terminal car house. No attempt is made to do wheel work or extensive overhauling, nor is any machine, blacksmith or carpenter work done here, all work of the kind stated being executed at the company's central plant, the Carroll Park shops. There is also a large car-cleaning force at the Park Terminal car house in charge of the superintendent of transportation.

The Park Terminal car house represents a study and improvements suggested in the buildings previously erected, and was built under the general direction of William A. House, president of the United Railways & Electric Company, assisted by T. A. Cross, general manager; J. M. Hood, Jr., chief engineer; A. T. Clark, superintendent rolling stock and shops, and W. C. Ludwig, superintendent of transportation. The architects were Baldwin & Pennington, and the contractors the J. Henry Miller Company, Inc. Both the architects and the contractors are Baltimore firms.

TESTS WITH A NEW BRAKE SHOE IN PHILADELPHIA

The Philadelphia Rapid Transit Company has been securing some remarkable results with a new type of brake shoe with regard to long shoe life, small scrap, minimum wheel wear and high frictional coefficients in braking. The first operating installation was made in May, 1910, and since that time about 1000 shoes have been placed on both single and double-truck cars with hand or air-brakes. These shoes, which were furnished by the Philadelphia Brake Shoe Company, are of the insert type. The body is made of a fine grade of iron, with a tread containing six cylindrical pockets 1½ in. deep and filled with cement. It has been found that these inserts are also a strong factor in eliminating the screeching common to many brake shoes. The insert composition is not affected by moisture, as was shown by its behavior during six weeks of heavy rain, when the first shoes were placed in service.

The pattern in use up to the present writing has a groove or throat to receive the wheel flange for the full length of the shoe. However, in accordance with a suggestion made by Harry Branson, superintendent of rolling stock and equipment, the new design will have a tread 2¼ in. wide and heel and toe guides only for the flange of the wheel. This change will bring all the braking on the treads, and prevent the pinching or breaking of the wheel flanges. The older shoes have been scrapped at an average weight of 6½ lb., but the new pattern shoe weighing 20 lb. originally will not have to be discarded until it reaches 4 lb.

COMPARATIVE BRAKING EFFICIENCY TESTS OF INSERT AND CAST-IRON SHOES.

Insert Shoe					Cast-Iron Brake Shoe				
Test Number.	Initial Pressure.	Terminal Pressure.	Length in which stop was effected.	Average Stop.	Test Number.	Initial Pressure.	Terminal Pressure.	Length in which stop was effected.	Average Stop.
50-LB. PRESSURE.									
1	50-lb.	45-lb.	210 ft.		1	50-lb.	45-lb.	274 ft. 0 in.	
2	45-lb.	45-lb.	200 ft.		2	50-lb.	46-lb.	262 ft. 0 in.	
3	50-lb.	45-lb.	190 ft.		3	50-lb.	45-lb.	253 ft. 0 in.	
4	50-lb.	45-lb.	212 ft.	204-ft.	4	50-lb.	45-lb.	282 ft. 6 in.	263-ft.
5	50-lb.	45-lb.	210 ft.		5	50-lb.	45-lb.	254 ft. 0 in.	
6	50-lb.	45-lb.	202 ft.		6	50-lb.	45-lb.	251 ft. 0 in.	
75-LB. PRESSURE.									
1	73-lb.	65-lb.	174 ft.		1	75-lb.	70-lb.	167 ft. 6 in.	
2	73-lb.	65-lb.	156 ft.		2	75-lb.	70-lb.	181 ft. 6 in.	
3	75-lb.	70-lb.	160 ft.		3	75-lb.	70-lb.	181 ft. 0 in.	
4	75-lb.	68-lb.	151 ft.	158-ft.	4	75-lb.	71-lb.	178 ft. 0 in.	180-ft.
5	75-lb.	68-lb.	145 ft.		5	75-lb.*	**71-lb.**	**192 ft. 0 in.**	
6	75-lb.	65-lb.	161 ft.		6	75-lb.*	70-lb.	178 ft. 0 in.	

*Pressure ran about 77 lb.

As previously noted, the shoes have been placed both on hand and air-brake cars. Not one of the shoes has been removed from the hand-brake cars, and the railway company expects them to give at least a year's service before scrapping. The average life of 115 shoes taken off the air-brake cars was 10,173 miles. The rest of the air-brake shoes, constituting about 70 per cent of the total, are still in service, so that the net average life should be several thousand miles more than the figure given. All of the insert shoes were installed at the Fifteenth Street car house, but the cars thus equipped have been scattered over several other divisions.

The drawback of the ordinary long-life shoe is its excessive abrasion of the wheel. This is particularly true of shoes made of such material as chilled or soft gray iron. However, the tests made with the new insert shoe by the Philadelphia Rapid Transit Company show that it wears the wheels far less than cast-iron, steel-back brake shoes. The exact figures obtained for the action of both shoes on steel wheels were as follows: Insert shoe used 67 days or 8445 miles wore off 3/32 in., insert shoe used 69 days or 8645 miles wore off ⅛ in., cast-iron shoe used seven days or 940 miles wore off ⅛ in., cast-iron shoe used five days or 740 miles wore off 3/32 in. On Sept. 13, 1909, before the extended installation of the insert shoe, the railway company tested it for its frictional coefficient value in comparison with common cast-iron brake shoes. The test runs were made on the Willow Grove line on a 3 per cent downgrade, 690 ft. long. The air-brakes were applied when the cars were running at top speed. The results are shown in the accompanying table, from which it will be noted that with 50 lb. pressure the insert shoe equipment was stopped in an average length of 204 ft. or 59 ft. less than the cast-iron shoe equipment. Similiarly in the test with 75 lb. pressure the insert shoes enabled the car to be stopped in 158 ft. or 22 ft. less than the cast-iron shoe equipment.

THE CLAIM DEPARTMENT

BY F. W. JOHNSON, SUPERINTENDENT BUREAU FOR PREVENTION OF ACCIDENTS, PHILADELPHIA RAPID TRANSIT COMPANY

The near approach of another national convention brings to mind the thought that there are many railway men who for years have been regular attendants at these conventions and at the more frequent gatherings of local organizations of a like nature, but have never really grasped the fact that the efficiency of their respective departments might be immeasurably strengthened by the adoption at home of some of the progressive ideas which have so largely contributed toward making conventions helpful and instructive to those who attend. The opportunity of meeting with other men who oftentimes are confronted by the same or similar problems, and thus of acquiring new ideas and suggestions through the medium of open discussion, cannot but prove of incalculable assistance to railroad men in general. The measure of benefit derivable from such intercourse is limited only by the depth of interest with which one enters into the spirit of such an occasion. If, then, it is a fact that an interchange of views and opinions has proven to be of mutual aid to the officials and heads of departments of the different companies, why should the same principles not apply with equal force and value with respect to lesser lights; that is to say, to the rank and file of the various departments of individual companies?

Consider this proposition for a moment, in conjunction with the claim department, for example, of any one of a number of companies situated in different parts of the country. It would, of course, be impracticable for any particular concern to attempt to have its entire department or even any considerable portion of it present at one of these gatherings. But there would appear to be little, if any, obstacle in the way of placing directly within their grasp much of the spirit and knowledge to be gleaned at the average convention, to the mutual profit and advantage of the department and of the individual. Until the possibilities of an idea such as this are more generally recognized, it would seem as though officials in general, and department heads in particular, are neglecting to take advantage of one of the most promising sources of benefit consequent upon the holding of national gatherings of this nature.

At these conventions are representatives, so to speak, of many thousands of earnest workers, to whom must necessarily be denied the privilege of participating in their proceedings. But it does not follow from this that they are not keenly interested in the various subjects under discussion, nor that they themselves would not be greatly benefited if afforded some means by which they might gain a fairly comprehensive insight

into the more interesting portions of their deliberations. I know of no one department which offers greater opportunities in this direction than does the average claim department. Nor do I know of any particular branch of railroading wherein work of this character could be made more interesting and directly beneficial to a company than in its claim department. Much of the proceedings of some of the associations are of a somewhat involved and technical nature, and would, for this reason, doubtless prove a little heavy to those not especially trained to these ends. With respect to the proceedings of the Claim Agents' Association, however, I venture to say that comparatively few topics are discussed the import of which should not readily be comprehended by virtually every investigator, inspector or adjuster of any practical experience at all. The very nature of claim work is such as necessarily to give to each a practical working knowledge of the scope of the department as a whole. This, together with the absence of perplexing technicalities, aside from the legal aspects of the situation, and involving, as it does, the never-ending study of "many-sided" human nature, offers a splendid field of endeavor to the department head who is genuinely interested in the task of developing his forces to their point of highest efficiency.

Continuing this line of thought, then, why should it not prove entirely feasible for any member company to preserve specimen copies of the various papers discussed at a convention, as well as a digest of the principal arguments advanced pro and con by different speakers, for subsequent consideration by those at home. These, combined with the usual detailed reports of the proceedings published through the columns of the Electric Railway Journal, and with the more voluminous reports annually prepared by the association itself, should provide a splendid working basis for the development of an idea such as this. A very interesting and instructive evening each month, throughout the entire year, could thus be devoted to frank, open discussions, under competent leadership, of topics of the most vital interest to the department. Subjects could be assigned to various members of the department for presentation in the form of papers; these to be followed by general discussion. A Question Box similar to that employed at times by the different associations would aid in clearing up many a doubtful point in the minds of the men.

Addresses by the various officials of the company would go a long way toward injecting a "personal" element into the work of the department. Prominent leaders in other communities doubtless could be prevailed upon to speak before the gatherings, thereby increasing the general interest. Company attorneys could give many a helpful "pointer" concerning important features of the work. Strong, forceful representatives of the company's medical corps should prove decidedly attractive speakers upon certain essential subjects, while the reports of delegates to conventions would aid wonderfully in keeping interest at concert pitch.

Gatherings of this nature would afford the head of the department an excellent opportunity of keeping in close personal touch with every member of his force, in a somewhat different sense from that ordinarily possible in the daily course of business. A little real, human interest in a man, if properly exhibited, will accomplish wonders in the direction of arousing a spirit of loyalty and confidence toward a superior. I care not who the man may be or what his station, if given the encouragement of a pleasant word now and then, he will return to his task with renewed courage, and will labor with ever-increasing zealousness for the best interests of his employers. Constant fault-finding or petty misunderstandings, on the other hand, tend to dishearten and to dampen his interest in the work. Especially applicable is this to the subject under consideration. The balance of the scales, figuratively speaking, between a verdict for the defendant or a substantial award for the plaintiff oftentimes depends directly upon the question of whether the investigator to whom the case originally was assigned really had his "heart" in the work. In large departments it frequently happens that the worker in the ranks rarely comes into personal contact with the head. In such cases much necessarily depends upon the subordinate chiefs in their handling of the men. The adoption of regularly scheduled meetings of the entire department, as has been suggested, would afford all an opportunity of becoming better acquainted with their chief, and of more clearly learning his real views and wishes concerning the policies of the department.

But there is still another angle from which to view the advantages of such a course. In thus opening up an avenue through which the members of his department may give full expression to their thoughts, he himself is given the opportunity of studying at close range such available material as may impress him as being worthy of development for positions of increasing responsibility. And this is in itself no small matter in departments of considerable magnitude. In thus encouraging the men to bring forth their best thoughts, and thereby stimulating the advancement of ideas of a novel and original character, many suggestions will in time be uncovered which undoubtedly will prove worthy of adoption. In such instances proper acknowledgment should be accorded to those whose alertness of mind has thus aided materially in strengthening the effectiveness of the department.

In practically every department are to be found men who, if given proper opportunity, plus a little encouragement, would jump at the chance to broaden their knowledge of claim work through the medium of suitable books and pamphlets upon the law of negligence. Few men of any real breadth of view would hesitate to render their co-workers every assistance within their power to a better and clearer understanding of the basic principles of claim work, should such a request be made of them. Unfortunately, however, many men who would otherwise welcome such assistance hesitate, through feelings of delicacy, to take the initiative in this direction, fearing, possibly, that their motives might be misunderstood. In this, as in many other respects, much depends upon the viewpoint. The superior, in looking down the line, may arrive at a certain conclusion. The private in the ranks, on the other hand, in looking up that same line toward his commander-in-chief, and in viewing exactly the same circumstances, oftentimes gets an entirely different impression. Hence the seeming reluctance of some to approach the head of their department, except upon invitation, which invitation at times doubtless seems discouragingly slow in putting in an appearance. Here, then, lies the keynote of the situation. The development of an idea, such as has been suggested, would aid mightily in encouraging the ambitious and would act at the same time as a spur to the indolent. In thus strengthening the personnel of a department the company gains in equal ratio with the individual.

In our close application to business we sometimes lose sight temporarily of the advantages possible through the introduction of a little of the social side of life into our daily affairs. The informal dinners and smokers of the various national associations of late years have provided many thoroughly enjoyable occasions for their members. Similar gatherings, possibly upon a little less pretentious scale, would go far toward insuring the success of work of this character within the confines of a single department.

There is nothing novel about the scheme. In several instances it has been tried with marked success by a number of electric railway companies. Some of our greatest business institutions have for years been zealous exponents of the idea, and I venture to say that its more general adoption throughout street railway circles would result in much good.

William A. House, president of the United Electric Railways & Electric Company, Baltimore, Md., contributed to a recent issue of the Baltimore *Star* an article entitled "How Rapid Transit Has Developed Baltimore." Mr. House gave the extent of the city in acres, and told what has been done by the company toward meeting the expansion of the population of Baltimore and the surrounding territory. Reference was also made by him to the part which the company has played in the upbuilding of the park system of the city.

BENEFIT ASSOCIATIONS IN THE SOUTH

Many of the electric railway companies of the Southern States have instituted sick and death benefit associations for their white employees. The following paragraphs will describe some of these associations with some notes on wages in Mobile:

MOBILE, ALA.

The Mobile Light & Railroad Company benefit association embraces about 75 per cent of the white transportation, shop and office employees of the company. The dues are 50 cents a month and the sick benefit payments $7 a week in addition to free medical attendance and drugs. The benefit payments begin on the fifth day after illness. The death benefit is $100. When a member dies the association also furnishes a floral design, two carriages and a delegation. There are emergency assessments of $1 per member to cover death payments, if such levy is necessary. In general, the fund is maintained by the contributions of the employees, although the company furnished some money when the association was formed. The association is governed directly by the employees. The officers of the company are honorary members only, and have the privilege of the floor, but they cannot vote or receive any benefits. The company has provided meeting rooms for the association on the third floor of its office building, where it has installed hot and cold baths, etc., and also takes care of the heating and lighting. These quarters are provided with a gymnasium, pool and billiard tables, library with current magazines and newspapers, writing materials, etc.

The system of paying platform employees is rather unusual, the men being given bonuses on the first of January and the first of July in addition to the regular wages. The Mobile management has found that this practice tends to prevent the men leaving its service without warning, and the company is able to pay its competent employees the highest possible rate, including the bonus received by the men who perform their duty and stay in the employ of the company, or who resign with an honorable discharge.

The wages per hour in cents and the bonuses are as follows:

	Rate	Bonus	Total
First two years	19	1	20
Third year	20½	½	21
Fourth year and after	21	1	22

ATLANTA, GA.

The Georgia Railway & Electric Company, Atlanta, Ga., has what is probably the most elaborate employees' welfare equipment in the South in a special structure known as the Transportation Building. The basement of this building contains the bowling alleys. The ground floor is used for offices of the transportation and other departments. The second floor is provided with pool tables, lockers, shower baths and a lunch room where regular meals are provided at 25 cents each, a clothes-pressing club where the men can have their clothing pressed for 30 cents a month, a cut-rate barber shop, shoe stand and a reading room. The lessee of the restaurant privilege gets free room, light, cooking utensils and dishes from the company, but the latter has full supervision of the price lists and the quality of food served. This scheme has worked out with such satisfaction that quite a number of the employees are regular monthly patrons. The third floor of this building also contains a dormitory where the men can have quarters for 10 cents a night. The top floor has an auditorium where monthly talks on operating subjects are given by the manager and superintendents. Meetings are held three times during the day, namely, at 9:30 a. m., 12:30 p. m. and at 7:30 p. m. Every employee of the transportation department must attend these discussions on courtesy to passengers, means for preventing accidents, reporting car troubles and other operating subjects. The auditorium is also used for religious services on Sundays for those who wish to attend.

Membership in the sick and death benefit association in Atlanta is open to any white employee under 50 who successfully passes the medical examination. Membership is retained only while in the employ of the company. Nine-tenths of the motormen and conductors belong to the association, and these classes also constitute about the same proportion of the total membership. The initiation fee is $1 and the monthly dues 50 cents. The benefit payments are $1 a day after the first five days of illness, and the usual addition of free medical service and medicines. The death payment is $100. It has been found that the dues are sufficient to make the organization self-supporting. However, the company made an initial contribution when the association was founded two years ago and the association arranges an annual baseball game for the benefit of its treasury.

The reporting room on the ground floor contains a board on which are posted the names of disciplined men and the number of demerits assigned. The board is also used to post the names and number of merits assigned for careful attention to duties. Among the demerits are the following: Absence from monthly talks, 10, and running too fast over special work, 10.

CHARLOTTE, N. C.

The Charlotte Electric Railway, Light & Power Company has provided its men with a clubroom equipped with hot and cold shower baths, tubs, lockers and other conveniences. The men have a house committee which levies monthly assessments for the purchase of books, pictures, etc. Thus far it has been impossible to organize a benefit association owing to the fact that Charlotte is a mill town and a large part of the men engaged do not remain on the cars very long. For this reason the company endeavors to secure farmers as recruits rather than mill hands. About 80 per cent of its present employees are from the rural districts. If a man leaves the company's employ he loses six months' standing in the wage rate if he returns once and a year's rating if he returns and is accepted a second time.

RAILWAYS and LIGHT COMPANY'S BENEFIT ASSOCIATION.
SICK REPORT.

Board of Managers:
I hereby report myself sick and under the treatment of
Dr.
Address
Signed
Residence
Date

N. B.—No Sick Benefit will be allowed unless this card is used to notify the Board of Managers.

Member's Report of Illness, Augusta, Ga.

LYNCHBURG, VA.

The splendid quarters provided by the Lynchburg Traction & Light Company for its employees were described and illustrated in the ELECTRIC RAILWAY JOURNAL of March 26, 1910. It may be briefly mentioned here, however, that 90 per cent of this company's employees are members of the sick and death benefit association. The monthly dues are $1. Sick benefits are paid at the rate of $1 a day, but are limited to $90 per annum. The death benefit is $100. The association has a physician who gives free medical attention to the members and their families. This company now has under consideration a pension system for disabled employees.

CHARLESTON, S. C.

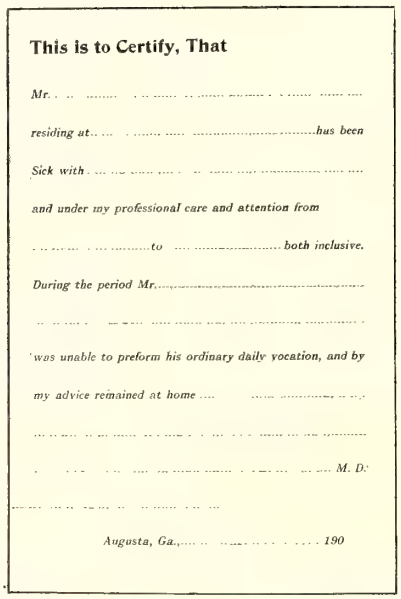
The Charleston Consolidated Railway, Gas & Electric Company organized a relief association about two years ago. It is supported by monthly contributions of 50 cents from the members, an annual contribution of $500 from the company and miscellaneous donations by directors and others. The dues of 50 cents a month have not been sufficient to meet all the expenses, but the difference has been slight owing to the low death rate which fortunately prevailed. Besides paying a death benefit of $75 upon the death of an employee, the by-laws also provide a payment of $50 in case the wife of a member dies and $25 in case the member loses a child of 12 years or under. About 75 per cent of the employees belong to the association. The report of this society for the year ended Dec. 31, 1909, showed a balance on hand of $1,614 and receipts of $2,573, which

include the preceding year's balance of $1,050 and expenses of $959. The association rents a hall for its meetings.

The company has recently provided dormitories at its car house for the benefit of late crews and men without families. The charge for this accommodation is 10 cents a night.

AUGUSTA, GA.

The Augusta-Aiken Railway & Electric Company sick and death benefit association was organized in 1903. Every white employee is required to join. The initiation fee is $1.50 and the monthly dues are 50 cents. Sick benefit payments are made four days after illness has been reported, and then only after a certificate has been received from the physician made out as shown on the accompanying forms. The sick benefit payments are $1 a day, but must not exceed $90 a year. The death benefit is $75. Extra assessments of 50 cents a month may be made to cover extraordinary expenses, but such assessments must not exceed $3 a year. The company has been contributing $300 to $375 a year to the fund of this association and has also provided the men with a meeting room over the car house where a gymnasium, pool tables, lockers, etc., have been provided. In this association the general manager is ex officio president and chairman of the board of managers. The auditor of the company controls all funds subject to the requisitions of this board. A novel feature of this organization is the provision for a standing committee of eight, known as the committee on grievances. This consists of the general manager and two other officers named by the company and five members elected by the association's board of governors. Any member suspended or discharged by the company has the right to appeal to this committee by filing a complaint in writing within three days after such suspension. The committee chairman and president of the association must thereupon call the committee together after at least one day's notice to the appellant, who must appear in person and may summon witnesses. The company allows any of its employees so summoned to attend without loss of wage time. After hearing evidence and investigating the matter, the committee by secret ballot may either sustain or reverse the decision of the company. In case of a favorable decision, the appellant is immediately reinstated. The company is so well pleased with the association as now organized that it does not consider it worth while to make any alterations.



This is to Certify, That

Mr. ....

residing at..... .....has been

Sick with ....

and under my professional care and attention from

.... to .... both inclusive.

During the period Mr. .....

....

was unable to preform his ordinary daily vocation, and by

my advice remained at home ....

....

.... M. D.

....

Augusta, Ga., ... 190

Physician's Certificate Used in Augusta, Ga.

The company has been successful in getting a high class of countrymen for its car service, and as its policy is to make promotions from the ranks the average length of service of its men is very high.

The Illinois Traction System is building a coal submerging and storage plant at Mackinaw Junction, Ill., midway between Peoria and Bloomington at the intersection of the line from Springfield. An excavation 250 ft. x 100 ft. is being made. The sloping sides of this excavation and the bottom will be covered with concrete so that when the excavation is filled with coal water may be pumped in to protect the fuel from deterioration or spontaneous combustion. Mechanical apparatus for reloading the coal will be provided.

REPORT ON RAIL CORRUGATION

One of the reports rendered at the meeting of the International Street & Interurban Railway Association at Brussels last week was on rail corrugation. The committee consisted of Mr. Busse, chief engineer of the Grosse Berliner Strassenbahn, and Messrs. Boulvin, general manager of the Compagnie Générale de Railways et d'Electricité, Brussels; Professor Carus-Wilson, consulting engineer, London; Culin, chief engineer of the Strassen-Eisenbahn Gesellschaft; d'Hoop, chief technical director of the Brussels Tramways; Dubs, manager of the Marseilles Railways; Fischer, manager of the Phönix rail mills, Ruhrool; Manage, chief engineer and general manager of the General Omnibus Company, Paris; Noirfalise, general manager of the Liège Railways; Petersen, manager of the Municipal Tramways of Dortmund, and t'Serstevens, secretary of the International Street & Interurban Railway Association.

The report reviews the previous reports on this subject presented at the meetings in Milan in 1906 (see Street Railway Journal for Sept. 8, 1906, page 367) and in Munich in 1908 (see Electric Railway Journal for Nov. 7, 1908, page 1323), as well as the special report of Mr. Petersen to members of the association last year (see Electric Railway Journal for Aug. 28, 1909, page 317).

The report recalled the fact that in the 1908 report a photograph was shown of the tread of a new rail containing notable irregularities caused in the rolling of the rail which it was thought might be the latent cause for the formation of corrugations after the rail was put in service. In this rail there were slight corrugations from 500 to 700 mm apart, due certainly to the process of rolling. Subsequently the Phönix rolling mills modified their process of rolling. In the Petersen report there was further evidence that at least a predisposition to corrugation was given during the manufacture of the rails. Some very interesting tests conducted in Dortmund showed that rails rolled at different times showed different characteristic corrugations.

The Prussian Government Railways also obtained similar results. A line was equipped with rails secured from two mills and laid in the track without definite order. Under traffic the rails from one of these mills showed marked corrugation, while those from the other mill were not affected.

In view of these facts the theory has gained ground during the last few years that the principal cause of rail corrugation lies in the quality of the rail. Nevertheless, a data sheet was sent out to the different members of the association and some of the most interesting replies were presented. These replies, however, did not change the opinion of the committee that corrugation is caused principally by the factors mentioned in the 1908 report and printed below:

(1) The quality of the rail (recent observations indicate that this is the principal cause of corrugation).

(2) The use of hard tires.

(3) Too rapid braking at high speeds.

(4) Too rapid acceleration.

(5) Too high speeds.

(6) Nosing or side oscillation of the car, which can be produced by: (a) rigid mounting of two wheels of the same pair of axles; (b) unequal diameters of the two wheels on the same axle; (c) difference in elevation of the two rails; (d) unequal division of the weight; (e) variations in resilience of the different springs of the same car; (f) play in the journal boxes; (g) irregularity in the gage of the wheels; (h) irregularities in the surfacing of the track; (i) effect of torsion due to the method of motor support; (j) axles out of square; (k) bad construction of the car; (l) too short wheel base.

(7) Large radius curves.

(8) Character of track substructure.

Seventy-five replies from companies were received to the data sheet and of these 72 reported corrugation on the tread of the rails. Thirty-eight companies had also noticed corrugation in the trolley wire and eight on the tires of the wheels.

The Amsterdam Tramway Company believes that a consid-

erable portion of the trouble is caused by an angular position of the wheel flanges in the groove of the rail, giving the wheel a constant tendency to climb the groove and resulting in constant grinding and slight vertical vibrations of the wheels. This was shown by attaching on the journal boxes a marker which traced the vertical movement of the wheels. The line drawn contained distinct waves. The side oscillation of the car was also determined by carrying a can of whitewash on the trucks and allowing a small stream to run on the pavement. This showed distinct nosing of the car. There was marked corrugation at the places where the nosing was most pronounced.

The Bordeaux Tramways made some tests which showed a close correspondence between side oscillation and variations in the diameters of wheels on the same axle and between this side oscillation and corrugation. These tests also indicated that the corrugation occurred on the side where the wheels slid on the rails. A test was then made by the company with a car in which the wheels were arranged so as not to skid. On the trailer axles one wheel was mounted loosely on the axle. On the motor axles a differential gear was used somewhat similar to that employed with automobiles. Two cars have been equipped in this way. The Bordeaux company believes that if the theory of the committee is correct, that composition of the rails has an influence on corrugation, this influence is of minor importance, and that it is more necessary to reduce the nosing of the car by reducing the lateral play between wheels and rails and also to reduce or abandon the coning of the wheels. The company also thinks that cars with a short wheel base are more subject to this oscillation than cars with a long wheel base. It also recommends an elastic track foundation, differing in this respect from other companies.

The Brussels Tramways Company has found that corrugation occurs principally in curves of large radius and in grooved rails. In many cases it disappeared when wooden ties were used instead of concrete foundation. It noted that the appearance of the phenomenon in rails coincided with the abandonment of the Bessemer process for the open-hearth process in most of the rail mills.

The Berlin Tramways found corrugation not only in high carbon rails but also on manganese rails.

The Helsingborg Tramways thought that the cause was due largely to the gyroscopic action of the armature. On account of irregularities in the track the four points of contact of the wheels with the rails are never in the same plane. The wheels tend to follow the irregularities in the track, but they are prevented by other forces, particularly by the gyroscopic force of the armature, which tends to maintain the axle in its original position. The consequence is that the pressure of the wheels on the rails varies and sometimes reaches high maxima which contribute to the production of corrugations. This theory explains the formation of corrugations in curves of large radius run at high speed, the increased wear at the joints where the position of the axle is abruptly changed, and the corrugations on wheel tires. On the other hand, during the passage of short radius curves at low speeds gyroscopic action has little effect.

The Copenhagen Tramways subjected the head of a corrugated rail to the acid test, but could discover no modification in the structure of the head. It also subjected the head of the rail to the drop test. No material difference in hardness was found between the crests and valleys of the corrugations, but the hardness of the entire head was found to have increased from 200, the hardness of new rails, to 285. This was no doubt due to cold rolling. Corrugation can be reduced by grinding the head of the rail, but this is an expensive process and costs the company 0.012 cent per car mile.

The elevated and underground railway of Berlin tried an experiment of installing on one line of heavy traffic, on which there was considerable braking, sections of the following types of rails: nickel steel rails, Bessemer rails and manganese steel rails. Of these rails the Bessemer showed only a slight corrugation, while the manganese and nickel steel rails were corrugated soon after they were put in service. The report also gives the observations of the corrugations of trolley wire and of wheel tires from different companies.

CONCLUSION

The conclusion of the committee was that the replies this year do not warrant any change from the conclusions as to the cause of corrugation adopted at the 1908 convention and quoted above, except to emphasize the fact already mentioned that predisposition to corrugation may be formed during the rolling of the rail if rolled at too low temperatures. The other causes mentioned undoubtedly favor the production of corrugation, so that it is well to eliminate or reduce these subsidiary causes where possible. It is also evident that rails laid on wooden ties, rails held in place on yokes and rails strongly attached to the substructure are less liable to corrugation than rails of long lengths which have been welded or connected with the rigid Melaun joint. It is reasonable to suppose that the tension engendered in these rails will loosen them and thus favor the production of corrugation. It would be very interesting to install a section of track equipped with rail on impregnated ties, strongly attached to the substructure, and also on metal ties and in concrete to determine whether a reduction in corrugation would be secured. The rails ought to be strongly attached so as to reduce so far as possible the vibrations in them. It might also be stated that the German Street & Interurban Railway Association has recently appointed a special committee to investigate this subject in connection with the metallurgist, Dr. J. Puppe. The International Street & Interurban Railway Association is interested in this investigation to the extent of bearing a portion of the expense.

A communication on the subject from Mr. Petersen, the author of the report in the ELECTRIC RAILWAY JOURNAL for Aug. 28, 1909, was appended.

MR. PETERSEN'S REPORT.

Mr. Petersen filed a new rail and found what he considered were points of incipient corrugation. These points were marked by a chisel on the lip of the rail, which was then

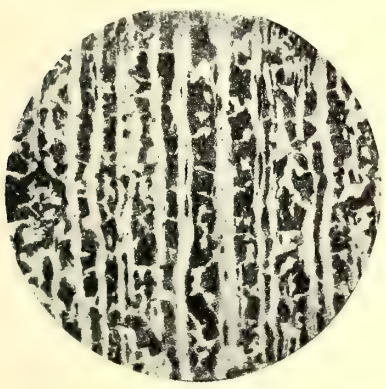


Fig. 1—Structure of Old Uncorrugated Rail

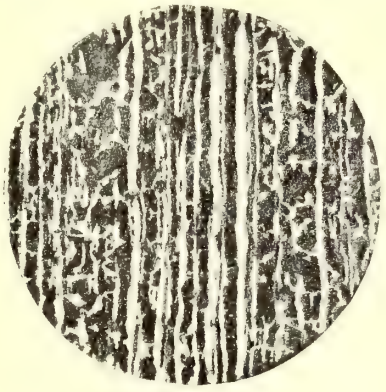


Fig. 2—Structure of Old Corrugated Rail

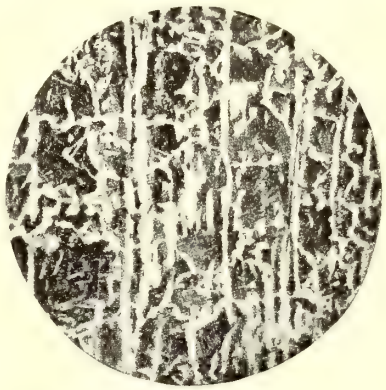


Fig. 3—Unused Rail Indicating Liability to Corrugation

placed in service and the rail later developed corrugations at these points. This rail carried a large traffic.

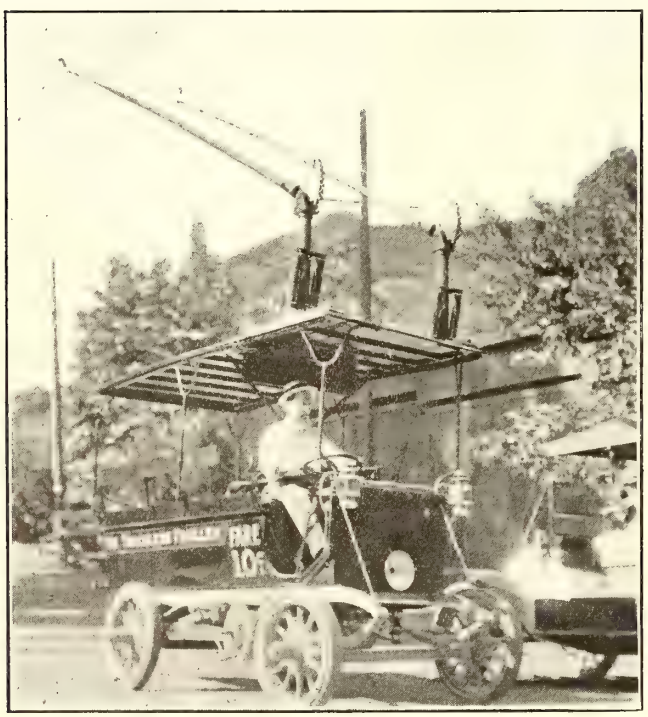
The three micro-photographs on page 435 show respectively the structure of (1) a rail which has been in service several years without showing corrugation; (2) a rail which has been in use and has become corrugated, and (3) a rail which has just been received from the mill. Examination indicates that the first has been rolled at a higher temperature than the other two which showed longitudinal cracks in the fibers of ferrite. These cracks are due to the inclusion of parts of the slag. The chemical analyses of these three rails were as follows:

	Rail 1.	Rail 2.	Rail 3.
C	0.34	0.44	0.47
SI	0.17	0.24	0.04
MN	0.74	0.78	0.96
S	0.075	0.065	0.048
P	0.048	0.051	0.087

It is easy to see that the rail which has been exempt from corrugation presents a fibrous texture much more orderly in its arrangement than that of the other two rails. These views support the claim that the writer has already advanced that the cause of corrugation is the crushing of the head of the rail in the final passes in attempting to roll rails at too low temperatures. These latent defects are developed in service, especially when the rails are laid on a concrete or metallic substructure and with a tight gage.

TRACKLESS TROLLEY IN CALIFORNIA

A trackless trolley line has been started near Los Angeles. The line is built in Laurel Canyon near Hollywood, a suburb of Los Angeles, and furnishes communication between the tracks of the Los Angeles Pacific railway at the mouth of the canyon and Bungalowtown, a new settlement a mile and a half north, near the canyon head. The promotors gained the



California Trackless Trolley

idea of this method from reading about the German systems and have equipped two cars. Each car will seat 16 passengers. Power is obtained from the Los Angeles Pacific Company. One trolley wire is connected to the trolley wire of the railway system. The other trolley wire is used for the return. Underrunning wheel trolleys are used and each car is equipped with two electric motors of 15 hp.

Each car is said to have a lateral range of 11 ft., so that it can pass any vehicle on the road without losing contact with the trolley wire. The cars were built in Los Angeles.

AN ODD ACCIDENT LETTER

A large interurban railway system recently received the following odd letter in regard to an accident:

Claim Agent,

..... Railway.

Dear Sir:

I am very glad I heard from you that you like to know about that damage done from getting wed from that water tank all over my clothing that Sunday th 14 of August on the way from ..... to ..... That will be about five dollars.

For it spoiled my Sunday dress and hat and besides I had trouble. And instead going to church. I had to go Some other place in ..... to get myself dry for I was wed all throught I was shaking all over from that cold water.

Kindly let me know about it,

Very Respectfully Yours,

X. Y. Z.

COMPLICATED SPECIAL TRACK WORK IN MILWAUKEE PUBLIC SERVICE BUILDING

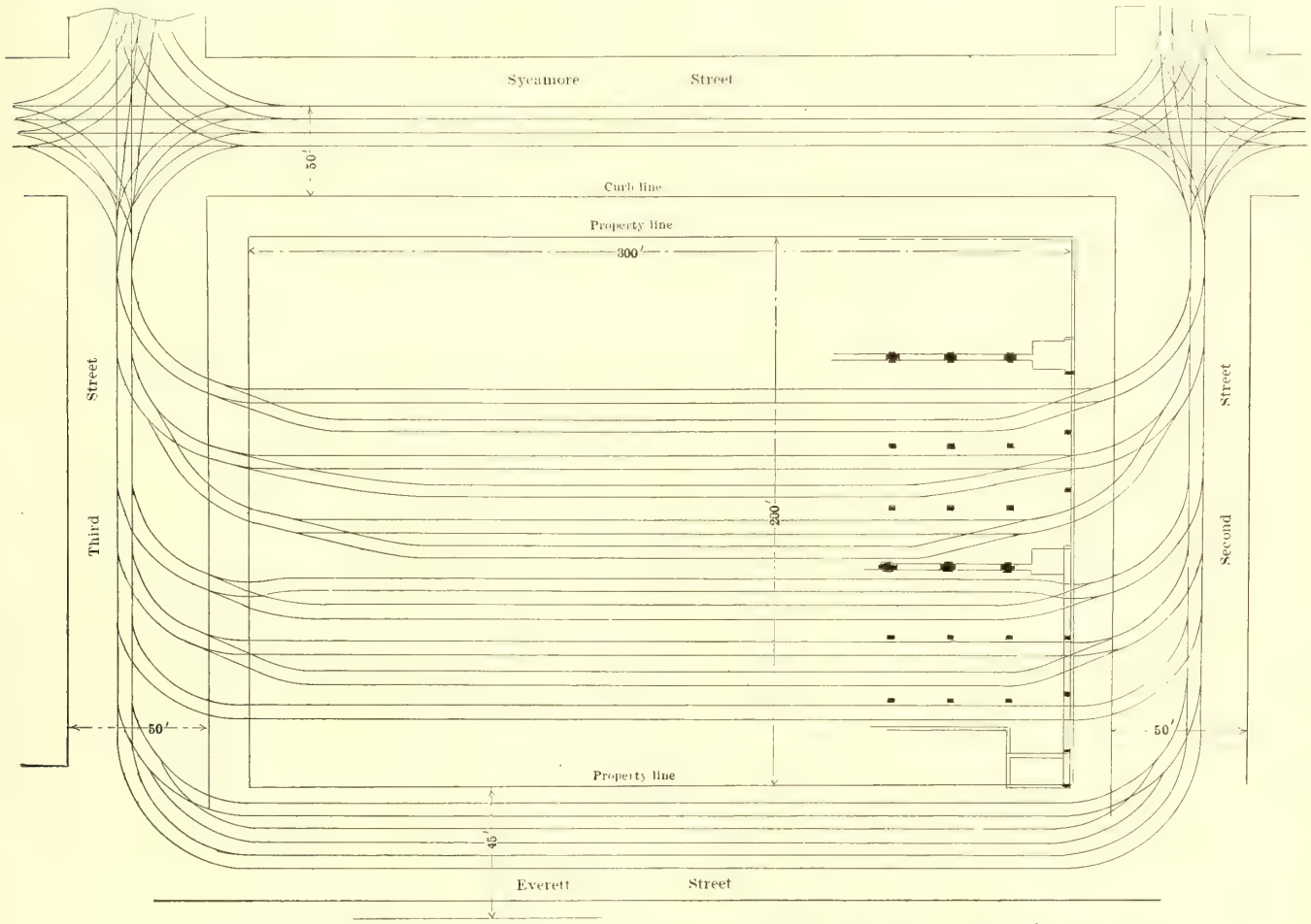
The Milwaukee Electric Railway & Light Company has just finished installing a complicated special track-work layout at its Public Service Building in Milwaukee. This structure covers a ground area of 300 ft. x 200 ft., provides headquarters for all the departments of the railway company, and includes a passenger terminal for all of the company's interurban lines operated out of the city. Practically all of the ground floor of the large building is used as a terminal station and trackage for handling interurban cars. The waiting-room section of the first floor is 44 ft. wide and about 150 ft. long on the Sycamore Street frontage of the Public Service Building. The remainder of the ground floor is occupied largely by 11 lines of track which extend through the length of the building from Third Street to Second Street. Three other through tracks connect with single-track ladders in the streets at either end of the building, by curves of approximately 47-ft. radius, and each ladder leads toward Sycamore Street, on which the Public Service Building faces. A line of double tracks extending along Sycamore Street is intersected at each corner of the building by double tracks from the north and by the ladders from the south, into which the station curves lead. Connecting curves at each corner of the building join the single-ladder track.

The general plan of the special track work at the Public Service Building is shown in the upper cut on page 437 and particular attention is called to the complicated intersections at the two corners on the Sycamore Street side of the building. Here it was necessary to lead out in six directions from one track, and this required a very complicated piece of frog work, making it practically essential that this special track layout be constructed almost entirely of solid cast material. The designing and placing of this special work were done by the maintenance of way department of the Milwaukee Electric Railway & Light Company, under the supervision of the superintendent of construction and maintenance of way of the company. The contract for manufacturing the special track work was carried out by the Falk Company, of Milwaukee. The entire layout conforms to the heavy 95-lb. T-rail section used in Milwaukee and is of the combined "steel-bound" and "solid cast-steel" construction. All throat ways are 1½ in. wide by 1¼ in. deep on straight track and 1¾ in. wide on curves and 11/16 in. deep over risers. The running surfaces of the rails and connecting pieces are designed for wheels with 3-in. treads. The guard rails are made of bar steel 1 in. by 5 in. in section. The gage of the special work layout is standard on straight track and 4 ft. 8¾ in. on curves.

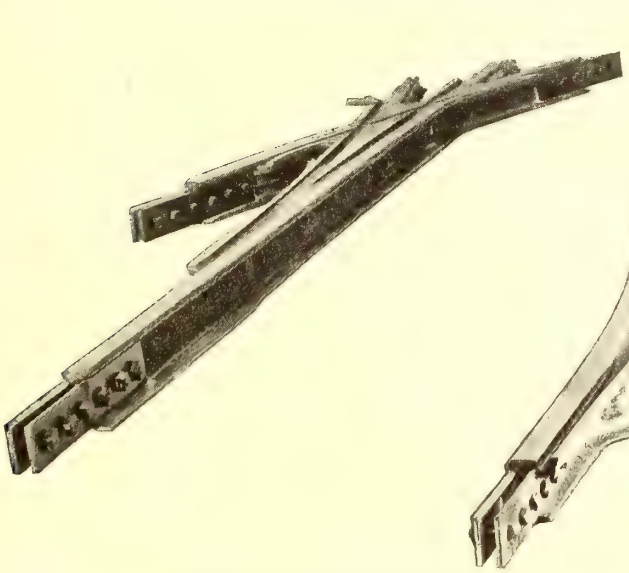
The most exceptional pieces in these special track-work layouts are double-intersecting mates and triple switches and mates, which are used in both the Second and Sycamore Streets and the Third and Sycamore Streets intersections. A view of

this complicated part of the special work as it was assembled on the shop floor is shown. The second engraving shows one of the two combination mates and double frogs. These are each one-piece castings approximately 19 ft. long, each weighing slightly less than one ton. The details of construction of the special track-work layout at both ends of the Public Service Building were carried out by the Falk Company and the de-

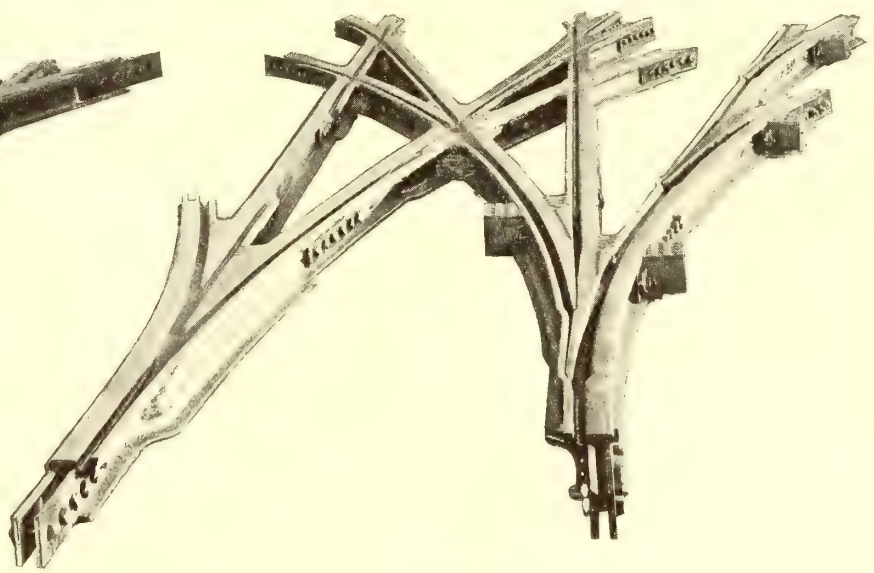
rails. The complicated pieces are solid, specially hardened cast steel and all other frogs in the main part of the layout are made of 95-lb. section rail bound together with a heavy mass of open-hearth steel. This form of construction eliminates all angle plates and bolts and thus produces an integral structure. The use of steel for bonding these frogs gives greater strength than ordinary gray iron as commonly used.



Track Plan of Public Service Building, Showing Complicated Intersections at Two Corners



Double Intersecting Mate



Triple Switch and Mate

sign of the three-way switch and mate used in leading six tracks laid in three streets into a single ladder is somewhat similar to a special track-work layout furnished by the Falk Company for the Metropolitan Street Railway Company, of Kansas City, and installed at its Ninth and Washington Streets car house. The Milwaukee work, however, is built of heavier

The installation of these two large intersections is of particular interest because the track-work rests on a foundation of concrete more than 18 in. thick, which forms a monolithic arch from curb to curb. The track surface is paved with No. 1 granite stone blocks to a foot outside of the outer rails and the remainder of the street is paved with asphalt.

NOTES ON TRANSPORTATION AND EXHIBIT ARRANGEMENTS FOR ATLANTIC CITY CONVENTION

H. C. Donecker, secretary of the American Street and Interurban Railway Association, has issued this week Convention Bulletin No. 3 which contains full information about transportation arrangements to and from Atlantic City next month. The special reduced rates which have been granted by the Trunk Line Association, New England Passenger Association, Central Passenger Association and Southeastern Passenger Association were announced in this paper last week, page 402. Those who attend the convention and who come from points outside of the territory covered by these associations should purchase regular tickets to the nearest point in the reduced-rate territory and then buy a round-trip ticket to Atlantic City at the reduced rates. When purchasing tickets it is important to call the attention of the agent to the fact that the purchaser is going to attend the convention, so that the proper form of ticket may be obtained.

All Atlantic City round-trip tickets sold on account of the c nvention must be validated at the railroad station or at the city ticket office of the line over which return trip is made from Atlantic City before commencing the return trip, otherwise they will not be accepted for return passage. No fee is charged for validation.

Those who intend to go to the convention are urged to communicate at once with the chairman or some member of the local transportation committee appointed by President Shaw to arrange for special trains and Pullman accommodations. The list of members of these committees and the territory assigned to each was printed in the Electrc Railway Journal for Aug. 27, 1910, page 333.

TRAINS FROM NEW YORK OVER THE PENNSYLVANIA RAILROAD

For the accommodation of members of the association and their friends who will attend the convention, the Pennsylvania Railroad announces a special train de luxe (or special parlor cars, if there are not sufficient number to justify a special train) from New York to Atlantic City on Saturday, Oct. 8, leaving New York at 2:55 p. m. Members and others are requested to make application at an early date for Pullman parlor car accommodations thereon. Other trains via the Pennsylvania Railroad leave New York at 9:55 a. m. and 2:55 p. m. week days and 7:55 a. m. Sundays only. The first-class one-way rate between New York and Atlantic City is $3.25 and six-months' excursion rate is $5. The parlor car seat rate is 75 cents.

Tickets reading via the Pennsylvania Railroad will be available for stop-off at Philadelphia within limit at pleasure of the holder. Frequent and fast express service is maintained via the Pennsylvania Railroad between Philadelphia and Atlantic City in both directions. Application for reservations on special or regular trains should be made to Colin Studds, district passenger agent, Pennsylvania Railroad, 263 Fifth Avenue, New York, N. Y.

TRAINS FROM NEW YORK OVER THE CENTRAL RAILROAD OF NEW JERSEY

The Central Railroad of New Jersey also announces that it will arrange to provide special Pullman parlor cars on New York-Atlantic City trains leaving New York on Oct. 7 to 10, inclusive, from foot of West Twenty-third Street at 9:50 a. m. daily (12:50 p. m. Saturday), 3:20 p. m. (except Sunday), 2:20 p. m. (Sunday only), and from foot of Liberty Street at 10 a. m. daily, 1 p. m. (Saturday only), 3:40 p. m. (except Sunday), and 2.30 p. m. (Sunday only).

All of the above are through express trains running via Red Bank and Lakewood. If a special number advise of their intention to use any one train, a special train composed exclusively of Pullman parlor cars will be operated for their accommodation. The parlor car fare between New York and Atlantic City is 75 cents in each direction. Passengers by this route have the privilege of stopping over at Lakewood and also of returning via Philadelphia. Applications for reservations should be made to W. C. Hope, general passenger agent, Central Railroad of New Jersey, 143 Liberty Street, New York, N. Y.

TRAIN FROM BOSTON

The committee on transportation for the New England States, which is composed of Charles H. Hill, chairman; Calvert Townley, H. C. Page, L. S. Storrs and Robert S. Goff, has addressed a letter to all member companies in that territory urging a large attendance of officers at the convention. Another letter has been addressed to all associate members in New England in which are pointed out the advantages of attendance at the convention. Accompanying each letter is the following announcement of special parlor car arrangements which will be made if a sufficiently large party is secured to warrant this:

"If sufficient number desire it arrangements will be made to secure special through parlor cars from Boston to Atlantic City. The cars would be attached to the 'Colonial Express,' leaving Boston, Monday, Oct. 10, at 8 a. m., and arriving at Atlantic City about 6:10 p. m. The cost of transportation, parlor car accommodations and dinner would be on the same basis as traveling alone on regular trains. If you care to join in making up such a party kindly let us know at your earliest convenience, but not later than Sept. 28. State the number of chair reservations desired. You will be informed on or before Oct. 1 regarding the success and practicability of carrying out the above arrangements. Address your communications to C. H. Hile chairman, transportation committee, 101 Milk Street, Boston, Mass. The suggestion has also been made that it might be desirable to provide special cars for Sunday. Will you kindly indicate your choice as between these two days? That is, advise whether you would prefer to leave on Sunday or Monday."

ADVANCE COPIES OF COMMITTEE REPORTS

Advance copies have been printed of nearly all of the committee reports which will be presented at the meetings of the Accountants' Association, the Engineering Association and the Transportation and Traffic Association. These reports will be mailed this week to all member companies and associate members so that all will have ample time to study them thoroughly before going to Atlantic City.

SPACE NUMBERS OF EXHIBITORS

In the Electric Railway Journal of Sept. 10, 1910, page 410, a list was printed of the names of manufacturing companies which had applied for exhibit space at the convention up to Sept. 2, 1910. The following list gives the space numbers which have been assigned to each exhibitor, and by referring to the accompanying plan of the pier the location of any exhibit can be found readily. The track exhibits this year will be placed on a temporary track about 250 ft. long parallel to the boardwalk and extending north from the pier. The boardwalk is soon to be widened at this point and additional reinforced concrete piers and extension girders have already been placed. A track will be built on these girders for the accommodation of full-size car body and truck exhibits. It is expected that several cars will be shown.

BUILDING NO. 1.

Space Nos.	Exhibitors.
112 to 125	General Electric Co., Schenectady, N. Y.
126 to 131	Galena-Signal Oil Co., Franklin, Pa.
208 to 216-304	William Wharton, Jr., & Co., Philadelphia, Pa.
209 to 217 305-415-417	The Pennsylvania Steel Co., Philadelphia, Pa.
218 to 228 306 to 318 404 to 430	Allis-Chalmers Co., Milwaukee, Wis.
219 to 229 307 to 319 419 to 427 454 to 556	Westinghouse Companies, East Pittsburgh, Pa.
401-405	Electric Railway Journal, New York City.
403	Dearborn Drug & Chemical Works, Chicago, Ill.
½ of 407	Kenfield-Fairchild Publishing Co., Chicago, Ill.
409-411	The J. G. Brill Co., Philadelphia, Pa.
433	American Railway Guide Co., Chicago, Ill.
429 to 560	R. D Nuttall Co., Pittsburgh, Pa.
434	Hunter Illuminated Car Sign Co., New York City.
435	Emery Pneumatic Lubricator Co., St. Louis, Mo.
436	Badger Fire Extinguisher Co., Boston, Mass.

AQUARIUM COURT.

Space Nos.	Exhibitors.
437 to 441	Under-Feed Stoker Co., Chicago.
447	Walker & Bennet Manufacturing Co., New York City.
453	G. C. Reiter, Canton, Ohio.
456	Electric Railway Equipment Co., Cincinnati, Ohio.
457-459	Buckeye Engine Co., Salem, Ohio.
463 to 467	National Carbon Co., Cleveland, Ohio.
464	Rail Joint Co., New York City.
469	Columbia Machine Works & Malleable Iron Co., Brooklyn, N. Y.

MACHINERY HALL.

515-517	Chicago Pneumatic Tool Co., Chicago, Ill.
516-518	Joseph Dixon Crucible Co., Jersey City, N. J.
519	Warren Webster & Co., Camden, N. J.
521	H. B. Underwood & Co., Philadelphia, Pa.
522 to 526	Electric Omnibus & Truck Co., New York City.
523	Edison Storage Battery Co., Orange, N. J.
525	Economy Oil Cup Co., Augusta, Ga.
527 to 535	Taylor Electric Truck Co., Troy, N. Y.
528-530	Railway Rolier Bearing Co., Syracuse, N. Y.
532 to 536	Turner Automatic Switch Co., Ft. Smith, Ark.
537	Black Diamond Boring Machine Co., Monongahela, Pa.
539 to 545	National Brake & Electric Co., Milwaukee, Wis
542-544	Yale & Towne Manufacturing Co., New York City.
546	Selah & Hoopes, Philadelphia, Pa.
547 to 551	U. S. Electric Signal Co., West Newton, Mass.
552	Philadelphia Electrical & Manufacturing Co., Philadelphia, Pa.
553	Duplex Metals Co., New York City.
555-557	Whitmore Manufacturing Co., Cleveland, Ohio.
559 to 563	Standard Steel Works Co., Philadelphia, Pa.
564-566	Jones & Laughlin Steel Co., Pittsburgh, Pa.
565	Niles Car & Manufacturing Co., Cleveland, Ohio.
567	Baldwin Loco. Works, Philadelphia.
568	Nachod Signal Co., Philadelphia.
570-572	Harold P. Brown, New York City.
571 to 573	Hess - Bright Manufacturing Co., Philadelphia, Pa.
574	W. T. Van Dorn Co., Chicago, Ill.
575-576	Cleveland Frog & Crossing Co., Cleveland, Ohio.

BUILDING NO. 2.

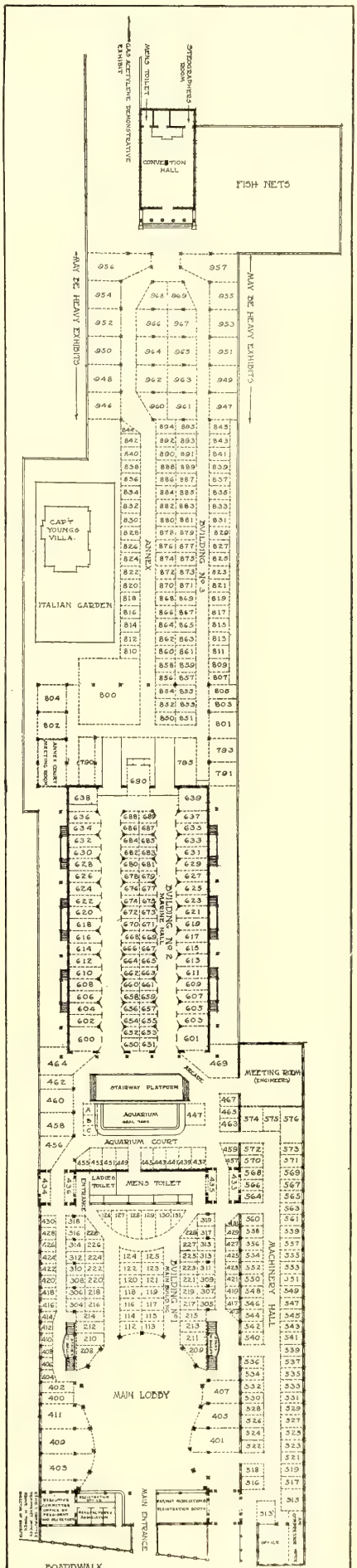
600 to 604	Ohmer Fare Register Co., Dayton, Ohio.
601-603	Ohio Brass Co., Mansfield, Ohio.
605	The Presto Co., New York City.
607	Elliott Co., Pittsburgh, Pa.
608	Trolley Supply Co., Canton, Ohio.
609	U. S. Metal & Manufacturing Co., New York City.
610	J. H. Williams & Co., Brooklyn.
611-613	International Register Co., Chicago, Ill.
612	Gold Car Heating & Lighting Co., New York City.
614-616	John A. Roebling's Sons Co., Trenton, N. J.
615	Adams-Bagnall Electric Co., Cleveland, Ohio.
618-620	Speer Carbon Co., St. Marys, Pa.
619	Gould Storage Battery Co., New York City.
621	Automatic Ventilator Co., New York City.
622	Recording Register & Fare Box Co., New Haven, Conn.
623-625	Goldschmidt Thermit Co., New York City.
624	A. & J. M. Anderson Manufacturing Co., Boston, Mass.
626-628	Southern Exchange Co., New York
627-629	Consolidated Car Fender Co., Providence, R. I.
631	Sherwin-Williams Co., Cleveland.
633	D & W Fuse Co., Providence.
635	Massachusetts Chemical Co., Boston, Mass.
636-638	H. W. Johns-Manville Co., New York City.
637-639	Western Electric Co., New York.
650-652	National Lock Washer Co., Newark, N. J.
654-656	National Brake Co., Buffalo, N. Y.
657	Cooper Heater Co., Carlisle, Pa.
658-660	New York Switch & Crossing Co., Hoboken, N. J.
659-661	Coin Counting Machine Co., New York City.
662 to 665	Ford & Johnson Co., Michigan City, Ind.
666-668	Electric Storage Battery Co., Philadelphia, Pa.
667	Indianapolis Brass Co., Indianapolis, Ind.
669	Eclipse Railway Supply Co., Cleveland, Ohio.
670	American General Engineering Co., New York City.

BUILDING NO. 2 (CONTINUED).

Space Nos.	Exhibitors.
670	Eureka Tempered Copper Works, North East, Pa.
671	Bayonet Trolley Harp Co., Springfield, Ohio.
672-673	Peter Smith Heater Co., Detroit, Mich.
674	Grip Nut Co., New York City.
675	Indian Refining Co., Cincinnati.
676	Lagonda Manufacturing Co., Springfield, Ohio.
677	W. J. Jeandron, New York City.
678	Poole Brothers Co., Chicago, Ill.
679	W. P. McVicker & Co., New York City.
680-681	Standard Motor Truck Co., Pittsburgh, Pa.
682	Adams & Westlake Co., Chicago, Ill.
683	Home Rubber Co., Trenton, N. J.
684	Atlanta Car Wheel Co., Atlanta,
688-689	Standard Underground Cable Co., Pittsburgh, Pa.
690	Carbolineum Wood Preserving Co., New York City.

BUILDING NO. 3.

706	American Rolling Mill Co., Middletown, Ohio.
791 to 795	American Hoist & Derrick Co., St. Paul, Minn.
800	Electric Service Supplies Co., Philadelphia, Pa.
801	American Brake Shoe & Foundry Co., Mahwah, N. J.
803	T. H. Symington Co., Baltimore, Md.
805	The Q M S Co., Plainfield, N. J.
807 to 811	McConway & Torley Co., Pittsburgh.
810-812	Sterling Varnish Co., Pittsburgh.
813	Dossert & Co., Inc., New York City.
814	Atlas Railway Supply Co., Chicago.
815	Acme Indicator Co., Cleveland, Ohio.
816	Garlock Packing Co., Palmyra, N. Y.
817	Pyrene Manufacturing Co., New York City.
818	Wheel Truing Brake Shoe Co., Detroit, Mich.
819-821	Watson-Stillman Co., New York City.
820	Star Brass Works, Kalamazoo, Mich.
822	Standard Paint Co., New York City.
823-825	Coleman Fare Box Co., Buffalo, N. Y.
824	Transportation Equipment Co., New York City.
826	American Railway Supply Co., New York City.
827	Rooke Automatic Register Co., Providence, R. I.
828-830	Standard Coupler Co., New York.
829	Anglo-American Varnish Co., Newark, N. J.
831	Ramapo Iron Works, Hilburn, N. Y.
832-834	The O. M. Edwards Co., Syracuse, N. Y.
833	American Mason Safety Tread Co., Boston, Mass.
835	Egry Register Co., Dayton, Ohio.
836	West Disinfecting Co., New York City.
837	Archbold-Brady Co., Syracuse, N. Y.
839	National Lead Co., New York City.
839-841	Smith-Premier Typewriter Co., Syracuse, N. Y.
840	Berry Brothers, Ltd., Detroit, Mich.
842-844	National Car Advertising Co., Chicago, Ill.
843-845	Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y.
850 to 859	Lorain Steel Co., Johnstown, Pa.
860 to 871	Carnegie Steel Co., Pittsburgh, Pa.
872 to 875	American Steel & Wire Co., Chicago, Ill.
876 to 879	Consolidated Car Heating Co., Albany, N. Y.
878	Tool Steel Gear & Pinion Co., Cincinnati, Ohio.
880-881	Whipple Supply Co., New York.
882	Universal Safety Tread Co., Boston, Mass.
883-885	Curtain Supply Co., Chicago, Ill.
884 to 887	Hale & Kilburn Manufacturing Co., Philadelphia, Pa.
890	Lord Manufacturing Co., New York.
891	Heany Fire-Proof Wire Co., New York City.
892-894	Electric Railway Improvement Co., Cleveland, Ohio.
893-895	Chicago Varnish Co., Chicago, Ill.
948	Flood & Conklin Co., Newark, N. J.
949	Buda Co., Chicago, Ill.
954	Forsyth Brothers Co., Chicago, Ill.
957	Titan Steel Casting Co., Newark, N. J.
956	Pantasote Co., New York City.
960	Wallace Supply Co., New York.
961	Globe Ticket Co., Philadelphia, Pa.
962	Heywood Brothers & Wakefield Co., Wakefield, Mass.
968	Duff Mfg. Co., Pittsburgh, Pa.
969	Wonham, Sanger & Bates, New York City.
Track	Barber Car Co., York, Pa.
Track	Pay-As-You-Enter Car Corporation, New York City.
Track	The J. G. Brill Co., Philadelphia.
Track	Jewett Car Co., Newark, Ohio.



Plan of Exhibit Hall

COLUMBUS STRIKE

There have been several important happenings during the week in connection with the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio. Governor Harmon refused to call a special session of the General Assembly of Ohio at the behest of Mayor Marshall to deal with the strike situation, the hearing on the temporary order restraining the trainmen of the company from interfering with train operation was postponed until Sept. 17, 1910, and Col. Theodore Roosevelt delivered an address in Columbus in which he referred in no uncertain terms to some of the phases of the present labor trouble.

Mayor Marshall's request to the Governor for a special session of the General Assembly was dated Sept. 12, 1910. The Mayor asked for the special session to provide for legal compulsory arbitration, to define distinctly the relations between public-service corporations and their employees and the obligations of one to the other, and to prevent overcapitalization of public-service corporations. In his reply to the Mayor the Governor said:

"Certainly in view of the expense to which the state has already been put to maintain order in Columbus you are the last who should suggest putting it to the further great expense of a special session.

"You assume that I have only to call the Legislature and tell them what to do. At both sessions the Republican majority, which controls both branches, took special pains to treat my recommendations with little or no respect.

"Now, with the presiding officer of each house and many of the members candidates at the pending election, you seem to think this majority would come to me and eat out of my hand, as it were.

"Under the circumstances I certainly would not be justified in calling a special session even if I were prepared to recommend the various measures you mention. I am bound in frankness to say that your sending such a letter at this time and promptly giving it to the press suggests a desire to make up by fertility in recommending new laws for the lack of efficiency in enforcing existing laws with which you are charged by the public in general."

On Sept. 13, 1910, the Mayor replied to the Governor. He disclaimed responsibility for the expense involved in keeping troops in Columbus, saying that in his judgment it were better to have the Legislature enact laws which would remedy bad economic conditions, even though the special session would be expensive, than to maintain troops to quell disorders due to the economic conditions that prevail.

The hearing on the question of continuing in force the temporary order of E. B. Dillon, judge of the Common Pleas Court at Columbus, restraining the striking trainmen in some measure from interfering with the operation of cars was set for Sept. 10, 1910. The organization which is maintained among the employees of the company is not incorporated, and for this reason a cross bill was filed with the court advanced in behalf of individual members of the men's organization. This cross bill asks dismissal of the injunction suit by the company, appointment of a receiver to take over property of the underlying companies and nullification of the company's leases. By agreement, the injunction granted by Judge Dillon was continued until Sept. 17 1910.

Col. Roosevelt spoke in Goodale Park, Columbus, on the afternoon of Sept. 10, 1910, on the subject of "Law and Order," and it is said that 30,000 people heard him. His remarks were confined almost wholly to conditions in Columbus. Among other things Col. Roosevelt said:

"The first essential to the establishment of justice is the establishment of law and order. Law must be maintained that disorder be suppressed, and woe to the man, public official or private citizen, who fails to realize this fact. Especially should we abhor and repudiate the conduct of any public official who, for any reason, fails in his duty in this respect.

"If it be true—I do not know that it is—that the attorneys for the strikers habitually appear for every miscreant arrested for assaulting the cars, and for assaulting other people, and furnish him bail bonds, then in their own interest and for their own good name let the wage-workers get rid of the attorneys."

On Sept. 7, 1910, the police arrested W. W. Haines, a former employee of the railway company, and J. R. Ray on the charge of being connected with attempts to dynamite cars of the company. Ray was later released, but Haines was held. Haines was discharged on Sept. 8, 1910, however, as the attorneys for the men on strike threatened to bring habeas corpus proceedings to secure his release. With this action Mayor Marshall established a censorship over the news at the police department on the ground that publicity was hindering all officials in the investigation of the riots and preventing the capture of those guilty by keeping them informed of all the movements made to arrest them.

J. A. Jeffrey, of the Jeffrey Manufacturing Company, picked up a stick of dynamite in front of the wholesale dry-goods house of the Sheldon Dry Goods Company on Sept. 7, 1910, and turned it over to Robert E. Sheldon, who is president of both this company and the Columbus Railway & Light Company.

On Sept. 7, 1910, a number of men are reported to have applied for positions as motormen and conductors as a result of the advertising which the company has been doing. Manager Stewart stated that positions with the company will all be filled within a short time. The old men who desire to return to work will be taken, however, as long as there is room for them.

The 10 labor leaders chosen to act for the strikers held a meeting on Sept. 6 and decided not to ask a sympathetic strike of other trades on account of lack of support of the organizations among men in other lines of work. This committee was to meet again on Sept. 13, 1910, for further action.

The Civil Service Commission has sustained the verdict of Safety Director Edward McCune in dismissing from the service the 33 patrolmen who refused to obey the order of the Mayor to serve on the cars. The commission says that a state of riot existed at the time; that the director of safety and the Mayor had joint control, and that the Mayor had authority to issue such orders as he deemed expedient.

The strikers sent agents through the state to appeal to the people not to ride on the cars during state fair week, but the company had all the business it could conveniently handle. Governor Harmon had the state troops patrol the tracks leading to the fair grounds.

In the cases of two new employees of the company Police Judge Osborne decided on Sept. 8, 1910, that men engaged in hazardous occupations of a lawful nature have a right to carry weapons to protect themselves. About 20 men employed by the company had been arrested for carrying weapons, but all were discharged as a result of this decision.

Some of the troops have been relieved from duty, but it is said to be the intention of the Governor to retain a sufficient number to insure order until the municipal authorities feel that they have the situation fully in hand.

The Maryland Public Service Commission has taken up the complaint of Marion G. Dinsmore and others against the fares charged by the United Railways & Electric Company, Baltimore, Md., for transporting passengers from Howard and Franklin Streets, Baltimore, Md., to Sparrows Point. At the original hearing it was agreed, in order to give the commission a clear insight into the matter, that the complainants should submit to the officials of the company a list of interrogatories touching upon matters relative to which specific information is desired. This was done, but it appeared that neither the questions nor the answers thereto were specific enough. Hence the case has been postponed until amended and more specific interrogatories can be filed and the company has had time to answer.

COMMUNICATION

THE ARNOLD PITTSBURGH REPORT

CHICAGO, Sept. 3, 1910.

TO THE EDITORS:

I notice that in a letter published in your issue of Aug. 20 Judge J. H. Reed, vice-president and general counsel of the Pittsburgh Railways Company, takes exception to one of the statements I recently made in a report to Mayor Magee regarding the property of the Pittsburgh Railways Company. He directs attention to the variation in the car-mile unit as a standard of service rendered, owing to the fact that in most cities the replacement of smaller with larger cars results in a greatly increased seating capacity and, I think without sufficient consideration, attempts to discredit the conclusions drawn by me, especially the one relating to service rendered by the Pittsburgh Railways Company.

While I have always recognized that the use of the car-mile unit has its limitations, it is an unfortunate fact that no other unit is usually available, especially for comparing service over a long period, and had the Pittsburgh Railways Company complied with my request to furnish full information regarding its equipment for the period that my report covers, I might have taken into consideration the exact seating capacity furnished by the Railways Company during the different periods. This information, however, was not furnished and it was necessary for me to secure it largely from the United States census reports and the Red Book published by your JOURNAL. This information was probably originally furnished to the above authorities by the Railways company and is therefore presumably correct.

I have had the matter again carefully checked, and do not at all agree with Judge Reed's conclusions that "as all winter car bodies" have increased 20 per cent, my measure of service, as expressed in passengers per car mile, must be modified in proportion, or that the tables, curves, etc., should be corrected.

It should be recognized that the analysis in my report is based entirely upon all-the-year-around figures and not on any particular winter schedule or on an "all winter car bodies basis," as is Judge Reed's, consequently all cars must be taken into consideration in order to determine the average increase in seating capacity. The following data show that the open equipment always constituted a large proportion of the total and that the seating capacity of the open cars is about one-half of the total seating capacity, notwithstanding the fact that many new cars were purchased within recent years. This is of course due to the fact the open single-truck cars have about the same seating capacity as the majority of the closed double-truck cars, and nearly two-thirds more seats than the closed single-truck cars. Taking all of this into consideration, the average number of seats per car has increased but 5 per cent from 1902 to 1909, as evidenced by the following table:

TABLE I.

	Per cent of total		
	1902.	1908.	1909.
Cars:			
Closed	56.5	62.4	62.5
Open	43.5	27.6	37.5
Seats:			
Closed	44.0	51.7	56.0
Open	56.0	48.5	46.0
	Seats per car		
	1902.	1908.	1909.
Cars:			
Closed	27.3	*31.5	*32.2
Open	†45.5	†45.5	45.5
Totals	35.2	36.9	37.0

NOTE.—* Means prorated from Judge Reed's statements. † Means assumed constant 1902 to 1910. (No cognizance is taken of 18 horse cars, given in the Red Book, as owned by the company in 1902.)

Now, computing the several ratios involving service on the basis shown by this table, we have Table II.

In the final lines of Table II I have noted seat miles per passenger, using Judge Reed's own figures, based upon the 20 per cent increase.

From Table II it will be seen that the average number of seat miles furnished per passenger riding over this distance decreased from 64.8 in 1902 to 55.2 in 1908, but rose to 58.2 in 1909. The original figures to which Judge Reed took exception are as follows: Passengers per car mile, 5.43, 6.60 and 6.28, respectively. These two ratios bear inverse relations but seem to me to prove the correctness of my deduction.

TABLE II.

	1902.	1908.	1909.
Passengers per car-mile	5.43	6.60	6.28
Earnings per car-mile	24.08	28.49	27.42
Expenses per car-mile	12.21	15.99	15.91
Car-miles per passenger	0.184	0.149	0.157
Car-miles per capita	10.35	9.60	9.70
Car-miles per mile of track	80,800	59,200	61,300
Seat miles per mile of track	2,205,000	1,862,000	1,982,000
Seat miles per passenger	64.8	55.2	58.2
Seat miles per passenger using winter schedule (figures from ELECTRIC RAILWAY JOURNAL, Aug. 20)	50.25	47.95	50.5

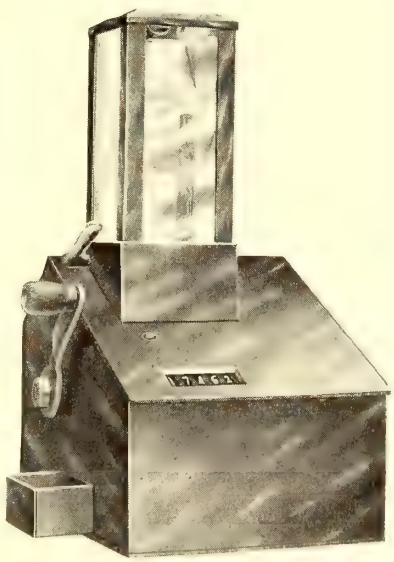
In view of these figures I do not, as yet, find reason to alter the statement in my report to which Judge Reed excepts, reading, "According to this record [total passengers per revenue car mile], the standard of service furnished decreased from 1902 to 1908, with a considerable increase in 1909."

Personally I regret that a discussion of this nature is at all necessary, but it only emphasizes the desirability of the general adoption by street railway companies of more suitable standards whereby results of their operation may be intelligently analyzed. Such standards have long since been suggested by the railway associations, but in many cases their acceptance has been tardy and half-hearted, even under protest, when required by supervisory commissions. I do not see that any harm can come from an intelligent analysis of results, and especially from a comparison of similar systems, always provided that proper allowances are made for conditions purely local in character.

BION J. ARNOLD.

TWO NEW FARE BOXES

The Recording Register & Fare Box Company, New Haven, Conn., is now offering two new types of registering fare boxes intended especially for prepayment cars. The No. 5 box illustrated has a glass receptacle for receiving the fares. The coins drop onto a plate at the bottom of the receptacle, and after inspection by the conductor his pressure on a lever drops them into the machine. By operating a crank on the side of the fare box the conductor runs the coins through the mechanism, which properly registers them and drops them into a till. The operation of the crank will not affect the register unless there are coins actually present in the machine. The register runs to 100,000 and registers once for each nickel, twice for each dime and once for each five pennies. The conductor is required to remove all the money from the till at the end of each trip, and may remove it at any time should he desire it for making change. The No. 6 registering fare box is designed for both cash and tickets, mechanically separates the coins from the tickets, properly registering them and dropping them into the conductor's till, but retaining the tickets.



Fare Box for Prepayment Cars

Mutilated or thin coins have heretofore been a serious obstruction to the successful use of coin-operated machines, but

it is stated that this trouble has been completely obviated in these fare boxes. Bent or damaged coins will pass safely through the machine and safety devices make it impossible to damage or break the mechanism by the use of slugs or other foreign substances. Another great advantage is that one or more fares may be deposited at a time, making it possible for a passenger to pay several fares without being confined to the slower operation of depositing them singly.

The registers used in these boxes are full geared. The figures are very plain, being 5/16 in. long, while the entire mechanism has been made strong, durable and simple. The manufacturer announces that the new machines will be on exhibition at the Atlantic City convention of the American Street & Interurban Railway Association.

NEW CARS FOR NORTHERN TEXAS TRACTION COMPANY

The American Car Company, St. Louis, has recently built for the Northern Texas Traction Company, Fort Worth, Tex., 15 double-truck, double-end motor cars with prepayment platforms and turtle-back roofs. The principal dimensions of the cars are: Length of body, 26 ft.; length over bumpers, 40 ft. 6 in.; width over all, 8 ft. 9 in.; clear height inside, 8 ft. Steel plates of No. 14 gage are used for the side panels and the yellow pine side sills are reinforced with 3/16-in. x 15-in. steel plate bolted on the outside. Both platforms are 6 ft. 6 in. long and are entirely enclosed with sheet steel and glass panels and folding and sliding doors. On the right hand side of the platform the wide opening is divided by a post into exit and entrance passageways which are closed with folding doors. An iron pipe stanchion in the center of the platform supports the inner end of a pipe partition rail, which on the front platform is swung around to the left of the motorman and fitted into a socket on the inside of the dasher. Double sliding doors which move together close the 48-in. central opening in the end bulkhead of the car body, but there is no central stanchion to separate incoming and outgoing streams of passengers. The sashes in these bulkhead doors are arranged to rise into the upper panel. The platform steps below both the folding and sliding doors are arranged to fold up against the platform knees. The long step is folded up by pulling down an inside door guard rod which is connected with suitable rods and bell cranks to the step hinges. The short step under the sliding door operates automatically with the movement of the door.

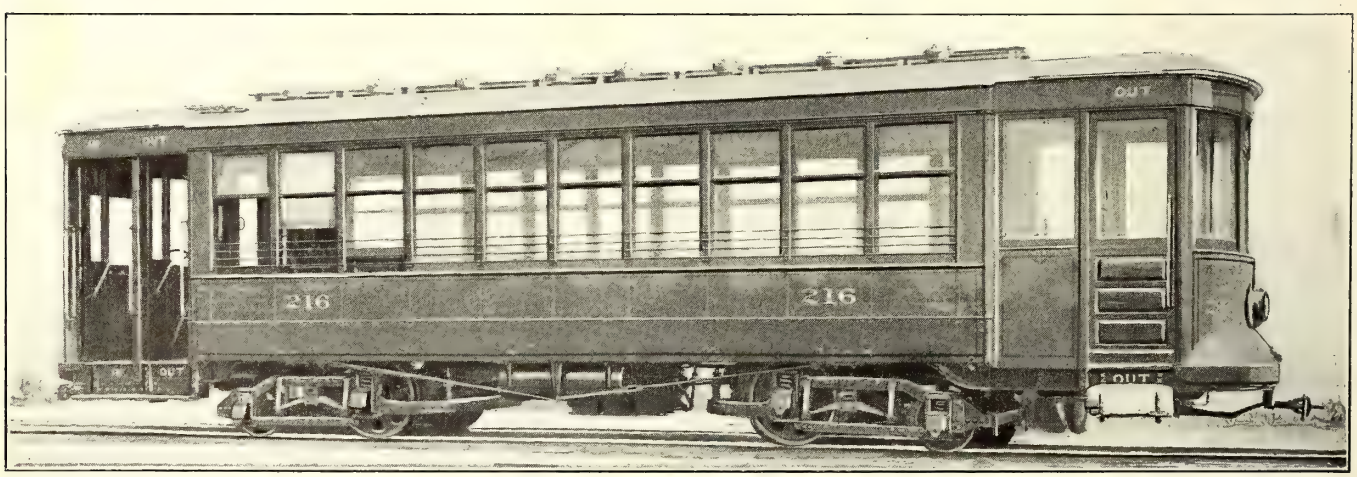
The turtle-back roof is framed with ¾-in. x 1½-in. oak carlins bent to the proper contour and strengthened with 5/16-in. x 1¼-in. concealed steel carlins over each side post. On top of the carlins is a layer of ⅜-in. poplar ceiling on which the No. 8 cotton duck roofing is bedded in white lead. Sixteen exhaust ventilators 6 in. in diameter with inside registers are inserted in the roof in two rows as close as practicable to the trolley board.

There are windows on each side of the car. The upper sashes are stationary and the lower sashes are arranged to rise 30 in. Sixteen reversible wooden-slat cross seats furnished by Heywood Brothers & Wakefield and four wooden-slat corner seats provide a seating capacity for 40 passengers.



Interior of Car with Turtle-Back Roof

The interior trim of the cars is solid mahogany. The special equipment includes Sterling-Meaker Giant hand brakes, Brill drawbars and angle-iron buffers, Wall gongs, Hunter illuminated signs, Forsythe ring curtain fixtures and Pantasote curtain material, International double registers, Crouse-Hinds arc headlights, Westinghouse air brakes, Sherwin-Williams chrome-yellow body paint, Berry Brothers' varnish and Universal safety step treads. The cars are mounted on Brill 39-E. single-motor trucks and are equipped with two General Electric-219 motors.



Semi-Steel Car with Turtle-Back Roof for Northern Texas Traction Company

Construction work was recently begun on the first of two 25,000-kw hydroelectric generating stations on the tributaries to the Doce River, in Brazil, which will furnish energy for an electric railway, 400 miles in length, between Victoria and Itabira, in the State of Minas Geras. The region penetrated by the new electric railway is a mining country producing large quantities of iron ore, the transportation of which to the coast will be the principal business of the new road. In building the road about 250 miles of existing narrow-gage steam roadbed will be utilized, the track being converted to standard gage. The railway is being constructed by British interests which own the iron-ore workings in the territory which the road will serve and the electrical equipment will be of English manufacture.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE.

California.—Safety Bar—Injuries—Negligence.

A street car company is not required, as a matter of law, either by a statute or rule of law, to keep a safety bar before the entrance of open street cars.

The distance between the projecting steps of passing street cars on defendant's double tracks was only 3 in., and the distance between the bodies of the cars was 18 in., but the handlebars of cars on either track would extend 2⅝ in. beyond that distance. There was no safety bar across the entrance of the car on which plaintiff was riding and injured by being struck by a handlebar on another car, and plaintiff was riding on the step of the entrance because of the crowded condition of the car. Held, that it could not be said as a matter of law that it was negligence not to provide a safety bar on the car.—(Morgan v. Los Angeles Pacific Co., 108 Pac. Rep., 735.)

Illinois.—Negligence—Imputed Negligence—Infants—Injuries to Infant—Instructions—Definition—Negligence of Gripman.

Negligence of a mother in permitting a child four years old to go out in the street, whereby he was injured, and negligence of a brother of such child in not taking care of him while on the street, cannot be imputed to the child.

An instruction, in an action for injuries to an infant four years old by being struck by a street car, that the negligence of the mother in permitting plaintiff to go on the street, or the negligence of his brother in not taking care of him while on the street, could not be charged against plaintiff, and "it is not a defense to the suit," is not erroneous, in that by the use of the quoted words the jury were authorized to find against defendant, though the negligence of the brother was the proximate cause of the injury, where other instructions given based liability on proof of negligence which must be the proximate cause of the injury.

An instruction defining "negligence" as the omission to do something which a reasonable man, guided by those ordinary considerations which ordinarily regulate human affairs, would do, or the doing of something which a prudent and reasonable man would not do, is substantially correct.

In an action for injuries to an infant run down by a street car, a requested instruction that if plaintiff ran into the side of the car, and if the car did not run into the plaintiff, defendant was not guilty, was properly refused, as the injury might have been caused by the act of the gripman in looking to one side, by reason of which he did not see the child as he should, of which there was evidence in the case.

Where an infant of tender years stood still a sufficient distance from a street car track to enable the car to pass him without coming in contact with him, and there was nothing in his action which indicated to the gripman that he was about to cross the track in front of the approaching car, and without warning he suddenly and unexpectedly started to cross in front of the car and was injured, there could be no recovery.

But where it was reasonably apparent to the gripman that the infant intended to cross in front of the car, and the gripman recklessly and negligently failed to stop the car, and ran against the infant, or the infant, by reason of such conduct, was brought into collision with the car, the infant could recover.

Where the gripman failed to discover the intention of the infant to cross in front of his car, because his attention was distracted by a disturbance on an adjoining corner, and in consequence of such inattention the infant is injured, the street railroad company is liable, though the front of the train had passed the infant and the infant ran against the side of the car.

Where in an action for injuries to an infant by a street car while he was crossing the street diagonally it was shown that the car running south stopped at a street north of where the accident occurred, and stopped immediately after the injury, and the distance between the place of stopping and where the accident occurred was less than 100 feet, evidence that the gripman was looking away "after the car started" was material, because of the shortness of the distance, no matter when he looked away, up to the time of the accident.—(Perryman v. Chicago City Ry. Co., 89 N. E. Rep., 980.)

Indiana.—Husband and Wife—Injury to Wife—Recovery by Husband.

Where a husband seeks pecuniary compensation for an injury to his wife, his damages must be determined as far as practicable on a financial basis, and no allowance can be made for the wife's suffering.

A husband seeking pecuniary compensation for an injury to his wife is ordinarily entitled to recover without a special plea for any injury sustained from loss of the aid, society, and companionship of the wife, though to justify a recovery for loss of services of exceptional value outside of the usual domestic duties a special plea may be necessary.

A husband suing for pecuniary compensation for injury to his wife may not split up the elements of his damages as to the value of her assistance in his business, her services in the household, her society, and companionship, and his testimony that her services, of which he had been deprived, were worth a specific sum per week to him must be deemed to cover his entire loss.—(Indianapolis Traction & Terminal Co. v. Menze (No. 21,360), 89 N. E. Rep., 370.)

Kentucky.—Damages—Personal Injuries—Excessiveness.

Plaintiff, a steam fitter earning $2.25 per day, was injured on August 9, 1907. On September 16 following he returned to work, and worked 12 days in that month, losing but few days thereafter because of inability to work, and in November following his wages were increased. He had no broken bones or dislocated joints. Several physicians testified that he had a curvature of the spine, and that he had suffered a severe nervous shock, and that pressure on either side of the spinal column, which was enlarged and swollen, increased the pulse. There was other evidence, however, that the increased temperature and pulse may have been due to acute indigestion, from which he suffered, and, though the physicians testified that his condition would likely grow worse, there was no satisfactory evidence of a permanent impairment of his power to earn money. Held, that a verdict for $5,000 was so excessive as to indicate passion and prejudice and required a new trial.—(Louisville Ry. Co. v. Roser, 122 S. W. Rep., 149.)

Massachusetts.—Injuries to Passengers—Negligence—Starting of Trains.

As defendant's two-car train moved slowly along the platform of a subway station, and was about a car length from the place where it was to stop, plaintiff's intestate attempted to get on the rear platform of the motor car; but his hand slipped from the grab iron and he fell under the train, receiving mortal injury. Held that, the carrier being bound to provide for the public the quickest possible entrance to its cars consistent with safety, it was not negligent in failing to require that the entrance doors be locked until the car came to a standstill, and that no negligence was therefore shown.

Where plaintiff's intestate attempted to board a moving subway car before it had stopped, and, losing his hold, fell and was injured, every element of danger being as plain to intestate as to defendant's servant, defendant's servant was not negligent in failing to thwart intestate's effort to board the car, nor in violating a rule requiring conductors at stations to stand on the rear step of a car platform, with the left hand grasping the body rail and the right hand the dasher rail, facing outward toward the station platform, and ride thus until the car arrives at its assigned berth; the object being to keep any person from boarding the car while in motion, etc.—(Gagnon v. Boston Elevated Ry. Co., 91 N. E. Rep., 875.)

Michigan.—Injury to Person Crossing Track—Contributory Negligence.

One who, knowing that a street car was following him, suddenly turned his team and attempted to cross the track in front of the car when it was about 40 feet distant, was guilty of contributory negligence.

Under the rule that plaintiff cannot recover if his negligence contributed to the injury, even though defendant's act was in violation of law, one guilty of contributory negligence cannot recover for injuries through being struck by a street car while attempting to cross the track, though

the car was running faster than permitted by a city ordinance. (Rouse v. Michigan United Rys. Co., 122 N. W. Rep., 532.)

Mississippi.—Use of Streets—Right of Travelers—Operation of Cars—Duty of Motorman.

Travelers on a street and a street railway company must each use the street with reasonable regard for the safety and convenience of the other.

A motorman must keep a reasonably careful lookout for persons lawfully using the street, and use reasonable precautions to prevent accidents to them, and the degree of care required varies according to the time, place and circumstances. (Austin v. Vicksburg Traction Co., 50 S. Rep., 632.)

Missouri.—Premature Start—Care required.

Where the gist of a passenger's case was that the street car was halted to let her alight in obedience to her signal, and was negligently started while she was doing so, she was entitled to have the jury pass on the weight of the evidence supporting such case, though she was in error as to her claim that the car always stopped at the west side of the street intersection.

Where a street car stopped at a crossing in response to a signal that a passenger desired to alight, there was a fair inference that the operatives knew, or should have known, that some person desired to alight, and should have exersised care not to start until assured that no one was in the act of alighting.

An instruction only requiring of the carrier's servants the use of ordinary care to prevent injury to a passenger calls for a standard of care below the legal requirement. (Groshong v. United Rys. Co. of St. Louis, 121 S. W. Rep., 1084.)

New Hampshire.—Master and Servant—Injuries to Servant—Assumed Risk—Duty to Warn—Assumption of Risk.

Where a servant knew, or as a reasonable man ought to have known and appreciated, the risk he voluntarily assumed in taking the position in which he was injured, he assumed the risk, and could not recover for resulting injuries.

It is no part of a master's duty to warn an intelligent and experienced servant not to be careless in the presence of known dangers, or not to unnecessarily incur risk of injury from the operation of known physical forces.

Plaintiff, an experienced motorman, knew that the rear of a car coming out of a car barn would swing toward a partition, and that for some distance would be so near as to strike a man standing in the intervening space, and that, with a short car, such dangerous space extended about 3 ft. from the door jamb. While taking out a long car without making any examination as to the increase of the dangerous space, plaintiff walked in between the car and the partition to grasp the trolley cord, and, when he reached a point about 10 feet from the door, ordered the motorman to start the car, and, as it moved out, the rear part caught plaintiff, jamming him against the partition, and causing the injury complained of. He testified that he knew that the long car would make a more extensive dangerous space, but guessed or supposed he was in a safe place, and could have performed the operation in hand from the rear of the car in safety. Held, that he assumed the risk, and could not recover.—(Manley v. Laconia St. Ry., 76 Atl. Rep., 81.)

New Jersey.—Speed—Necessity for Signals—Damages—Grounds—"Natural" and "Proximate" Effects of Delinquency.

It is not negligence to run a trolley car upon a public highway at a rate of speed which is not incompatible with the lawful and customary use of the highway by others with reasonable safety.

Such timely warning of the approach of a trolley car must be given as will enable others to avoid any danger from it, and the nonperformance of such duty in approaching a street crossing intended to be crossed is evidence of negligence, which, if the natural and proximate cause of the injury complained of, is actionable.

The rule of law requires that the damages chargeable to a wrongdoer must be shown to be natural and proximate effects of his delinquency. The term "natural" imports that they are such as might reasonably have been foreseen, such as occur in an ordinary state of things. The term "proximate" indicates that there must be no other culpable and efficient agency intervening between the defendant's dereliction and the loss. (Smith v. Public Service Corporation of New Jersey, 75 Atl. Rep., 937.)

New York.—Care as to Persons Near Track—Injuries to Persons on Track—Contributory Negligence of Child.

It was the duty of a motorman, on approaching a crowd of boys playing tag near the track, to check the speed of the car, so as to have it under control, or at least to drop the fender and give the usual signals.

A boy 8½ years of age playing tag near a street railroad track is not, as a matter of law, guilty of contributory negligence in failing to avoid an approaching car. (McFarland v. Elmira Water, Light & Ry. Co., 120 N. Y. Sup., 292.)

New York.—Injuries to Intending Passengers—Contributory Negligence.

In an action for injuries by being squeezed between two cars at a point where the tracks converged, it was not negligence for plaintiff, attempting to board one of the cars, to let a more infirm person board the car ahead of him. (Christensen v. Brooklyn Heights R. Co., 119 N. Y. Sup., 509.)

New York.—Injuries to Travelers—Care Required.

A traveler on a city street was entitled to watch the way in front of him and avoid manholes in the street and their covers in passing an obstructing team, and when he was confronted by a car approaching in front at a speed violating the ordinances of the city he was not bound to clear the track under all circumstances, but was only required to exercise reasonable care.—(Burns v. New York & L. I. Traction Co., 123 N. Y. Suppl., 474.)

Texas.—Negligence—Personal Injuries—Instructions—Injury to Passenger Alighting from Car—Negligence—Questions for Jury.

The court is never justified in charging the jury that certain enumerated acts would be negligence as a matter of law, or, in case they find such acts to have been committed, to find for plaintiff, unless such acts are prohibited by statute or are so lacking in ordinary prudence that reasonable minds could not differ as to the quality of the acts.

In a street car passenger's action for injuries, where it appeared that plaintiff, a cripple, while attempting to alight, handed one of his crutches to defendant's conductor, it could not be said as a matter of law that the conductor in giving the starting signal might not, as a person of ordinary prudence, have believed that in the interval elapsing between the giving of the signal and the starting of the car plaintiff would have time to steady himself on the ground, and that the conductor would have had time to pass the crutch to him.—(Galveston Electric Co. v. Dobbert, 127 S. W. Rep., 838.)

Washington.—Collisions—Obligation of Pedestrians—Use of Streets—Right of Pedestrians—Crossings—Duty of Pedestrians.

One approaching a street car crossing with knowledge of the situation must use ordinary care, and cannot heedlessly cross the track and throw the entire burden of his safety on the motorman on an approaching car.

The rights of pedestrians and of a street railroad are equal and their duties are reciprocal, and neither has the exclusive right of way, but each must have due regard to the rights of the other.

The rule that the failure of a pedestrian to look and listen before crossing a street car track is not negligence per se does not mean that one can carelessly cross the track without using his senses for his protection, and in determining the question of contributory negligence the failure to look and listen is a fact to be considered.

A pedestrian, knowing the situation, approached a street car crossing at night. She saw two cars on the west side of the crossing, and started across, and, when a little out from the crossing, she looked east, and saw no car, and went along. A car from the east struck her. The car was running 10 miles an hour. From the curb to the first rail was 10 ft. The car was lighted and had a headlight. Held, that she was guilty of contributory negligence as a matter of law.—(Hellieson v. Seattle Electric Co., 105 Pac. Rep., 458.)

News of Electric Railways

Service Begun by Pennsylvania Railroad from New York to Long Island.

Regular service was begun on Sept. 8, 1910, over the Long Island Railroad from the terminal of the Pennsylvania Railroad at Seventh Avenue and Thirty-third Street, New York. The first train was run at 3:30 a. m., and carried a number of officials of the Long Island Railroad and the Pennsylvania Railroad. An official statement by the companies shows that on the main line, where it took 44 minutes from Seventh Avenue and Thirty-third Street, New York, to Jamaica, it requires only 19 minutes by the tunnel from the terminal. To Hollis, there is a saving of 25 minutes; to Floral Park, 24 minutes; to Mineola, 29 minutes; to Garden City, 19 minutes; to Hempstead, 23 minutes; to Hicksville, 18 minutes; to Farmingdale, 18 minutes; to Brentonwood, 25 minutes; to Ronkonkoma, 25 minutes; to Riverhead, 25 minutes; to Greenport, 40 minutes.

On the Montauk division the saving in time runs all the way from 15 minutes to 30 minutes. On the main line there are 14 trains eastward in the forenoon and 34 trains at short intervals in the afternoon. On the Montauk line, 22 morning trains are provided and 36 afternoon and night trains. Fourteen trains are run from the terminal to Oyster Bay from 12:10 a. m. to 10:10 p. m.

The terminal station of the Pennsylvania Railroad in New York was described and illustrated in the ELECTRIC RAILWAY JOURNAL of April 9, 1910, page 656.

Following the first day's operation of trains to the Pennsylvania Railroad terminal, Ralph Peters, president of the Long Island Railroad, issued a statement in which he said in part:

"During the first 24 hours the Long Island Railroad operated 196 trains in and out of the Pennsylvania Station, and it is estimated that about 35,000 people were carried.

"Taking it all together, the results for the first day of such a vast and important operation were quite satisfactory. There were no personal injuries to passengers or employes. There was considerable congestion at the Pennsylvania terminal ticket offices, caused by a misunderstanding of the public in connection with the honoring of tickets. This whole matter will be adjusted and straightened out within a few days. Additional facilities will also be available in the Pennsylvania station.

"The situation at Jamaica is very much congested and will be until the new terminal at that point is completed, and the management of the company can only do its best in handling the trains on time and without accident until the Jamaica facilities are completed. When that is done 75 per cent. of our present troubles will be wiped out."

Samuel Rea, vice president of the Pennsylvania Railroad, commenting upon the opening of the new Pennsylvania terminal, said:

"One important thing, however, remains undone, and that is, while the company has constructed the facilities for subway connections, the city has not yet provided these necessary rapid transit facilities to accommodate its own citizens, and the public arriving and departing from the new station. It is a matter of deep regret that the city's subway system, with proper connection, is not now completed and ready to perform this necessary function. Coupled, however, with this regret is the expectation that the Mayor of the city and the Public Service Commission will promptly have some progress made in this regard.

"Such extensions, which would serve the West Side south of Forty-second Street, under Seventh Avenue, into the borough of Brooklyn, and on the East Side, north of Forty-second Street into the Bronx, would complete the present subway system and provide service on the East and West Sides of Manhattan, or, in effect, complete two tri-borough routes. They would prove self-sustaining from the start, and their construction would, therefore, not restrict the action of the city and the Public Service Commission in projecting and perfecting any other required routes.

"The company, in expressing this opinion, does so not from a selfish interest, but as a large taxpayer and property holder in the city, and as representing the sentiments of its patrons and citizens in all boroughs of the city for increased rapid transit facilities."

Situation in Detroit.

Proctor Owens, a so-called political dark horse, has been nominated for Mayor of Detroit by the Republicans. Mr. Owens' opponent for the nomination was Philip Breitmeyer, the present Mayor. The following statement made by Mr. Owens after it had been established beyond a doubt that he had received the nomination indicates his position in regard to the street railway issue:

"Municipal ownership will be one of the foremost planks in my platform in my effort to be Mayor of this city. I believe it is the only way to solve the street railway problem, and I will support it to the best of my ability if I am afforded the opportunity. I am for municipal ownership, first, last and all the time. It has worked wonders with our lighting and water supply. The street railway proposition must be settled, and I will give the voters every bit of energy I possess in bringing about its settlement."

Mr. Owens was born in Kentucky in 1860, and attended the University of Missouri, Northwestern University of Ohio and the University of Michigan. Subsequently he attended the Detroit College of Law and was admitted to the bar in 1901. He ran for prosecutor on the prohibition ticket two years ago and last year for circuit judge in the primaries, but was defeated in both campaigns. Several years ago he was defeated for the State Legislature.

Mayor Breitmeyer has announced that he will retire from public life. He is even quoted as favoring Mr. Thompson, the Democratic nominee for Mayor. "He was a good Mayor before," Mr. Breitmeyer is reported to have said, "and he will be a good Mayor again. We will just have to elect Mr. Thompson now—that's all."

The Detroit *News* says that members of the sub-committee on franchises of the Committee of Fifty have declared themselves in favor of suing Frederick T. Barcroft to secure certain papers in connection with his appraisal of the property of the Detroit United Railway. The *News* quotes Alderman Zink, who was defeated for renomination on Sept. 6, 1910, as saying:

"We bought this appraisal and paid a lot of money for it. The people will not believe that the Council did right. They want to know about this thing that we bought. We cannot explain and it defeated a lot of good men at the polls yesterday."

The *News* also quotes Frederick W. Walker, who succeeded Mr. Barcroft as engineer of the Committee of Fifty, as follows:

"Mr. Barcroft is not an engineer. I understand he is not a graduate of any institution. Understand me, it is merely my opinion from the work I have done on this appraisal and Mr. Barcroft's own testimony at Cleveland, that he is not an engineer. I have no right to say that he is not. For instance, Mr. Barcroft said that the engines in the power plants are obsolete. I do not agree with him, although that, of course, is a matter of our own opinion. However, Mr. Barcroft, after depreciating the engines according to his opinion does not depreciate the foundations which are built for the specific machines and are worthless except for the life of the engines. I found that the boilers in stations A and B were purchased at about the same time. In A they had had a life of 10½ years, in B only 9 1-3 years. But Mr. Barcroft depreciated the newer engines 69.6 per cent, and the older ones, of the same type and manufacture, 66 per cent."

Trackless Trolley Line in California.—The Laurel Cañon Utilities Company has placed a trackless trolley system in operation between the terminus of the Los Angeles Pacific Railway, Los Angeles, Cal., at the mouth of Laurel Cañon and Bungalowland, a distance of about 1½ miles.

New Road Opened in Washington.—The Twin City Light & Traction Company, Centralia, Wash., has placed

in operation the electric railway which it completed recently in this city. The company has secured a franchise in Chehalis, and has awarded a contract for the construction of an electric railway to connect Centralia and Chehalis, which are 5 miles distant.

New Road Opened in California.—The Stockton Terminal & Eastern Railroad, Stockton, Cal., which has an electric railway under construction between Stockton and Jenny Lind, 27 miles distant, has completed the line from Stockton to Linden and has established service temporarily between these places with gasoline motor cars.

Louisville & Nashville Railroad Experimenting with Motor Car.—The Louisville & Nashville Railroad is experimenting with a new motor car for suburban service which was designed by Theodore H. Curtis, superintendent of machinery of the company. The tests are being made with a view to adopting cars of the new type for use in competition with the electric railways.

Petition for Investigation of Boston Elevated Railway.—The League of Street Car Users of Boston has petitioned the Railroad Commission of Massachusetts to make "a complete investigation of the conduct and management of the Boston Elevated Railway," in view of the recent request of the company for additional rights and privileges which the league terms "asking the power to secure a monopoly of street railway transportation service in the metropolitan district."

Strike of Substation Employees.—The employees in the substations which supply current to the lines of the Los Angeles-Pacific Company, Los Angeles, Cal., between that city and the beaches, went on strike on Aug. 29, 1910, because the company had not replied at once to their request for an increase in wages from $85 to $90 a month. R. P. Sherman, general manager of the company, gave the men the alternative of returning to work at once pending the investigation of the request for an increase in wages, or having their places filled. The men returned to work.

Rehabilitation Expenditures of Chicago Railways Company.—Up to Sept. 1, 1910, the Chicago (Ill.) Railways Company had expended $26,000,000 in the rehabilitation of its properties. This amount has been expended under the supervision of a board of supervising engineers consisting of three members, (1) in the reconstruction of approximately 200 miles of track laid on a substructure of concrete, in which the ties and the lower half of the 129-pound rails are entirely embedded; (2) in the purchase of 1,000 cars; (3) in the construction of a dozen new buildings, viz., carhouses, sub-stations, machine shops, paint shops, etc.; (4) in the laying of hundreds of miles of copper cable and trolley wire; (5) in the laying of hundreds of miles of underground conduits; (6) in the resetting of hundreds of poles and the erection of hundreds of new ones; (7) in the construction of tunnels.

San Francisco Municipal Railway.—City Attorney Long, of San Francisco, has filed a demurrer to the action brought by the United Railroads of San Francisco in the United States Circuit Court at that place to prevent the construction of a municipal railway on Geary Street, San Francisco. Mr. Long entered a general denial and introduced an affidavit by Mayor McCarthy, in which the Mayor denies that the Central Railroad ever was engaged in operating a railway on Geary Street, between Stockton Street and Taylor Street. The Mayor says the city intends to construct a street railway on Geary Street from Kearny Street to Point Lobos Avenue; to Tenth Avenue and Fulton Street, and on Point Lobos Avenue to a convenient terminal near the ocean. The Mayor denies that the city intends to construct a street railway on Market Street from East Street to Geary Street, in the construction of which the city would attempt to use any tracks, poles or wires of the United Railroads, without due compensation. According to the Mayor, the city intends to endeavor to agree with the company regarding the joint use of the tracks on Point Lobos Avenue from Thirty-third Avenue to Fortieth Avenue, but if such an arrangement cannot be made the city will construct the railway over a route to be determined upon, which will not interfere with the property of the United Railroads. It is denied that any franchise was accepted by the United Railroads or its predecessors with the understanding that the city would not become a competitor with the company.

Financial and Corporate

New York Stock and Money Market

September 13, 1910.

The volume of sales in the stock market to-day exceeded 400,000 shares. Not many months ago such a day would have been considered extremely dull. The last week has been one of the dullest that Wall Street has ever experienced, and the improvement to-day was very welcome. The fact that prices advanced with activity indicated a revival in buying interest. There has been no reason for the recent stagnation except lack of public interest. There have been no happenings that have been specifically depressing.

The money market continues to be easy, with call rates especially reasonable. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 4½ to 4⅝ per cent.

Other Markets

In the Philadelphia market Rapid Transit has been fairly active and there has been some trading in Union Traction. In each of these issues prices have been a trifle stronger. Other tractions have been neglected.

In Boston there has been little dealing in traction shares. Massachusetts Electric has been less active than during recent weeks. Prices for these issues have remained about the same. Boston Elevated continues to sell occasionally at about 126.

Tractions have been almost entirely absent from the Chicago trading during the past week. Railways Series 2 has now and then been sold and the price is constantly lower. The last sale to-day was at 12¼.

There has been little trading in traction shares in the Baltimore market during the past week, but activity in the bonds of the United Railways has continued. Prices remain unchanged.

Quotations of various traction securities as compared with last week follow:

	Sept. 6	Sept. 13
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	*50¼	50¼
Aurora, Elgin & Chicago Railroad (preferred)	85	85
Boston Elevated Railway	a126½	126½
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	a10	10
Boston & Worcester Electric Companies (preferred)	a37	37
Brooklyn Rapid Transit Company	74	74½
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82	82⅜
Capital Traction Company, Washington	*131	*131
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a70
Chicago Railways, ptcptg., ctf. 2	a16½	a11½
Chicago Railways, ptcptg., 3	a8	a8½
Chicago Railways, ptcptg., ctf. 4	a5½	a4½
Cleveland Railways	*91½	91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a103	a104
Detroit United Railways	*45	*45
General Electric Company	140⅞	144
Georgia Railway & Electric Company (common)	109	a110½
Georgia Railway & Electric Company (preferred)	*86	*86
Interborough-Metropolitan Company (common)	18⅝	8⅞
Interborough-Metropolitan Company (preferred)	49⅜	50¾
Interborough-Metropolitan Company (4½s)	79¼	79½
Kansas City Railway & Light Company (common)	a25	a25
Kansas City Railway & Light Company (preferred)	79½	a79½
Manhattan Railway	133	131
Massachusetts Electric Companies (common)	a18	a18
Massachusetts Electric Companies (preferred)	a81¾	81¾
Metropolitan West Side, Chicago (common)	a20	20
Metropolitan West Side, Chicago (preferred)	62	62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68	67
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a44¼	a44
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	17½	a18¼
Philadelphia Traction Company	a84	82¼
Public Service Corporation, 5 per cent col. notes	a95	95
Public Service Corporation, ctfs.	a101	101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	60¾	60¾
Third Avenue Railroad, New York	8⅞	9
Toledo Railways & Light Company	*7	*7
Twin City Rapid Transit, Minneapolis (common)	108	110½
Union Traction Company, Philadelphia	a49	a43½
United Rys. & Electric Company, Baltimore	a15	a15
United Rys. Inv. Co. (common)	*31	*31
United Rys. Inv. Co. (preferred)	54	55¼
Washington Ry. & Electric Company (common)	*32⅞	*32⅞
Washington Ry. & Electric Company (preferred)	*89½	*89½
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*100	a100¾
Westinghouse Elec. & Mfg. Company	59	61
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last sale.

Annual Report of the Interborough Rapid Transit Company.

Gross operating revenue of the Interborough Rapid Transit Company of New York in the year ended June 30, 1910, was $28,987,648, a gain of 9.28 per cent over the preceding year. The subway division increased its gross earnings 14.28 per cent, while the Manhattan Railway (elevated) division gained 5.03 per cent. Operating expenses were $11,013,143, an increase of $265,700, or 2.47 per cent, over the previous year, the result largely of increased wages. The expenses of the subway division increased 4.59 per cent and of the elevated division 0.92 per cent. Net operating revenue was $17,974,505, an increase of $2,197,554, or 13.93 per cent. The gain in net revenue was 20.05 per cent for the subway division and 8.17 per cent for the elevated division. In the following comparison for two years the results from operations for the fiscal year ended June 30, 1909, were stated by the company as nearly as possible in conformity with the rules of the uniform system of accounts effective on July 1, 1909:

Year ended June 30, 1910.	Manhattan Ry. Division.	Subway Division.	1910 Total.	1909 Total.
Revenue from transportation	$14,723,223	$13,443,805	$28,167,028	$25,764,892
Other street railway operating revenue	331,919	488,701	820,620	759,502
Gross operating revenue.	$15,055,142	$13,932,506	$28,987,648	$26,524,394
Operating expenses:				
Maintenance of way and structures	$849,626	$664,444	$1,514,070	$1,442,641
Maintenance of equipment	881,566	792,221	1,673,787	1,624,812
Traffic	3,079	1,130	4,209	
Transportation expenses.	3,887,832	2,849,473	6,737,305	6,479,081
General expenses	634,590	449,182	1,083,772	1,200,909
Total operating expenses.	$6,256,693	$4,756,450	$11,013,143	$10,747,443
Net operating revenue..	$8,798,449	$9,176,056	$17,974,505	$15,776,951
Taxes	1,525,142	225,280	1,750,422	1,799,807
Income from operation..	$7,273,307	$8,950,776	$16,224,083	$13,977,144
Non-operating income ..	25,635	385,389	*411,024	1,001,775
Gross income	$7,298,942	$9,336,165	$16,635,107	$14,978,919
Total income deductions.	$5,857,754	$4,695,206	$10,552,960	$10,389,096
Net corporate income...	$1,441,188	$4,640,959	$6,082,147	$4,589,823
Dividends on Interborough Rapid Transit Co. stock (9 per cent)		3,150,000	3,150,000	3,150,000
Surplus	$1,441,188	$1,490,959	$2,932,147	$1,439,823
Percent expenses to earnings:				
Excluding taxes	41.56	34.14	37.99	40.52
Including taxes	51.69	35.75	44.03	47.30
Passengers carried	293,826,280	268,962,115	562,788,395	514,680,342
Daily average passengers carried	805,004	736,882	1,541,886	1,410,083

* Decrease in non-operating income is largely due to the policy inaugurated July 1, 1909, of not crediting to income the interest on advances for construction of the Belmont tunnel.

Theodore P. Shonts, the president, states in his report:

"The total amount of taxes was $1,750.422, as compared with $1,799,807 last year, a decrease of $49,385, or 2.74 per cent, the result of an increase on the subway division of 238.28 per cent, and a decrease on the Manhattan division of 12.01 per cent. This increase in subway division taxes is due to the policy inaugurated July 1, 1909, of writing off from earnings an amount sufficient to meet the State tax upon gross earnings of the subway division and the State tax on the company's capital stock. These taxes were paid under protest and are now in litigation. The decrease in the taxes of the Manhattan division is the result of a decision of the court of appeals confirming the claim that the company is entitled to the benefits of equalization in the matter of the special franchise taxes.

"The surplus over dividends of 9 per cent on the capital stock was $2,932,147 as compared with $1,439,823 last year, an increase of $1,492,324, or 103.64 per cent.

"The percentage of operating expenses to gross operating revenue was 37.99 per cent, as compared with 40.52 per cent last year, a decrease of 2.53 per cent, the result of a decrease on the subway division of 3.16 per cent, and on the Manhattan division of 1.69 per cent.

"The number of passengers carried was 562,788,395, as compared with 514,680,342 last year, an increase of 48,108.053, or 9.35 per cent, the result of a gain on the subway division of 30,531,969 or 12.81 per cent, and on the Manhattan division of 17,576,084, or 6.36 per cent. The increase in the number of passengers carried during the year was distributed among practically all stations of both the subway and Manhattan divisions; the few exceptions were instances where the decreases were occasioned by local conditions.

"During the past year your properties have been kept unusually free from fire and, as a consequence, your insurance shows a decreasing cost during a period of general advancement of insurance rates throughout the country.

"Precautions and safeguards against fire have been increased on all your properties. Rigorous inspections are continuously made and systematic fire drills of employees held semi-monthly at every yard and storehouse. The watchman service has been extended and is being kept at its highest efficiency, and additional alarms have been installed, with direct connection with fire headquarters.

"Elaborate automatic sprinkler systems are now installed at your 137th Street and Broadway yard (subway division), and are nearing completion at your 159th street and Eighth Avenue yard (Manhattan division). These sprinklers, installed at an expense of over $100,000, and operating under high pressure, are capable of deluging these yards and, in the opinion of the underwriters, make a large fire at either of these points practically impossible.

"A number of improvements were also made in your shops and storehouses during the year, resulting in a 10 per cent reduction in the cost of the insurance covering them, the saving in premium amounting to more than enough to pay the cost of making the improvements.

"As a result of changes in the organization inaugurated at the beginning of last year for the purpose of securing greater efficiency and economy in the transaction of the company's business, the general expenses of your company for the year ended June 30, 1910, decreased $117,137, the result of decreases in general office salaries and expenses, general law expenses, law expenses in connection with damages and other miscellaneous general expenses.

"In conformity with the established custom of your company in adopting promptly every known safety device in the operation of its trains, there was installed during the year in subway cars, both local and express, an electric signaling device for signaling to the motormen when all doors are closed. By the use of this device the closing of the last door automatically signals the motorman, indicating that the train is ready to proceed. Its installation and use have not only proved satisfactory in preventing accidents, but have resulted in a very material reduction in the length of station stops and a consequent decrease in train headway.

"In last year's annual report mention was made of the practicability of increasing the service by reducing the interval between trains through the introduction of speed control signals. These signals permit trains to operate safely through stations under closer headway and their operation at Ninety-sixth Street, where they were first installed, proved so successful that their installation was extended during the past year to include the express stations from Ninety-sixth Street to Brooklyn Bridge.

"For the purpose of facilitating the loading and unloading of passengers and reducing station stops, so as to secure a closer train headway and consequent increase in the service, center side doors are now being installed on all cars operated in the express service in the subway.

"The company some time ago installed an automatic recording instrument on the Second Avenue line of the Manhattan division and recently, owing to its satisfactory operation, arranged for the extension of its use over the entire system. This device provides a printed record for each motorman, indicating at the end of each trip the degree of economy exercised by him during the trip. The operation of the device is resulting in a considerable saving for the company by reducing the amount of electrical current consumed.

"As an incentive to individual effort a premium system has been inaugurated whereby motormen having the best record—i. e., those operating their trains in the most economical manner—receive a substantial bonus at the end of each month. The interest displayed by the motormen in their efforts to make improved records is very marked, and the economies effected and increased efficiency secured by the introduction of the device are very gratifying.

"The following statement shows the results of the adjustment of claims:

	1910.	1909.	Increase.	Per cent.
Claim, suits and judgments	$214,198	$222,088	*$7,890	3.5
Expenses	107,411	105,417	1,994	1.9

* Decrease.

"With an increase of 48,108,053 in the number of passengers carried, the aggregate of verdicts rendered against the company during the year was $27,372. In the supreme court, the plaintiffs recovered in only 19 per cent of the cases tried and in all of the courts the plaintiffs' recoveries were 30 per cent. This was a reduction of over 6 per cent compared with last year. The percentage of verdicts in favor of the company in all the courts was 42 per cent, the same as last year.

"Notwithstanding the increase in the number of passengers carried, there were only six more actions brought in the supreme court, although, as last year, there was an increase in the number of petty actions in the lower courts. Only $19,998 in judgments are pending on appeal.

"The cost of damage settlements and judgments amounted to 0.74 per cent and the legal and claim department expenses to 0.37 per cent of the gross operating revenue.

"With the approval of Mayor Gaynor and the Public Service Commission, your company successfully advocated before last winter's Legislature a bill intended to pave the way for the general third tracking and extensions of the Manhattan Railway system by avoiding legal delays in condemnation proceedings and facilitating immediate construction of the same when completely authorized, in accordance with our plan. Similar efforts resulted in the enactment of a measure allowing a transfer, subject to permission of the commission and the Mayor, of the Belmont tunnel property to another railroad corporation. Governor Hughes signed both of these bills.

"The Federal excise tax on corporations imposed under the authority of an act of Congress passed at the session of 1909 amounted to about $60,796 for the year ending Dec. 31, 1909; and, because of the large penalties provided for, that amount has been paid by the company, under protest. In January of this year an equitable action was brought by one of the company's stockholders to enjoin the company and its directors from paying this tax, on the ground that the act was contrary to certain provisions of the constitution of the United States. The pleadings, besides raising the general constitutional questions contained in other test cases, present the peculiar conditions under which this company operates the municipally-owned subway, including its exemption from taxation. The action, with others of a similar nature, is now before the United States supreme court, and argument will be heard some time in the fall.

"The proceeding brought by this company against the comptroller of the State of New York to review his action in assessing this company for the State franchise tax measured by a percentage upon subway earnings and upon dividends paid in excess of 4 per cent was argued before the appellate division of the New York supreme court in March, 1910, and a decision was handed down whereby the comptroller's assessment for excess dividend taxes was annulled. This would mean the cancellation and credit to the company of taxes already paid to the amount of $186,375, and a saving in future taxes of $52,500 a year. The State has appealed to the court of appeals from that decision, and when the matter is finally determined it is probable that an even greater reduction will be obtained.

"The long litigation over the special franchise taxes of the Manhattan Railway Company is about concluded. As a result of the trial of these proceedings, the tax for the year 1909 was reduced by the sum of $139,917. This species of taxation with respect to the elevated lines is particularly onerous, and it is confidently expected that the large assessments made by the State Board of Tax Commissioners will be further reduced upon appeal.

"Practically all of the litigation over the special franchise assessments upon subsidiary and affiliated companies has been concluded, and substantial reductions have been secured.

"Immediately upon the passage of the amendments to the rapid transit act, near the close of the legislative session of 1909, in view of the urgent need of additional rapid transit facilities, and in response to a request from the Public Service Commission in reply to an earlier proposal for permission to extend your lines, your company prepared and forwarded to that body under date of June 30, 1909, the most favorable proposition for the construction and operation of new subway and elevated extensions that it was justified in making under the act as amended. This proposition, which constituted the logical extensions of the present subway and elevated systems, owing solely to the fact that the city was without funds for subway construction, was predicated entirely upon the use of private capital, the title to the new subways to vest in the city in conformity with contract No. 1. On Aug. 27, 1909, a reply was received from the commission, suggesting certain changes and modifications in the routes proposed in our application, which suggestions were complied with as far as the interests of your company would permit, the principal change being the substitution of Madison Avenue for the Lexington and Third Avenue routes. On Nov. 24, 1909, this amended proposal was rejected by the Public Service Commission. In the same communication, however, your company was invited to submit new proposals involving further modifications, particularly with respect to the separation of the two propositions for subway and elevated improvements.

"In the meantime, the situation in regard to the construction of new subways had changed very materially. City officers had been elected on a platform pledged to city-built subways, and by the passage of a constitutional amendment the city had in sight funds with which to construct its own subways. It could borrow money for this purpose, and indicated an intention to do so, at from 1¾ per cent to 2 per cent less than private capital could be secured for, which difference in interest charges alone made the use of private capital impossible. But, in order to meet the views of the Public Service Commission, as far as possible, and with a view to bringing about the earliest practicable relief from the present overcrowded condition, your company on June 10, 1910, addressed a communication to that body offering to carry out the elevated improvements independently of subway construction and to put the Belmont tunnel in operation as a part of the present subway system, with free transfers to all existing subway lines. Subsequently, it having been tentatively considered in various conferences with the commission that private capital could not be used in competition with city money, and William J. Gaynor, Mayor, having expressed a desire for the company's views on subway construction, they were furnished him in a letter dated July 5, 1910. They were also simultaneously furnished to the Public Service Commission in response to a similar request from William R. Willcox, chairman.

"The conclusions embodied in the proposal now before the commission were arrived at after a very careful study of the transit needs of Greater New York. They are based on long experience in determining the requirements of the traveling public and were compiled in a spirit of fairness to all concerned, i. e., the city, the passenger, and the company. These logical extensions of the existing subway will not only double its present carrying capacity, but will enable passengers to travel directly to and from all important centers without transferring. At the same time, as construction progresses, each new section can in turn be joined to existing lines making the additional mileage immediately available. For example, the Pennsylvania Railroad terminal can be connected with the West Side subway at Forty-second Street in 18 months; the Bronx extensions can be completed in about the same time, while the Brooklyn extensions can be placed in operation in 15 months, and the Belmont tunnel in three months.

"As to the use of city money versus private capital, there can be no difference of opinion. Inasmuch as the city receives all of the profits for the first five years, and shares in the profits equally with the company thereafter, the saving of over $1,000,000 per annum in interest charges alone by the use of city money illustrates as nothing else can that the use of private capital would be an economic waste in which the city and the fare-payers would be equal losers with your company. Similarly, the establishment of a universal 5-cent subway fare, as against a 10-cent fare between two independent lines, is equally conclusive proof of the wisdom of extending the present system."

Additions and betterments chargeable to capital account for the year ended June 30, 1910, aggregated $1,295,033 for the Manhattan division and $3,031,302 for the subway division.

Receipts of the voluntary relief association for the year ended June 30, 1910, were $80,752, and disbursements were $69,448. During the year there were 76 deaths. The total membership at the close of the year was 5,687. From the dates on which two recreation rooms were opened, in March, 1910, to the close of the fiscal year over 95,000 luncheons were served in the rooms.

Duluth-Superior Traction Company, Duluth, Minn.—A quarterly dividend of 1¼ per cent has been declared on the common stock of the Duluth-Superior Traction Company payable on Oct. 1, 1910. This dividend compares with 1 per cent paid quarterly from October, 1909, to July, 1910, inclusive.

El Paso (Tex.) Electric Railway.—The El Paso Electric Railway has filed with the Secretary of State of Texas a certificate of the increase in its capital stock from $1,500,000 to $2,500,000.

Greenville (S. C.) Traction Company.—It is stated that a controlling interest in the Greenville Traction Company, which controls the Greenville Gas & Electric Company, has been secured by the Southern Power Company, Charlotte, N. C.

Mattoon (Ill.) City Railway.—The Mattoon City Railway has filed at Springfield, Ill., a certificate changing its name to the Central Illinois Public Service Company. The company has canceled $160,000 of refunding and extension mortgage bonds of 1906, which were due in 1936, which leaves outstanding $300,000 of first mortgage 5 per cent bonds.

Ocean Shore Railway, San Francisco, Cal.—At the hearing before United States District Judge Van Fleet on Sept. 6, 1910, to determine the amount of liens against the company that should have priority over the bonds, the attorney for the receiver of the company filed a report showing that the receipts of the company between Dec. 7, 1909, and July 31, 1910, were $116,689 and that the expenditures were $204,872. The matter was continued until Sept. 10, 1910.

Philadelphia (Pa.) Rapid Transit Company.—A meeting of the directors of the Philadelphia Rapid Transit Company was held on Sept. 7, 1910. Following the meeting Charles O. Kruger, president of the company, said: "No changes will be made in the board. The two directors whose terms expire, Mr. Loeb and Mr. Phipps, have declared that they will continue to serve if re-elected. The ballot to be submitted at the annual meeting will contain, therefore, no new names." The annual report of the company will be presented at the meeting of the stockholders on Sept. 21, 1910.

Dividends Declared.

Interborough Rapid Transit Company, New York, N. Y., quarterly, 2¼ per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Houghton County Traction Company, Houghton, Mich., semi-annual, $3 per share, preferred; semi-annual, $2.50 per share, common.

Louisville (Ky.) Traction Company, quarterly, 2½ per cent, preferred; quarterly, 1 per cent, common.

American Railways, Philadelphia, Pa., quarterly, 1½ per cent.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

El Paso (Tex.) Electric Company, 2 per cent, common (No. 2).

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, three-quarters of 1 per cent.

Portland Railway Light & Power Company, Portland, Ore., quarterly, 1¼ per cent, preferred.

South Side Elevated Railroad, Chicago, Ill., quarterly, one-half of 1 per cent.

Stark Electric Railroad, Alliance, Ohio, quarterly, three-quarters of 1 per cent.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

Traffic and Transportation

Connecticut Company Accepts Finding of Arbitrators

The Connecticut Company, New Haven, Conn., in acknowledging receipt of the report of the board of arbitration in the matter of the wages of its employees as concurred in by Judge William S. Case and David E. Fitzgerald and receipt of the minority report filed by Clarence Deming, mention of both of which was made in the ELECTRIC RAILWAY JOURNAL of Sept. 10, 1910, page 416, says that it will abide by the findings of the majority of the arbitrators. The company says:

"In accordance with the articles of agreement under which the arbitration has been conducted a decision of a majority of the board is binding upon both parties, and we shall, therefore, acquiesce in the findings agreed upon by the first two named.

"The rates of pay decided upon will be put into effect at once, and employees will be paid on the prescribed basis from now on. The arbitration is retroactive to June 1, 1910, and as rapidly as possible the amounts due our employees will be computed and paid them. This operation, however, extending, as it does, over three months, will require a vast amount of clerical work, which cannot be completed in time for next week's payroll.

"We are disappointed that the board has not seen fit to support our contention as to what constitutes a fair rate of pay, but the decision will be acquiesced in cheerfully, and the employees will be treated exactly the same as if the decision had been arrived at by the company officers.

"We are pleased that the arbitrator appointed by the men has ruled in favor of the sliding scale, whereby employees longer in our service receive more pay than those who have just entered it as against the flat rate principle of equal pay for all men as contended for by the men themselves.

"We are also pleased that the men's arbitrator has ruled in favor of a differential whereby the employees of the larger divisions, whose work it has seemed to us is more arduous, receive more than the employees on the smaller divisions; also on the further point that our compensation for overtime is a fair one, which shall be continued."

Traffic on Northwestern Elevated Railroad.

The daily average number of passengers carried by the Northwestern Elevated Railroad, Chicago, Ill., for the year ended Aug. 31, 1910, arranged by months, follows:

	1909.	1908.
September	112,711	100,101
October	118,987	118,015
November	119,292	116,956
December	122,006	122,057
	1910.	**1909.**
January	117,860	111,801
February	122,332	115,419
March	124,208	116,153
April	121,739	117,584
May	118,938	112,023
June	121,173	110,988
July	115,972	103,506
August	119,605	104,790
Twelve months	119,574	113,667

Fender Ordinance in Trenton.—An ordinance has been introduced in the City Council of Trenton, N. J., to compel the electric railways which operate in Trenton to equip their cars with fenders to be approved by the Mayor.

New Transfer System in Pittsfield.—On Sept. 1, 1910, the Berkshire Street Railway, Pittsfield, Mass., adopted a new transfer system which makes it possible for passengers to ride anywhere within the limits of Pittsfield for a single fare.

Suits Threatened Against Overcrowding.—The city has served notice that it will institute immediately no less than 100 suits against the Pittsburgh (Pa.) Railways to compel it to observe the new ordinance prohibiting the overcrowding of cars.

Accidents in Pennsylvania.—The Railroad Commission of Pennsylvania reports that during July, 1910, 15 persons were killed and 41 persons were injured on the electric railways in the State. Three of those who were killed and 21 of those who were injured were trespassers.

Readjustment of Fares on Louisville & Eastern Railroad.—The Louisville & Eastern Railroad, Louisville, Ky., has established its fares on the basis of 2 cents a mile fixed in multiples of five, but has made no change in the rates for special monthly tickets, school tickets, and 25-trip and 50-trip books.

Complaint Against Fares in Pittsburgh.—A complaint has been filed against the Pittsburgh (Pa.) Railways with the State Railroad Commission in which it is alleged that the company refuses to issue transfers to and from West Carson Street, and that the fare of 10 cents for a continuous trip between points mentioned in the bill of complaint is excessive, unjust and unlawful and is a discrimination against persons employed in the mills and about the railroads on West Carson Street, who are unable to reside in the more healthful hill-top district of the South Side because of the excessive fares.

Extension of Hudson & Manhattan Railroad in Jersey.—The Hudson & Manhattan Railroad, which operates under the Hudson River from New York to New Jersey, has completed and placed in operation the extension of its line in Jersey City to Henderson Street, a distance of more than a mile. Only half a mile of line remains to be constructed to connect with the Pennsylvania Railroad and establish service over the line of that company to Newark. According to an official statement, the Pennsylvania Railroad will furnish 60 per cent of the equipment for the service to Newark and the Hudson & Manhattan Railroad will furnish 40 per cent.

Application for Further Suspension of Subway Order Denied.—The Public Service Commission of the First District of New York has denied an application made by the Interborough Rapid Transit Company for authority to extend its summer schedule in the subway until Oct. 1, 1910. The company obtained exemption from the order of April 5, 1910, which required that so far as was possible enough cars be run to provide just as many seats as passengers, and fixed the maximum headway during the non-rush hours in the daytime at 2½ minutes. The exemption was first made for 30 days from July 12, 1910, and later on it was extended to Sept. 5, 1910.

Protest Against Steam Railroad Milk Rates in Massachusetts.—At the recent hearing before the Railroad Commission of Massachusetts on the petition of the Boston Dairy Company, Whiting & Son and Hood & Son against the rates for transporting milk which have been established by the Boston & Maine Railroad and the Boston & Albany Railroad, it was suggested by the representative of one of the complainants that the commission recommend to the Legislature that the electric railways be permitted to carry interstate milk. For the Boston & Maine Railroad it was stated that 70 per cent of its milk business is interstate and 30 per cent intrastate. This company offered to furnish a detail statement which would show the cost of transporting milk over its lines since Aug. 1, 1910. W. P. Hall, chairman of the commission, explained that the commission is not empowered to compel electric railways to interchange cars.

Freight Service Between Philadelphia and Allentown.—The Lehigh Valley Transit Company, Allentown, Pa., has arranged with the Philadelphia (Pa.) Rapid Transit Company to establish freight service by electric railway on Oct. 1, 1910, between Philadelphia and Allentown and points in the Lehigh Valley. The service will be substantially the same as that conducted by the Lehigh Valley Transit Company over its entire system, which, as the company expresses it, is "express service at freight rates," except that the company makes no collections or deliveries. The freight rates of the Lehigh Valley Transit Company are identical with the rates of the steam railroads with a very few exceptions, such as in the case of milk, ice cream and furniture. A new freight station is being erected at Chestnut Hill, where the lines of the Lehigh Valley Transit Company connect with the lines of the Philadelphia Rapid Transit Company, and freight will be transferred here, as the difference in the gage of the tracks of the two companies prevents the operation of through cars. All other stations in Philadelphia and along the lines of the Lehigh Valley Transit Company were erected so as to permit the handling of express.

Personal Mention

Mr. W. H. Hitchcock has been appointed superintendent of transportation of the Wilmington & Philadelphia Traction Company, Wilmington, Del.

Mr. L. B. Wickersham, general manager of the United Railways, Portland, Ore., has been appointed chief engineer of the company, reporting to the president.

Mr. E. P. Shannon has been appointed assistant to Mr. John F. Stevens, president of the Oregon Electric Railway, United Railways and the Oregon Trunk Railway, Portland, Ore.

Mr. W. A. Rosen has resigned as auditor of the Interstate Railways and the United Power & Transportation Company, Philadelphia, Pa., and the companies controlled by them.

Mr. C. A. Coolidge, who was recently appointed general manager of the Oregon Electric Railway, Portland, Ore., has been appointed general manager of the United Railways, Portland, to succeed Mr. L. B. Wickersham.

Mr. Henry M. Richards, chairman of the executive committee of the Washington Water Power Company, Spokane, Wash., and formerly president of the company, was presented with a silver loving cup recently by the employees of the company as a token of esteem.

Mr. John P. Moore, formerly instructor in electrical railway engineering at the Pennsylvania State College, is again associated with Mr. Robert P. Woods, Indianapolis, Ind., consulting and constructing engineer. Mr. Moore is located at Roswell, N. M., and is engaged in extensive irrigation projects in the Southwest in the capacity of electrical engineer.

Mr. R. C. Taylor, whose resignation as superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind., was announced in the Electric Railway Journal of Sept. 10, 1910, has been appointed master mechanic of the Illinois Traction System, in charge of the shops of that company at Granite City, Ill., just outside of St. Louis.

Mr. Fred E. Fisher, general manager of the Joliet & Southern Traction Company, Joliet, Ill., and president of the Fisher Construction Company, has resigned from these companies to become special construction manager of the Illinois Traction Company's line between Morris and Joliet. On Sept. 7, 1910, the employees of the Joliet & Southern Traction Company surprised Mr. Fisher at his home in Joliet and presented him with a gold watch and chain as a token of esteem.

Mr. R. K. Kirkpatrick, has resigned as superintendent of the Kansas City & Westport Belt Railway, Kansas City, Mo., a short freight and passenger line controlled and operated by the Metropolitan Street Railway, Kansas City. Mr. Kirkpatrick became connected with the Metropolitan Street Railway in 1904. At first he did special work for the company, compiling city and county ordinances and franchises. Subsequently Mr. Kirkpatrick was appointed superintendent of the Kansas City & Westport Belt Railway. His work with this company was very successful. There were very few accidents, and the receipts from passengers and freight increased rapidly with only a small increase in operating expenses. Mr. Kirkpatrick practised law in Buffalo, N. Y., before he became connected with the Metropolitan Street Railway, Kansas City.

Mr. Charles L. Sykes, for three years assistant general passenger agent of the interurban electric railway operated between Fort Worth and Dallas by the Northern Texas Traction Company, Fort Worth, Tex., has been appointed general passenger agent of the Galveston-Houston Electric Railway, which will be placed in operation early in 1911. The Northern Texas Traction Company is controlled by Stone & Webster, Boston, Mass., and Mr. Sykes has been in the employ of Stone & Webster for six years. Since August, 1910, he has been touring the West and the East to study advertising methods used by electric railways. Mr. Sykes was secretary of the Fort Worth Ad Men's Club, which he represented recently at Omaha at the national meeting of advertising organizations. He will assume his

duties with the Galveston-Houston Electric Railway on Oct. 1, 1910.

Mr. N. J. Hullin, whose appointment as general superintendent of the railway department of the Sacramento Electric, Gas & Railway Company, Sacramento, Cal., was announced in the ELECTRIC RAILWAY JOURNAL of Sept. 3, 1910, began his business career at the forge in the shop of a shipsmith. For the last 26 years, however, he has been engaged in street and electric railway work. His first street railway work was as a road machinist with the Market Street Railway, San Francisco, Cal. He next became a repairer of cable grips with the Sutter Street Railway, San Francisco, Cal. For four years he acted as roadmaster of the Piedmont Railway, Oakland, Cal., and for 14 years was in charge of track construction and maintenance for the Sacramento Electric, Gas & Railway Company. In February, 1910, Mr. Hullin supervised the reconstruction of about 4 miles of line for the Power, Transit & Light Company, Bakersfield, Cal., and returned to Sacramento to accept the position of general superintendent of the railway department of the Sacramento Electric, Gas & Railway Company.

Sir J. Clifton Robinson, of London, celebrated on Aug. 30, 1910, the fiftieth anniversary of his connection with tramways construction. This date is coincident with the fiftieth anniversary of the existence of tramways in the United Kingdom, because on Aug. 30, 1860, Mr. George Francis Train opened the first British tramway at Birkenhead. With this work Sir Clifton Robinson, then a boy of 12 years, was associated in a minor capacity. Subsequently he joined the staff of Mr. Train and in 1866 accompanied him to America. Since that time Sir Clifton has taken a very active part in tramway construction and operation in many British cities, including Edinburgh, Liverpool, London and Brussels, as well as in the Irish cities of Cork and Dublin, and also in Los Angeles, Cal. He is perhaps best known in connection with the London United Tramways Company, the largest privately owned tramway system in Great Britain, which he promoted and managed for a number of years. This system is now a part of the tramway system belonging to the Underground Electric Railways Company, Ltd., with which Sir Clifton Robinson is identified as a director of the District Electric Railway and the Metropolitan Underground Railway of London.

Henry L. Doherty & Company, New York, N. Y., announce the incorporation of the Cities Service Company under the laws of Delaware, with an authorized capitalization of $50,000,000, to be divided into $30,000,000 of 6 per cent cumulative preferred stock and $20,000,000 of common stock. The common stock has been all issued and when the transfers for the issues of the subsidiary companies that will be first taken into the combine are made there will be about $5,000,000 at once put in use. Of the remainder there has been set aside to be used for corporate purposes, within the discretion of the board of directors, $500,000, which will leave a remainder of $14,500,000 of common stock in the treasury to be used for the acquirement of additional properties. It is announced that this holding company will take over as the basis of its organization the Denver Gas & Electric Company, the Empire District Electric Company and the Spokane Gas & Fuel Company. Henry L. Doherty & Company are to act as bankers and syndicate managers for the new company and will be paid for their services only in common stock. When the stocks of the Cities Service Company have been issued there will be outstanding: preferred, $8,779,650; common, $4,889,825. The balance of the securities are to be retained by the company to acquire additional properties. The Cities Service Company contemplates taking over a number of other properties in addition to those that have here been named. These include the Lincoln Gas & Electric Company, Lincoln, Neb., and the Knoxville Gas & Fuel Company, Knoxville, Tenn. The Montgomery Light & Water Power Company, the Meridian Light & Railway Company and several other properties will probably be eventually included. Henry L. Doherty will be president of the company. No bonds will be issued by the Cities Service Company, but the interest and principal of the underlying bonds of the subsidiary companies will be guaranteed by the Cities Service Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***St. Clair Traction Company, Belleville, Ill.**—Incorporated in Illinois to build an electric railway from Belleville to a point in the southeastern part of St. Clair County. Capital stock, $2,500. Headquarters, Belleville. Directors: Edward L. Thomas, David O. Thomas, C. A. Heinzelman, L. D. Turner, Jr., and William A. Twenhoefel, all of Belleville.

***Suffern (N. Y.) Railway.**—Incorporated in New York to build a street railway in Suffern. Capital stock, $50,000. Incorporators: W. Barbour, S. D. Brewster, New York, and H. H. Parmlee, Paterson, N. J.

***Montrose & State Line Railroad Company, Montrose, Pa.**—Chartered in Pennsylvania to build a 15-mile railway from Montrose to the New York and Pennsylvania State line. Capital stock, $150,000. Incorporators: H. E. Paine, president; F. H. Widmyer, F. W. Ogden, W. J. Douglas, E. C. Randolph, T. P. Hamilton, Howard Fravel, H. J. Paine, Scranton, and R. L. Koehler, Dalton.

***Buckhannon, Weston & Glenville Electric Railway, Weston, W. Va.**—Incorporated in West Virginia to build an electric railway from Sago to Buckhannon, via Weston and Glenville. Incorporators: S. C. Rusmisell, L. H. Morrison, J. G. Hall, L. H. Treppett, W. H. Gaston, G. F. Day, C. E. White, D. O. B. Hall, of Buckhannon, and J. A. Crislip, Clarksburg.

FRANCHISES

Stockton, Cal.—The Central California Traction Company, San Francisco, has been granted a franchise by the City Council to extend its tracks over certain streets in Stockton.

Crainville, Ill.—The Egyptian Traction Company, Eldorado, has been granted a franchise by the Board of Trustees to build an electric railway in Crainville. This projected 100-mile railway will connect Mt. Vernon, Ind., and Murphysboro, Ill. T. E. K. Hixon, Eldorado, general manager. [E. R. J., July 30, '10.]

Peoria, Ill.—The Peoria & Galesburg Railway has asked the City Council for a franchise to use the tracks of the Peoria Terminal Railway of South Washington Street at Peoria, thereby giving it a line almost to the city limits, from which point it will start for Galesburg. S. F. Atwood, secretary. [E. R. J., Aug. 13, '10.]

Fort Wayne, Ind.—The Fort Wayne & Toledo Electric Railway has been granted a new franchise by the County Commissioners to build an electric railway through Allen County to Bryan, Ohio. This projected 44-mile railway will connect Fort Wayne and Maysville, Ind., and Hicksville, Bryan and Toledo, Ohio. R. T. Bastress, general manager. [E. R. J., Sept. 3, '10.]

Hammond, Ind.—The Indiana Northwestern Traction Company, Monticello, will ask the City Council for a new franchise to build its line in Hammond. A proposition will also be submitted to the County Commissioners to build a joint bridge over the Little Calumet River. This proposed line will connect Cedar Lake, Hammond, Crown Point and Chicago. Eugene Purtelle, 222 La Salle Street, Chicago, president. [E. R. J., July 2, '10.]

Indianapolis, Ind.—The Beech Grove Traction Company has been granted a franchise by the City Council to build a railway over several streets in Indianapolis. This projected railway will connect Beech Grove and Indianapolis. C. F. Smith, secretary. [E. R. J., April 16, '10.]

Mason City, Ia.—The Mason City & Clear Lake Railway has been voted a 25-year franchise by the City Council to build a belt line and possibly suburban extensions in Mason City. A similar franchise will be voted on for a line in Clear Lake on Sept. 16.

Baltimore, Md.—Messrs. Hiller & Heintzeman will apply to the City Council for a franchise to build a street railway to connect South and Southwest Baltimore. It is understood that the United Railways & Electric Company,

Baltimore, will construct and operate the proposed line if the franchise is passed.

Waltham, Mass.—The Boston & Western Railway, Boston, has asked the Board of Aldermen for a franchise for a line on Main Street.

Long Branch, N. J.—The Atlantic Coast Electric Railroad, Asbury Park, has been granted an extension of time on its franchise by the City Council for building an extension of its line in Long Branch.

Dayton, Ohio.—The Dayton Street Railway will apply to the City Council for a franchise to extend its Kammer Avenue line from its present terminus into the Westwood plant, in Dayton. The company has begun work on the eastern extension of its line, a distance of 1 mile.

Palestine, Tex.—George W. Burkett and associates have been granted a franchise by the city commissioners to build a street railway in Palestine. [E. R. J., June 25, '10.]

Springville, Utah.—Abel J. Evans and associates have been granted a franchise by the Council to build an electric railway in Springville. This is part of a plan to construct an electric railway from Salt Lake to Payson. Franchises have been granted from all the cities in Utah County except Provo and Spanish Fork. [E. R. J., Sept. 3, '10.]

Bellingham, Wash.—J. D. Crary, representing the Gray's Harbor Electric Company, Aberdeen, has applied to the City Council for a franchise to build a railway in Bellingham. Similar applications for franchises have been made by this company to the Councils in South Bend and Raymond.

Freewater, Wash.—The Walla Walla Valley Traction Company, Walla Walla, has been granted a franchise by the City Council to build an electric railway in Freewater.

Morgantown, W. Va.—The South Morgantown Traction Company will apply to the Council for a franchise to extend its railway in Morgantown. It is expected to extend this line to connect Fairmont and Morgantown.

TRACK AND ROADWAY

Phoenix, (Ariz.) Railway.—This company is building an extension of its line on Second Avenue in Phoenix which will be 2 miles long.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will build a line from Cypress to Anaheim.

Oakland (Cal.) Traction Company.—This company is said to have begun work on the extension of its Liese Avenue line in Allandale, and will continue the extension to the foothills of Fruitvale.

Pasadena (Cal.) Rapid Transit.—The directors of this company will vote on Oct. 18, 1910, to issue $3,000,000 of bonds for building an electric railway between Pasadena and Los Angeles on a direct line without grade crossings and promising a 12-minute service between the business centers of the two cities. Horace M. Dobbins, Pasadena, president. [E. R. J., Sept. 25, '09.]

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—This company, it is reported, will make extensive improvements on its lines. The continuation of double tracks from Tenth Street and P Street along Tenth Street and Y Street will soon be built, and the operation of a permanent line of cars on E Street is also being considered.

Peninsular Railway, San José, Cal.—This company, it is said, has begun work grading for the extension of its tracks to Dumbarton Bridge.

Vallejo & Northern Railways, Vallejo, Cal.—This company, which is building an electric railway to connect Vallejo, Cordelia, Suisum, Vacaville and Sacramento, announces that a branch will be built from Sacramento to Woodland. [E. R. J., Aug. 13, '10.]

***Golden, Col.**—It is stated that the same financial interests which are back of the North American Smelter & Mines Company, Golden, are planning to build an electric railway to connect the Golden smelter with the mines of Clear Creek and Gilpin Counties. It is possible that a through passenger service from Idaho Springs and Central City will be established, the tracks of the Denver Tramways being used between Golden and Denver. Surveys are being made.

Nezperce & Idaho Electric Railroad, Nezperce, Idaho.—This company, it is said, will soon build a 14-mile extension from Vollmer to Forest.

Decatur Southern Traction Company, Decatur, Ill.—At a meeting of the stockholders of this company held Aug. 31 the capital stock of the company was increased from $25,000 to $1,200,000. Arrangements were also made to begin work at once on the line from Decatur to Pana. H. C. Simmons, Virden, secretary. [E. R. J., July 30, 1910.]

DeKalb & Western Railway, DeKalb, Ill.—It is reported that this company has begun tracklaying near Lee Center on its proposed electric railway to connect Chicago and Rock Island. Newton Taylor is interested. [E. R. J., Dec. 25, '09.]

Aurora, Elgin & Chicago, Elgin, Ill.—It is reported that this company has completed surveys for a proposed extension of its line from the Des Plaines River to Hinsdale.

Illinois Western Interurban Railway, Quincy, Ill.—This company is said to have secured most of the right-of-way for its projected electric railway to connect Quincy, Mt. Sterling, Ripley, Rushville, Littleton, Macomb and Bushnell. A. J. Whitman is interested. [E. R. J., Aug. 13, '10.]

Galesburg & Rock Island Traction Company, Rock Island, Ill.—This company is said to have let the contract to the London Construction Company for building its proposed 41-mile electric railway to connect Galesburg and Rock Island. Warren C. McWhinney, president. [E. R. J., July 23, '10.]

Evansville, Mt. Carmel & Olney Electric Railway, Evansville, Ind.—M. A. Peeple, Goshen, Ind., vice-president of the Burnes Construction Company, Chicago, Ill., which has the contract for building this line, announced that work on the line would be commenced in two weeks. It is stated that $100,000 has been raised for the construction of the line. It will connect Mt. Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. [E. R. J., July 2, '10.]

Forest City & Mason City Railway, Forest City, Ia.—This company, recently incorporated, has completed surveys and is now securing rights of way for its proposed 30-mile railway to connect Forest City, Fertile and Mason City. C. N. Christopherson, Forest City, is interested. [E. R. J., July 2, '10.]

Covington, Big Bone & Carrollton Railroad, Covington, Ky.—This company has begun construction on its proposed 22-mile interurban railway to connect Carrollton, Covington, Crescent Springs, Big Bone, Ghent, Warsaw, Union, Florence, Erlanger, Ludlow and West Covington. M. J. Crouch is interested. [E. R. J., June 18, '10.]

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company, which has recently placed its line in operation, it is said, contemplates extending its railway eventually to connect Great Bend, Hankinson, Lidgerwood, Sisseton and Watertown. [E. R. J., March 26, '10.]

Gallatin Valley Electric Railway, Bozeman, Mont.—It is reported that this company will extend its line to Belgrade.

Virginia City, Southern Electric Railway, Virginia City, Mont.—This company is reported to have financed its project and is asking for bids for the grading of its proposed 12-mile railway between Alder and Virginia City. Karl Elling, president. [E. R. J., April 23, '10.]

Beatrice, Neb.—R. Iams, Clay Center, and associates are said to be at work on a plan to build a 200-mile interurban railway to connect Beatrice, Neb., and Wichita, Kan., via Greenleaf, Clay Center, Industry, Manchester, Salina, Lindsburg, McPherson and Halstead, Kan. Application for a charter will soon be made. [E. R. J., June 11, '10.]

Nebraska Traction & Power Company, Omaha, Neb.—This company, which has recently awarded the contract to the Baker Construction Company, Omaha, for building its proposed extension from Fremont to Norfolk, is said to be considering plans for constructing a branch line from Clarksburg to Madison.

Jersey Central Traction Company, Keyport, N. J.—This company, it is reported, will soon extend its railway to Elizabeth and Long Branch via Sea Bright.

*Mandan, N. D.—J. M. Ramsey, Norfolk, Ohio, is reported to be considering plans for building an electric railway to connect Mandan and Bismarck, N. D.

Citizens' Traction & Power Company, Albuquerque, N. M.—This company has decided to operate electric cars instead of gasoline motor cars over its proposed 2-mile street railway in Albuquerque. [E. R. J., July 16, '10.]

Dayton, Covington & Piqua Traction Company, Dayton, Ohio.—This company is reported to be considering plans to extend its line from Union to Versailles.

Muskogee (Okla.) Electric Traction Company.—This company has begun work on its Fair Ground extension, a distance of 2 miles.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—This company, recently incorporated to build electric railways in Oklahoma and Kansas, has formally organized by electing directors. The proposed lines will extend from Stillwater to Morreson, 14 miles; Stillwater to Perkins, 10 miles; Stillwater to Glencoe, Jennings and Sapulpa, 79 miles, and from Stillwater to Coyle, Langston and Guthrie, 45 miles. Directors: Harry L. Drullard and A. G. Lampke, New York City; H. K. Lytle, Brooklyn; Claude Powell, Ralph Sturgeon, G. W. Tucker and Lewis Lampke, Stillwater. [E. R. J., Aug. 20, '10.]

*London, Ont.—Press reports state that preliminary plans are being arranged for the construction of a 50-mile electric railway to connect London and Stratford.

*Aylmer & Port Burwell Electric Railway, St. Thomas, Ont.—Press reports state that John H. Teall, promoter of this proposed railway, has secured the necessary capital and that construction of the line is now a certainty.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company advises that during the next few months it will place contracts for building 5 miles of new track in Albany. R. E. Welch, Portland, general manager.

Berwick & Nescopeck Street Railway, Berwick, Pa.—This company has awarded the contract for the material for overhead work to the H. W. Johns-Manville Company, Philadelphia, for four to eight miles of new track. The contract for rails has been let to the Pennsylvania Steel Company. Work will soon begin on the line from the Nescopeck Station to the steel plant, and it is then intended to construct a loop through Berwick and West Berwick.

Du Bois Electric & Traction Company, Du Bois, Pa.—It is said that this company has agreed with the Mahoning Valley Traction Company to build through Big Run and connect the lines of the Du Bois Electric & Traction Company and the Mahoning Valley Traction Company at the Buffalo, Rochester & Pittsburgh Railroad station in Big Run.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—At a recent meeting of the directors of this company it was decided to proceed with the building of its proposed 23-mile railway to connect Lebanon and Ephrata, via Iowa, Reistville, Schaefferstown, Kleinfeltersville, Hopeland, Clay and Lincoln. George D. Krause, Lebanon, president. [E. R. J., Dec. 25, '10.]

*Meadville, Pa.—It is said that surveys have been made, and a portion of the right of way secured for a proposed electric railway which would enter Exposition Park and connect up several lines now in operation at various points between Conneaut Lake and Pittsburgh.

*North Wales, Pa.—Press reports state that surveyors have begun outlining the route for the proposed electric railway to connect the Philadelphia division of the Lehigh Valley Transit Company at North Wales and the Philadelphia & Western Railway at Villa Nova.

Scranton (Pa.) Railway.—This company is said to be considering the building of a 1-mile extension to the new Lackawanna yards at Hampton.

Amarillo (Tex.) Street Railway.—This company is said to have begun work on its 3-mile extension of its San Jacinto Heights line in Amarillo.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company announces that it intends to build a new car house, south of Agricultural Park, facing on Santa Barbara Avenue, in Los Angeles. The structure will be 1000 ft. x 250 ft., of concrete and steel construction.

San Diego (Cal.) Electric Railway.—This company, it is said, will erect a temporary machine shop at Arctic Street and E Street, San Diego, for the purpose of repairing cars while its new car shops are under construction. The structure will be of corrugated iron, 62 ft. x 90 ft.

Connecticut Company, New Haven, Conn.—This company is preparing to construct a new car house, to be located at State Street and Cedar Street, in New Haven.

Aurora, Elgin & Chicago Railway, Chicago, Ill.—This company will build a combination station and office building at Wheaton. The structure will be 120 ft. x 40 ft., and will be three stories high, built of brick with tile roof. It is expected to commence construction in the fall.

New York & North Shore Traction Company, Mineola, N. Y.—This company is said to be considering plans for erecting a car house on State Street and Leavitt Avenue, Flushing.

Aylmer & Port Burwell Electric Railway, St. Thomas, Ont.—It is said that this company has secured a tract of land abutting the creek at Port Burwell, upon which it expects to build the terminal of its line.

Portland, Eugene & Eastern Railway, Portland, Ore.—This company advises that during the next few months it will place contracts for building a new car house in Albany.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company is now building a new substation in Los Angeles to replace the old University substation, which is to be demolished.

Connecticut Company, Bridgeport, Conn.—This company, it is reported, will double the floor space at its present plant in Bridgeport, and add considerably to the capacity of the station. It will install two turbo-generators of 2100-kw capacity each in the new engine room.

Sterling-Moline Traction Company, Sterling, Ill.—This company is said to be considering plans for building a power plant and dam on the Rock River at Lyndon. A. Van Petten, Stirling, general manager.

Rochester Railway & Light Company, Rochester, N. Y.—This company has been awarded the contract for supplying power for the Brighton pumping station in Rochester.

Portland Railway Light & Power Company, Portland, Ore.—This company has begun work on the superstructure of its auxiliary power plant at the foot of East Lincoln Street, in Portland. The structure is to be 100 ft x 100 ft. with a concrete floor 3 ft. deep. The chimney is of concrete 150 ft. high. The capacity of the plant will be 10,000 hp. at the start, which can be increased as desired. The cost is estimated to be about $250,000.

Philadelphia (Pa.) Rapid Transit Company.—This company has abandoned its plan to enlarge its Delaware Avenue powerhouse. Instead additional machinery will be installed in its station at Thirty-third Street and Market Street.

Berkshire Street Railway Company, Pittsfield, Pa.—This company will soon build a brick auxiliary power station in Cheshire, to be 20 ft. x 40 ft. and one story high. It will be equipped with 5000 kw in rotary converters. This is part of the company's plan to rearrange its power system and the contract for this work has been awarded to Fred T. Ley & Co., Springfield.

Whatcom County Railway & Light Company, Bellingham, Wash.—This company is now building an addition to its power plant on Railroad Avenue and York Street, in Bellingham. The extension will be of concrete and brick foundation, with steel frame. [E. R. J., Oct. 30, '10.]

Wheeling (W. Va.) Traction Company—This company has awarded the contract to Lewis & Wood, Pittsburgh, Pa., for building its pump house at Forty-second Street in Wheeling. It is expected to have work begun at once.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company expects to soon build an addition 80 ft. x 144 ft. and 72 ft. high to its Commerce Street power house, in Milwaukee. It will also erect a substation, 40 ft. x 57 ft., and 52 ft. high, at Clinton Street and Maple Street. Reinforced concrete will be used in both buildings.

Manufactures & Supplies

ROLLING STOCK

Portland, Eugene & Eastern Railway, Albany, Ore., is considering the purchase of one car.

Tri-City Railway, Davenport, Ia., has ordered seven 43-ft. 8-in., double-truck, closed, pay-as-you-enter cars from the Cincinnati Car Company.

Portland Railway, Light & Power Company, Portland, Ore., it is reported, is preparing to let a contract for 40 additional cars to be delivered early next summer.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill., which is building a 15-mile line from Palatine to Bangs Lake, is considering the purchase of six cars.

Power, Transit & Light Company, Bakersfield, Cal., noted in the Electric Railway Journal of Jan. 15, 1910, as considering the purchase of several new cars, has ordered six 40-ft. pay-as-you-enter cars from the American Car Company.

Oakwood Street Railway, Dayton, Ohio, has completed at its shops a double-truck pay-within car, 45 ft. long over all and seating 44 passengers. If this car proves satisfactory enough cars of this type will be built to equip the company's lines.

Burlington (Vt.) Traction Company has ordered three single trucks from the Taylor Truck Company for the three semi-convertible cars which it ordered recently from J. M. Jones' Sons, as noted in the Electric Railway Journal of Aug. 27, 1910.

Illinois Traction System, Peoria, Ill., has placed an order with the Barney & Smith Car Company, Dayton, Ohio, for two sleeping cars. The cars will be similar in design to those now operating, as described in the Electric Railway Journal for March 19, 1910, page 476. The cars just contracted for will be 57 ft. long and 10 ft. wide. Each car will have 10 upper and 10 lower berths, two toilet rooms and a smoking room. The interior fittings will conform to those in use in the cars now in operation, which were designed by H. E. Chubbuck, vice-president, and J. M. Bosenbury, superintendent motive power and equipment, Illinois Traction System.

Ohio Electric Railway, Cincinnati, Ohio, reported in the Electric Railway Journal of April 16, 1910, as having ordered 10 passenger, smoking and baggage cars from the Cincinnati Car Company, has drawn the following specifications for these cars:

Seating capacity..... 58	Curtain fixtures.....
Weight .....45,000 lb.	.....Curtain Sup. Co.
Bolster centers, length	Curtain material...Pantasote
..... 38 ft. 6 in.	Hand brakes.....Peacock
Length over vest..60 ft. 2 in.	Heating system .....
Width over sills..8 to 8⅛ in.	....Peter Smith hot water
Sill to trolley base.9 ft. 10 in.	Headlights.....G. E. arc
Height from top of rails	Journal boxes .....Sym.
to sills .....45 in.	Motors .....four West-121
Body, ...wood	Paint.....Pullman standard
Interior trim.....	Roofs.....Monitor deck
.....Honduras mahogany	Sanders .....air
Underframe .....composite	Sash fixtures .....Edwards
Air brakes .....West	Seats, style .....H. & K.
Bumpers.....8 in x ½in	Seating material .....
(steel plate)	.....plush and leather
Car trim.....polished bronze	Step treads .....Mason
Control ... West. automatic	Trolley retrievers...Knutson
Couplers	Trucks, type..Taylor M.C.B.
.....McConway & Torley	Wheels .....37 in. steel

TRADE NOTES

Ohmer Fare Register Company, Dayton, Ohio, is equipping 79 cars of the Eastern Pennsylvania Railway, Pottsville, Pa., with Ohmer registers.

Kellogg Switchboard & Supply Company, Chicago, Ill., announces that R. C. Coyne will take charge of the Wisconsin territory of the company with headquarters for the present at Delavan, Wis.

B. F. Reamy, formerly connected with the mechanical department of the Interborough Rapid Transit Company, New York, N. Y., has opened an office at 229 Broadway, New York, where he will engage in the sale of general railway supplies.

Mead-Morrison Manufacturing Company, Cambridge, Mass., engineer and manufacturer of elevating and conveying machinery and hoisting engines, announces that it is at the present time working to the extent of its facilities and, in fact, has 50 more machinists engaged than ever before at one time.

S. F. Bowser & Company, Inc., Ft. Wayne, Ind., have appointed Edward H. Barnes, Atlanta, Ga., as their Southern representative. Mr. Barnes has been in the railway supply business for a number of years and was recently associated with the Bass Foundry & Machine Company, Ft. Wayne, Ind. He was in the operating department of the Southern Railway for a number of years before he became connected with the Bass Foundry & Machine Company.

Cooper Heater Company, Carlisle, Pa., has received contracts to equip the following lines with Cooper pressed steel hot water heaters; Milwaukee Northern Railway, Stark Electric Railroad, Missouri & Kansas Interurban Railway, Shamokin & Mt. Carmel Transit Company, Shamokin, Pa.; Lehigh Traction Company, Hazleton, Pa.; also to equip the new pay-as-you-enter cars of the United Transit Company, Reading, Pa., and the Lehigh Valley Transit Company, Allentown, Pa.

ADVERTISING LITERATURE

Economy Oil Cup Company, Augusta, Ga., has issued a booklet in which are set forth the numerous advantages of the Economy oil cup.

Pawling & Harnischfeger Company, Milwaukee, Wis., has reprinted, in the form of a folder, an article from the July issue of "Factory" entitled "Four Laborers Instead of Thirty."

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued list No. 113 of new and second-hand rails, cars, power-house equipment and machinery which it has on hand for immediate shipment.

The J. G. Brill Company, Philadelphia, Pa., has reprinted in pamphlet form the editorial "Two-Motor Equipments for City Cars," which was published in the Electric Railway Journal of June 11, 1910, page 1015. The text is accompanied with two illustrations of the Brill No. 39-E single-motor truck.

Wheeler Condenser & Engineering Company, Carteret, N. J., has reprinted the paper entitled "Condensers for Small Central Stations," which was presented by George H. Gibson, at the annual convention of the Missouri Electric, Gas, Street Railway & Waterworks Association, held at Jefferson City, Mo., on April 16, 1910.

Topping Brothers, New York, N. Y., have published a book describing the "Mechanigraph," a machine which instantly makes transparent and printable an opaque pencil or pen drawing at a cost of approximately one-third of a cent per square yard. Specimens of the work possible with this device are reproduced in the publication.

National Brake & Electric Company, Milwaukee, Wis., has issued Publication No. 391 entitled "National Air Compressors," in which the National air compressors for general industrial purposes are described and illustrated. The publication contains 68 pages and is concluded with a series of tables giving dimensions, capacities and other data regarding National compressors.

Trussed Concrete Steel Company, Detroit, Mich., has issued a catalog describing and illustrating its rib metal reinforcement. Among some of the users of the company's product are the Chicago (Ill.) Railways, Third Avenue Railroad, New York; San Diego (Cal.) Electric Railway, Second Avenue Railroad, New York, and Omaha & Council Bluffs Street Railway, Omaha, Neb.

Jeffrey Manufacturing Company, Columbus, Ohio, has issued Bulletin No. 42 in which its coal-handling and mine-equipment machinery is described. The publication contains several photographic views which show installations where Jeffrey conveyers are used. The company has also issued Booklet No. 28, which shows Jeffrey conveying machinery for handling stone, sand, gravel, ores, etc.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, SEPTEMBER 24, 1910 No. 13

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 24, 1910.

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Single-Phase for the Hoosac Tunnel

The decision of the New Haven railroad to adopt the single-phase system on the Hoosac Tunnel division and on its New York, Westchester & Boston line, just announced, is one of the most important developments of the year. Practically no equipment has been subject to more adverse criticism and has been more stoutly defended than the present single-phase system on the main line of the New Haven railroad. Its adoption as a motive power from New York to Stamford was announced in October, 1905, and the line still remains the most important single-phase road in the world. The electrification of the Hoosac Tunnel and of the New York, Westchester & Boston line, now announced, will practically be equal both in importance and mileage to that of the present electrified main line, and the electrification of the Harlem River branch and of the main line from Stamford to New Haven together will be practically equivalent to twice the present electrical system. Probably the most important feature of all of the new electrification work of the company is that it will be single-phase without direct-current complication, so that the equipment should be very much simpler and capable of very much better work than even the present equipment. The decision of the New Haven railroad is an important one to the entire industry for two reasons. It not only guarantees an extended application of the single-phase system to trunk-line service, but it indicates that the results with the present system have been so satisfactory as to warrant its extension.

From Chicago to New York by Electric Car

Many persons, even among those actually connected with electric railway systems, do not realize the possibilities of through travel by electric car. They consider that the local transportation which electric roads furnish constitutes their sole function, and though many know in a vague way that long distances can be traversed by electric cars, they look upon such trips as slow and involving too many discomforts to make the journey a pleasant pastime. It is safe to say that comparatively few people will undertake to duplicate the trip from Chicago to New York described by Mr. Van Valkenburgh in this week's issue. Nevertheless, some will undoubtedly do so each year and many more will take parts of the journey. The automobile has popularized road touring, and we do not see why a long excursion by trolley during nine months of the year should not present most, if not all, of the pleasant features of an automobile tour through the countryside. If not quite such fast traveling, it would certainly be far less expensive, and would avoid most of the discomforts of automobiling as well as all dangers of break-downs. An account of a long trip like that from Chicago to New York is instructive in two ways. In the first place it teaches the public the possibilities in the way of long-distance traveling by trolley, and, in the second place, it offers valuable hints to railway companies. Accord-

ing to the article in this issue long-distance traveling by trolley would be greatly facilitated if better connections were made at junction points and if the companies would provide means by which the public could obtain complete information in advance in regard to the expense and time required to make such tours.

Car Standing Room Here and Abroad

The last annual report of the street railway system in Zurich, Switzerland, contains a rather significant paragraph on the seating and standing capacity of the latest cars used in that city. It appears that the trail cars built during 1909 were constructed for a seating capacity of 16 persons and a standing platform load of 22, or 11 on each platform. This condition is not an isolated instance, for it is the general custom to build Continental street car platforms large enough to accommodate many standing passengers. As a rule passengers are not permitted to stand inside the car except in stormy weather. This latter practice is the one often quoted in city councils here in connection with "No seat, no fare" legislation. Evidently European street railway operators, like those in this country, recognize the practical impossibility of seating every passenger during rush hour periods. It is quite likely that the American passenger would soon find the foreign restrictions with regard to standing much more irksome than the "help-yourself" methods to which he is accustomed.

Maintenance of Service

From the days of Wellington's classic "Handbook of Railway Location" engineers have realized that the alignment and grade of a piece of track exert a profound influence upon the wear and tear of rolling stock, and upon power consumption and schedules. It is seldom, however, that the direct effects of a specified track installation can be expressed quantitatively, for in most cases when a track is laid it stays in service for many years, and changes in rolling stock design soon complicate comparisons of present with earlier results. The abandonment of the Tremont Street subway as a route for the elevated trains of the Boston Elevated Railway Company furnishes an interesting instance, however, of what may follow in maintenance matters when the rolling stock is operated upon more favorable trackage. When the elevated train service was opened in Boston in 1901 it was soon found that the operation of trains in the Tremont Street subway presented serious difficulties in the way of rail and wheel wear. Prior to the introduction of manganese steel rails, a minimum life of 44 days was obtained on the rails of one of the worst curves in the tube. As the train service became standardized the wear upon wheels necessitated grinding about 48 pairs per day at the Sullivan Square shops. In the late fall of 1908 the elevated trains were transferred to the Washington Street tunnel, which is characterized by relatively light grades and easy curves, over which operation can take place without any such marked speed reductions from alignment causes as hampered the movement of trains in the old subway. The result has been that the number of wheels ground has been halved, there being at present, with about 100 more cars in regular service, only 24 pairs per day handled, and this without requiring much if any overtime work. It is safe to say that a large part of this reduction is due to no other factor than the operation of the trains over a track laid out with a minimum number of curves and grades.

COMPARISON OF RESULTS IN BOSTON AND BROOKLYN

The Boston Elevated Railway and the Brooklyn Rapid Transit systems are somewhat similar in mileage, earnings and territory served and a comparison of the latest figures available regarding their operations shows interesting results. The statistics upon which we have based our comparison are contained in the annual report of the Boston company for the fiscal year ended Sept. 30, 1909, and of the Brooklyn system for the year ended June 30, 1910. For the sake of uniformity the gross and net earnings stated for the Brooklyn system include the figures of "other income" and therefore correspond to the classification followed in the Boston report.

In gross earning power the Brooklyn company makes the more conspicuous showing. With one-quarter more mileage than the Boston company, it earned gross about 50 per cent more. Operating a total of 606 miles of track, the Brooklyn system had gross earnings of $21,446,357, while the Boston company, with 484 miles of track, reports gross revenues of $14,493,853. As the gross earnings are derived chiefly from passenger traffic the difference is attributable principally to the greater density of passenger travel in Brooklyn. The Boston lines carried 580,596 revenue passengers per mile of track. As the form of Brooklyn report does not permit separation of the revenue passengers from a presumably small total of free passengers, it is necessary to state the average of those classes of traffic combined, 690,031 passengers per mile of track. Probably the elimination of free passengers from this computation would affect the comparison very slightly. Unfortunately a comparison of the relative transfer traffic on the two systems is impossible because of the absence of information on this point in the Boston report. It should be explained that a large part of the transfers in Boston are effected between elevated and surface lines at points where no transfer slips are required. A careful estimate by the Boston company in the fiscal year 1908 showed that the transfer traffic in that year reached 58 per cent of the revenue traffic. The transfer traffic in Brooklyn in the 1910 fiscal year amounted to 36 per cent of the revenue and free traffic.

The evident differences in transfer traffic are due to fundamental differences in the construction and operation of the two systems. It is not necessary in this comparison to make a detailed analysis of all of these conditions. But the important fact may be pointed out that the elevated mileage in Boston is designed mainly to supplement the surface facilities and to afford a rapid transit collection and distributing agency in the center of the city for the outlying lines, while in Brooklyn the elevated lines are almost entirely self-contained agencies for the collection and transportation of their own passengers. Of the mileage in Boston 95 per cent is surface and 5 per cent elevated; of that in Brooklyn 88.3 per cent is surface and 11.7 per cent elevated.

The Boston company used in operating expenses $9,488,484, or 65.5 per cent of its gross earnings, retaining for net earnings $5,005,369. The Brooklyn company, with operating expenses of $11,726,392, or 54.7 per cent of its gross had net earnings of $9,719,965. Reduction of the main figures relating to earnings to a track mileage basis brings out in another way the differences in results. The showing per mile of track is as follows: Gross, $29,946 for Boston and $35,390 for Brook-

lyn; operating expenses, $19,604 for Boston and $19,351 for Brooklyn; net, $10,342 for Boston and $16,039 for Brooklyn. Taxes, interest and rentals amounted to $8,189 per mile in Boston and to $11,729 in Brooklyn. The resulting balance was $2,153 for Boston and $4,310 for Brooklyn. The most striking figures here are the approximately equal operating expenses and the larger surplus per mile of track in Brooklyn.

Further analysis of the expenses shows differences in the expenditures for both maintenance and transportation. The companies do not give the same general operating expense accounts throughout. The Brooklyn system divides its total operating expense between eight accounts, as follows: Maintenance of way and structures; maintenance of equipment; operation of power plant; operation of cars; damages and legal expenses; general expenses; freight, mail and express expenses; American Railway Traffic Company expenses. The Boston classification shows general expenses, maintenance of roadway and buildings, maintenance of equipment and transportation expenses. In Boston 17 per cent of gross was applied toward maintenance, divided as follows: Way and structures, 9.8 per cent; equipment, 7.2 per cent. Corresponding expenses in Brooklyn were as follows: Way and structures, 6.1 per cent; equipment, 9.7 per cent; total, 15.8 per cent. Transportation expenses in Boston were 41.6 per cent of gross. Operation of power plant and of cars and damages and legal expenses in Brooklyn totaled 34.9 per cent of gross. General expenses were 6.9 per cent of gross in Boston and 3.2 per cent in Brooklyn.

Per mile of track the Brooklyn company expended more for total maintenance than the Boston company, but almost the same for transportation. Maintenance of way cost $2,925 per mile and maintenance of equipment $2,154 in Boston, a total of $5.079; the corresponding expenditures in Brooklyn were $2,161 and $3,413, a total of $5,574. Transportation costs, which were $12,460 per mile of track in Boston, can be stated in a little more detail for Brooklyn, as follows: Operation of power plant, $2,473; operation of cars, $8,352; damages and legal expense, $1,521; total, $12,346. General expenses were $2,065 per mile of track in Boston and $1,138 in Brooklyn. This does not complete the expenses of the Brooklyn system, whose classification shows in addition freight, mail and express and traffic company expenses, which were $293 per mile.

Revenue car-miles in Boston amounted to 51,127,681 and in Brooklyn to 77,984,651. Although Boston showed a little larger gross revenue per car-mile, larger relative operating expenses reduced its net earnings below those of the Brooklyn system. Car-mile gross earnings were 28.3 cents in Boston and 27.5 cents in Brooklyn. Operating expenses were 18.5 cents in Boston and 15 cents in Brooklyn. Net earnings compare as follows: Boston, 9.8 cents; Brooklyn, 12.5 cents. Car-miles run by United States mail cars and the revenue from such traffic are stated in the Boston report, from which it appears that the average car-mile revenue from this class of business was 16.3 cents. In Boston 5.5 revenue passengers were carried per car-mile and in Brooklyn the average was 5.4.

Separation of the operating expenses into average car-mile results shows the following for Boston: General expenses, 2 cents; maintenance of way and structure, 2.7 cents; maintenance of equipment, 2 cents; transportation, 11.8 cents. Brooklyn expended 0.9 cent per car-mile for general expenses, 1.7 cents for maintenance of way, 2.6 cents for maintenance of equipment, 1.9 cents for operation of power plant, 6.5 cents for operation of cars, 1.2 cents for damages and legal expenses and 0.2 cent for freight, mail and express. The 3.5 cents more per car-mile spent in Boston was used principally in transportation but partly in maintenance and general expenses.

HEAT-TREATED AXLES

When specifications for heat-treated axles were presented at the Denver convention of the Engineering Association the general impression seemed to be that such high-grade and expensive material was required only by roads operating a very severe service, such as the Interborough Rapid Transit Company, which stood as sponsor for the specifications. As a direct result of the interesting discussion on the subject which took place at the convention more than 20 electric railways have made inquiries from one axle maker during the past year for prices on heat-treated axles furnished under the specifications recommended and several orders have been placed. These prospective buyers were not confined to elevated and high-speed interurban roads, but included some city and suburban companies. This is encouraging evidence of a growing appreciation of the fact that in buying material to be used where a failure may result in a serious accident or interruption to service, the best is none too good, even for the small road.

The future demand for heat-treated axles will come from progressive master mechanics who, even though they have little expert knowledge of steel making, can appreciate the improvement in the quality of the metal in axles which results from the careful tempering and annealing to which they are subjected after forging. Most axle failures, except those resulting from defects in the metal, such as piping, seams and segregation, are caused by what is known as "fatigue" of the metal. The constant reversal of stress with every revolution of the axle tends to break up the fine-grained structure of the steel into coarse crystals and the cleavage lines between these crystals gradually develop into a crack or progressive fracture. Proper heat treatment greatly increases the resistance of the metal to fatigue and eliminates internal stresses in the axle which might cause a crack to develop when the journal load is applied.

The purchasing agent who is asked to get bids on heat-treated axles will probably be surprised at the higher prices which are quoted, but he should be reminded that the increased cost represents quality. The steel makers are prepared to make lower-grade untreated axles at cheaper prices if necessary to get the order. Last year's specifications, which will be presented again at the Atlantic City convention with only slight changes, were drawn with the purpose in view of excluding axles which are not heat-treated, while not imposing unnecessarily severe requirements for properly treated steel. A difference of 3000 lb or 4000 lb. in the elastic limit may not appear to warrant a difference of several cents a pound in the cost of the axles, but the requirements of the specifications are just above the limits of untreated steel. If axle makers are allowed to furnish material slightly below the requirements of the specifications at a reduced price, the purchaser has no assurance that the axles so bought are uniform in quality and will last in service. The master mechanic who wants heat-treated axles should insist on the manufacturer meeting the requirements of the specifications in every particular.

NOTES FROM WILMINGTON, NORTH CAROLINA

The street railway facilities of Wilmington, N. C., which has a population of about 35,000, are furnished by the Tidewater Power Company. This company is a consolidation of the original public service interests of the city and supplies all gas and electric lighting besides carrying on a general industrial power business. The accompanying map of the system shows the railway lines owned outright by this corporation and those leased by it from the Consolidated Railways, Light & Power Company. The combined properties are operated under A. B. Skelding, general manager. It will be seen that outside of the city system there is a line to Wrightsville Beach, an important summer resort to which extended reference will be made later. The track construction in Wilmington consists of a standard 7-in., 72-lb. T-rail laid in stone or wood paving on creosoted ties. The line to Wrightsville Beach has 60-lb. T-rail. All tracks are bonded with O.B. soldered bonds, which have been in successful use for the last four years.

POWER

The Wilmington company probably has the distinction of being the first Southern railway to use steam turbines. Its present equipment consists of one 1000-kw and two 400-kw units of the Westinghouse-Parsons type. One of the smaller units has been in service seven years, and the other was purchased by the company immediately after the maker's exhibition at the St. Louis Exposition. This 400-kw turbine has been in service for five years. The 1000-kw unit is guaranteed to take not more than 13.7 lb. of steam per brake-horse-power at full load, 15 lb. at half load and 15.5 lb. at 50 per cent overload.

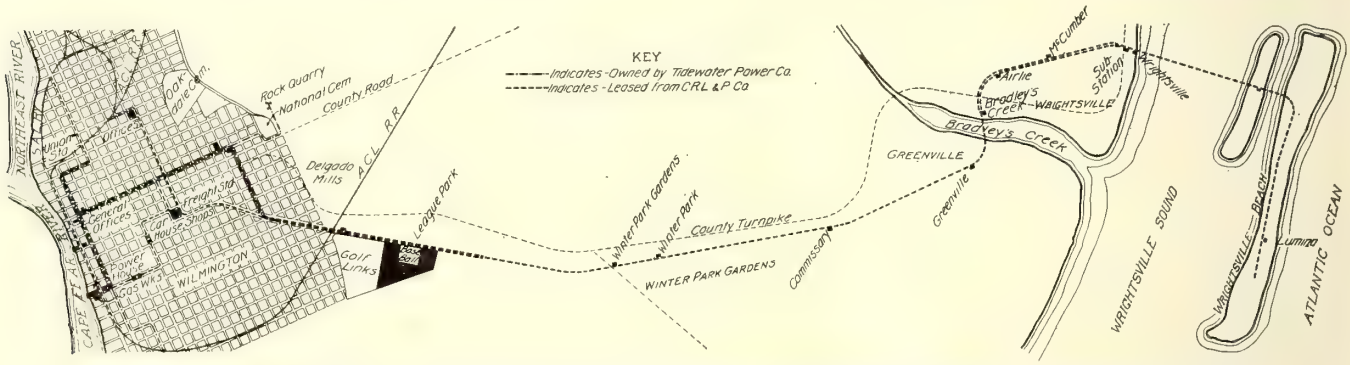
The electrical output of the main station not only serves to handle the railway business, but also to light the city, including ornamental arches on a number of important blocks. The cost of installing these arches was shared equally by the city and the company. There is also a good motor business, mostly on a.c. circuits, except elevator motors, which are operated by direct current and a few motors direct-connected to the trolley circuit. The power output throughout the year is quite steady, as the power requirements at Wrightsville Beach make up for the low summer lighting load in the city. The average daily load factor in 1909 was about 30 per cent.

SHOP PLANS

The company has built for a shop a structure consisting of a main building 50 ft. x 110 ft. with a lean-to 40-ft. x 30 ft. The construction is of the slow-burning mill type with a corrugated iron roof, the whole being capable of ready dismantling owing to the probability of changing the location of the building at a future date. The tool equipment is composed principally of a number of second-hand machines purchased from the abandoned Plant System shop of the Atlantic Coast Line. Previously the company was obliged to give out its work to high-priced local machine shops, but found that the prices were too high to continue this practice. No car house has been constructed, nor is one contemplated, as the rolling stock can be stored in the open in this mild climate. When cars are stored for any length of time they are enveloped with waterproof covers which cost about $15 apiece.

WRIGHTSVILLE BEACH

One of the best assets of the Wilmington Company is



Wilmington Railway System—Map Showing the City Lines and Suburban Route to Wrightsville Beach

All of these machines are operated at two-phase, 380 volts, 60 cycles. Part of the turbine output is raised to 2300 volts for lighting purposes and part to 11,000 volts, three-phase, 60 cycles, for transmission to the railway substation at Wrightsville Beach, 9 miles distant. In addition to the two-phase and three-phase transformers, the electrical portion of the power plant also contains one 500-kw and one 150-kw rotary converter, the larger machine having recently replaced a 300-kw unit. An adjoining building contains 264 chloride accumulator cells to steady the railway load.

The boiler-room equipment consists of four 250-hp B. & W. boilers, Blake feed-water pumps, Cochrane feed-water heaters, a De Laval circulating pump, a 24-in. Alberger barometric condenser for the smaller turbines and a 30-in. condenser of the same type for the larger turbine. Both condensers can be operated with the turbines in any desirable combination. Most of the fuel used at this station consists of slab timber, refuse of the nearby lumber mills, and unsalable coke from the company's gas works. The average labor and material cost of power per kw-hour at the a.c. side of the switchboard was about 0.9 of a cent in 1909.

The Wrightsville Beach substation, previously referred to, contains one 150-kw and one 200-kw rotary converter. During the summer the smaller rotary and its transformers were put in a box car which was kept near the middle of the line to maintain the voltage at that point. This portable station was a condemned freight car bought from the Atlantic Coast Line for $150.

Wrightsville Beach, 11.3 miles distant from Wilmington. This place is not only the favorite seaside resort of the better class of Wilmington residents, but it is also widely known throughout North Carolina and adjoining states. By arrangement with the Seaboard Air Line and the Atlantic Coast Line visitors have been brought direct from Atlanta, Birmingham, Athens and Augusta. This summer Pullman sleepers were run from Atlanta. The beach is an island several miles in length joined to the mainland by an electric railway trestle 1.1 miles long. The daily average attendance during the season is about 1500, aside from the 300 to 400 cottagers who commute from Wilmington.

As the company owns the only approach to the beach, the residents are dependent upon it for transportation, light, freight, express and mail service. There are about 75 cottages scattered along both sides of the track with platforms arranged for the easy delivery of groceries and other materials direct from the cars. There are also two large hotels at the beach. The summer population is about 5000. The round-trip fare from any part of Wilmington is 35 cents with the single exception that three tickets may be purchased for $1. No reductions are made on the combination steam-railroad tickets.

In first exploiting this resort the company tried all the ordinary seaside resort attractions, such as Ferris wheels, chutes and merry-go-rounds, but neither the local public nor the visitors seemed to care for these amusements. The principal attractions are bathing, dancing and music. For dancing the company has provided a ballroom, 120 ft. x 50 ft., where

music is furnished by a 16-piece band from June 1 to Sept. 1. The lower part of the pavilion has bathrooms and a refreshment stand. Despite the mild climate, the season is not longer than in many Northern cities since most Southern vacationists spend September in the mountains. The cottage season, however, has been growing longer from year to year.

No solicitation for business is permitted nor are there prohibitory signs of any kind on the grounds, the intention of the management being to make the visitors feel as much at home



Wilmington Railway System—Leaving the Cars for Wrightsville Beach

as if they were the guests at a social gathering. Concerts constitute the principal feature on Sunday afternoons and evenings. It is an interesting fact that operatic music is preferred to the kind ordinarily called "popular," the taste of the people having apparently been improved by the extended use of phonographs in this part of the country. Water sports also have proved a great drawing card, canoe races being especially popular. In one canoe game the contestants try to go over all the breakers without capsizing. One of the accompanying illustrations shows a sack race at the beach.

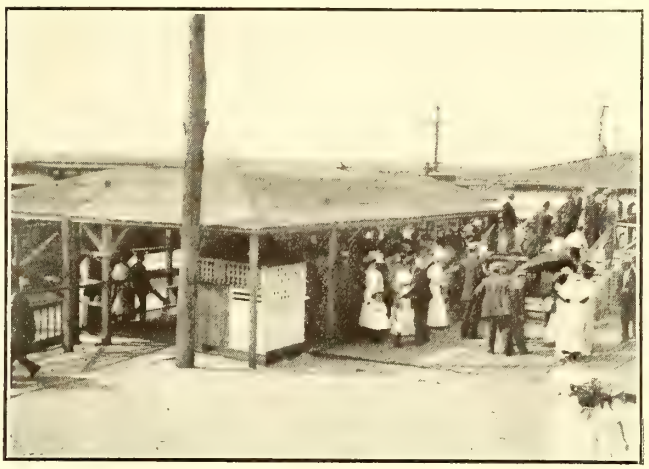
Wrightsville Beach is advertised on billboards in the larger towns and by posters at the steam railroad stations. Advertisements are also placed in the street cars of inland towns



Wilmington Railway System—Dancing and Bathing Pavilion at Wrightsville Beach

like Columbus, Atlanta, Augusta and Charlotte. It has been found, however, that the best advertising is that which comes from the patrons themselves, especially through the unique entertainments known as "souvenir dances." During the summer many organizations, such as those of the State bankers, lawyers, doctors, teachers, etc., assemble at the beach for their annual conventions. The company arranges to get in advance the mailing list of all probable attendants and sends to each a handsomely engraved invitation to a dance to be given on a certain night in honor of their organization. The pavilion is then decorated in a manner appropriate to the profession of the guests. When the entertainment is given, from 300 to 400 favors, costing perhaps not more than $50, are distributed to the ladies. These souvenir dances have proved so popular that the company has had inquiries about them from all over the United States.

The line to Wrightsville Beach is single-track part of the



Wilmington Railway System—Entrance and Exit to Cars at Wrightsville Beach

way and is protected by the staff system. When a conductor fails to meet a train from the opposite direction he must wait three minutes at a meeting point and then call up the dispatcher for instructions over the private telephone. The company operates its best rolling stock in this service. The cars are of the convertible type, seating 68 passengers. The two 75-hp motor equipments per car are operated on the Westinghouse multiple-unit system, five-car trains being run at the height of the season. The cars also carry Westinghouse air brakes, Knutson retrievers, solid-steel wheels and other specialties to insure safe, high-speed operation. The line terminates at the beach alongside an enclosure to which homegoing passengers are not admitted until they have paid fare.



Wilmington Railway System—A Sack Race at Wrightsville Beach

A similar enclosure is used at the baseball grounds on the Wrightsville line to avoid confusion in handling the patrons and getting their fares.

PROPOSED PLEASURE RESORT AND EXTENSION

The success of the Wrightsville Beach resort has led a number of capitalists to interest themselves in the construction of an all-year resort to cost about $10,000,000 and to require about five years for construction. The proposed site is about 5 miles

from Wrightsville Beach, and if the plan is carried out the Tidewater Power Company would construct an extension to reach it. The proposed resort would be readily accessible by steam railroads, as it is only 12 hours from Washington and 17 hours from New York.

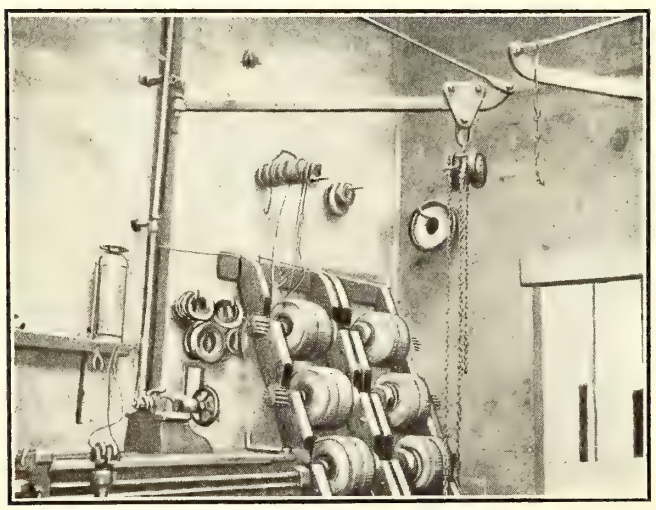
FREIGHT AND EXPRESS BUSINESS

The company does a general freight and express business. Through physical connections with the steam railroads, both freight and Pullman cars can be brought to any desired point on the street railway system. The usual charge for hauling a freight car up to the Wrightsville trestle is $5, and $7 is charged for taking the car over the trestle to the beach. Local freight is handled at 10 cents per 100 lb. By an arrangement with the Southern Express Company express packages are carried along with the regular freight. In summer the freight and express business is worth $50 to $70 per day. Small express packages up to 100 lb. are carried on passenger cars for 25 cents each.

REPAIR SHOPS OF THE BANGOR RAILWAY & ELECTRIC COMPANY

One of the most extensive repair shops in New England is that of the Bangor Railway & Electric Company, of Bangor, Maine. The shops, which were completed about three years ago, are combined with a car house. The property is located on the principal business thoroughfare of the city about a mile south of the commercial center. The space occupied is about 182 ft. long x 130 ft. in extreme width, of which nearly one-half is required by the repair department. The car house section is at the front of the building and extends toward the rear to a distance of 101 ft. The building is constructed of concrete blocks on a concrete foundation with a bay on the street side of the property containing quarters for the operating department superintendent, foreman and trainmen, and space for lavatory facilities, sand, salt and track tool storage. The natural lighting of the shops and car house is effected by ample window areas and skylights provided with ribbed glass. The grounds have been made attractive lately by the cultivation of lawns and flower beds, with a floral set of the company's initials at one side and potted plants in the window ledges.

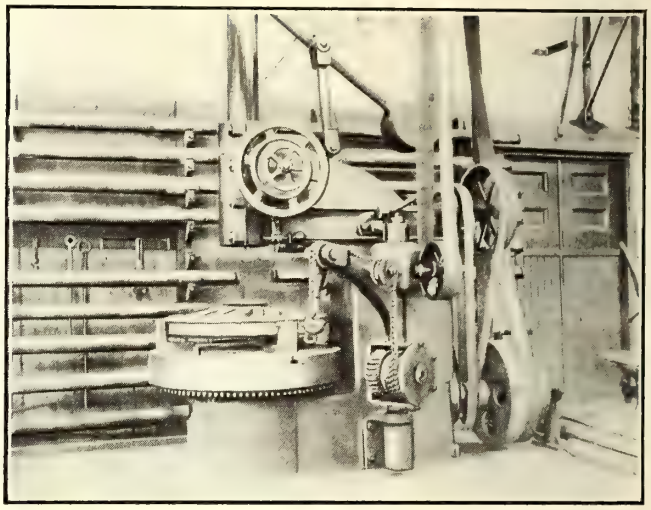
The car storage and shop are separated by a fire wall, while



Armature Rack, Crane and Lathe

Kinnear rolling steel doors are provided at the front of the former. Reinforced concrete columns and girders were employed in the construction of the building frame, the main girders being 10-in. wide x 30 in. deep. In general the columns are 12 in. square in horizontal cross-section with chamfered edges. Each column is reinforced with four 11/16-in. vertical steel rods, while the column foundations are reinforced by 12 ½-in. steel rods each. The latter roof beams are also thoroughly reinforced. The 6-in. granolithic floor used is reinforced by a 12 in. x 16 in. concrete pier below the rails except in the pits. The columns in general are 20 ft. apart. The car house has 10 tracks, which are connected with the main line of the company by suitable ladder tracks carried through a switching yard in front of the building, there being four tracks carried through the car house into the repair shop. All tracks are installed 11 ft. apart on centers, while in the machine shop a maximum of one track is all that is allowed in any bay. The shops and pits are steam heated from a boiler located on the premises.

The pit track rails are supported by 10-in. 25-lb. I-beams



Wheel Borer with Wheel on Bed

anchored into 18-in. x 23-in. concrete piers 42 in. high and placed 14 ft. apart on centers. The rails are held in place by angle iron braces 3 in. x 3 in. in section and riveted to the I-beams. The running rails are clamped into the I-beams. By this construction a space of 17 in. is left between the center of the rail and the nearest concrete wall carrying the floor, thereby giving room for a man to sit on the chamfered edge of the floor and let his legs hang comfortably into the pit while making truck repairs. The man working in the pit also finds this 17-in. space convenient in working on the car below the floor level. The pit lighting is arranged by special 104-volt plugs and sockets wired in iron conduit into all the columns of the shops, from which flexible leads are run as necessary. There are no permanent lighting fixtures in the pits. An interesting feature of the building construction was the later use for storeroom bin construction of much of the form timber employed in pouring the concrete.

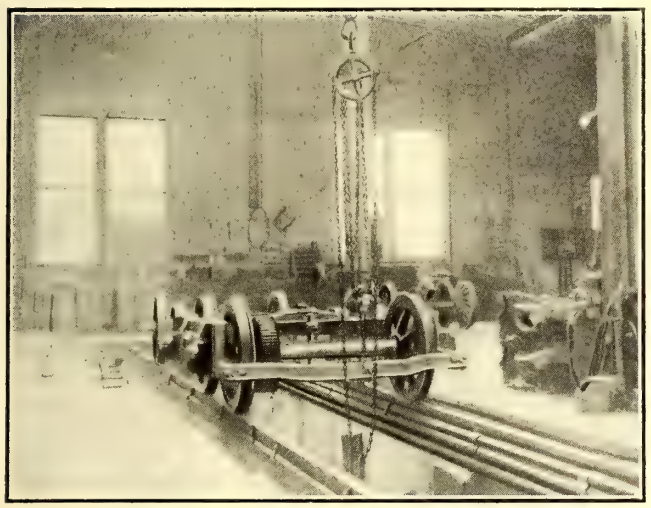
The roof of the entire building is of the slag concrete type, there being a maximum height of 20 ft. 6 in. from the floor to the bottom of the roof girders. The roof slopes from a central ridge in each direction toward the side walls, the latter being 16 ft. high from the floor to the bottom of the lintel. A sloping roof is also provided over the trainmen's quarters and sand storage room.

In the car house section are five tracks with inspection pits, the latter being 40 ft. long in each case, with their heads near the doorways, to facilitate the most rapid examination of the rolling stock after it enters the building. The car house is divided into two equal sections, with a fire wall between running parallel to the tracks, the pits being divided by the assignment of three to one section and two to the other. The offices of the foreman and superintendent, trainmen's quarters, etc., are all 10 ft. 6 in. wide, and the bay containing them extends throughout the entire length of the car house. A special feature is the length of the sand and salt room, which is 40 ft. The floor of the latter is carried 4 ft. below that of the rest of the building, to give increased capacity for storage. The motormen's and conductors' lobby is 20 ft. long. In the car house there are three stub-ended tracks without pits which terminate without passing through into the shop proper. The bottoms of the pits are waterproofed.

The shop proper consists of a machine shop division, with two pit tracks, one of which is 40 ft. and the other 60 ft. long; office for the master mechanic and storekeeper, carpenter shop and paint shop. Each of these four divisions is blocked from the others by a fire wall running through its whole length, with the exception of the office shared by the master mechanic and the storekeeper, which is set into the wall space between the machine shop and the storeroom, so that it will be most accessible from all parts of the shop. This office has glazed sash on two sides so that from his desk the master mechanic can follow the general run of all work in the machine and store divisions.

MACHINE SHOP

The machine shop proper is about 80 ft. long x 60 ft. wide. It is well equipped with tools, which are mainly group-operated. A 10-hp GE 550-volt, three-phase, 60-cycle induction motor furnishes the driving power through a line shaft and belting. The motor is mounted overhead and is started from the floor by a pair of levers attached to the short-circuiting handle of the rotor resistance, so that it is unnecessary to mount the motor platform to start the machinery. Each of the two pit tracks is served by a radial hoist which has proved invaluable in transferring work from the track to the nearest tool. The heavier tools are mounted on the floor near the two pit tracks, a space about 30 ft. wide being left between the westerly track and the storeroom and office wall. The most important tools now in service are a 42-in. Niles driving wheel lathe, employed chiefly



Pit-Work Facilities in the Bangor Shops

in turning steel-tired wheels, and fitted with two tool posts for multiple work; a 20-in. Flather engine lathe, an 18-in. Prentice Bros. drill press, a 1½-in. Reliance tapping and threading machine, a 36-in. Niles-Bement-Pond car wheel borer, a Niles 100-ton hydraulic wheel press, a 20-in. Wood engine lathe, a 17-in. x 17-in. x 48-in. Draper planer, a 10-in. emery wheel and an Ohio Brass gasoline pot for melting babbitt and heating large soldering irons. One of the illustrations shows the wheel boring machine with a home-made axle rack behind it.

Another view shows an armature rack and its radial hoist installed at one end of the machine shop, near the car house partition wall. All the radial hoists are so arranged that practically no manual labor is required in transferring heavy parts from the tracks to the tools. The unusually good natural lighting of the machine shop pits is indicated in the above cut, which shows a truck stripped for motor application on one of the pit tracks, with radial hoist above. The general type of pit construction is also shown in the same view. Field winding is carried on by means of a lathe shown at the left of the armature rack in one of the illustrations. When winding coils the wire is held taut by passing it under a trolley wheel fastened to the under side of an iron bar hinged to a strap bolted into the concrete floor. The wire reel is held on a horizontal rod and pair of bushings supported on a pair of tripods. The power service is supplied by a three-phase distribution system.

CARPENTER SHOP AND STOREROOM

The carpenter shop, which adjoins the machine division, occupies a room about 80 ft. x 20 ft. and is equipped with one combined 15-in. White cutoff and rip saw, a 36-in. band saw and a 12-in. buzz planer. These tools are group-driven by a 5-hp induction motor located on an overhead platform. A platform is provided 10 ft. above the floor for storing sash and signs. The machine tools in the carpenter shop are installed side by side so that they can be fed with lumber without mutual interference. A paint shop of the same size as the carpenter shop adjoins the latter.

The shop storeroom is about 81 ft. x 19 ft. in size. Three sides of the room are provided with storage bins and at each end of the room is a gallery with 300 sq. ft. of floor area, supported about 10 ft. above the floor level. In general the parts stored are segregated in the classification of truck parts, motor and control parts, line fittings and car fittings. The galleries are used for the storage of shovels, brooms, heavy tools and incandescent lamps. Although the company operates an extensive central station and power service in addition to its railway facilities, the shops are devoted exclusively to transportation repairs. The blacksmith shop is located at the southern end of the machine shop. It is equipped with a forge blower and exhaust fan driven by a 3-hp induction motor. Bar iron is stored in the blacksmith shop on a rack five tiers high and 14 ft. long. The storeroom lighting is effected by skylights of ribbed glass.

WHEEL PRACTICE

The company turns car wheels by revolving them in the heavy Niles lathe by pin drives through the space between the spokes. This enables the making of a positive drive from the face plates, without springing the shaft, and it avoids the uneven cutting sometimes resulting from an axle drive. When tires are turned a small shoulder is left on the wheel tread close to the flange, which frequently saves the loss of ¼ in. of stock on the tire. High-speed tools made by the Midvale Steel Company are used in the tire turning. The tool size is 1 in. x 1¼ in. and the tool holder is 3 in. long x 2⅛ in. wide.

Cast-iron wheels are used on the city lines and steel-tired wheels on the suburban runs. The company's standard axles are 4½ in. in diameter at the center and 5⅛ in. in diameter at the wheel seat, the wheel diameter being 33 in. The journals are of the MCB type, 7 in. x 3¾ in., and the tires are 2½ in. thick with 3-in. tread and 1⅛-in. flange when new. The tires are permitted to wear down to ¾ in. thickness. The company turns an average of two sets of wheels daily and obtains an average tire life of 120,000 miles. A solid gear has been adopted. On account of the rigorous Bangor weather the winter life of the cast-iron wheels is about 20,000 miles, compared with a summer life of 50,000 miles.

Tires are expanded for shrinking upon hubs and for their removal by gas and air heater consisting of a ring of 1¼-in. pipe 3 ft. in diameter, on the inside of which are bored ⅛-in. holes set 1½ in. apart. The air is supplied under a pressure of 25 lb. per sq. in. Although the heat is intense enough to drop off a tire in five minutes, the device may be held in the hand with perfect comfort. A six-station watchman's clock and recorder system of Holtzer-Cabot make is installed in the shops.

The master mechanic of the shops is C. H. Sanborn, who succeeded M. E. McCormick upon the advancement of the latter to the post of assistant superintendent of the railway system, following the death of former Superintendent W. H. Snow. The superintendent of the railway service is C. H. Johnson.

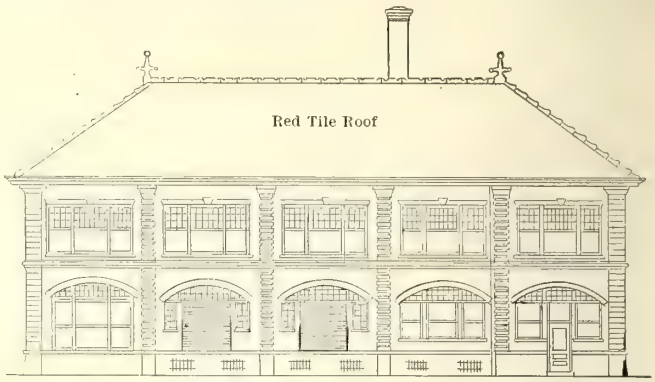
Ambassador Oscar Straus sends from Constantinople a translated copy of a new "Law of Concessions," recently passed by the Turkish Parliament. It is intended to apply to public utilities as distinguished from concessions governing mines and quarries, commercial, agricultural, industrial and financial enterprises. The copy of the law is filed for public reference in the Bureau of Manufactures.

NEW ST. LOUIS EXPRESS TERMINAL

The St. Louis Terminal Railway Company, a subsidiary of the Illinois Traction System, is erecting an express station at Twelfth Street and Lucas Avenue in St. Louis. This building is of particular interest because it is of a higher type of construction than usually is employed for electric railway freight or express stations. The new building has a frontage of 88 ft. 4 in. on Lucas Avenue and 263 ft. on Twelfth Street. It is "L" shaped, each wing having a clear inside width of 33 ft. 10 in. The ground space within the "L" will accommodate a series of parallel loading tracks so spaced that freight may be wheeled through the cars nearest the station and into other cars on parallel tracks.

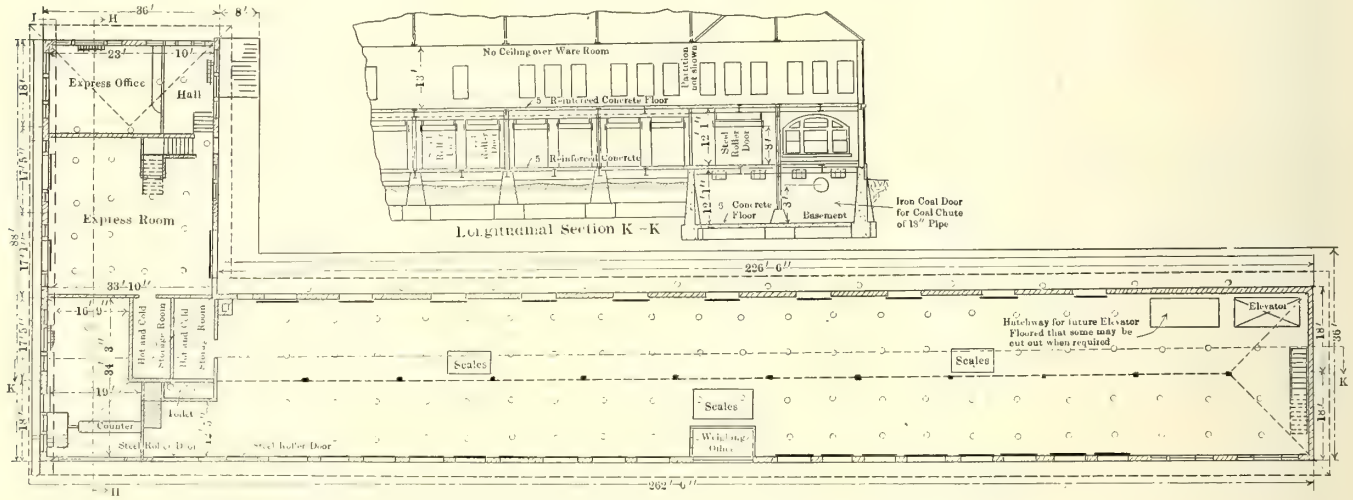
The building is two stories high. The longer wing will have two warehouse floors each 226 ft. 6 in. long by 33 ft. 10 in. wide interrupted only by a row of steel roof-supporting columns along the center line. The smaller wing will be subdivided on the first floor into an express room, space for clerks and two hot and cold storage rooms, each 7 ft. 10 in. by 16 ft. 5 in. in the clear. One of these storage rooms will open into the express room and the other will connect with the large freight room. The walls of the storage rooms are to be built of heat insulating material and steam radiating pipes will be installed in each so that, according to the time of the year, the two rooms may be used for hot or cold storage purposes. The second floor of the smaller wing will be subdivided into eight offices each about 15 ft. x 18 ft. in size and provided with a closet 3 ft. x 7 ft. in size. The second floor of the longer wing will not be ceiled and will provide storage space for heavy freight, which can be handled by either of two elevators 6 ft. x 14 ft. in size. Toilet facilities will be provided on both floors.

The new express terminal is located close to the center of the business district of St. Louis and just across the street from the proposed 12-story passenger station and office building of the Traction Company. Because of its prominent location special care has been taken to design a structure which will have an attractive appearance. The materials chosen for the side walls of the express station are Bedford stone for sills, watertable, lintels, etc., hard-burned buff brick for exterior walls and red French-A tile for the roof covering. The side and partition walls are to be supported on concrete foundations carried to a depth which will give a basement 12 ft. high in the clear. The basement will have a 6-in. concrete floor. All the foundations are to be made of a 1:3:5 mixture of concrete reinforced where necessary with 1-in. corrugated bars. The



Illinois Traction System—End Elevation of St. Louis Express Terminal

side-wall foundations will be 18 in. thick at the ground line. Along the track side of the building will be a reinforced concrete loading platform 7 in. wide placed on a level with the floor of the freight warehouse. The partition walls, except those in the basement, which are to be made of concrete, will be made of Mackolite 4 in. thick, bonded and laid in lime



Illinois Traction System—First Floor Plan and Section of St. Louis Express Terminal



Illinois Traction System—East Elevation of St. Louis Express Terminal

mortar. Such partitions will be used to subdivide the office section of the building. The warehouse and the express room will have a 5-ft. wainscot laid with impervious buff brick. The floors throughout will be made of reinforced concrete carried on structural steel members and columns enclosed in concrete. A 1:2:4 concrete mixture with a 1-in. Granitoid wearing surface will form the floor structure. The floor slabs, which have a span of 9 ft. 6 in., will be reinforced with triangular-mesh

steel reinforcing material having a metal area of .162 sq. in. per 12 in. of width.

The roof will be carried on steel trusses 14 ft. deep having a span of 35 ft. 9 in. These trusses are to be spaced 19 ft. apart and will carry a concrete sheathing reinforced with Kahn Hy-Rib metal. The mixture for the sheathing will be 1 part of Portland cement and 3 parts of sand, to which will be added 2 per cent of Hydratite or similar concrete waterproofing powder. The roof covering will be ornamental French-A tile with special corners and angle pieces. The ceilings on the second floor and in the offices on the first floor will be plastered on No. 18 wire cloth supported on 1-in. channels.

The wall construction for the two hot and coal storage rooms on the ground floor will be composed of an outer wall of 4-in. Mackolite plastered on the outside and lined inside with ½-in. Union Fiber Company's refrigerator Linofelt. The doors to the hot and cold storage rooms will be 2-ply 2-in. matched wood with weather-stripped plank frames and lined on the inside with Linofelt. Floors will be given a uniform slope to a center drainage outlet.

The building will be heated by a low-pressure steam radiating system fed from a smoke-consuming type of boiler located in the basement under the office section. A complete system of illumination with a busbar type central control board designed for Edison plug fuses for each distributing circuit will be installed.

SINGLE PHASE FOR THE HOOSAC TUNNEL

The statement in the annual report of the Boston & Maine Railroad, just issued, that plans are being prepared for the electrical equipment of the Hoosac tunnel, calls renewed attention to the electrification plans of the New York, New Haven & Hartford Railroad, because owing to the control of the Boston & Maine Railroad by the New Haven Road this work of electrification will be conducted by the electrical engineering department of the New Haven company.

The New York, New Haven & Hartford Railroad has at present five electrification plans in consideration or under way as follows:

First, the equipment of the Hoosac tunnel, which is about 25,000 ft. in length and has two tracks.

Second, the electrical equipment of the New York, Westchester & Boston Railroad, which extends from 180th Street or Adams Street, in New York, to the corner of East Fulton Street and Columbus Avenue, thence across the present New Haven tracks to North White Plains on the north and New Rochelle on the east. At 180th Street, New York, the road will connect with the present subway, for which it will act as a feeder. This line is 21 miles in length and consists of two tracks and four tracks.

The third electrification plan is that of the Harlem River branch from New Rochelle to Morrisania and consists of six tracks.

The fourth is the extension of the present electrified section of the road from Stamford to New Haven, consisting of four tracks.

The fifth is a study of equipment of the Boston terminal and of the electrical zone around Boston.

It will be of great interest to learn that a decision has been reached to use the single-phase system at 11,000 volts on the first four of these systems. The system to be used in the Boston electrical zone has not been determined.

The section comprising the Hoosac tunnel line to be equipped will be from North Adams, which is beyond the west portal, to the immediate vicinity of the east portal. Both freight and passenger trains will be hauled through the tunnel by electric locomotives, of which there will be five of the straight single-phase type. Power will be obtained from a station which will be erected by the company. This station will have a capacity of 6000 kw in two 3000-kw turbine units. An 11,000-volt overhead system will be erected in the tunnel, which has a height of 18 ft. or a clearance of slightly more than 4 ft. above the cars. Work has already been commenced on this installation. Messrs. Stillwell and Putnam, of New York, have been retained as constructing engineers for the Hoosac tunnel electrification under the direction of the New Haven engineers.

The second electrification plan mentioned is that of the New York, Westchester & Boston Railway, which will also be single-phase, but the service will be entirely by motor cars. About 75 to 100 cars will be required. The ratio of motor cars and trail cars has not yet been finally determined. This will also be a straight single-phase road, without direct-current complications, and 11,000 volts will be used on the trolley. It is interesting to learn that before the adoption of the single-phase system on the New York, Westchester & Boston Railroad the New Haven road secured from Messrs. Stillwell and Putnam a report on the proper system to use. The decision of these engineers was in favor of the single phase, at 11,000 volts, similar to that used on the main line of the company.

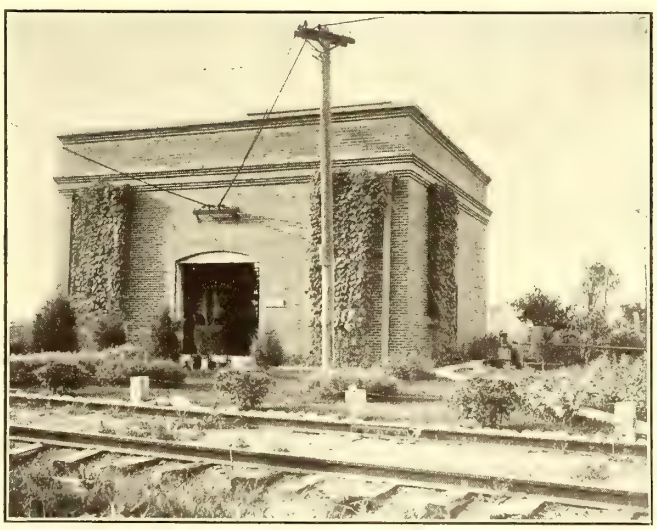
An account was published in the issue of this paper for April 16, 1910, of the details of the overhead equipment to be used on the Harlem River branch of the New Haven road, whose equipment with the single-phase system was authorized by the directors some time ago.

The extension of the main line electrification from Stamford to New Haven has been authorized by the directors, but will not be undertaken until some of the other work described above is further advanced.

All of the engineering work mentioned is under the direction of the engineering department of the New Haven railroad, of which E. H. McHenry is vice-president and W. S. Murray is electrical engineer.

PRIZES FOR ATTRACTIVE SUBSTATION GROUNDS

C. D. Morgan, general manager of the Indianapolis, Crawfordsville & Western Traction Company, announced in the spring that he would give money prizes to the substation employees who succeeded in getting the grounds around their buildings into the most attractive shape. The accompanying illustration shows a view of the yard and substation building at Raucks. The lawn has been seeded and ornamental shrubbery has been cultivated until the spot draws favorable attention from the passengers on the cars. This work is to be commended because the majority of the substations along the line of many interurban roads have been designed without much regard to outer appearance and usually the surroundings receive very little attention.



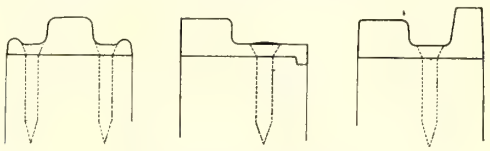
An Attractive Substation at Raucks, Ind.

Plans are at present being considered for the electrification of a portion of the North Western Railway in the environs of St. Petersburg, Russia. It is proposed to build a power station for the development of the water-power of the Wolchow River.

HISTORY OF STREET RAILWAY RAILS*

BY E. B. ENTWISLE, CHIEF ENGINEER, LORAIN STEEL COMPANY

Before electric traction became general, and, indeed, for a limited period thereafter, the use of the stringer rail was almost universal. Two types are illustrated herewith, the center and the side bearing, also the guard rail for curves. These were spiked to continuous wooden stringers which rested upon cross-ties spaced 7 ft. to 10 ft. apart. This type of construction has been replaced by the girder rail, the development of which is shown by the absence of any lower flange in the first designs. The difficulties encountered in rolling girder rails with

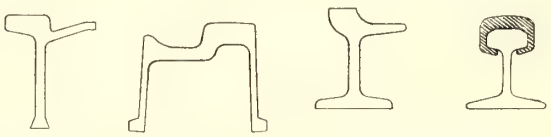


Stringer Rail Sections

wide lower flange, especially of the grooved or guard type, were many, but were finally overcome by the Universal mill which provides a separate roll with a vertical spindle for shaping the rail-head and guard in the final pass through the rolls.

The use of T-rails for industrial, steam and interurban railways is now general and is shown in the varying weights of from 8 lb. to 110 lb. per yard. The sections of the American Society of Civil Engineers are in most general use; they originally numbered 13 sections from 40 lb. to 100 lb. per yard. Other sections have been added from time to time. They are commercially known as "A" sections down to 8 lb. per yard and up to 110 lb. The heaviest T-rail rolled weighs 175 lb. per yard and has been used for traveling-crane tracks where excessive loads are carried. In addition to the A. S. C. E. sections we have the American Railway Association sections, types "A" and "B" from 60 lb. to 100 lb., varying by 10-lb. increments; also four Dudley sections and six Pennsylvania Railroad sections, old and new. Before the adoption of the A. S. C. E. sections there were more than 100 different shapes and weights of T-rails.

The manufacture of girder rails was begun when electric railways began to supplant the horse railroads and the old form of tram rail proved unequal to the demands of the



White's Rail, 1888; Lewis & Fowler, 1890; Beer's, May, 1859; Hunter's Renewable Head, 1869, Originally Proposed in 1820

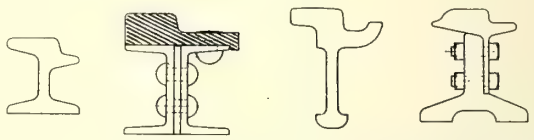
heavier equipment. The Cambria Iron Company was the first to roll a girder rail. It was 3 in. high and weighed about 35 lb. per yard. This rail had a tram ¾ in. wide and was used on one of the cable railways in San Francisco, where it rendered good service for over 20 years.

From 1885 to 1890 various other forms of girder rail were proposed. The Richards rail of 1887 was one of the earlier types of grooved rail, of which large quantities were rolled by the Johnson Company, this being one of the first to have any semblance of a lower flange. The present mode of rolling grooved and "Trilby" rails on a Universal mill had not yet been attempted.

To obtain the advantage of a groove, or a guard, such as we now find necessary on short radius curves, the ordinary form of girder rail was used and the guard was formed by riveting a bar of rectangular shape to the tram. As the demand for a more stable construction increased and the facilities for rolling advanced, there was produced the present guard rail in which the guard is united to the head in a solidly rolled section with a full lower flange. This rail was not successfully produced until 1892 and then only in sections 4½ in. high.

The need for rails of greater height than 4½ in., in order to take care of brick or stone block paving and yet keep the weight of rails under 60 lb. per yard led very early to the form of chairs much used in track laid in the '80s. These chairs were drop-forged, generally 4 in. high, and were in quite common use until rails 6 in. and later 9 in. high were rolled. The use of the higher rail has caused the almost entire disappearance of chair construction.

The 9-in. high girder rails first were rolled late in 1892 and about two years later the 9-in. guard rail followed. In 1890 the Gibbon rail was introduced. One railway at least tried the experiment of operating electric cars over this construction which consisted of the old form of stringer rail with a small depending flange through which the rail was secured to short cast-iron boxes placed at intervals of about 5 ft. No cross-ties were placed under the boxes, the rails being held to gage simply by tie bars. This proved to be unsuccessful. The same inventor later produced the duplex rail, in which one-half represented the head and the other half the tram. These broke joints about midway in each length and were secured through the vertical webs to cast-iron chairs, which in turn were spiked to cross-ties in the usual manner. So far as the writer knows, this was the only rail rolled in two distinct halves which ever secured an actual trial in track. Many other forms of duplex



San Francisco, 1877; Moxham Girder, 1885; Richards', 1887; Littell's, 1887

rail have been invented, but their alleged advantages do not appear to have induced many engineers actually to place them in use.

A box girder rail was patented by W. C. Wood in 1890 and was known as the Lewis & Fowler rail. This rail had many strong adherents and was for a time commercially successful, but of late years it has given way to the present single-web girder rail, which is now considered standard. One firm alone has produced more than 870,000 tons of girder rail within the last 10 years.

In the 25 years in which the Lorain Steel Company and its predecessor, the Johnson Company, have been rolling girder rails, 200 different sections have been produced. These have varied from 3½ in. to 9 in. in height and weigh from 30 lb. to 164 lb. per yard. About one-half of these sections are now available, the remainder having been declared obsolete. This census of the rail sections produced does not include T-rails, slot rails nor the electrically welded sections which for a brief period occupied the attention of track inventors and designers.

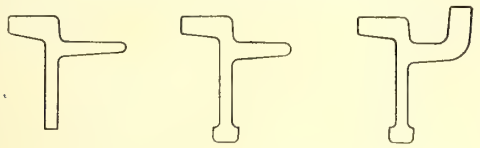
The limitations of this paper forbid a description of the various forms of current track construction. However, we may refer to one type of track construction recently adopted by the Board of Supervising Engineers of Chicago Traction and of which track a large mileage has been laid and is in successful operation. No other city in the United States has laid an equal amount of track material during the same time. The Lorain Steel Company alone furnished more than 65,000 tons of Chicago section for straight track, the rail being of the Trilby pattern 9 in. high and weighing 129 lb. per yard. The first rail of the new construction was laid June 18 1907.

One of the characteristics of the Chicago concrete track was the use of Carnegie steel ties weighing 14½ lb. per foot. It was considered that the best construction would be obtained by inverting the tie, placing the base, which is broader than the head, on top so as to get a broader bearing for the rail on the metal surface. These ties were laid 5 ft. centers in connection with 2-in. x 5/16-in. tie rods spaced 6 ft. centers. A similar

*Abstract of a paper read at the meeting of the Central Electric Railway Association, Indianapolis, Ind., Sept. 22, 1910.

construction was planned on the route of the old cable track, but with wooden ties spaced just the same as the old yokes of the cable track. This spacing was later reduced from 5 ft. to 3 ft. Where traffic prevented this construction, or because it was less costly to repair if disturbed by sewer or water-pipe construction, a trench about 2 ft. deep was dug and 8 in. of crushed stone used to fill in; wooden ties were laid on this and then concrete was applied to fill it up to within 6 in. of the top of the rail. The paving was separated from the concrete by a 1-in. sand cushion. The ties were placed 2 ft. centers and the tie rods 6 ft. centers.

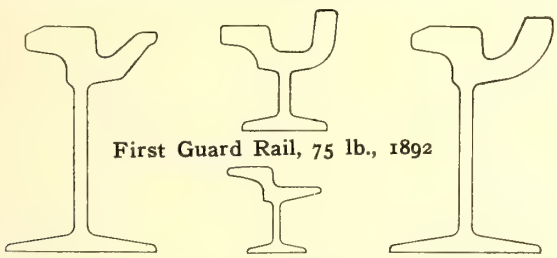
It has been said that the necessity for a girder rail weighing



Development of the Girder Sections

129 lb. per yard is questionable. However this may be, manufacturers are willing to roll lighter or even heavier rails provided railway engineers call for them. It is a long call from the first girder rail our company rolled in any great quantity, namely, section 38 lb., No. 111, to the Chicago section 129 lb., No. 403, but it must be remembered that cars and car equipments have been growing larger and larger. The weight relation between the bobtail car and the present pay-as-you-enter car (both having seen service in Chicago) is probably 1 to 25 or 30, whereas the increase in the height of rail is about 1 to 2½ and the weight about 1 to 3½. The bobtail car is 12 ft. long and the pay-as-you-enter car 48 ft. long.

It may be that we shall have still larger cars and that larger and heavier rails will be required, but to the writer it appears that for the width of street set apart for street railways in most of our cities we have about reached the limit in car



Chicago Straight Track, 129 lb.; 30-lb. Girder, 1885; Chicago Guard Rail, 145 lb.

width, if not in length, and perhaps in the weight of rail which will carry them at the minimum maintenance cost. Our efforts now should be directed toward the standardization of rolling stock and track, that economy in first cost as well as in maintenance may be successfully practised. The work begun and now being prosecuted with zeal by the standardization committees of the American Street & Interurban Railway Association deserves our warmest commendation as being a step in the direction of reducing cost to the manufacturers as well as to the user of street railway materials.

The report of the New York Public Service Comission, Second District, as to passenger train delays for July, 1910, shows that 68,715 trains were run, of which 82 per cent were on time at division terminals. The average delay for each late train was 25.2 min., and the average delay for each train run was 4.6 min. The principal causes of delay were: Waiting for trains on other divisions, 32 per cent; train work at stations, 16.2 per cent; waiting for train connections with other railroads, 14.6 per cent; trains ahead, 7.6 per cent; wrecks, 5.9 per cent; meeting and passing trains, 5.7 per cent; engine failures, 5 per cent. The best records were made by the Norwood & St. Lawrence Railroad, 98 per cent, and the Little Falls & Dolgeville Railroad, 98 per cent.

THE DESIGN AND EFFICIENCY OF HIGH-TENSION INSULATORS *

BY A. O. AUSTIN, ELECTRICAL ENGINEER, OHIO INSULATOR CO.

When we consider the importance of the insulator to any transmission system, we are surprised that so little systematic research work has been done. The principal reasons for this are that the manufacturer depends largely on secret processes and that experiments leading to the production of new types must extend over a very long period. In 1904 the Bay Counties and Standard Electric lines of California were being reinsulated, and it was decided to see what improvements could be made. Although the new insulators were the largest then manufactured, it was considered that it was only a matter of time before they would be giving trouble in fog sections.

The early experiments soon made it evident that if improvements could be made in the porcelain body and glaze, the efficiency of the insulator would be increased and its production cost decreased. By 1905 it was found that the high efficiency insulator could be made more cheaply than the regular types. It was during these early tests that there was developed the disk suspension insulator, which has been adopted on practically every transmission line installed in the last two years.

As the current for testing insulators is very small and the potential extremely high, ordinary methods of measurements cannot be used. To analyze the behavior of certain types, it is necessary to try a number of each. The insulator is designed to support the transmission conductors, and is much stronger than the pin or supporting structure, except in extreme cases. Unnecessary mechanical strength in the insulator is to be avoided where it is obtained at the expense of electrical reliability. Although very little has been done along this line, much can be accomplished by making the gripping or cementing surfaces small but of very high efficiency. Electrically, the insulator must prevent serious leakage of current between the conductors or between the conductors and ground, either through the air or over its surface.

While the rating of insulators is usually based on wet or rain tests, much more attention should be given to the dry flash-over characteristics. In rating the insulator careful consideration should be given to the effect of locality and the manner of installation. The insulator should be designed not so much for high limits in the laboratory as for working efficiency on the line.

Fig. 1, on page 466, shows two types of insulators, each composed of four shells. These insulators were connected in multiple for the test. In type "A," the low efficiency design, the arc followed a path of 46 in. and built up over the surface, while in type "B," the high efficiency design, the arc built up through the air a distance of 19⅛ in. The potential necessary to cause this flash-over was 225,000 volts, corresponding to a needle gap of 23 in.

It is well known that a little dirt on a surface will permit flash-overs at a very greatly reduced potential. In analyzing the two styles for dielectric strength, the possibilities of type "B" are very apparent. Type "A" is a four-part insulator with a short inner shell, two large intermediate shells and an 18-in. top. When this insulator is tested under dry conditions, it is found that the small inner shell flashes or spills over at about 200,000 volts depending on the size of the pin and the amount of cement. On an unassembled or part test this inner shell may be tested to flash-over but no higher. It follows that if the same character of flash-over occurs in the assembled insulator, the part receives the same potential, so that assembling gives no gain in the factor of safety against puncture. The same fact holds for the other parts, as the arc is formed over the surface in each case. This reasoning holds no matter what the aggregate of the individual test voltages may be. In this particular insulator the sum of the test voltages for the several parts exceeded 270,000 volts, so it might be supposed that

*Abstract of a paper read at the meeting of the Central Electric Railway Association, Indianapolis, Ind., Sept. 22, 1910.

some of the parts received a potential at flash-over on the assembled insulator less than on the part test because the assembled insulator flashed over at 225,000 volts. This supposition would be logical if the arc built up over all the shells simultaneously. However, investigation shows that first the small center flashes and then the other shells, one after the other, until the arc extends over the entire insulator. Owing to the large drop in potential over the large shells, the entire series cascades with the spilling of one of them, the complete action

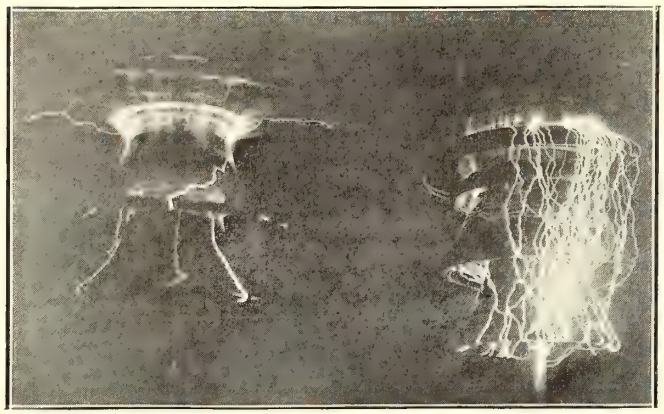


Fig. 1—Type "A" and Type "B" Four-Shell Insulators

taking place during a single alternation. The only intimation of this action is the spilling of the small inner shell, which can be plainly seen since it occurs before the flash-over of the entire insulator. In the assembled insulator when one part is stressed to the flash-over potential before the others, it is said to be overstressed. This overstressing applies to storm conditions as well as to dry flash-overs and it is responsible for the poor showing of a great many insulators.

Fig. 3 shows two insulators in series, the top unit of which is overstressed. The charging current for the large unit is seen jumping around the upper unit. The small insulator flashed over when tested alone at 57,000 volts and the larger

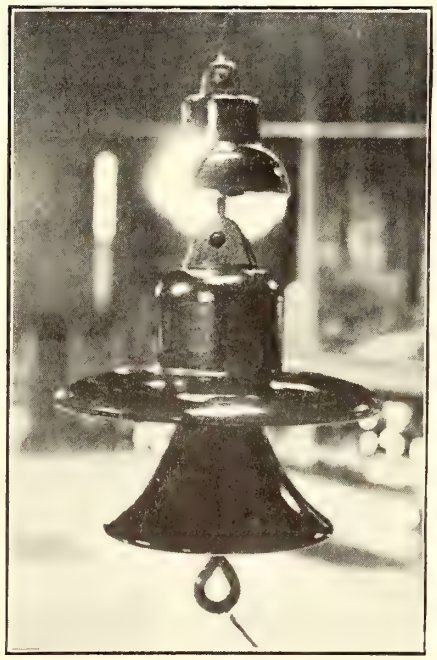


Fig. 3—Overstressed Top Unit of Two Insulators in Series

one at 150,000 volts, while a potential of only 63,000 volts on the series connection was necessary to cause a continuous flash-over of the small unit. On the precipitation test the following results were obtained: Wet flash-over of the small unit, 35,000 volts, of the large unit, 92,000 volts, and of the series connection, 100,000 volts. From this it will be seen that the overstressed member furnished only 8000 volts and was practically worthless when most needed. In addition, the overstressed part was stressed to its arcing potential just before it spilled. This occurred on each alternation and the part was in danger of puncturing.

The two units may be considered as two electrostatic condensers in series, and the drop in potential will be inversely pro-



Fig. 2—Type "A" and Type "B" Insulators in Multiple

portional to the respective capacities of the insulators. In the pin type insulator the several parts may be considered as condensers in series, the cement forming the condenser plates and the porcelain forming the dielectric. The electrostatic capacity of the condenser varies directly as the area of the plate and inversely as the thickness of the dielectric. Applying this law to the ordinary pin type insulator, it is seen that the electrostatic capacity of the center shell must be small as compared to the other shells because its cemented area is smaller and the thickness usually greater. Since the electrostatic capacity is least it must carry a greater proportion of the stress on the assembled insulator. This accounts for the frequent punctur-

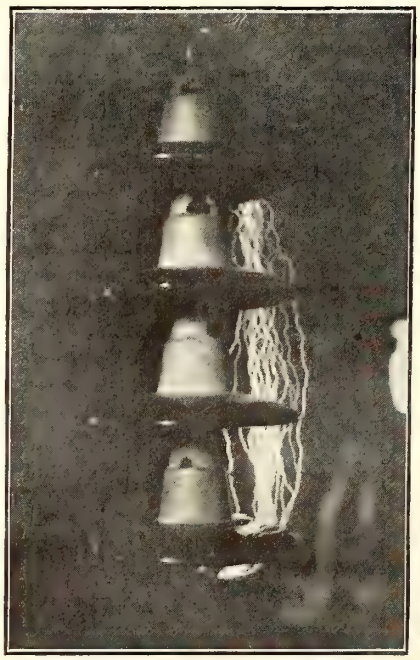


Fig. 4—Dry Flash-Over Tests on Type "B" Insulator

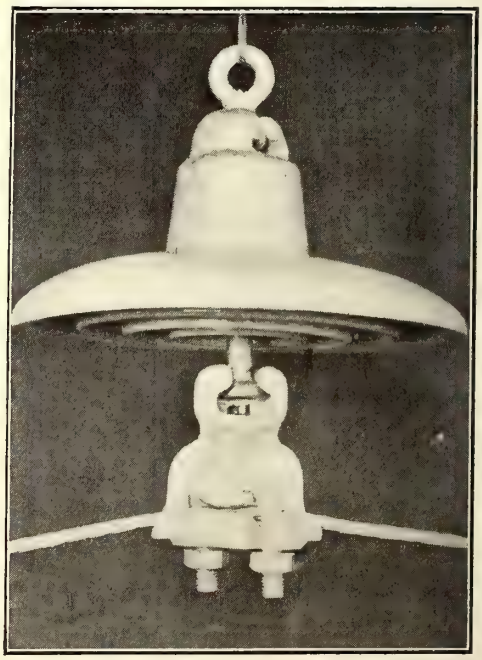


Fig. 5—Single Section of Type "B" Insulator with Tower Eye and Clamp

ing of the center shell on assembled test. The first insulator to be built for an assembly test of 175,000 volts was so designed and the assembled insulator passed the final test without a puncture, the parts first being tested to 60,000 volts each.

If the parts where plain shells are used are too thin, a very high flux density is the result and the parts are flooded with static electricity at comparatively low potentials. This flooding of the surface cuts down the insulation, as the static electricity forms arcs which partially break down the resistance of the air. As the stress in a dielectric varies inversely as the square of the distance from the electrodes, the importance of the distribution of material is apparent.

When the stress is too high the air breaks down and the surface is flooded with charging current or static electricity. The extent of this reduction in insulation is larger than supposed, as was shown by tests on two 10-in. disks having the same flash-over distance between the cap and pin. The plain disk flashed over at 65,000 volts and the petticoat disk at 92,000 volts. In each case the shortest distance between the cap and pin was 8⅜ in. In these designs the addition of 16 per cent in material resulted in an increase of 41½ per cent in the flash-over potential. When compared on wet test the increase in the flash-over due to the high efficiency construction was 60 per cent. In addition to standing much higher tests, the high efficiency type did not become flooded with static electricity and also noisy long before the flash-over potential was reached, as was the case with the plain disk. This example alone will show that it is quality of insulation that should be looked for rather than weight.

The following rules apply to any type of insulator and must be adhered to if the corresponding properties are desired:

To obtain a factor of safety against puncture greater than unity in the assembled insulator, the stress on any part must be less than the tested strength of that part.

To obtain maximum flash-over efficiency the equivalent striking distance between the surfaces should be in proportion to the difference in potential between those surfaces.

In addition to the electrostatic electricity, there is a distribution of stress due to surface leakage. The leakage path of a cylindrical rod has for resistance a quantity proportional to the length of the rod and inversely proportional to the circumference of the rod; the resistance of the path per inch length will then be the same at any point. If the diameter of the rod varies, the width of the leakage path varies in proportion to the circumference and the resistance per inch of length at any part will be inversely proportional to the diameter.

The curve, Fig. 6, shows the relation between the diameter and the surface resistance. Where the variables in the leakage path may be expressed in differential form the equation

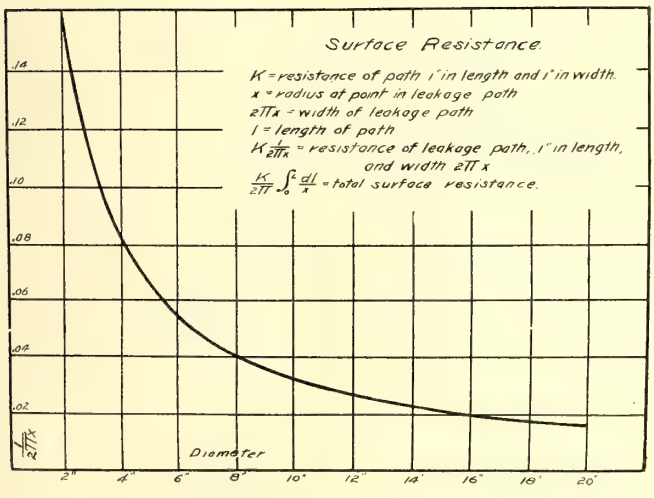


Fig. 6—Relation Between the Diameter and Surface Resistance of Insulators

may be integrated to find the resistance for the part. The curve shows that the surface resistance drops off very rapidly with an increase in diameter. The area between two points on the curve represents the resistance between those two points. The total area under the curve is proportional to the resistance of a flat disk. The curve shows that little surface resistance is gained by the use of parts of large diameter and that if the leakage surface is to be effective, it must have length and small diameter.

The vertical petticoat added to a flange furnishes surface resistance of best form, for it has the surface characteristics of the tube, namely, length of path of uniform width. The petticoats on a disk in addition to increasing greatly the surface resistance of the part increase the flash-over potential, thus serving a twofold purpose.

Fig. 2 shows on test two types of suspension insulator in multiple. Type "A" is flashing over while type "B" shows but

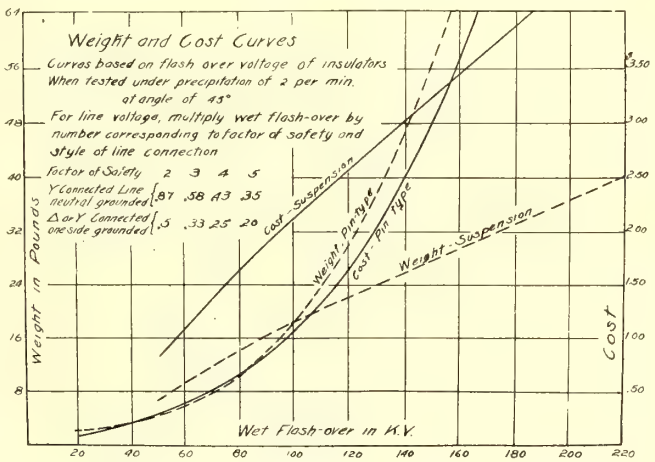


Fig. 7—Weight and Cost Curves of Pin and Suspension Insulators

little static electricity. Type "A" is composed of two 14½-in. sections having a total weight of 45 lb. and a length of 20½ in.; "B" is composed of three 10-in. sections, having a total weight of 24 lb. and a length of 17¼ in.

Fig. 4 shows four sections of type "B," on dry flash-over with the arc striking clear of the insulator at 285,000 volts.

The following table shows the properties of a 100,000-volt insulator of each type:

	Type "A"	Type "B"
Number of sections	4	6
Diameter	14½ in.	10 in.
Length of insulator	41 in.	34½ in.
Wet flash-over	235,000 volts	265,000 volts
Tested dielectric strength	440,000 volts	540,000 volts
Surface resistance	K 440	K 527
Per cent of minimum to maximum width of leakage path	10.6	16
Mechanical strength	10,000	10,000
Formation of arc, dry	over surface	through air
Formation of arc, wet	over surface	through air
Total weight	90 lb.	48 lb.
Weight of porcelain	62 lb.	30 lb.
Depreciation due to loss of one section	25 per cent	16⅔ per cent
Number of cemented joints	12	12

The table shows that type "B" is remarkably efficient, accomplishing more than type "A" with approximately half the material. Fig. 5 shows a single section of the type "B" high efficiency insulator with tower eye and wire clamp. Single sections of this insulator, when provided with an eye pin and cap, are used for guys and to make dead ends on the lower voltage lines found in railway work.

In insulating any line it is well to remember that stress thrown on the insulator, due to lightning, does not depend on the line voltage. For this reason, insulators with a much higher factor of safety should be used on the lower voltages. Types having long narrow shells close to the pin, or having little thickness of material between the pin and the conductor, should never be mounted on a metal pin but on a wooden pin of good length thoroughly impregnated with paraffine or oil. The insulator when mounted in this manner will give good service even when the lightning conditions are severe. In this case the pin must be considered as part of the insulator and the climatic conditions must be such that the pin will not burn. Only moderate sized insulators should be installed in this manner, as the charging current sufficient for the largest types is enough to burn a wooden pin. It is impossible to prevent breakage on

the line, but the insulator should be such that ample insulation remains should one part become broken.

Fig. 7 shows some weight and cost curves of pin type and suspension insulators based on the flash-over voltage of insulators when tested under a precipitation of 0.2 in. per minute at an angle of 45 deg.

When lines are equipped with insulators of high efficiency design and great dielectric strength, much of the trouble will be eliminated. Where thin parts are used, a high flux density may be set up in the material and the insulator puncture or shatter like an overcharged Leyden jar. In conclusion it may be said that when the properties which produce reliability in the transmission insulator are fully understood and ample insulation is provided, much will have been done to make the transmission line as reliable as possible.

THE DESTINIES OF 500-VOLT D. C., 1,200-VOLT D. C. AND 6,600-VOLT A. C. MOTORS *

BY W. E. DAVIS, VICE-PRESIDENT CLEVELAND CONSTRUCTION COMPANY

A few years ago, during the construction period of the Aurora, Elgin & Chicago Railroad third-rail system, the treasurer of one of the leading trust companies in Cleveland made to me the following statement: "What is the use of building a new power plant? Before it is completed it is obsolete, due to the extraordinary development of the methods of producing and distributing electrical energy." In this case this statement happened to be particularly true, for it occurred very shortly before the introduction of the steam turbine as a generating unit, but at the time of the remark this machine had not been quite perfected to a point where it could be unqualifiedly recommended. The same remark could, with great justice, be made at the present day, under similar conditions, when we see looming up before us the development of the internal combustion engine.

Steam railroads are demanding a system calling for a tremendous output of energy over long distances, and are slowly but surely feeling their way toward electrification and even more slowly but surely overcoming the tremendous existing prejudices of all steam railway employees against electrical application. But the managements of these lines are wise enough, in most cases, to see the handwriting on the wall, and no steam railway to-day is complete without its corps of competent electrical engineers. Yet practically all steam roads are holding back electrical development to-day, awaiting results. They have far too much at stake to move otherwise than with the greatest caution.

Cities are demanding the abatement of smoke and noise due to the operation of steam locomotives, and are passing ordinances compelling the adoption of other power than steam. This result in congested districts is inevitable—but what system can be used to fulfil such requirements? A few months ago the city of Chicago passed such an ordinance applying to all steam roads entering the city. No one stopped to think of the fact that within the city of Chicago there are upward of 3000 steam road sidings into the different factories, yards and warehouses, used more or less continually by heavy steam locomotives and trains of freight cars. No one stopped to think that there is in existence to-day no system of electrical application that would properly control such conditions. The ordinary 500-volt trolley is not to be thought of, being utterly inadequate. The third rail is impracticable with streets and highways. The high-tension trolley wire is equally so, because of its dangerous characteristics when placed at such locations. Therefore, the able attorney of the Chicago & Northwestern Railway, in an address on this question before the Chicago City Council, asked: "How shall we do it?" He is as yet unanswered.

A very few years ago the leading electrical manufacturing companies introduced to the public the so-called single-phase system, using not only alternating current for distribution but alternating current motors for car equipments. At last was found the remedy for all ills to which the electric railway is heir, and an enthusiasm was displayed in this respect by both companies that was too good to last. In other words, the departure was a little too radical to warrant immediate success. New principles were involved and the new conditions produced were ascertained only by actual operation.

One of the greatest supposed merits of the new system was the possible operation upon both a.c. and d.c. This was certainly ideal for long-distance lines, particularly when they entered and operated upon a city system at the terminals or elsewhere. The conclusion must not be drawn that we are prepared to condemn the single-phase system. Far from it. It is the writer's desire to designate what, in his opinion, are the weak points. One of the most important is the complication brought about by the interchange of alternating and direct current in the same apparatus. These complications may possibly be satisfactorily taken care of upon large locomotives, where there is ample room and accessibility of parts, but up to the present time this arrangement for ordinary interurban and city work is, in our opinion, to be strongly criticised.

On the Washington, Baltimore & Annapolis Electric Railway, where the single-phase system was introduced and where complications of single-grounded trolley d.c., double trolley d.c. (sometimes grounded and sometimes not) and the 6000-volt grounded a.c. were placed in combination on the same equipment, the intricacy and number of parts were such as practically to condemn the apparatus from the start and eventually the line was changed to the 1200-volt direct current.

Even when operating on alternating current alone, the car apparatus is more complicated than that of a d.c. equipment of the same capacity, and the motors, for the same horsepower, must be from 15 to 25 per cent greater in size. This necessitates larger axles, larger gears and pinions and other operating parts and causes a considerably greater weight and a consequently greater output of energy to operate the car. But the operating expenses due to this condition are to a certain extent offset by the elimination of substations, of heavy feed wire and the simplicity of overhead distribution.

The writer of this article was connected with the construction of the Aurora, Elgin & Chicago third-rail d.c. system west of Chicago, and with the Chicago, Lake Shore & South Bend Railway, using 6600-volt, single-phase current, east of Chicago. These lines are about the same length and have many conditions in common.

In first cost, with equal capacity of power house and equal number of cars and equipments, the average saving with the single-phase system is about 15 per cent so far as the electrical equipment itself is concerned. As both of these railways were built for extremely heavy service and as the consequent cost was large, this percentage saved was sufficient, in the writer's opinion, to offset the extra cost of the maintenance of car equipment, yet up to date the delays, due to defective apparatus, are considerably greater on the alternating than on the direct-current road. This is the one condition to which operating managers so strongly object, and they are thoroughly justified in so doing.

Tests of economy in the consumption of current, in connection with the single-phase equipment, show exceedingly well. It is greatly to be regretted that no standard for the consumption of electrical energy in connection with the operation of railways has yet been devised. We all know that the car-mile is a most ambiguous quantity, varying with the size and weight of car, and even the seat-mile and the ton-mile are no criterions of actual conditions.

The questions of speeds and stops alone are two most important factors and must be considered. Actual tests, covering a period of several months, on the Chicago, Lake Shore & South Bend Railway show an energy output per ton-mile at the power plant of less than 100 watts. The cars covered by such tests

*Abstract of paper presented at meeting of Central Electric Railway Association, Indianapolis, Ind., Sept. 22.

are 57 ft. long, weigh 56 tons and operate at a maximum speed of 60 m.p.h. Recent tests, made by the writer of this article, on six different types of cars in Detroit, the largest car being 44 ft. in length, weighing about 25 tons and equipped with two motors, showed an average consumption of from 85 watts to 150 watts per ton-mile. This difference, of course, is accounted for very largely by the excessive number of stops made by the city cars over and above the interurban, and these results are obtained at the car and not the power house; hence, from 10 to 15 per cent at least must be added for the intervening losses.

Tests made a short time ago on the Western Ohio Railway, a typical interurban high-speed 500-volt system, operating from 45 ft. to 50 ft. cars, with a maximum speed of 55 m.p.h., showed a consumption of current of from 93 to 97 watts per ton-mile at the car. Tests made in Cleveland on four-motor interurban cars of the Lake Shore Electric Railway, in suburban service, showed 73.9 watt-hours per ton-mile at the car. The weight of the car was 37 tons, and four 75-hp motors were used. Therefore, so far as the writer can judge, no criticism can be made upon the economy of current in connection with the operation of the single-phase system.

It might be of interest to state here that the comparative freedom from trouble on the Chicago, Lake Shore & South Bend Railway is probably due largely to the fact that the system is entirely a.c. at 6600 volts, with no d.c. or low-voltage complications.

Another objectionable feature of the single-phase railway motor, and a most important one as well, is the high armature speed. Much trouble has been caused by excessive centrifugal force at high speeds, with consequent loosening of armature coils, and the setting up of a rubbing or chafing of parts which in time is bound to develop inherent defects.

In locomotive work where great power and moderate speeds are demanded the a.c. motor appears to find its destiny. Tales galore can be told on the Chicago, Lake Shore & South Bend Railway of ordinary passenger cars starting 600-ton and even 800-ton trains on 2 per cent and 3 per cent grades, of the operation of trains with from 8 cars to 11 cars on holidays and excursions, and of the operation of the system in snowstorms when every other electric railway and even the steam roads in the same territory were out of business. Indeed, in one case which came under the writer's personal observation, a car ran from Michigan City to South Bend in a snowstorm that tied up every railway in the vicinity, both steam and electric. The snow was 3 ft. deep on the level. No track was in sight either in front or behind the car, but a stretch of unbroken snow as far as the eye could reach, in places as high as the sills of the car itself, and the car had no snow-removing device except a small iron-plate pilot about 30 in. in height. This result was possible because the system possessed the most important factor of all, a magnificent line voltage. Time was actually made up in the run of nearly 40 miles. The deck sash had to be closed to prevent the snow, driven by the car, from filling the passenger compartment, and in passing through the long drifts the car became so dark, at 2 o'clock in the afternoon, that all of the electric lights had to be turned on, yet several minutes of time were made up on this run. In the same storm the Aurora, Elgin & Chicago third-rail system was tied up to such an extent that no car was run for nearly a day. On the single-phase line not a trip was missed and every car was maintained practically on time.

These results are worth a great deal. One wrong impression which the purchasers of single-phase equipment have is that they expect all the virtues of the 500-volt motor to be superimposed upon whatever virtues the single-phase system may have. This expectation has not been their mistake, as they have been led by the manufacturers to believe that such results could be produced.

The single-phase locomotives of the Grand Trunk Railway in the tunnel between Port Huron and Sarnia have shown very economical results. This work is exceptionally heavy duty, namely, the hauling of freight trains up rather steep grades. During practically two years of operation this electric system has shown a net economy, including interest on the capital invested, of more than 15 per cent over the same operation with less favorable results by steam locomotives.

Reports from the New York, New Haven & Hartford single-phase locomotives operated in heavy passenger service are at the present time most flattering, showing a distinct economy over the old system of steam locomotives. W. S. Murray, the electrical engineer of the New York, New Haven & Hartford Railroad, who had the moral courage to recommend this system to his board of directors and the courage to install and successfully develop it, most truthfully said, in effect: "No one can criticise our installation, for there is no precedent or no parallel from which criticism can be derived. Our road is the only trunk steam line electrically equipped, consisting of 40 miles of some of the heaviest passenger service in the world. Unjust comparisons have been made with the direct-current equipment of the New York Central, which is simply a terminal proposition." It is the writer's strong opinion that should the New York Central & Hudson River Railroad decide to equip electrically its main lines from New York City to Albany it would not adopt 500-volt d.c. distribution. The cost would be absolutely prohibitive.

With these facts before us let us search for a sign of the future. We find the 500-volt d.c. system firmly entrenched in all the largest centers of population, with every indication of becoming permanent until some revolution of power application arrives. This condition will to a great extent govern the interurban or dependent lines. Changes will undoubtedly be made with feeder and transmission lines, but the 500-volt trolley application under these conditions is here to stay, at least for a long period of time. New and larger railways will be built, demanding higher voltage and less losses, mechanical and electrical, and to this end the higher potential direct-current system with from 1200 to 2400 volts looks very favorable. Such an arrangement has the decided advantage of being able to operate without complications on both d.c. interurban and city lines, as well as its own, by regulating the voltage at the motor terminals by means of motor combinations, each motor being nominally a 500-volt machine. Then comes the real work in comparison with which all others appear as play, namely, the electrification of the trunk lines of the steam railways. Here is a condition demanding hundreds of thousands of kilowatts, climbing mountains or crossing deserts hundreds of miles from any base of supply, tremendous suburban traffic in proximity to the greater cities, 3000-ton freight trains to be hauled over 2 per cent and 3 per cent grades and speeds of 90 m.p.h. for express passenger trains. Such conditions are to a great extent never thought of in ordinary electric railway practice. Somewhere in this field the single-phase system or modifications of it will find its own.

A short time ago, while the writer was in the factory of one of the largest electrical manufacturers, he saw a mercury gas rectifier which could be placed upon an ordinary directors' table, but from which was being taken nearly 1000 kw of direct current from an impressed alternating current. If this apparatus should become a commercial success it will very greatly simplify many problems of electric traction, because it will allow a conversion from a.c. to d.c. at frequent intervals with practically no substation attendance. New motors are being designed embodying a combination of a.c. and d.c. principles. New discoveries are being constantly made in the line of insulation and the handling of high-tension and apparatus. One of the leading electrical manufacturers is at present attempting to perfect a 2400-volt system with four 600-volt motors in series for each car, with indications that the result will be favorable. The most serious drawback at present seems to be the matter of commutation of generating units. At present it is customary to obtain 1200 volts by operating two rotary converters in series. The operation of four rotaries in series for 2400 volts would be an undesirable complication, and as in several instances in Europe currents of 2000 volts d.c. are being commutated with success, the writer sees no rea-

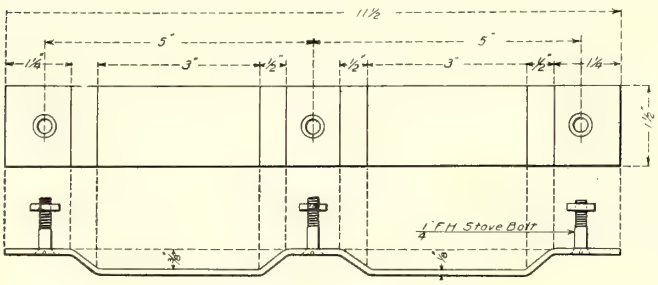
son why the 2400-volt system should not be a feature of the future.

In accord with the universal law, the greater the obstacles the higher we have to go to surmount them. The writer believes that the future of the electric railway will be developed in accordance with the following self-evident truth:

That the voltage employed must be proportional to the duty to be performed.

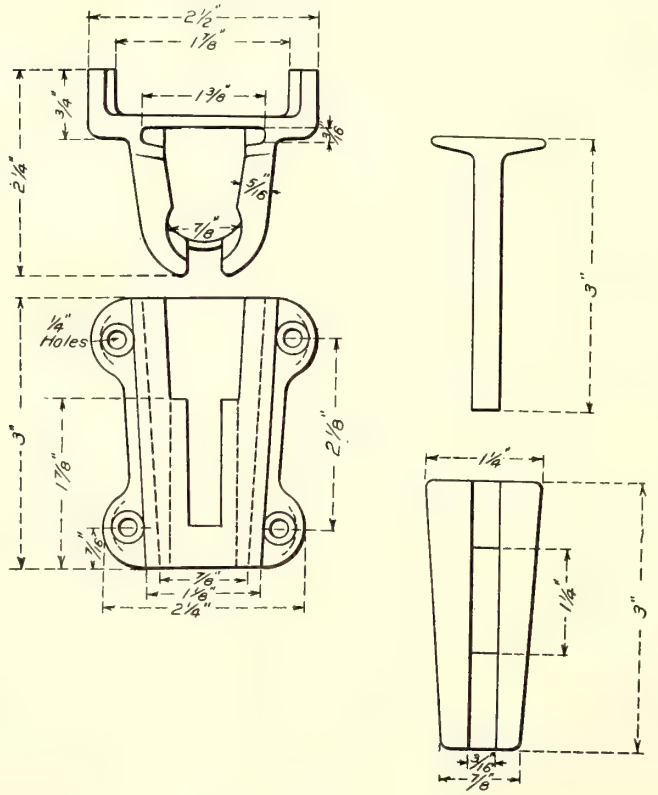
REPORT OF STANDARDIZATION COMMITTEE OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

The standardization committee of the Central Electric Railway Association presented a report at the meeting in Indianapolis, Sept. 22, devoted principally to couplers, pilots, marker brackets and headlight hangers and plugs. A preliminary statement of the report of the committee was published in



Standard Headlight Holder

the issue of this paper for Sept. 10. The main features of the standard coupler, as mentioned in that article, were recommended. The committee, in its report, however, decided to recommend a distance from the center of the swivel pin of the tailpiece and the back end of the tailpiece of 4 in. instead



Marker Bracket and Arm

of 4½ in. as suggested at the Fort Wayne meeting. In addition, it recommended that article 10 of the report of the standardization committee presented at the meeting of the Central Electric Railway Association May 26 read: "Pulling face of coupler to project 6 in. beyond buffer face of coupler at maximum degree of lateral movement of drawbar."

PILOTS, MARKER BRACKETS AND HEADLIGHT HANGER AND PLUGS

In addition, the following recommendations were made:

Pilot to be 3 in. in rear of face of buffer band.

Marker bracket to be as per print and to be placed on corner posts of vestibules, also on center of dashboard.

Style of headlight plug to be as per print.

Style of headlight plug standard as per print.

The committee also decided to request the American Street & Interurban Railway Association to publish all adopted standards in loose leaf forms.

The committee decided to refer the trailer-circuit connector to the association, owing to the fact that the type of connector which the committee considers most desirable was covered by patents. The association was requested to take the adoption of this connector under consideration, subject to a stipulated price for the connectors and all parts pertaining thereto, as the connector meets the full requirements which the committee would recommend.

FROM CHICAGO TO NEW YORK ON ELECTRIC CARS

BY E. C. VAN VALKENBURGH

To the uninitiated the idea of a trip from Chicago to New York seems to be an idle dream, while among those actively engaged in electric railway work the trip is often looked upon as an undertaking involving so much discomfort and delay as to make it unavailable as an every-day undertaking. Honesty compels the writer to confess that, although familiar with the electric railway field generally, he was of somewhat the same opinion until the start was actually made. After that it was one pleasant surprise after another.

While a trip of this kind may not be practical from a commercial standpoint, it certainly offers wide possibilities to the vacationist or the tourist having a little time to spend, and a better way of seeing the country at a reasonable cost would be hard to imagine. All along the way the roads generally show a high standard of equipment and maintenance both in roadway and rolling stock and a very satisfactory rate of speed is maintained. On the few short stretches where roadways are crooked and speeds slow the improvements found or actually under way will make better speeds and service possible within a very short time.

Of the entire distance traveled on electric cars, 1643 miles in all, including numerous side trips, there was less than 250 miles which could not be covered on limited electric trains. As a means of spending a vacation or enjoying an outing, a trip of this kind affords many advantages in addition to the old ones of "No dust, no dirt, no smoke." By other methods of travel one fails to get the view of the various cities and towns that is afforded by the electric car in passing through the principal residence and business streets. And as far as loss of time at the terminals of the various roads is concerned, the delays are usually short and it is a poor town indeed that does not have something of sufficient interest to make all too short the time before the connecting car leaves. Most schedules are so arranged that the wait is rarely more than half an hour at the most, and in many places the cars make close connections.

Another advantage which will be appreciated by those who desire to see all that is possible along the way is the opportunity afforded for making side trips to points of interest. From the various interurban centers it is possible to make almost innumerable side trips, the number and extent of which are limited only by the time at the tourist's disposal.

Among the side trips taken by the writer were those from Toledo to Detroit and Mount Clemens; from Erie to Cambridge Springs; from Westfield to Chautauqua Lake and Jamestown; from Buffalo to Niagara Falls and Olcott Beach, and from Albany to Lake George, Glens Falls and Saratoga Springs and through the Berkshire Hills to Great Barrington.

On a trip of this kind the time required will depend entirely upon the time at the disposal of the tourist and his inclination

to stop and look around. The writer gave to it two days less than four weeks. This time, however, included that required to make side trips aggregating over 800 miles and stops of two or three days each at several points along the route. In only two instances was any traveling done after dark. The trip could easily be made by daylight in a week's time, allowing for short stops at junction points, or in from 45 to 50 hours of continuous traveling.

The distance covered without side trips, but including 30 miles on steam road and 114 miles by boat, was 1163 miles and the cost was $19.64. Excluding 823 miles of side trips, 138 miles of which was over steam roads, the distance traveled amounted to 1986 miles at a total cost of $33.50.

One of the obstacles encountered in planning a trip of this kind is the difficulty of obtaining reliable information before the start is made. It is comparatively easy, when once on the way, to get information covering the route for the next couple of hundred miles, but if the traveler wishes to plan in advance exactly the route he wishes to follow and to know the cost and connections, he has to have considerable perseverance and an ability to write letters asking for information.

Another feature which is apt to discourage the average traveler is the lack of uniform baggage regulation. Over parts of the trip it is possible to check baggage under practically the same conditions as apply on steam roads. Over other sections baggage is checked, but is carried only on certain cars or on express cars once or twice a day. This latter arrangement is not very attractive to one making close connections and covering a considerable distance each day. The other alternative of checking baggage in parcel-rooms during stopovers becomes expensive when there is more than one piece of baggage and the stops are frequent. If the various roads would check hand baggage free at terminal points as an accommodation to holders of their tickets it would do much to popularize through travel and would prove a real convenience and economy to the tourist. The good will engendered should prove of real value to the road. Then, again, in encouraging people to carry their baggage with them it would relieve the roads of handling such as might otherwise be left for the baggage or express car.

The route traversed was as follows:

City car to Pullman Station, Chicago, South Shore Lines (C., L. S. & S. B.) to South Bend.

Northern Indiana Lines (C., S. B. & N. I.) to Goshen.

Winona Interurban Railway to Peru.

Wabash Valley Route (Ft. W. & W. V. T. Company) to Fort Wayne.

Ohio Electric Railway to Lima.

Lima Route (Western Ohio & T., B. & S.) to Toledo.

Lake Shore Electric Railway to Cleveland.

Cleveland, Painesville & Eastern to Ashtabula.

Pennsylvania & Ohio Railway to Conneaut.

Cleveland & Erie Railway to Erie.

Buffalo & Lake Erie Traction to Buffalo.

Buffalo, Lockport & Rochester to Rochester.

Rochester, Syracuse & Eastern to Syracuse.

Oneida Railway to Utica.

Utica & Mohawk Valley Railway to Little Falls.

New York Central Railroad (steam) to Fonda.

Fonda, Johnstown & Gloversville (electric division) to Schenectady.

Schenectady Railway to Albany.

Albany Southern Railway to Hudson.

Hudson River Day Line steamer to New York.

The electric division of the New York Central could have been used from Yonkers to New York, or, as was learned after reaching the city, electric railways could have been used from Tarrytown to New York City. The first of these changes would have added 15 miles to the total electric railway mileage, while the latter would have added 25 miles.

The side trips were:

Detroit United line, Toledo to Mount Clemens.

Edinboro Route (Erie Transit Company) to Cambridge Springs.

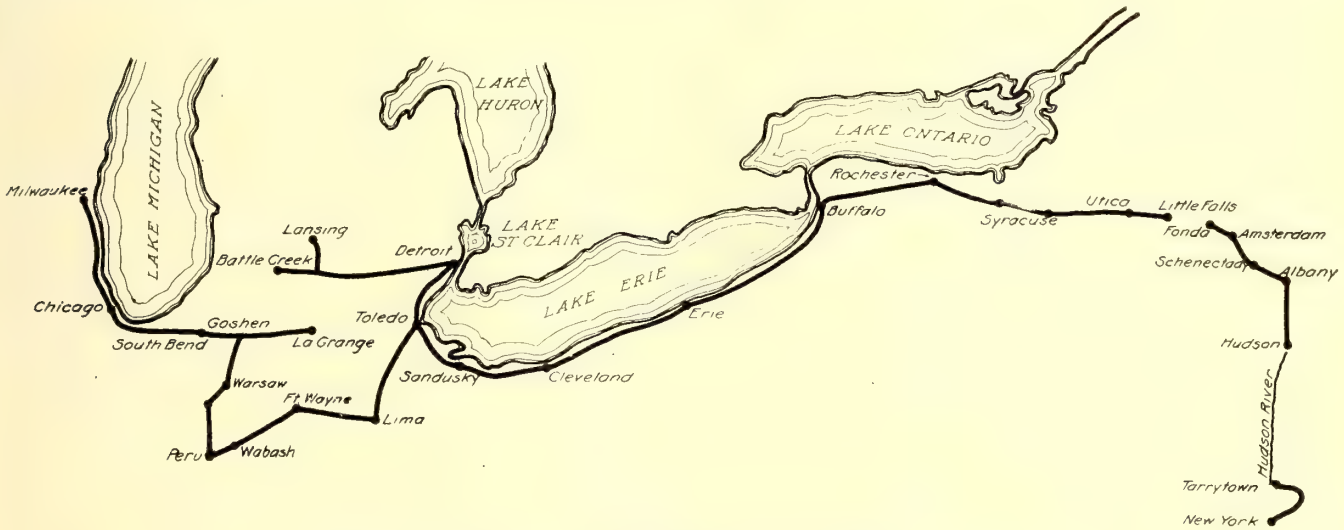
International Railway to Niagara and Olcott Beach.

United Railway, Albany to Troy.

Hudson Valley Railway, Troy to Glens Falls, Lake George and Saratoga.

Berkshire Street Railway, Hoosac Falls to Great Barrington.

In the matter of fares the average is practically 1¾ cents per mile. When compared with through rates on the steam roads there is little if any advantage in favor of the electric railway. When compared with local fares, as they should be, they are on nearly an even basis through the Central States. In the Eastern States, however, where steam road fares vary from 2¼ cents to close to 3 cents, there is a decided advantage in favor of the electric railway.



Map Showing Route for Trolley Tour from Chicago to New York

ACCOUNTANTS' ASSOCIATION LUNCHEON

The American Street & Interurban Railway Accountants' Association will have a "get-together" luncheon at the Hotel Marlborough-Blenheim, Atlantic City, at noon on Oct. 11. A letter has been issued to members of the Accountants' Association, signed by President H. S. Swift and Secretary H. E. Weeks, urging a large attendance at the meeting and the luncheon, which is an annual feature of the conventions.

The Svenska Almenna Electricitiäts Aktiebolag, of Westeras, and the Siemens-Schuckert Company, Berlin, have contracted with the Swedish State Railway authorities to establish a large electricity generating station at Torju to supply the power for the trains on a section of the Swedish Railways.

FACILITATING TRAFFIC MOVEMENT IN INDIANAPOLIS FREIGHT HOUSES

A diagram of the freight houses used by the interurban lines reaching Indianapolis has been issued by the Indianapolis Traction & Terminal Company. It shows the ground floor plan of each of the three freight houses and the location of the doors at which shipments for the various points of destination should be unloaded. In order to avoid congestion a traffic rule is made for drivers of wagons. Copies of the diagram are being circulated in Indianapolis and vicinity. The diagram is reproduced herewith. A circular notice regarding the change in system reads as follows:

"On and after Sept. 20, 1910, all teams entering and reentering the traction terminal freight yards will enter from Ohio Street and move in a southerly direction to Wabash Street, thence in Wabash Street to Capitol Avenue. It is especially requested that shippers give instructions to their drivers to follow this rule in order to avoid the blockades and congestion in the freight house yards. Attention is also called to the diagram accompanying this notice, in order that wagons may be loaded in such a manner as to facilitate the movement of the teams in accordance with this rule.

"SUGGESTIONS TO SHIPPERS

"Send your shipments to the interurban freight houses at the earliest hour possible in the day. At present over 70 per cent of the teams reach the freight houses between 4 p. m. and 6 p. m. This causes congestion and a great deal of delay both to the shippers, teamsters and the interurban companies. Freight trains leave the terminal on nearly all the lines between 11 a. m. and 12 noon which could transport a great deal of the merchandise that now goes out on the late night and early morning trains, thereby reaching destination that much earlier.

"Shipping clerks and draymen should be instructed to load the drays so as to more readily and quickly reach the doors showing destination points on the diagram submitted. All teamsters should be instructed to enter the freight yards from Ohio Street on the north and not undertake to turn around when in the yard, but pursue a general southerly direction into Wabash Street and then west into Capitol Avenue. This will very much facilitate the movement of teams and avoid blockades that now sometimes occur.

"Consignees are urgently requested to remove their freight from the freight houses at the earliest hour possible in order to facilitate the handling of all the merchandise which is outward bound."

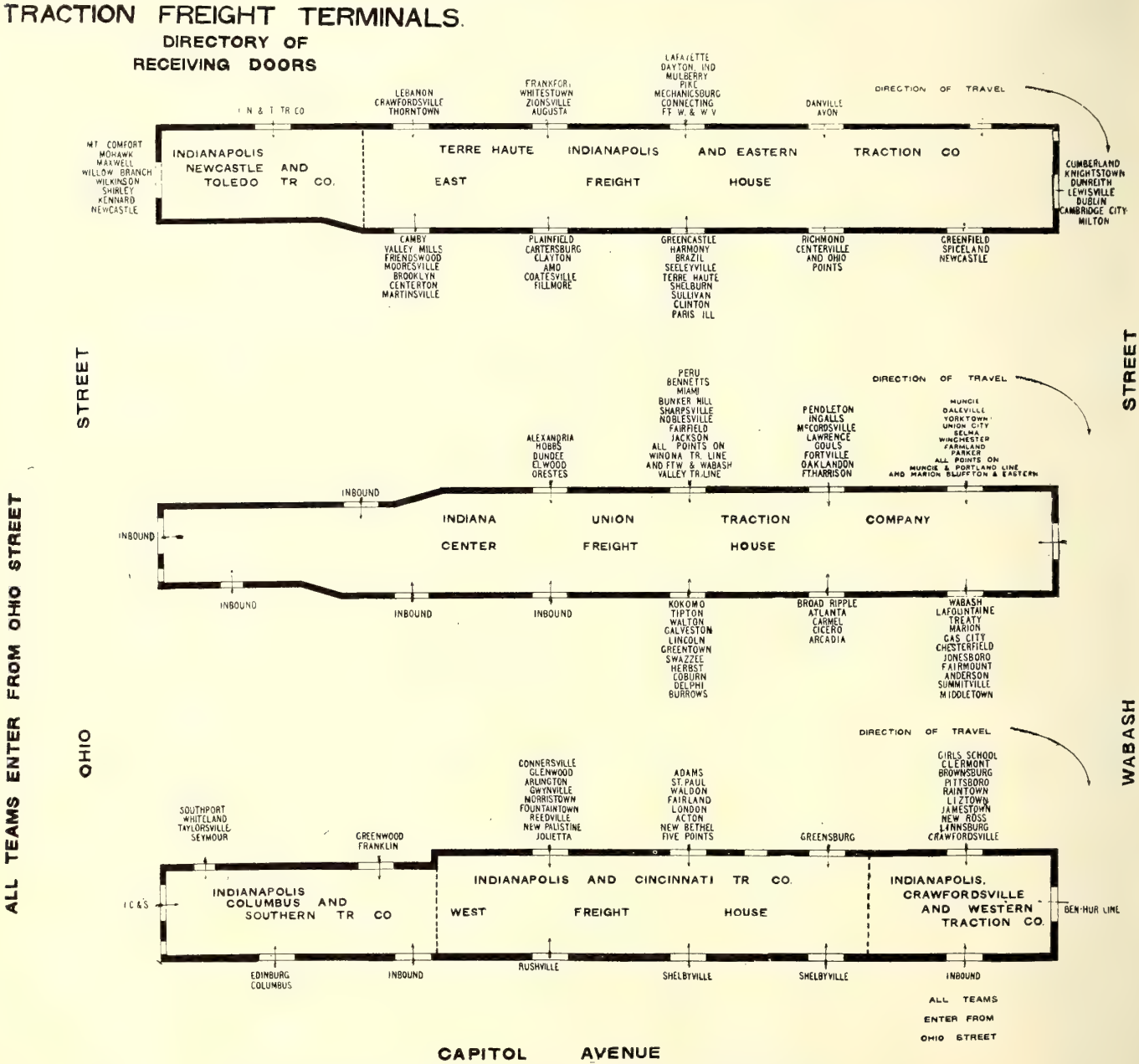


Diagram of Interurban Freight Houses in Indianapolis

REINFORCED CONCRETE POLES AT FORT WAYNE AND SYRACUSE

The Fort Wayne & Wabash Valley Traction Company has now in service about 125 reinforced concrete poles. These poles are used for the most part in city line work and straight track, but the company has placed some poles at corners to test their performance. About 60 additional poles are now being manufactured by the company. The following facts in regard to the poles are taken from a written communication presented at the last annual meeting of the Street Railway Association of the State of New York by one of the representatives of the Syracuse Rapid Transit Company.

The first reinforced concrete poles at Fort Wayne were installed about two years ago, and were two in number. Their satisfactory appearance and performance led the company to increase the number. The appearance of the concrete poles on the street is similar to that of wooden poles painted light gray. The spacing is from 100 ft. to 125 ft. and the same rake is given when setting as for wooden poles. The Fort Wayne & Wabash Valley Company has a large gravel bed on the same lot as its power house, and up to the present time all of its poles have been made by a contractor on this lot at prices ranging from 20 cents to 25 cents a foot, or $7.50 for a 30-ft. pole, depending upon the price of the reinforcing steel. A mixture of one part cement and four parts gravel is used, the gravel being of such a grade that the actual mixture is about one part cement, two parts sand and two parts fine stone. The reinforcing rods are ½-in. twisted bars, 30 ft. long, eight to a pole. The forms are made from three 30-ft. 2-in. hard pine planks, cleated across for the prevention of checking, with the chamfering strips nailed on the sides of the form. A complete form thus consists of three planks and two blocks for the ends. The forms are held together by ordinary bench clamps.

The Fort Wayne company has made a test of these poles as follows: A 40-ft. and 8-in. cedar pole and a 30-ft. reinforced concrete pole were set in concrete about 30 ft. apart and connected with a heavy span wire at the standard height for spans. The middle of this span was loaded with pig iron suspended in a large basket up to a weight of 980 lb., when complete failure of the wooden pole occurred. Before the weight dropped to the ground the concrete pole bent at the ground line and showed a crack on the back side ¼ in. wide down to the first reinforcing bars. After the removal of the load the concrete pole assumed its original form and it is now in use on a corner supporting a quantity of overhead special work.

The method of casting the poles is as follows: The forms are assembled on several blocks or sills to give a firm level bearing and 1 in. of concrete is placed on the bottom of the form throughout the length. Then three reinforcing rods properly spaced are laid on this concrete and more concrete is filled in until the forms are half full. Two more bars are now placed each 1 in. from the sides of the forms and concrete is filled to within 1 in. of the top of the forms, when the last three bars are placed. The remaining space is then filled with concrete and the top smoothed off with a float. As the form is filled the concrete is carefully troweled and spaded, but no other ramming is done and no surface finish is used. The holes for cross-arm and other bolts are made by iron rods which are run through the forms at the proper points and are taken out when the forms are removed. The poles is taken out of the forms three or four days after casting and is allowed to dry out for two weeks, after which it is ready for use.

By using a gin pole and a gin wagon the Fort Wayne company erects its 30-ft. concrete poles at a labor cost of $1.62, bringing the total cost of delivery and erection to $3.25, which compares very favorably with the cost for setting wooden poles.

The success of these poles has led the Utica & Mohawk Valley Railway Company to construct two poles of the same kind. In making this pole a mixture consisting of one part cement and two parts sand and two parts crushed stone was used. The length of this pole is 35 ft. and its calculated weight was about 3000 lb. In this connection it might be said that a 35-ft. iron pole weighs 1421 lb. when made of 8-in., 7-in. and 6-in. extra heavy pipe.

As only two poles were built by the Utica & Mohawk Valley Company, the cost was higher than for construction of a larger number. The cost of the latter in detail, based on a pole 35 ft. long, 6 in. square at the top, 11 in. square at the base and 10 in. square 8 ft. from the base, is estimated, per pole, as follows:

Cement, 5⅓ cu. ft. at $1.60 per bbl	$2.13
Sand, 10½ cu. ft. at $0.75 per cu. yd.	.28
Stone, 10½ cu. ft. at $1.00 per cu. yd.	.39
Steel, 237 lbs. at $0.016 per lb.	4.60
Total material	$7.40
Labor	1.14
Total cost	$8.54

Or 24½ cents per foot.

The company has found that these poles may be transported in the same manner as wooden or iron poles. It is necessary only to take care to avoid chipping of the corners. In future poles one of the reinforcing rods is to run out of the bottom and top of the pole to act as a lightning ground and protector.

The Utica & Mohawk Valley Railway Company has not built any more concrete poles than the two originally constructed, but is contemplating manufacturing about 50 of them soon. A few will first be made and given a thorough test. If these tests prove satisfactory the company will complete the order for the 50 poles.

REPORT OF THE MUNICIPAL RAILWAYS OF ZURICH, SWITZERLAND

The annual report of the Zurich municipal street railways for the fiscal year ending December, 1909, shows that the route length of track actually operated increased from 29.5 km (16.3 miles) to 31 km (19.2 miles) over 1908. These figures were equivalent to 1.65 km (1.01 miles) and 1.69 km (1.05 miles) per 10,000 inhabitants for the years 1908 and 1909 respectively. Practically all of the routes are double track. The gross earnings were 395,786 francs ($79.155), an increase of 13.3 per cent, and equal to 68.8 per cent of the total earnings against 72.8 per cent in the preceding year. The number of passengers per car-km was 4.29 (6.8 per car mile) and the gross earnings per car-km 51.37 centimes (16.4 cents per car mile). The operating expenses per car-km were 35.52 centimes (11.36 cents per car mile). The principal rolling stock consisted of 168 motor cars and 44 trailers. A rather striking feature of the latest trailers is that while the seating capacity of the car is only 16, each platform is intended for a maximum of 11 standing passengers. The car mileage in 1909 was 4,020,769 car-miles of which 260,623 car-miles were furnished by trailers.

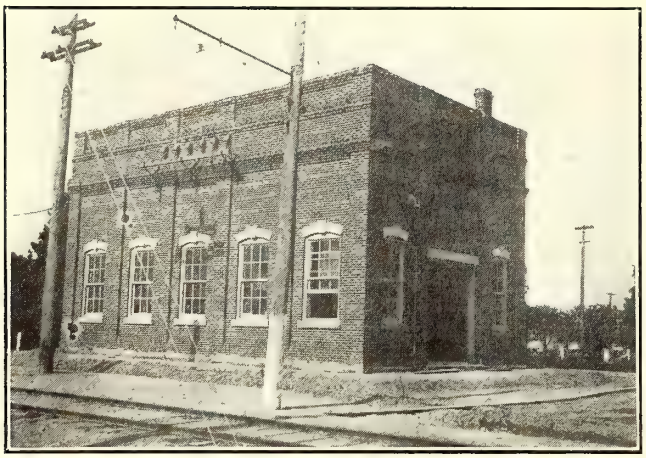
A popular innovation was the erection of a large number of signs at crossings and transfer points on streets where more than one car line is operated. These signs give the numbers of the routes and also show when the first and last cars leave for the opposite terminals. The signs are made up of enameled shields which may be removed for interchange whenever alterations are made in the service. The municipal railways opened three apartment houses for their employees during the year. The rents are very reasonable. In return for the reductions made, the tenants are obliged to be the first men on hand for emergency duty, as in snowstorms. In a paragraph of the report relating to traffic regulation it is stated that 966 reports were made to the police against obstructing vehicles and bicycle riders.

NEW TYPE OF SUBWAY CAR

A. B. duPont, formerly general manager of the Municipal Traction Company, Cleveland, Ohio, has designed and built a subway car which has recently been tested in Cleveland. The car has side entrances and is built with low dropped side sills so as to reduce the height of the cars. The trucks are under the raised ends of the sills.

WELLAND SUBSTATION OF THE NIAGARA, ST. CATHARINES & TORONTO RAILWAY

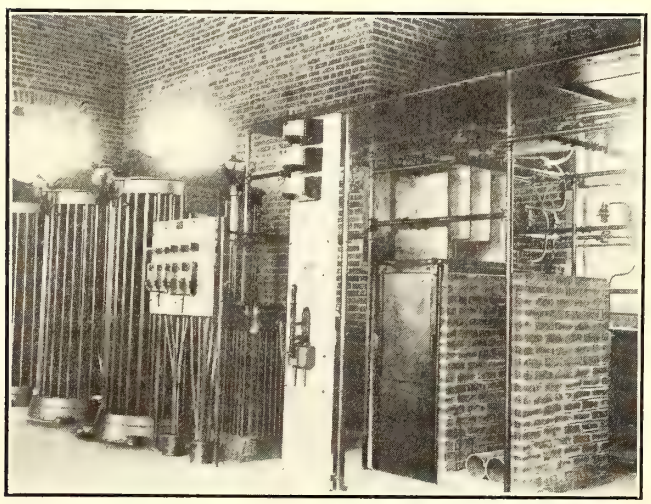
A new substation has recently been erected and put into operation on the Welland branch of the Niagara, St. Catharines & Toronto Railway, at Welland, Ont. The building is entirely fireproof with the exception of the doors and the windows, which are of wood. The main part of the structure is of red brick. The sills and arches of the windows are of concrete. The roof is of concrete reinforced with Trussit manufactured by the General Fireproofing Company, Youngstown, Ohio. It



Welland Substation of the Niagara, St. Catharines & Toronto Railway

is supported on I-beam purlins. The main floor is of concrete reinforced with expanded metal and it is also supported on I-beams. The building is large enough for two units, but at present only one is required. A neat appearance has been given to the substation interior by placing the high and low-tension cables of the transformers and rotary converters almost entirely below the main floor in the basement.

All of the electrical apparatus was made and installed by the General Electric Company, Peterboro, Ont. It includes one 500-kw, six-phase, 600-volt, 500-r.p.m. rotary converter; three single-phase, oil-cooled transformers, each rated at 185 kw



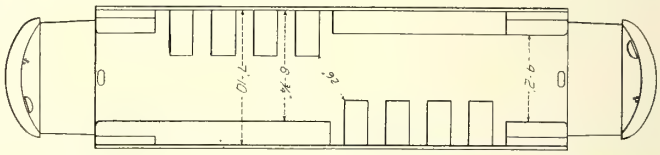
High-Tension Section of the Welland Substation of the Niagara, St. Catharines & Toronto Railway

and reducing the transmitted current from 12,500 volts to 430 volts with 4½ per cent taps in the primary and ⅓ and ⅔ starting taps in the secondary; one 75-k.v.a. oil-cooled reactance; and a 15,000-volt K-2 automatic oil switch installed in a brick cell on the station floor in front of the electrolytic lightning arresters. The disconnecting switches on the line entering the building are over a platform. The a.c. panel has a 12,000-volt switch-operating handle with special trip coils in addition to one voltmeter, one ammeter and one power factor indicator. The current transformers are in the basement. The potential transformers are supported by a pipe framework at the right of the a.c. panel. The d.c. switchboard consists of three panels, one for the rotary converter and the other two for feeders. One feeder goes north toward Thorold and the other south toward Port Colborne, on Lake Erie. A section break is placed in the trolley wire just outside the station.

The power for operating the substation machinery is supplied by the Electrical Development Company, Niagara Falls, Ont., but the transmission line was constructed by the railway company on its own right-of-way between Thorold and Welland, a distance of 11 miles. The substation and the transmission line were designed by W. H. Horton, electrical engineer for the railway. Mr. Horton also superintended the construction.

NEW SEATING PLAN FOR THE PHILADELPHIA PAY-WITHIN CARS

The next lot of pay-within cars which the Philadelphia Rapid Transit Company will place in service will be provided with a combination of longitudinal and cross seats, designed by C. O. Kruger, president and general manager of the company. As shown in the acompanying plan, the arrangement of seats on each side consists of a short longitudinal seat, four transverse seats and a long longitudinal seat. These two types of seats



Philadelphia Pay-Within Car with Combination Seating Plan

are arranged in the opposite order on the other side of the car, so that with a car 7 ft. 10 in. wide it has been possible to secure an aisle fully 26 in. wide at the narrowest point and 4 ft. 2 in. wide opposite the narrow platforms. This arrangement should relieve the congestion at the ends and even in the center of the car, so that passengers will have little difficulty in leaving by the front door. The rear platform is used as an exit only in extreme cases, as for cripples or aged people. The compromise seating plan described will accommodate 16 persons in the cross seats and 28 in the longitudinal seats.

THE PHILADELPHIA INVESTIGATION

The Pennsylvania State Railroad Commission reports that the investigation being conducted for it of the Philadelphia Rapid Transit system by Ford, Bacon & Davis is progressing satisfactorily. The preliminary work included the preparation of the details of the plan of report together with a general study of the situation and a comparison of the Philadelphia operations with those of other large cities. There is to be a systematic checking of the traffic and service by lines, principally at the rush hours, from observations taken by the experts' own force on the street and on cars. This force will also obtain by inspection a check of the car assignments and physical condition of the cars. The general passenger count will form the basis largely of the expert study of traffic and service. This comprehensive count of all of the lines of the system involves a considerable amount of detail comprised in the securing and training of checkers, preparing blanks, diagrams, etc. From these records will then be prepared the diagrams which will present a picture of the traffic and service for the entire city. A force of about 40 men has been employed.

The report on cars is well under way. In it will be included all of the information on the subject of cars, and, in brief, it will be practically a chapter on the car question which can be added to the general report as a part of the latter.

COMMUNICATION

THE ARNOLD PITTSBURGH REPORT

PITTSBURGH, PA., Sept. 19, 1910.

TO THE EDITORS:

We have noted Mr. Bion J. Arnold's letter of Sept. 3 in your issue of Sept. 17, but cannot agree with his new results. As every railway manager knows, car-mile records are used for comparison from day to day as a means of quickly noting any change in traffic on a line, and when so used are fairly accurate, since there is seldom a change in the car-mile unit in one day. Mr. Arnold, however, has made use of this analysis *for a long term of eight years*, and his conclusions, therefore, are incorrect, because of the great change in the car-mile unit during that time.

There is quite a difference, it seems to us, between "car unit" or "average number of seats" per car and "car-mile unit" or "average number of seat-miles per car-mile" in connection with a company having many sizes of cars, such as ours. The latter unit takes into account the number of miles each size of car operates, while the former disregards this very important consideration and can be correct only if every type and size of car happens to be operated the same number of miles per day. Mr. Arnold, in his new tables, in his letter of Sept. 3, has shifted from a "car-mile unit" to a "car unit," and his results are, therefore, incorrect.

For example, suppose a motor car seating 48 people runs 155 miles per day, and a trail car seating 26 people runs 25 miles per day, it is not right to average the seats of the two cars to arrive at the average seat-miles per car-mile. If we do this we shall get the erroneous result of $\frac{48+26}{2}=37$ as the average seating capacity per car, whereas the correct result is $48\times155=7440$ seat-miles for the larger car and $26\times25=650$ seat-miles for the small car, a total of 8090 seat-miles for the total of $155+25=180$ car-miles operated, or an average of $8090\div180=45$ seat-miles per car-mile. Mr. Arnold's method gave 37 seats, or an error of about 18 per cent.

Even with this incorrect method of getting his new "car unit," he admits that his original report needs a 5 per cent correction wherever car-miles are used in curves, data or analyses and proceeds to show that a 20 per cent correction will be needed if our statement is correct that the car service in 1908 was as good as in 1902. If he will read our former letter again he will find that we really did not say that 20 per cent was the exact correcting factor for his data for 1908; we did say that if the "increased seating capacity of the *cars operated*" be considered, the service of 1908 will be found equal to that of 1902.

The facts are there are a number of underlying conditions which Mr. Arnold did not take the trouble to investigate before making his report, and in arriving at a figure to represent the average effective seating capacity of our cars per car-mile, in his letter of Sept. 3, he has not confined himself to the actual "cars operated."

(a) He treats our summer cars, which operate only four months of the year, as if they were operated all the year round.

(b) He pulls down the average number of seats in the summer months by crediting the service at that time with a lot of small winter car bodies which were in the barn, having been replaced by summer cars.

(c) He gives no more value to a large car, operating all day, than to a trail car operating only two trips per day.

(d) He apparently does not know—or, at least, he does not give us credit for the fact—that during the panic of 1908 many of the small cars and trailers were left in the barn and not operated, so that the car-mile unit was larger than at any time previous.

(e) He did not investigate the service at the rush hour, the only time after all at which there has been any cause for complaint; had he done so he would have found a greater effort in later years to distribute the car-mileage to suit the traffic, a much larger number of cars being used in the rush hour than formerly. In this connection the facts are:

First.—The cars daily leaving the city between 5 p. m. and 6 p. m. in 1908 were more than 25 per cent greater in number than in 1902, and the effective seats per car operated were more than 15 per cent greater, giving a net increase in excess of 40 per cent above 1902.

The increase in traffic between the years mentioned was less than 20 per cent.

Which year has the better service in the peak?

Second.—The corresponding figures for 1909 are an increase in cars of more than one-third over 1902; an increase in seats per car of 20 per cent, or almost 60 per cent more seats between 5 p. m. and 6 p. m. than in 1902.

The increase in travel between the years mentioned was less than 25 per cent.

How much better is the service of 1909 than 1902 in the peak?

It is true that since 1902 our evening rush hour has become more pronounced but to no such extent as the increase in cars shown above.

We regret exceedingly the necessity for writing this as well as our former letter. It has been done solely for the purpose of attempting to correct the erroneous impression circulated among railroad men that we had adopted such a short-sighted policy as a gradual curtailment of service through a period of years.

Any such statement is incorrect, and if Mr. Arnold had just remembered to consider the following, we believe he could not have done otherwise than agree with us:

(a) The great change in the size of the car operated until at the present time there are more than 350 large, double-truck cars on the system, as against only 15 in 1902.

(b) The effort made in later years to change the headway to suit the traffic conditions, resulting in a very greatly increased service during the evening rush hours.

(c) That the length of time each size of car is operated should be considered in any effort to arrive at a definite figure for the effective seats per car-mile in any year.

(d) That at least the summer cars stored in the barn eight months of the year, and about 500 28-seat winter cars stored in the barns in the summer, should not be considered as if operating the year round.

PITTSBURGH RAILWAYS COMPANY,
by J. H. REED, Vice-President.

REPORT OF RHODE ISLAND COMMISSIONER

The annual report of Joseph P. Burlingame, railroad commissioner of Rhode Island, covering the year ended Dec. 31, 1909, shows that total receipts of street railway companies from all sources were $5,629,099. Total expenditures were $4,184,658, leaving net earnings of $1,444,441. As compared with the report for the previous year, these figures show a decrease in total receipts of $37,104 and in expenditures of $319,301. The increase in net earnings was $282,197. The report states that the street railways followed the policy of attempting to retrench in expenses during the year and that no extended development took place. Of the total receipts the passenger department furnished $4,257,098 and the freight department $210,120.

The 12 street railway corporations transacting business in the State reported 370 miles of road, or 406 miles of single track. The total number of cars was 936 motor cars, 75 freight cars and 83 other cars. There was a decrease of 2 motor cars, 9 freight cars and an increase of 2 other cars. The total number of passengers carried was 84,565,671, a decrease from the previous year of 2,462,183. All but two companies reported decreases in the number of passengers carried. The number of employees was 2602.

CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The fourteenth regular meeting of the Central Electric Accounting Conference will be held at the Hotel La Salle, Chicago, Ill., on Sept. 24, 1910, at 10 a. m. The program is as follows:

Report of committee on uniform comparative statements, by W. B. Wright, chairman.

Paper—"Uniform Statistics," by J. D. Maynes, auditor of receipts, Illinois Traction System.

General discussion of the following questions:

"What do you consider the advantages or disadvantages of using fare registers in the cars as compared with the use of some form of cash-fare receipt?"

"What particular difficulties or inconsistencies have you encountered in the preparation of annual reports to commissions?"

"Do you consider it more practical to compute interurban passenger earnings from reports of tickets sold or by using the values of tickets which have been lifted by conductors, and why?"

"What do you consider the advantages or disadvantages of an interline baggage check having a separate coupon for each road?"

"In what respects do you consider the unit type of way bill superior to the so-called 'blanket' way bill generally used by steam railroads?"

At 1 p. m. the meeting will adjourn to a special car of the Chicago & Milwaukee Electric Railroad. Luncheon will be served on the car, and the program will be completed as the car proceeds to Milwaukee.

REPORT OF LIVERPOOL TRAMWAYS

The annual report of the Liverpool Corporation Tramways for the year ended Dec. 31, 1909, shows traffic revenue of £561,271 and gross revenue of £592,728. Operating costs, including rental of leased lines, amounted to £400,206. The gross profit of £192,522 was apportioned as follows: Interest, £50,919; sinking fund and repayment of loans, £59,249; reserve, renewal and depreciation account, £54,903; contribution in aid of the general rate, £27,451. The number of passengers carried was 121,532,940, a decrease of 3 per cent from the previous year. The number of car-miles run was 11,952,373. The car-mile earnings were 11.27d. in 1909, as compared with 11.04d. in 1908. Operating costs per car-mile in 1909 were 8.036d.

The number of passengers carried under the through-ticket arrangements between the Liverpool Overhead Railway Company's system and Garston, which became effective on July 12, 1909, was 1220, yielding a revenue of £40, of which the Liverpool Corporation Tramways received £12 and the Liverpool Overhead Railway £28.

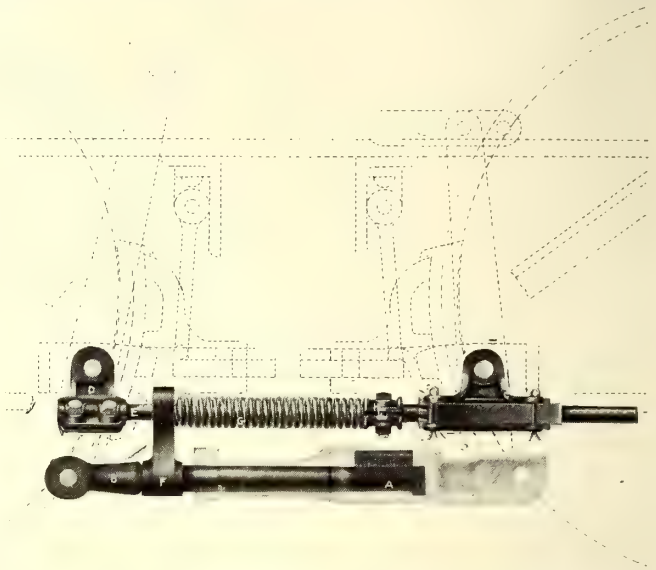
ADDITIONAL EXHIBITORS AT ATLANTIC CITY

The following companies have reserved exhibit space at the Atlantic City convention. This list is supplementary to the list of exhibitors published in the Electric Railway Journal of Sept. 17, p. 438, and includes all companies to which space was assigned between Sept. 2 and Sept. 20.

Space, No.	Name.	Location.
606	American Rolling Mill Co.	Middletown, Ohio
686	Best Manufacturing Co.	Pittsburgh, Pa.
838	Buffalo Foundry & Machine Co.	Buffalo, N. Y.
540	The Crocker-Wheeler Co.	Ampere, N. J.
937, 939	C. W. Hunt Co.	New York City
821	H. R. Langslow Co.	Rochester, N. Y.
517	Leeds & Northrup.	Philadelphia, Pa.
941, 943	Meyer Safety Guard Co.	Omaha, Neb.
634	The Alexander Milburn Co.	Baltimore, Md.
559	W. K. Mitchell Co.	Philadelphia, Pa.
687	Morgan Crucible Co.	New York City
A, B, C,	Elmer P. Morris & Co.	New York City
810	National Lead Co.	New York City
685	Railway & Traction Supply Co.	Chicago, Ill.
835	Railway Improvement Co.	New York City
812	Wright Wrench Co.	Canton, Ohio

A SHIM TYPE BRAKE SLACK ADJUSTER

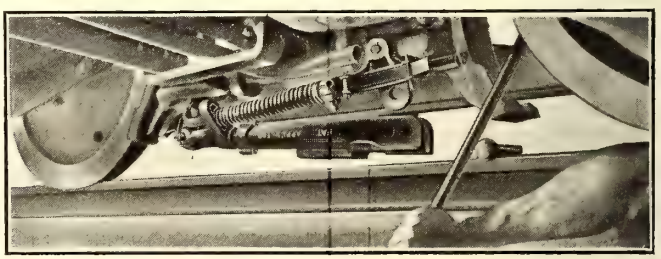
Since July, 1909, the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., has had in service on all of its cars the Sauvage automatic brake slack adjuster which is being manufactured by the Standard Coupler Company, New York. The operating conditions on the railway named are unusually severe, as part of the route is made up of steep grades and curves up the Palisades, opposite New York, while the cars used are almost as heavy and as fast as the average



Application of the Automatic Brake Slack Adjuster to an Electric Railway Truck

interurban rolling stock. The new adjusters have, therefore, been subjected to very hard tests, especially during the winter. As the results they gave have been satisfactory to the railway, it may be of interest to mention some of the improvements which they have effected in the braking maintenance before describing the mechanism in detail.

In the first place, these adjusters made it possible to change from a three-day to a weekly brake inspection, and the average mileage between inspections was brought up to 1800 miles. Further, the piston travel of practically all the cars was standardized for 5½ in. to obtain uniform braking effort in place of having a piston travel which varied from 6 in. to 11 in. The new apparatus weighs only 12 lb. per truck more than the original turnbuckle equipments, and requires no attention whatever, whereas the turnbuckles required frequent adjustment and had to be rethreaded every year. The effect on brake



Changing Shoes on a New Jersey & Hudson River Car Equipped with Brake Slack Adjusters

shoe life has also been very favorable. Formerly, in the winter service brake shoes had to be discarded after 15 days' service, during which they made an average of 3500 miles. Last winter the shoes were replaced about every 25 days, which represented an average of 5000 miles. Of course, the latter figure is much lower than the life obtained on roads with more favorable topographical conditions, but it must be borne in mind that on this particular railway it represents a reduction of 50 per cent to 60 per cent in brake shoe cost.

The lettered engraving on page 476 shows the principal parts of this brake slack adjuster as installed. The rod *E* is connected to the live lever fulcrum pin by the bracket *D*. The friction clamp *C* is connected to the pin of the dead lever fulcrum; it has a slot made larger than the fulcrum pin by twice the distance of the required brake shoe clearance. Thus, if 1/16-in. brake shoe clearance is needed, the slot is ⅛ in. larger than the fulcrum pin. The push bar *B* is connected to the bottom of the live lever and its barrel *A* is connected to the bottom of the dead lever. The second hole in the barrel provides for the take-up necessary after a wheel has been turned down. The spring *G*, which is placed on the rod *E*, is kept in tension by the clamp *H*. The pushing of this spring against the yoke *F* keeps the shoes off the wheels and the levers in full release. On trucks with beamless brakes the spring, spring clamp and yoke are not necessary, but in the New Jersey & Hudson River installation they are installed on this style of truck as well as on those which have no truck lever release springs to insure the finest possible adjustment.

When the brakes are applied the rod *E* pulls through the friction clamp *C* if the total clearance between the opposite shoes and the wheels is greater than the clearance in the fulcrum pin slot. When the brakes are released the dead lever fulcrum pin drops back the allotted distance provided by the slot in the friction clamp. This slot prevents the taking up of too much slack. The shoes are now off the wheels for the predetermined clearance, and are held in position by the rod *E* and the clamp *C*. Consequently, when the brakes are in the release position the shoes are not tight on the wheels, so that all wear from dragging is eliminated.

The additional movement of the live lever, due to excessive slack, pulls the lower bar *B* out of the barrel *A*. Upon this, one, two or more of the shims riding on the bar drop behind it to make a solid continuation of the bar. Since the bar cannot recede, the slack is taken up absolutely by the shims. The dropping of shims is continued automatically whenever any additional wear of the shoes takes place. In this way the brakes are adjusted in accordance with the operating conditions with an exactness which would be impossible if the adjustment had to be made for standing piston travel. All other styles of release springs heretofore provided for brake beams are dispensed with where this shim adjuster is used.

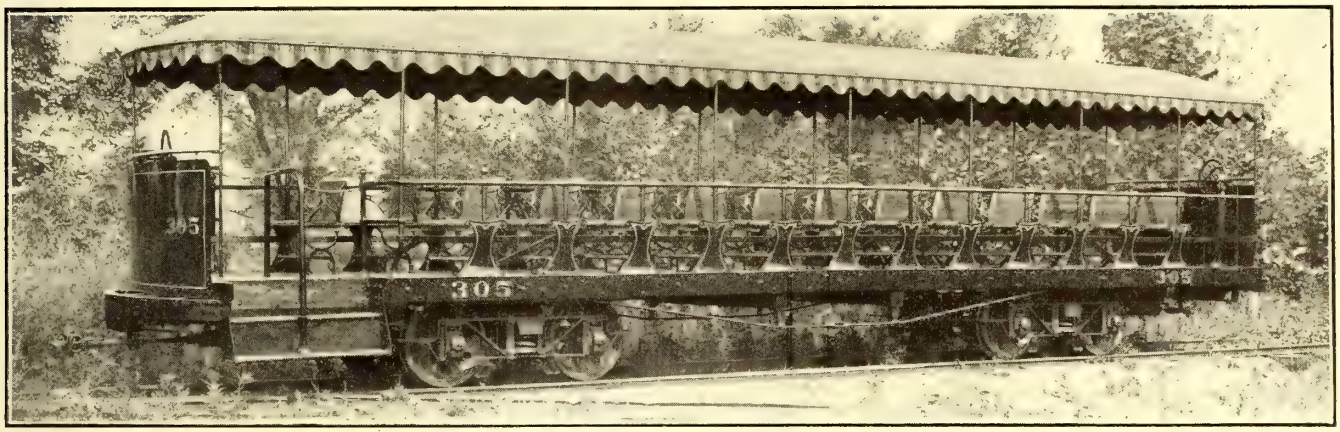
The only attention which this device requires is the simple process of installing a new shoe. To do this the pin at the bottom of the dead lever is removed, the barrel is turned upside down and pushed back on the bar to restore the shims to their original position, and then the friction clamp is pushed back on the rod with a pinch-bar to take out the worn shoe, as illustrated. The new shoe is then inserted, the barrel is turned right side up and the pin replaced, thereby completing the process.

When the piston or chain travel (as in the case of hand-braked cars) does not exceed the predetermined limit, the adjuster mechanism is at rest. The working parts of the adjuster are fully protected against the entrance of foreign substances and require no oil or grease lubrication. The shims are of specially treated, non-corroding steel, and are thoroughly coated with flaked graphite. All parts are made of malleable iron or forged steel, in accordance with the service.

MOONLIGHT TRAIL CARS

The Wichita (Kan.) Railroad & Light Company has received from the Danville Car Company four open cars of the unusual design shown in the accompanying illustration. These are intended for trailer service only and are known as moonlight excursion cars. The seating capacity of 48 is furnished by 24 reversible ash-slat seats arranged 12 on each side. The car body is 40 ft. 6 in. long over the crown piece and 7 ft. 11¾ in. wide over the sills. The width of the car body over the posts at the seat ends is 8 ft. 6 in. The bottom framing consists of 4¾-in. x 7¾-in. long leaf yellow pine side sills, which are plated with ⅝-in x 8-in. steel; 11-in. white oak crown pieces; 3½-in. by 4 9/16-in. crossing of white oak; Brill angle-iron bumpers to protect the crown pieces. The step side of the car is supported by Z-bar knees. The floor boards are of yellow pine. The roof consists simply of yellow and brown duck, supported by 1¼-in. pipe, as illustrated.

The steps are double and are supported by wrought-iron hangers. A dividing rail is installed on each platform. Brill angle-iron buffers are fastened to the car sills and center knees. The sills and the center knees project beyond the crown pieces, thereby affording secure support for the buffer. To do away with mortising the panels to the sill malleable wrought corner seat-end panels are used; these are secured to the sills with lag screws and to the seat rails with joint bolts. The cars are mounted on Brill 420 trailer trucks, having a wheel base of 4 ft. 6 in., 30-in. diameter cast-iron wheels and 4¼-in. diameter axles. The radius of the shortest curves on which these cars will be operated is 35 ft.



Moonlight Trail Car for the Wichita (Kan.) Railroad & Light Company

ELECTRIC WELDING IN PHILADELPHIA

The electric welding process devised for cast steel by the Philadelphia Rapid Transit Company, which was described on page 356 of the ELECTRIC RAILWAY JOURNAL of Feb. 26, 1910, has now been in use for over 18 months with uniform success. By means of a water rheostat, the ordinary trolley potential is reduced to about 20 volts. The arc can be easily manipulated for a great variety of welding purposes, such as relining or filling worn holes, thickening the worn ends of brake beams, building up armature shafts and repairing truck frames without disassembling, etc. The welding flux is a secret composition discovered by Harry Branson, superintendent of rolling stock and equipment. The arc has also been found equally convenient for cutting metal. Owing to its intense whiteness, each operator is provided with a metal hood, which has a colored lens prescribed for this work by a Philadelphia oculist.

News of Electric Railways

Proposal from Hudson & Manhattan Railroad for West Side Subway in New York

William G. McAdoo, president of the Hudson & Manhattan Railroad, which operates under the Hudson River between New York and New Jersey, has sent to the Public Service Commission of the First District of New York a proposal for the construction by that company of a tunnel from Broadway and Thirty-third Street, near the new terminal of the Pennsylvania Railroad, south along Broadway to Union Square and thence under University Place, Wooster Street and Church Street to connect with the terminal station of the Hudson & Manhattan Railroad at Church Street, Cortlandt Street and Fulton Street. He suggests that the proposed road be constructed on the city's credit: that the Hudson & Manhattan Railroad equip and operate the line under a lease for a reasonable term of years at sufficient rental to pay interest on all bonds issued for the purpose, and that a sinking fund be established sufficient in amount to amortize the cost of the line within a reasonable period. After suggesting to the commission that it lay out a line covering the route previously mentioned, the company in its letter continues substantially as follows:

"This company will immediately, upon preparation of the plans and specifications therefor, and providing the same are satisfactory to our engineers, submit an offer to the city to construct said line and to operate the same. Said offer will be to the following effect: That the said line shall be constructed upon the city's credit, and that this company will equip and operate the same under a lease, for a reasonable term of years, to be agreed upon, at a rental sufficient in amount to pay full interest on all bonds issued by the city therefor, and a sinking fund sufficient in amount to amortize the cost within some reasonable period. We are also willing to agree that the city may participate, on some reasonable basis, in the net earnings from the operation of said line.

"Under this plan a sufficient rental would be immediately assured to the city, so that under the recent constitutional amendment the bonds issued therefor can be excluded in determining the city's debt limit. We believe that this line, operated in conjunction with our Hudson tunnel facilities, and drawing a large traffic from that source, will be self-sustaining from the beginning. Any objection that this plan would involve the devotion of the public credit and important streets to a private undertaking is fully met by the fact that the city, in the franchises covering the Sixth Avenue and Grand Central extensions, has reserved the right to take over those lines at any time after the expiration of 25 years. As any contract entered into under this plan would, in accordance with the provisions of the Rapid Transit Act, reserve to the city the right to take over the road constructed under it at any time after the expiration of 10 years, the city's interest would be adequately protected.

"The effect of the carrying out of this plan would be this: At the end of 25 years the city could take possession of a complete West Side line from the Grand Central Station to Cortlandt Street; whereas under the lease of the present subway to the Interborough Rapid Transit Company the city cannot get possession until the end of 75 years.

"As before stated, this company already has the right to construct an extension from Thirty-third Street and Broadway to the Grand Central Station. It also has constructed at Thirty-third Street a large and commodious underground station, which could be connected with the proposed new line, thus providing unusual accommodations at that point. At the Hudson Terminal there is already built one of the most complete and satisfactory underground railroad stations for rapid transit uses in the world. The new road could be connected with the Hudson Terminal in such way as not to interfere with the proposed Broadway-Lexington Avenue line through the lower end of Church Street. Having these terminal facilities all prepared, and having already the necessary power houses and organization, this company could construct and put the proposed road into operation in a very short time—probably within two years after the work is authorized.

"This being done, a new rapid transit line, running through the heart of the hotel, theater, shopping, and wholesale dry goods districts and extending from the Grand Central Station to the Hudson Terminal, would be in operation within about two years. At Thirty-second or Thirty-third Street and Broadway a convenient underground foot passage could be constructed connecting the new Pennsylvania Railroad station with this line.

"It is our idea to operate the road from the Grand Central Station to the Hudson Terminal as a through route, with a quick service and every convenience that the best of modern appliances and experience can provide.

"We have not, of course, attempted to go into detail, and are submitting to you simply the general features of the plan. We believe that it offers the best and promptest solution of the present rapid transit need for the West Side. It does not interfere with any other projected lines along the West Side, such, for instance, as the Seventh Avenue line, leaving the field open for the construction of that or any other West Side line, whenever opportunity presents itself.

"I may add, in conclusion, that should this company become hereafter the successful bidder for the operation of the proposed Broadway-Lexington line, when it is completed we would be willing to consider the Grand Central-Hudson Terminal line herein proposed as a West Side connection, to be operated in conjunction with the Broadway-Lexington system, and for a single rate of fare."

The line proposed by the Hudson & Manhattan Railroad would connect at the Grand Central Station with the New York Central & Hudson River Railroad, the New York, New Haven & Hartford Railroad, the Third Avenue elevated line of the Interborough Rapid Transit Company and the subway line of that company. At Thirty-third Street and Broadway it would connect with the present line of the Hudson & Manhattan Railroad, the Pennsylvania Railroad, the Long Island Railroad, the Metropolitan Street Railway and the Sixth Avenue elevated line of the Interborough Rapid Transit Company. At Lexington Avenue and Forty-second Street it would connect with the proposed Broadway-Lexington Avenue subway. At the Hudson Terminal it would connect with the proposed Broadway-Lexington Avenue subway.

Appeal of Boston & Eastern Electric Railroad for Rehearing

The Railroad Commission of Massachusetts has heard the appeal of the Boston & Eastern Electric Railroad from the decision of the majority of the members of the commission that action on the petition of the company to construct an electric railway between Boston, Lynn, Salem and Beverly should be postponed until the Legislature of 1911 has made known its attitude regarding the electrification of the steam railroads operating into Boston. Charles H. Baxter conducted the appeal of the company for a rehearing. Mr. Baxter said in part:

"We have asked you to reconsider your finding because we believe that an error in law has been made, and that chapter 630 of the Acts of 1910 has not been properly construed by this board. This board has undoubtedly been granted wide discretionary powers, but as in the case of all public boards, there are certain bounds set by existing laws which control the actions of this commission, and the Legislature that created this board is at all times the superior authority. If these bounds did not exist, the act creating this board would be unconstitutional, as it would amount to the delegating of the power to legislate, which the constitution does not permit.

"The Legislature in 1906 passed an act authorizing the formation of the Boston & Eastern Railroad, and by the passage of that act the Legislature meant that such a type of railroad should be built in Massachusetts. The Legis-

lature has gone further. By chapter 630 of the Acts of 1910, the company is expressly authorized to construct and operate a tunnel under the harbor.

"The Legislature and Senate clearly made it known to you and to the public that they desired to have this road built, and built without delay; that they did not desire to have any postponement of this matter until 1911.

"I believe it is the duty of this commission to examine what the Legislature meant by chapter 630 of the Acts of 1910. It is my opinion that the majority of the commission in their memorandum handed down on Aug. 22 have acted in direct violation of the will of the Legislature.

"Your memorandum states that a majority of the board is of the opinion that further consideration of the application of the company for a certificate of exigency should be suspended until the General Court of 1911 shall have made known its opinions with respect to metropolitan improvements.

"The Legislature considered these proposals, and the Legislature and the Governor decided that there was no reason for any such delay, and that the Boston & Eastern Railroad would in no way interfere with any of the projects, as stated in the memorandum.

"We therefore feel that a majority of this commission has vetoed the direct will of the people of Massachusetts as expressed to them through the Legislature and the Governor of this Commonwealth. You have misconstrued the action of the Legislature and we ask you to right the error and use your discretionary power as to the issuing of the certificate as intended.

"If you are to put off the building of this great enterprise until 1911 because of questions that exist now and are not to be decided until then, there is no reason in the world why in 1911 the matter should not again be put off until 1912 on the ground that in 1911 questions may arise that cannot be decided until 1912, and so on for years to come.

"You must realize, gentlemen, that the position taken by the majority of the board is absolutely unsound, and we feel that it is perfectly tenable for this board to change the opinion, as expressed on Aug. 22, 1910, and to change it without loss of dignity.

"We contend we have presented to you a sound legal reason whereby your memorandum of Aug. 22, 1910, may be reversed, and whereby you may follow the wishes of the Legislature and take immediate action on the petition before you, and we ask you in fairness to us, and in fairness to the people whom we desire to serve, that you give this matter your immediate consideration."

Columbus Strike

By consent of both parties the temporary order granted by E. B. Dillon, judge of the Common Pleas Court at Columbus, to restrain the trainmen of the Columbus Railway & Light Company from interfering with the operation of cars was continued indefinitely by the court on Sept. 17. The order was granted on the application of the company, and is said to have contributed materially in preserving order.

Petitions have been in circulation to ask Governor Harmon to remove Mayor Marshall from office for incompetence and for not suppressing rioting in connection with the strike. They were to have been presented to the Governor during the week ended Sept. 17, 1910, but friends of the Governor are said to have induced the leaders in the movement to delay presenting the petition on the ground that it would embarrass the Governor in his campaign for re-election.

Karl Webber, prosecuting attorney of Columbus, is investigating the riots with a view to presenting evidence to the grand jury for consideration. He will be assisted by Attorney General Denman, at the request of Governor Harmon. Mr. Webber has assured the Governor that his department will prosecute the cases vigorously and with dispatch.

Mayor Marshall addressed a second letter to Governor Harmon on Sept. 13, 1910, in which he reiterated his belief that a special session of the Legislature should be called to enact laws that would make arbitration compulsory in the case of differences between a public service corporation and its employees. The Governor did not direct a reply to the Mayor in answer to this letter, but issued a statement in which he said that eminent legal authorities believe that the present arbitration laws go as far as the constitution permits. He quoted section 1 of Article IV of the Laws of Ohio, which follows:

"The General Assembly may establish courts of conciliation and prescribe their powers and duties, but such courts shall not render final judgment in any case, except upon submission by the parties of the matter in dispute and their agreement to abide by such decision."

E. K. Stewart, general manager of the company, states that the position of the company is unchanged. The company has no objection to its men becoming members of any body that may be organized among the employees, but no organization of employees will be recognized by the company. With the exception of perhaps 50 men, the company, it is stated, would be willing to re-employ old employees, but they would have to take such runs as are open. A few more men have deserted the union and returned to work, and quite a number of the men engaged to operate cars during the strike have left the city, and their places have been filled with new men who have accepted permanent employment.

At a meeting of delegates from the various labor organizations on Sept. 13, 1910, it was definitely decided that it would be inadvisable to call a general strike out of sympathy for the street railway men.

John F. Brady, one of the men engaged to operate cars during the strike, who was accused of injuring two women and a child while shooting at strike sympathizers, several weeks ago, was arrested in Cleveland on Sept. 13, and returned to Columbus. He was bound over to the grand jury on the charge of shooting to kill. Mr. Brady claims that he left Columbus after the shooting to escape the possible vengeance of a mob, and not because he feared the legal action that might be taken.

Dynamite was exploded under three cars on the evening of Sept. 18, 1910, one on the South Side, one on the West Side, and another at Bexley, where a car was dynamited two weeks before. The car at Bexley was badly shattered, but no one was seriously injured. The other cars were only damaged slightly.

Michigan Central Railroad Establishes Electric Freight Service in Detroit Tunnel.—The Michigan Central Railroad established freight service with electricity as motive power in its tunnel under the Detroit River between Detroit, Mich., and Windsor, Ont., on Sept. 17, 1910.

Council of Toronto Adopts Municipal Ownership Resolution.—The City Council of Toronto, Ont., has accepted that part of the report of the committee on rapid transit of the Council which was submitted to it with the approval of the Board of Control and has adopted a resolution which authorizes the Board of Control to negotiate for the purchase of the property of the Toronto Railway. It is further provided in the resolution that if a basis of purchase agreeable to the Council should be arrived at legislation shall be applied for to enable the city to acquire the property.

No Special Council Meeting to Consider Chicago Consolidation Traction Ordinance.—Mayor Busse of Chicago has announced that no special meeting of the City Council of Chicago will be called before the Council convenes in regular session on Oct. 3, 1910, to act on the proposed ordinance to authorize the Chicago Railways to take over the Chicago Consolidated Traction Company. The principal features of the ordinance as approved by the committee on local transportation of the City Council on Aug. 18, 1910, were published in the ELECTRIC RAILWAY JOURNAL of Aug. 27, 1910, page 340.

Tentative Plan for Subway Loop in Boston.—A project for the construction of a subway loop under the West End of Boston in connection with the termination of the Cambridge Subway at Park Street is being advocated by real estate interests centering at Scollay Square and Bowdoin Square. The movement is headed by E. D. Codman, and tentative plans have been prepared by Guy C. Emerson, former superintendent of streets of Boston, for submission to the joint board consisting of the Massachusetts Railroad Commission and the Boston Transit Commission for study. A hearing will be given by the two boards on Sept. 27, 1910.

Financial and Corporate

New York Stock and Money Market

September 20, 1910.

Interborough-Metropolitan stock has furnished the only point of real interest in the stock market during the past week and reason appears now for the story that J. P. Morgan & Company, together with other large banking interests, have agreed to finance the reorganized property. On July 26 the common stock sold at 14¼ and the preferred at 41½. The close to-day was common 21, preferred 55¼.

The money market continues unchanged. Call loans to-day were 1⅝ to 2 per cent; 90 days, 4 to 4½ per cent.

Other Markets

There has been some selling pressure in traction shares in the Philadelphia market during the past week and in consequence there has been rather more activity than usual. Prices, however, have declined only fractionally. At the close to-day Rapid Transit sold at 17¾, Philadelphia Traction at 81½ and Union Traction at 42½.

In the Chicago market there has been some trading in Series 1 and 2 of the Chicago Railways Company, but there has been little character to the movement. Only small lots have been handled and prices have been well sustained. Other tractions have not been in the market.

About the only traction dealings in the Boston market have been those in Boston Elevated. Small blocks of this issue have been picked up and the price during the week has fractionally advanced. Massachusetts Electric is no longer active.

United Railways stock has sold in the Baltimore market during the week, in small lots, at about 14. The bonds of the company continue to be active at former prices.

Quotations of various traction securities as compared with last week follow:

	Sept. 13.	Sept. 20.
American Railways Company	a44	a43½
Aurora, Elgin & Chicago Railroad (common)	50¼	a46
Aurora, Elgin & Chicago Railroad (preferred)	85	a85¼
Boston Elevated Railway	126½	127
Boston & Suburban Electric Companies	*15	*15
Boston & Suburban Electric Companies (preferred)	*74	*74
Boston & Worcester Electric Companies (common)	10	a10
Boston & Worcester Electric Companies (preferred)	37	35
Brooklyn Rapid Transit Company	74½	74¾
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	82⅜	83
Capital Traction Company, Washington	*131	a131½
Chicago City Railway	a195	a102¾
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a70	a65
Chicago Railways, ptcptg., ctf. 2	a11½	a15
Chicago Railways, ptcptg., 3	a8½	a8
Chicago Railways, ptcptg., ctf. 4	a4½	a4¼
Cleveland Railways	91½	*91½
Consolidated Traction of New Jersey	a73	*73
Consolidated Traction of N. J., 5 per cent bonds	a104	*104
Detroit United Railways	*45	*45
General Electric Company	144	142½
Georgia Railway & Electric Company (common)	a110½	a111
Georgia Railway & Electric Company (preferred)	*86	*86
Interborough-Metropolitan Company (common)	18⅞	21
Interborough-Metropolitan Company (preferred)	50¾	55¼
Interborough-Metropolitan Company (4½s)	79½	81¼
Kansas City Railway & Light Company (common)	a25	a26
Kansas City Railway & Light Company (preferred)	a79½	a79½
Manhattan Railway	131	135
Massachusetts Electric Companies (common)	a18	a18
Massachusetts Electric Companies (preferred)	81¾	a82
Metropolitan West Side, Chicago (common)	20	a20
Metropolitan West Side, Chicago (preferred)	62	a62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	67	64⅞
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a44	a44¾
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a18¼	a17¾
Philadelphia Traction Company	82¼	a82
Public Service Corporation, 5 per cent col. notes	95	95
Public Service Corporation, ctfs.	101	101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	60¾	58
Third Avenue Railroad, New York	9	9¾
Toledo Railways & Light Company	*7	*7
Twin City Rapid Transit, Minneapolis (common)	110½	110⅜
Union Traction Company, Philadelphia	a43½	a42¾
United Rys. & Electric Company, Baltimore	a15	14¼
United Rys. Inv. Co. (common)	*31	*15
United Rys. Inv. Co. (preferred)	55¼	56
Washington Ry. & Electric Company (common)	*32⅞	a32¼
Washington Ry. & Electric Company (preferred)	*89½	a88
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	a100¾	a100½
Westinghouse Elec. & Mfg. Company	61	60
Westinghouse Elec. & Mfg. Company (1st pref.)	*123	*125

a Asked. * Last sale.

Annual Report of the Philadelphia Rapid Transit Company

Losses due to strike fell heavily upon the Philadelphia Rapid Transit Company in the fiscal year ended June 30, 1910. Decreased receipts and larger expenses caused a deficit after the payment of taxes, licenses and fixed charges of $1,329,723, or $1,105,453 more than the deficit in the previous year. A comparative statement for two years follows:

	1910.	1909.	Increase.
Passenger receipts	$17,979,152	$18,306,963	*$327,811
Chartered cars	11,948	10,566	1,382
Total	$17,991,100	$18,317,529	*$326,429
Maintenance of way and buildings	$1,025,015	$889,777	$135,238
Maintenance of equipment	1,019,983	938,758	81,225
Transportation	4,527,960	4,413,417	114,543
Power	1,460,677	1,445,077	15,600
General expenses	1,853,123	1,677,708	175,415
Total expenses	$9,886,758	$9,364,737	$522,021
Net earnings from operation	$8,104,342	$8,952,792	*$848,450
Miscellaneous earnings	510,256	480,463	29,793
Total income	$8,614,598	$9,433,255	*$818,657
Taxes, licenses and fixed charges	9,944,321	9,657,525	286,796
Deficit	$1,329,723	$224,270	$1,105,453

* Decrease.

The decrease in passenger receipts in 1910 as compared with 1909 was equivalent to 1.8 per cent. In total receipts from passenger and miscellaneous sources the decrease was a shade less, or 1.6 per cent, because there was a small gain in miscellaneous earnings. Last year was the only one since the organization of the company in 1902 when the total revenue from all sources failed to show an increase over the preceding year. The 1910 total, including miscellaneous receipts, was a little less than the results for 1908. The 1910 passenger earnings were smaller than the corresponding results for any year since 1906.

A statement relating to the strike losses contained in the report of Charles O. Kruger, the president, is as follows:

"Had it not been for the strike of your motormen and conductors, which lasted from Feb. 19 to April 25, a very different report would have been submitted.

"At the time the strike was called the company had, in the seven months of the fiscal year, shown an increase of $681,964 in gross receipts, and of $285,819 in net receipts. Had the same rate of increase continued for the fiscal year, your company would have shown gross receipts of $20,059,462, an increase of $1,261,469. The actual loss in passenger receipts during the 66 days of the strike, comparing with the receipts of the year before, was $1,558,105. This is considering only the loss of receipts while the strike was in progress. It takes weeks, and even months, after a prolonged strike to get traffic back to its former condition, and it is doubtful whether even at the end of the fiscal year, June 30, the receipts of the company had become normal.

"In addition to the very heavy increase in the operation of the road during the strike period, there were many extraordinary expenses incurred in protecting your property during this time which were not properly chargeable to current expenses; these expenditures were accordingly carried to strike account. They amount, in the aggregate, to $836,856.

"Two courses were open with respect to this account, either to charge a portion of it off each year, or to close the whole account into profit and loss; the latter course was adopted, as your management felt it was for the best interests of the property to have the whole strike expenses closed out on your accounts."

All the general operating expense accounts show increases and operating expenses amounted to 54.95 per cent of passenger receipts, as compared with 51.12 per cent in the previous year. The proportion of gross passenger receipts used in operating expense is divided as follows: Maintenance of way and buildings, 5.7 per cent; maintenance of equipment, 5.6 per cent; transportation, 25.2 per cent; power, 8.1 per cent; general expenses, 10.3 per cent. The maintenance expenditures therefore aggregated 11.3 per cent of passenger receipts.

An increase in the amount charged for taxes, licenses and fixed charges made the total for the year $9,944,321, which is equal to 53.7 per cent of the total passenger and

miscellaneous receipts. The report shows separately the taxes and licenses, which aggregate $1,569,858, or 8.5 per cent of passenger and miscellaneous receipts. The charge for these items was increased $104,905 over the preceding year. Of this increase $78,428 was due to the new Federal tax, $25,000 was on capital stock and loans, and $4,040 was on real estate, while there was a decrease of $2,563 in the tax on gross receipts. Fixed charges were increased by $181,890, due to larger interest and rental requirements, which were offset in part by a reduction in miscellaneous interest charges.

Regarding various features of the operation Mr. Kruger says:

"With a view of furthering the welfare of our employees, your board of directors approved on Dec. 31 an insurance and pension plan, under which the beneficiaries of motormen and conductors, power-house and shop employees receive $500, payable at death to the heirs of any one who was in the employ of the company on Jan. 1, 1910, and who shall have remained in the service continuously from that date to the date of death. Pensions at the rate of $20 a month are made payable to any employee who has reached the age of 65 years and completed 25 years of continuous service.

"Under this plan 34 insurance payments of $500 each were made between Jan. 1 and June 30.

"In the period from Jan. 1 to June 30 12 employees have been placed on the pension roll; two died after going on this roll, making the pension expense to the company at the present time $200 per month. The total length of service of the 10 pensioners now on the roll is 364 years, and their average length of service 36 years.

"The sliding scale of wages approved at the same time the pension and insurance plans were put into effect provides a wage scale for motormen and conductors of from 23 to 25 cents, according to length of service. The maximum for men now in the service will be reached in 1914. Pay at the rate of 23 cents an hour for all men who were in the service on Jan. 1, 1910, went into effect on July 1, 1910.

"Another phase of the welfare work of the company is the establishment of a department where men who need temporary loans can obtain same without interest. This plan was adopted mainly to make it unnecessary for our employees to patronize 'loan sharks,' and pay the ruinous rates of interest demanded by them. Upon a capital of $1,200 loans to twice that amount have been made to deserving employees, the instalments received in payment being reloaned as they are turned in.

"The total mileage of the system including car barns and sidings is 627.65; of this 207 miles are laid with heavy section of girder-rail weighing 141 lb. to the yard, the rail adopted as the standard by this company.

"We have relaid during the year 7.24 miles of track. This has all been built with a heavy section of girder-rail, weighing 141 lb. to the yard.

"We have renewed special work at 133 locations with a total of 258 pieces.

"During the year 255 cars have been changed over to the pay-within type and are in actual operation. In addition to the changing over to the pay-within cars, the equipment department has placed in operation 20 new cars on the elevated division, these cars being the standard style of equipment adopted for this division. Five single-truck cars have been rebuilt into freight cars; six double-truck four-motor ash cars have been built and placed in service and one new coal car has been purchased and placed in service.

"At the present time the shops are busy changing over 10 of the old style 18-ft. single-truck cars to the pay-within type; these cars will be lengthened out, so that they will have a total length over all of 26 ft. 6 in. This is an experiment and we think will be a good way of utilizing equipment, which is getting too small on certain of our divisions. These 10 cars will be equipped with ball-bearing armatures and roller bearing journal boxes, it being the hope of the management that the power consumption can be materially reduced and cars of this size operated with two motors instead of four.

"The shop department is also equipping at the present time with manual brake devices 25 trains of two cars each; it is the intention to run these trains on some of the divisions where a larger car than the present single truck car could be used to advantage. This is more or less in the form of an experiment and if successful will be a method of utilizing a number of cars which in themselves are too small to operate to any profit at the present time.

"In the power-house department you are constructing at the present time an addition to the power-house property at Thirty-third and Market Streets; in this building there is to be erected an exhaust steam turbine with 6000-kw generating capacity. This will give you 5000 kw additional current from the power-house, without any additional boiler plant installation. After a careful study of the situation the chief engineer decided that this was far the most economical way of securing additional power at this particular location, as there will be no increase in the labor account.

"As a preliminary to the new financing required at the end of the fiscal year, your fiscal agents, Messrs. Drexel & Company, selected a disinterested expert and had a careful examination made of your property, particularly of the equipment. It is very gratifying to be able to state that this report was most favorable in every particular.

"The loss of revenue from the strike made necessary new financing of your property. Accordingly a special meeting of stockholders was called at which two plans were submitted to you. One provided for the sale of securities in the insurance fund and the replacing of the fire protection with fire insurance policies, the other a transfer of your equipment to the Union Traction Company of Philadelphia, and leasing the same from that company, and using this lease, with the Union Traction Company's guarantee of the rentals, as the basis of an issue of car trust certificates. The result of this plan was the raising of $1,500,000, which has to be paid off at the rate of $75,000 each six months with interest at the rate of 5 per cent. Both plans were approved by you, and both plans also received the approval (which was requisite) of the Union Traction stockholders, and accordingly the securities in the insurance fund have been disposed of and the equipment transferred to the Union Traction Company. All of these matters were not completed at the end of the fiscal year, so that the full result of this financing does not show in the fiscal statements. There had also been unissued $600,000 of the former $5,000,000 collateral loan pending the reformation of the lease of the Lehigh Avenue Passenger Railway Company. This was accomplished during the year and the bonds sold to your fiscal agents. The result of these different plans of financing is to put a very comfortable cash balance in the treasury of the company.

"The relations between the city and the company under the contract of July 1, 1907, have continued very satisfactory. The company is regularly paying into the city treasury the $500,000 required by the contract, and all plans of financing are first submitted to City Councils for approval. This secures the fullest publicity, and City Councils, after investigation, have given their assents to the steps which it was necessary to take to place the company in funds.

"The 600,000 shares of stock of your company are held by 2297 shareholders of record, an average holding of 261 shares; of the 2297 shareholders, 2091 hold 500 shares or less."

The total number of passengers carried during the year was 432,884,253, a decrease of 38,671,977, from the preceding year. Of the total 62,923,399, or 14.53 per cent, used free transfers. This number is 7,291,574 larger than the aggregate of free transfer passengers in the previous year. The average number of cars operated daily during the year was 1862, an increase of 4.31 per cent. The cars made a total of 5,624,080 trips. The car mileage was 70,943,404.

Statistics of the passenger traffic for two years are as follows:

	1910.	1909.
Total passengers carried	432,884,253	464,264,656
DIVISION OF PASSENGER RECEIPTS		
Package tickets used, per cent	.1233	41.6830
Cash fares paid, per cent	74.9570	37.3059
Exchange tickets purchased, per cent	5.0044	4.2641
Exchange tickets used (received), per cent	4.8060	4.2125
Transfer tickets used, per cent	14.5358	11.9828
Carried free, per cent	.5735	.5517
	100.0000	100.0000
Receipts per passenger, cents	4.1533	3.9432

Atlantic Shore Line Railway, Sanford, Maine.—It is stated that most of the $1,191,000 of 4 per cent refunding bonds of the Atlantic Shore Line Railway, the coupons on which are in default, have been deposited with the reorganization committee, and that the mortgage trustee is preparing to purchase the property of the company in behalf of the bondholders at foreclosure. It is denied that E. H. Knowlton, Brookline, Mass., has secured an option on the property of the company in behalf of Massachusetts capitalists.

Babylon (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized the Babylon Railroad to increase its capital stock from $25,000 to $75,000 and to execute a first mortgage upon all its property for $300,000 to secure the payment of its coupon bonds, payable in 60 years from date, with interest semi-annually at the rate of 5 per cent per annum. The company is authorized at present to issue coupon bonds to an aggregate amount of $237,000 to be sold at not less than 85, and to use the proceeds to pay indebtedness incurred in constructing its railroad. The new bonds are authorized on condition that a mortgage executed to the Metropolitan Trust Company in 1888 to secure the payment of bonds in the aggregate amount of $600,000, under which bonds to the amount of $450,000 have been issued, shall be satisfied and discharged at the time the new mortgage is recorded.

Boston (Mass.) Elevated Railway.—The stockholders of the West End Street Railway have ratified the proposed increase of the common stock of the company by the issue of not more than 27,800 shares of a par value of $50 each to reimburse the Boston Elevated Railway for improvements. The Railroad Commission of Massachusetts has approved the petition of the company to issue the additional stock at $75 a share, plus the amount of dividends that shall have accrued under the provisions of the lease to the Boston Elevated Railway at the time that payment for the stock is made.

Central Park, North & East River Railroad, New York, N. Y.—On Sept. 17, 1910, Judge Lacombe, in the United States Circuit Court, returned an order of foreclosure in the case of the $1,200,000 mortgage on the property of the Central Park, North & East River Railroad, of which the Farmers' Loan & Trust Company, New York, N. Y., is trustee.

Chicago (Ill.) Railways.—In a bill filed by the Securities Company, New York, N. Y., in the Circuit Court in Chicago, for the appointment of a receiver for the Chicago Railways, it is asserted that the company is insolvent; that its indebtedness exceeds its capital stock by $87,000,000; that all of its property and assets will not reach within $25,000,000 of its aggregate of debts and liabilities; that even such assets as it has are mortgaged to secure its bonded indebtedness; that it has defaulted on its debts for interest which was due June 1, 1908, and has not yet been paid; that a large number of unsatisfied judgments, aggregating more than $1,400,000, are in existence on which executions have been returned "no property found," and that its credit is destroyed. The Securities Company owns $20,000 of the bonds of the Chicago Railways, and it asserts that creditors whose claims aggregate between $5,000,000 and $6,000,000 are interested in the suit.

Connecticut Valley Street Railway, Northampton, Mass.—As announced in the Electric Railway Journal of July 16, 1910, page 125, the Railroad Commission of Massachusetts recently authorized the Connecticut Valley Street Railway to issue $100,000 of 6 per cent cumulative preferred stock, to retire an equal amount of first and refunding bonds. There were originally $200,000 of first and refunding bonds outstanding, and the company has now received authority from the Railroad Commission to issue an additional $20,000 of preferred stock and $80,000 of bonds, secured by the first mortgage of 1900 of the Northampton & Amherst Street Railway, to retire the $100,000 of first and refunding bonds of the company which are still outstanding.

Kansas City Railway & Light Company, Kansas City, Mo.—The Kansas City Railway & Light Company reports earnings as follows for the year ended May 31, 1910: Gross earnings, $7,161,042, as compared with $6,627,977 for the previous year; operating expenses, $4,153,250, as compared with $3,766,788 for the previous year; net earnings, $3,007,792, as compared with $2,861,189 for the previous year; other income, $17,399, as compared with $1,218 for the previous year; gross income, $3,025,191, as compared with $2,862,407 for the previous year; taxes, interest on bonds, etc., $2,628,337, as compared with $2,576,155 for the previous year; net income, $396,854, as compared with $286,252 for the previous year.

Los Angeles (Cal.) Railway.—The proposed increase in the authorized capital stock of the Los Angeles Railway from $5,000,000 to $15,000,000, to which reference was made in the Electric Railway Journal of July 23, 1910, page 162, has been approved by the stockholders of the company.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has denied the motion of the Farmers' Loan & Trust Company and the Guaranty Trust Company for an indefinite postponement of the sale of the property of the Metropolitan Street Railway under foreclosure, and has fixed Nov. 4, 1910, as the date of the sale. The New York & Harlem Railroad has resumed dividends on its stock by declaring a semi-annual dividend of 1½ per cent on its $10,000,000 of stock, payable on Oct. 1, 1910, to holders of record on Sept. 19, 1910, out of $400,000 received annually as rental from the Metropolitan Street Railway under lease of 1896. Up to October, 1908, the New York & Harlem Railroad used the rental from the Metropolitan Street Railway to pay semi-annual dividends of 2 per cent each, but in April, 1909, October, 1909 and April, 1910, the dividends were not paid because there remained unpaid about $800,000 of special franchise taxes assessed against the company. In June, 1910, the New York & Harlem Railroad was reimbursed by the Metropolitan Street Railway at the instance of Judge Lacombe, of the United States Circuit Court, for $400,000 advanced by the New York & Harlem Railroad. Pending a full adjustment of the tax matter it was deemed inexpedient by the New York & Harlem Railroad to declare a dividend at the rate of more than 3 per cent a year.

Montreal (Que.) Street Railway.—In connection with the reports about the amalgamation of the Montreal Street Railway and the Canadian Light & Power Company, it is stated that a holding company will be formed with a capital of at least $50,000,000, and that the shareholders of the Montreal Street Railway will receive 4½ per cent debenture bonds in the proportion of $250 in bonds for each share of stock of the Montreal Street Railway and, in addition, a bonus of common stock in the new company on the basis of one-half share of the new stock for every share of stock of the Montreal Street Railway. The shareholders of the Canadian Light & Power Company will receive in this bonus stock, so it is said, 150 shares for every 100 shares of stock which they hold at present. They will, however, receive no debenture bonds.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil.—The interim report of the Rio de Janeiro Tramway, Light & Power Company for the year 1909, subject to adjustment, shows gross earnings for the tramway system of £748,310 and net earnings of £357,043. The corresponding figures for 1908 were £744,865 and £314,324. Additional shares of capital stock of the Jardin Botanico Tramway Company have been purchased. The Rio de Janiero company previously held a controlling interest in that property. Gross earnings of all the departments for the year were £1,546,759 and net earnings were £626,049. Including the estimated income of the Jardin Botanico system for 1910, the earnings of the property for this year are estimated as follows: Gross, £2,009,589; net, £1,014,246.

Sedalia Light & Traction Company, Sedalia, Mo.—The protective committee of bondholders of the Sedalia Light & Traction Company, composed of Otto T. Bannard, H. K. Hallett and R. T. Sheldon, announced on Sept. 13, 1910, that $329,600 par value of the bonds of the company had been deposited with the New York Trust Company, and that $152,000 of the bonds had been deposited in Chester, Pa., under an agreement to act in concert with the committee of bondholders of the company composed of Messrs. Bannard, Hallett and Sheldon. The time for receiving further deposits of the bonds has been extended to Sept. 27, 1910.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—An initial dividend of 1¼ per cent has been declared on the preferred stock of the Terre Haute, Indianapolis & Eastern Traction Company for the quarter ended Sept. 30, 1910, payable on Oct. 1, 1910, to holders of record on that date.

Third Avenue Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has adopted a final order denying the application for the approval of the plan for the reorganization of the Third Avenue Railroad submitted by the bondholders' committee. On July 29, 1910, the commission announced its decision refusing the application chiefly on the ground that the amount of the proposed issue of new securities—$55,000,000—was excessive. The proceeding was continued, however, so as to permit the committee to amend the application if it desired. William D. Guthrie, chief counsel for the committee of bondholders, on the other hand, served on Chairman Willcox of the commission a formal demand that a final order be entered, the idea being, it is said, to open the way for an appeal to the courts by the bondholders from the finding of the commission.

Union Street Railway, New Bedford, Mass.—The Union Street Railway and the Dartmouth & Westport Street Railway have applied to the Railroad Commission of Massachusetts for permission to consolidate. As stated in the ELECTRIC RAILWAY JOURNAL of Aug. 27, 1910, page 343, the plan is to increase the capital stock of the Union Street Railway from $1,125,000 to $1,625,000, the $500,000 of new stock to be exchanged, dollar for dollar, for the stock of the Dartmouth & Westport Street Railway.

United Railways, St. Louis, Mo.—It has been announced that the quarterly dividend of 1¼ per cent on the preferred stock of the United Railways, which has been paid regularly since April, 1900, will not be paid in October. Robert McCulloch, president and general manager of the company, has issued the following statement to the holders of the preferred stock of the company in explanation: "The company has a floating debt of $1,300,000, all growing out of a betterment of the physical condition of the property, which condition is constantly being improved. A duty to the preferred stockholders impels a suspension of the dividend until this indebtedness is liquidated. The dividend being cumulative, its payment is only deferred. The usual October dividend will not be paid."

Dividends Declared

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1½ per cent.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Germantown (Pa.) Passenger Railway, quarterly, $1.31¼.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 1¾ per cent.

Illinois Traction Company, Champaign, Ill., 1½ per cent, preferred.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., 3 per cent, preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1 per cent.

Northwestern Elevated Railroad, Chicago, Ill., quarterly, 1 per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

St. Joseph Railway, Light, Heat & Power Company, quarterly, 1¼ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., $3.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1¼ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 1¾ per cent.

Union Traction Company of Indiana, Indianapolis, Ind., 2½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1¾ per cent.

West End Street Railway, Boston, Mass., $1.75, common.

Wheeling (W. Va.) Traction Company, 1 per cent.

Traffic and Transportation

Transfer Changes in Brooklyn to Prevent Abuses

The Brooklyn (N. Y.) Rapid Transit Company has notified the Public Service Commission of the First District of New York that on Oct. 15, 1910, it proposes to modify its transfer system so as to compel passengers who transfer to travel in one general direction, and has posted in its cars over the name of the Brooklyn Heights Railroad the following notice to the public in which the reason for the change is given:

"Effective Oct. 15, 1910, the rules and regulations regarding the issuance and acceptance of transfers on the lines of this company, and certain reciprocal privileges with the lines of other companies, will be modified. These changes are made in accordance with existing law. They are intended to afford the public every legitimate privilege, and at the same time relieve the company from transfer abuses.

"Between the lines of this company (excluding the 10-cent fare routes to Flushing and North Beach) the present plan of three rides for a single fare (including the additional privilege to and from feeder lines) will be retained, with the exception that the route taken shall be in the same general dirction. Direction tickets will be issued which, while permitting this, will prevent the use of transfer tickets for travel in a reverse direction, or to return to the starting point for a single fare.

"At the points where, for reciprocal convenience, passengers of certain lines of the Brooklyn Union Elevated Railroad, the Nassau Elevated Railroad, Brooklyn, Queens County & Suburban Railroad, Sea Beach Railway, and South Brooklyn Railway are carried free over certain lines of this company, and passengers of certain lines of this company are carried free over certain lines of the companies above mentioned, such reciprocal privileges will be continued to passengers paying a cash fare, but no transfers will be issued to such passengers by the second company."

The company has also announced that a number of changes in the routes of its lines of purely local interest will go into effect on Oct. 15, 1910.

The management states that the governing reason for the new rules and regulations regarding transfers is the prevalent abuse of the transfer privilege. The changes embodied in the new system, so far as they relate to the lines of each company, have been based upon decisions of the higher courts rendered since May 9, 1907, when the last transfer system was made effective. On account of the curious topography of Brooklyn it is possible under the present transfer system for a passenger to make return journeys to a starting point for a single fare on more than 150 different routes, comprising two, three or four ride loops. While it is the purpose of the new transfer system, as stated in the notice, to afford every facility to passengers who desire to make a continuous trip in the same general direction on the lines of the same company, the use of direction tickets will prevent travel in a reverse direction or the return to a starting point for a single fare.

With reference to the practice of using transfer tickets for riding in a reverse direction or to return to the starting point for a single fare, the company calls attention to the opinion of Judge Gray, of the Court of Appeals, in the case of Kelly vs. the New York City Railway, 192 N. Y., 97, decided April 24, 1908, which upheld the right of the New York City Railway to carry people only in the same general direction for one fare. This opinion says:

"In this instance the plaintiff, upon the one fare paid on entering the southbound car on the Bowery, under his interpretation of the law, could have continued northerly from Chambers Street on West Broadway to Canal Street and there have boarded an eastbound car on the Canal Street Line, which would have returned him to the Bowery near to his starting point. * * * I do not think that the statute intended to confer any such extraordinary right, and, in my opinion, the regulation of the defendant was a reasonable one and not in contravention of the statute. It was as liberal in the privileges which it accorded to the traveling public as it was possible for the company to be, short of allowing a round trip upon payment of a single fare. It might happen, as in this case, that the passenger

was taking as direct a route by the use of street railway lines as was possible from the point at which he boarded the car of the Third Avenue line to the point at which he left the car of the Eighth Avenue line. It is manifest, however, with the enormous number of passengers carried daily to and fro upon the defendant's cars, 30 to 40 per cent of whom are transferred, that it would be almost, if not quite, impossible, by any plan workable under congested conditions of travel, to provide for a transfer that would indicate the destination of a particular passenger intending, in good faith, to reverse his direction of travel by taking the third side of a quadrilateral route. * * * What was intended by the Legislature, when authorizing a leasing, or consolidation, of competing lines of railroads, appears to have been the attaching of a condition by which the public would gain some advantage from it and its convenience be promoted thereby. That condition was that the contracting companies should 'carry * * * between any two points on the railroad, or portions thereof embraced in such contract, any passenger desiring to make one continuous trip between such points for one single fare.' The statute, more or less, defines the scope of the legislative enactment in the language used: 'that the public convenience may be promoted by the operation of the railroads as a single railroad with a single rate of fare.' But a single railroad would never be required to give a passenger a return transfer for one fare, and it is hardly conceivable that it should be. A trip, ordinarily, conveys the idea of transportation in one direction. Unless connected with some other expression it does not carry the idea of a return. A 'continuous trip' does not add to the import. A continuous trip, like a continuous line, is supposed to extend in the same general direction. * * * The defendant was required to carry him (the passenger) upon the several lines which it operated for a single fare and with the right to a transfer, but 'substantially as a single railroad with a single rate of fare.' If the Legislature had intended to require railroad companies coming within the purview of the statute to carry a passenger for a single fare in a reverse direction from that in which he started, or on a round trip, as the result would certainly be in the great majority, if not all, of the cases, it would not have resorted to the comparison 'of a single railroad' to express its object. The statute should be read in the light of the habitual method of the railroad transportation of passengers, which is to require one fare for a trip upon its line and another fare for a return trip."

The lines comprised in the Brooklyn Rapid Transit System exchange transfers at more than 600 line intersections. At nearly one-half of these intersections reciprocal privileges have been exchanged between the lines of separately operated companies, without legal obligation on the part of the companies to give or continue such transfers. It is not proposed under the new transfer plan to discontinue these reciprocal privileges, but to limit them to two rides. For example, a passenger paying a cash fare on the Vanderbilt Avenue line of the Nassau Electric Railroad may transfer to the Fulton Street line of the Brooklyn Heights Railroad, and vice versa, but in neither case will he receive an additional transfer. On the lines of the same company a passenger will have the same privilege as heretofore of making a continuous trip in the same general direction, including the additional privilege to and from feeder lines. It will no longer be possible, however, to leave Park Row on a Fulton Street car, transfer to Nostrand Avenue and return by Myrtle Avenue to Park Row. Again, a passenger from Ridgewood on the Bushwick Avenue line will be able to transfer to the Union Avenue line toward Greenpoint Ferry, in the same general direction, but will not be able as heretofore to return to Ridgewood for a single fare.

Answer of New Haven Road to Complaint Regarding Advance in Commutation Rates

An answer has been filed with the Interstate Commerce Commission by the New York, New Haven & Hartford Railroad in relation to the complaint respecting the advance in commutation rates between points in New York State and Connecticut. The answer states in substance:

"1. The commutation rates as set forth in said tariff are less than the normal passenger rates from the points therein mentioned, and the making of such rates is within the discretion of said railroad, and such rates are exempt from condemnation of the provisions of the act to regulate commerce and the amendments thereof, as has been repeatedly held by this commission. The defendant thereof pleads to the jurisdiction of the commission, denying that it has any power to pass an order reducing said rates.

"2. Without waiving the above plea to the jurisdiction of the commission, and without admitting its power to pass an order affecting said rates, the company, in compliance with the request of the commission, pleads the following facts:

"The rates covered by the tariff in question are commutation rates between points in the State of Connecticut and the Grand Central station, New York. The railroad of the New York, New Haven & Hartford Railroad Company ends at Woodlawn Junction in the State of New York, where it connects with the New York & Harlem Railroad. For the convenience of passengers upon its trains, this company has made the best arrangement which it could with the New York & Harlem Railroad, owning said connecting railroad, and with the New York Central & Hudson River Railroad, owning Grand Central station in New York City, for the transportation of such passengers without change of cars over the New York & Harlem Railroad and into said Grand Central station, and also out of said Grand Central station over the New York & Harlem Railroad to points upon its own railroad.

"The amounts paid to the New York Central & Hudson River Railroad for the use of the Grand Central station have recently increased very much, in consequence of the large expenditures that have been made upon said station. The total amount paid to the New York Central & Hudson River Railroad for the transportation of passengers beyond the terminus of the New York, New Haven & Hartford Railroad to and from Grand Central station is so large that the resulting cost per commuting passenger is in many cases greater than the price paid by such passenger for his commutation ticket. The addition of this large element of cost to the operating cost of transporting the commuting passengers over the New York, New Haven & Hartford Railroad renders the total cost of this service so great that none of the rates as advanced by tariff I. C. C. A.-833 are fully remunerative to the carrier, and in no case are they unreasonable or unjust to the passenger."

Hearing in Massachusetts on Lenox Fares

The Massachusetts Railroad Commission gave a hearing on Sept. 14, 1910, upon the petition of the Selectmen of Lenox, Mass., for a 5-cent fare in Lenox on the Berkshire Street Railway. The company was represented by Bentley W. Warren, Boston, who stated that the petitioners would be given as a concession a 5-cent fare, including a transfer from the center of Lenox to New Lenox, a point about half a mile south of the Pittsfield-Lenox boundary line. This would afford a 5-cent fare throughout the town, and protect the through line of the company from Lee to Pittsfield from undue reductions. Chairman Hall called the petitioners' attention to the fact that what they really seemed to desire was a reduction in the rate from Lenox to Pittsfield, which is now 15 cents, and which would be only 10 cents if the 5-cent fare was established to the town line. Mr. Warren said that the company could grant fare schedules in the rapidly growing city of Pittsfield which it could not afford to maintain in a community like Lenox, which has only 3000 people in winter and 6000 in summer. If a 10-cent fare should be established to Pittsfield the rate would be only about 1 cent per passenger mile, an unprofitable rate, considering the present costs of labor and material, except in densely populated districts where the average ride is short. The Lenox portion of the Berkshire line has a low density of traffic. The company could not afford to increase its car service in the morning, as requested by the petitioners. Mr. Warren offered to submit figures later regarding the earnings of the Lenox line. The commission took the case under advisement.

Through Cars Between Pottsville and Tamaqua.—The Eastern Pennsylvania Railway, Pottsville, Pa., proposes to operate through cars between Pottsville and Mauch Chunk.

At present passengers between Pottsville and Mauch Chunk have to change cars at Tamaqua.

Change of Place of Meeting of Central Electric Traffic Association.—The meeting of the Central Electric Traffic Association which was arranged to be held at Winona Lake, Ind., on Sept. 27, 1910, will be held at Warsaw, Ind., on that date instead of at Winona Lake, on account of the closing of the hotel at the latter place at which it was proposed to hold the meeting.

Elevated Traffic Over Brooklyn Bridge Tied Up.—Just at the height of the evening rush hour on Sept. 13, 1910, a fire occurred in the switch tower at the Manhattan end of the Brooklyn Bridge which governs the movement of elevated trains, and train service over the structure was suspended for about an hour. Passengers who ordinarily patronize the elevated lines had to resort to the surface cars which cross the structure and to the subway to Brooklyn.

Hearing on Necessity for Additional Equipment in Albany.—The Public Service Commission of the Second District of New York ordered the United Traction Company, Albany, N. Y., to show cause before the commission on Sept. 20, 1910, why the company should not purchase 30 double-truck passenger cars for use on its Pine Hills and West Albany lines by Jan. 1, 1911. This order followed the complaint made by the Common Council of Albany and the investigation of the facilities of the company made by the commission.

Petition for Reduction in Fare in Newburyport.—The Aldermen of Newburyport have petitioned the Massachusetts Railroad Commission to reduce the fares of the Haverhill & Amesbury Street Railway, the Citizens' Electric Street Railway and the Boston & Northern Street Railway within the municipality on the ground that the existing charges are excessive. The petitioners urge that the reduction be made either through the issuance of transfers or by a direct reduction in the cash tariff. A hearing has been assigned for Oct. 19, 1910.

Massachusetts Company Complains About Snow Removal Conditions.—Complaint has been made to the Railroad Commission of Massachusetts by the Connecticut Valley Street Railway, Greenfield, Mass., about the regulations imposed by Greenfield for the removal of snow from 32,854 ft. of street railway track. The company says that the regulations are burdensome and involve great and needless expense. It wishes to have 36 hours after a storm in which to remove the snow, and it wants the regulations to provide that it shall not be compelled to remove snow unless the fall is at least 6 in. A date for a hearing has not been set.

Freight Service Between Philadelphia, Frankford and Fox Chase.—The Philadelphia (Pa.) Rapid Transit Company has established freight service between the station at Front Street and Market Street, Philadelphia, and Frankford and Fox Chase. The route traversed by the cars operated in the new service is west on Market Street, from Berks Street to Eleventh Street to Montgomery Avenue to Fifth Street to Berks Street. Cars for Fox Chase continue from Berks Street on Fifth Street to their terminus. Cars for Frankford traverse Berks Street to Front Street, Front Street to Kensington Avenue, Kensington Avenue to Frankford Avenue, Frankford Avenue to Arrott Street.

Ticklers in the New York Electric Zone.—The Public Service Commission of the Second District of New York has denied the application of the New York Central & Hudson River Railroad for an order authorizing it to dispense with the maintenance of bridge ticklers in the electric zone. The company claimed that on account of the change in motive power from steam to electricity between Grand Central Station and Croton on the Hudson Division and North White Plains on the Harlem Division it would be unnecessary for employees to go on top of cars and, there being no danger on this account, that the use of ticklers was unnecessary.

Public Service Commission Exhibit at State Fair.—The Public Service Commission of the First District of New York exhibited at the State Fair held in Syracuse during the week ended Sept. 17, 1910, charts and maps which show the nature of the traffic problem in New York City and the work of the commission in relieving traffic congestion, photographs of the fender and wheel-guard tests held by the commission, and charts which show the annual saving in human life effected during the three years the commission has been in office. During the three years ended June 30, 1910, the charts showed that the number of deaths by accident on the street surface railways in the territory under the jurisdiction of the commission had decreased from 303 in the year ended June 30, 1908, to 152 for the year ended June 30, 1910. The commission also exhibited the plans and contracts for the new Tri-Borough Subway system.

Report on Service in New Haven Needless.—The question of the advisability of New Haven retaining an engineer to report on street railway service in that city furnished by the Connecticut Company has recently been discussed among members of the City Council. There is considerable opposition, however, to action of this kind on account of the expense that would be involved. The attitude of the company regarding the proposal is indicated in the following statement which it made in reply to an inquiry from one of the local papers: "The Connecticut Company will be glad to receive information and suggestions from any authorized representative of New Haven regarding the operation of its street railway system in New Haven and vicinity. The company will continue to co-operate with the city in adopting any reasonable proposition looking to the improvement of the property and its operation. It is suggested, however, that, in view of the extensive improvements now under way and the additional facilities to be added in the near future, the employment of an expert to indicate defects which will soon be remedied will involve an unnecessary expense."

British Columbia Electric Railway Discontinues Profit-Sharing Plan.—The profit-sharing plan of the British Columbia Electric Railway, Vancouver, B. C., was revoked on June 30, 1910, at the request of the employees, and the following schedule of wages was adopted: For conductors and motormen, per hour, first three months, 22 cents; second three months, 25 cents; second six months, 27 cents; second year, 29 cents; third year, 31 cents; fourth year, 33 cents; fifth year and after, 35 cents per hour. This schedule to continue till June 30, 1913. The hours of labor and rates for extra time, viz., one and one-half after 11 p. m. to 1 a. m. and double pay from 1 a. m. to 5 a. m., remain the same. The system which has existed since July 1, 1903, gave a share of the profits to all employees who had been one year in the company's service. The plan was: First, a dividend of 6 per cent on capital stock of company. Then the balance of the year's profits was divided into three equal parts, of which two-thirds were given to the stockholders and one-third to the employees. Of this latter sum, in addition to their regular salaries, every employee received the same amount. This yearly bonus amounted during the seven years 1903-1909 to the following sums: $30, $35, $40, $45 (1907 not given), $62 and $57 per employee.

Reduction in Fare Refused to Places Now Part of Los Angeles.—The Los Angeles-Pacific Company, Los Angeles, Cal., has refused the request of citizens of Hollywood and Colegrove, which are now part of Los Angeles, for a 5-cent fare to Los Angeles, instead of the present 10-cent fare. A special commutation fare, which remains to be fixed, will, however, be established between Los Angeles, Hollywood and Colegrove. In replying to the committee which represented the citizens of Hollywood and Colegrove, Paul Shoup, assistant general manager of the Southern Pacific Company, in charge of electric railways, pointed out that the entire "shoestring" district and San Pedro are part of Los Angeles, yet the company could not reduce its rate. Hollywood and Colegrove are the same distance from Los Angeles as Pasadena and Glendale, yet passengers from Pasadena and Glendale to Los Angeles pay a higher fare than is in effect on the line of the Los Angeles-Pacific Company. In reply to the statement that a 5-cent fare would increase traffic, Mr. Shoup said that it undoubtedly would in the long run. While the Hollywood line is paying expenses, the Colegrove line is, however, run at a loss. Should a 5-cent fare be put into effect, neither line would pay. Mr. Shoup explained in detail plans which the company has in contemplation for expending $500,000 in improving the Hollywood and Colegrove lines.

Personal Mention

Mr. F. P. Vogt has resigned as auditor of the Evansville (Ind.) Railways.

Mr. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad and the Connecticut Company, New Haven, Conn., has been elected acting president of the Boston & Maine Railroad and the Maine Central Railroad to succeed Mr. Lucius Tuttle, resigned.

Mr. C. H. Hile, assistant to the vice-president of the Boston (Mass.) Elevated Railway, has been appointed acting superintendent of transportation of the company in place of Mr. George C. Tripp, who has been absent for a protracted period on account of illness.

Mr. G. A. Harvey, formerly electrical engineer of the International Traction Company, Buffalo, N. Y., is assisting Mr. Horatio A. Foster, who is associated with Mr. Bion J. Arnold, on some work in connection with the Southern California Edison Company, Los Angeles, Cal.

Mr. Allen McCarty has been appointed general auditor of the Delaware & Hudson Railroad, Albany, N. Y., a newly created position. Hereafter the comptroller of the company will have charge of the general, corporate and fiscal accounts and the general auditor will have charge of the operating, revenue and expense accounts.

Mr. H. W. Firth, electrical engineer of the Great Eastern Railway Company of England, is making a short trip in this country, to inspect heavy electric traction installations and electric power station practice. The Great Eastern Railway is one of the large trunk lines of England, and serves the Eastern counties of England. Its main terminus is in London.

Mr. M. O. Robinson, superintendent of the power house of the Canadian Pacific Railway at Fort William, Ont., has been appointed manager of the Port Arthur & Fort William Electric Railway, Port Arthur, Ont., to succeed Mr. N. C. Pilcher, who as noted in the Electric Railway Journal of Aug. 6, 1910, has been appointed general manager of the Sherbrooke (Que.) Street Railway.

Mr. J. O. Hilliard has been appointed trainmaster of the Puget Sound Electric Railway, Tacoma, Wash., to succeed Mr. D. B. Rose. Mr. Hilliard is a native of Wisconsin. He has filled a number of places of importance and responsibility with steam railroads in the Middle West and on the Pacific Coast. He was for a time chief dispatcher for the Oregon Railroad & Navigation Company, The Dalles, Ore. Since then he has been dispatcher for the Northern Pacific Railway in Tacoma.

Mr. A. L. Adams has been appointed superintendent of distribution of the Puget Sound Electric Railway and the Tacoma Railway & Power Company, Tacoma, Wash., reporting to Mr. K. C. Schluss, superintendent of power of these companies. Mr. Adams is a recent graduate of the University of Maine. He served with the transportation department of the Tacoma Railway & Power Company upon entering the employ of the company. Later he became connected with the office of the superintendent of power.

Prof. George F. Swain, of Harvard University and consulting engineer of the Massachusetts Railroad Commission, has been selected to supervise the appraisal of the property of the New York, New Haven & Hartford Railroad in Massachusetts authorized by the Massachusetts Legislature to determine the relation between the assets of the company and the aggregate of its outstanding capital stock and indebtedness. The commission, or validating board, in charge of the appraisal consists of the Railroad Commissioners, the Tax Commissioner and the Bank Commissioner.

Mr. Nugent Fallon has been appointed acting superintendent of Division 5, South Boston Lines, of the Boston (Mass.) Elevated Railway to succeed Mr. Frank M. Damon, resigned. Mr. Fallon was graduated from the Massachusetts Institute of Technology in 1906, with the degree of civil engineer. He immediately became a conductor with the Boston Elevated Railway, and then passed through successive posts of motorman and pitman and employee in the road department, wire department, armature shop and power station. Later he worked under the storekeeper, purchasing agent and superintendent of the Grove Hall division. From three to five months were spent in each of these "cadet" assignments. For six months Mr. Fallon was assistant to the superintendent of transportation of the company. Subsequently he became chief clerk of the Charlestown Division. He is a member of the New England Street Railway Club.

Mr. George E. Moffatt, for the past year and a half general superintendent and consulting engineer of the British Columbia Electric Railway Company, Ltd., has just resigned. Mr. Moffatt has had an extended experience in electric railway work. From 1893 to 1899 he was superintendent of the Philadelphia Rapid Transit Company. After leaving that company he become consulting engineer for the London United Railways of London. He returned to this country in 1900 to act as one of the constructing engineers for the Lackawanna & Wyoming Valley Railway and the Rochester, Auburn & Syracuse Railway. In 1903 he was general manager of the Fargo & Moorhead Street Railway, and left that company to accept a similar position with the Conneaut & Erie Traction Company. In 1905 and 1906 he was general manager of the Citizens' Street Railway of Richmond, Va., and the Pittsburg, Binghamton & Eastern Railway. In 1907 he severed his connection with operating work to act as general superintendent of the Danville Car Company, and a year later accepted the position of consulting engineer of the Federal Construction Company of New York. This position he resigned in 1909 to accept that of general superintendent and consulting engineer of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C.

Mr. Alexander Shane, chief inspector of the Indiana Railroad Commission, has been appointed general manager of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., to succeed Mr. A. A. Anderson, who resigned several months ago to become vice-president and general manager of the Springfield (Ill.) Consolidated Railway. Mr. Shane is a native of Louisiana. Since 1866 he has been engaged in constructing railway bridges and superintending railroads. During 1866 and 1867 he was employed by the Louisville & Nashville Railroad in repairing damages done to the road during the war. From 1868 to 1870 he was engaged in erecting the bridge over the Ohio River at Louisville, Ky., for the Louisville Bridge & Iron Company. After this work had been completed Mr. Shane became a foreman with the company and assisted in erecting bridges in various parts of the United States. In 1875 he accepted a position with the Louisville Bridge Company in charge of repair and maintenance of the Louisville bridge. He remained with the Louisville Bridge Company until 1880, when he accepted a position with the Keystone Bridge Company, Pittsburgh, Pa., as foreman of erection of superstructures. In 1884 Mr. Shane became supervisor of bridges and buildings on the Chicago Division of the Cleveland, Cincinnati, Chicago & St. Louis Railway and held this position until 1898, when he was appointed superintendent of the bridges and buildings of the Toledo, St. Louis & Western Railroad. In 1902 he was appointed superintendent of maintenance and way of the Toledo, St. Louis & Western Railroad and he remained with the company until June, 1907, at which time he was appointed chief inspector of the Railroad Commission of Indiana. During his connection with the Railroad Commission of Indiana Mr. Shane devoted much of his time to supervising the construction and maintenance of electric railways and assisted in the work of preparing the uniform code of rules which was adopted by the electric railways in Indiana.



Alexander Shane

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Greenville, Greenwood & Augusta Railway, Augusta, Ga.**—Chartered in Georgia to build a 125-mile railway from Augusta, Ga., via Greenwood to Greenville, S. C., connections to be made with the Carolina, Knoxville & Western Railway. Capital $1,000,000. Incorporators: Henry Briggs, Frank Hammond and J. P. Charles, Greenville, S. C.; J. C. Fawcett and Henry L. Zimmerly, New York.

***Springfield & Western Railroad, Springfield, Mo.**—Incorporated in Missouri to build a 100-mile electric railway from Springfield to Carthage and Joplin, via Bennetts, Plano, Halltown, Paris Springs, Miller, Red Oak and Avilla, with a branch from Paris Springs via Mount Vernon and Monett to Pierce City. Surveys have been started at Springfield. Capital stock, $2,000,000. Incorporators: Hector D. Mackay, president, and Mortimer M. Hollenback, chief engineer, both of Springfield.

***Georgia & Carolina Railway, Spartanburg, S. C.**—Application for a charter will be made in South Carolina by this company to build a 120-mile railway from Hamburg to Spartanbug, S. C., via Saluda, Newberry, Whitemire, Glen Springs and Pacolet. Capital stock, minimum, $100,000, to be increased later to $2,500,000. Incorporators: Allen W. Jones, Charles C. Howard and G. R. Coffin, Augusta, Ga.; A. E. Padgett, Edgeville, and Dan Crosland, Aiken, S. C.

FRANCHISES

Montgomery, Ala.—The Montgomery Traction Company has been granted a franchise by the Council to build an extension of its tracks from the end of the present Cloversdale system to the new woman's college in Montgomery.

Los Angeles, Cal.—The Pacific Electric Railroad has applied to the City Council for a franchise to build tracks in Pedro Street.

Oakland, Cal.—The Southern Pacific Company, San Francisco, will apply for a franchise to the City Council to build its tracks on Occidental Street in North Oakland for the purpose of connecting its Oakland and Berkeley ferry train systems.

San Francisco, Cal.—The Ocean Shore Railway has asked the Board of Supervisors for a 5-year extension of time to its franchise to construct the tracks of its Richmond and Sunset concessions as well as the right of way across the park.

Genoa, Ill.—The Woodstock & Sycamore Traction Company, Woodstock, has applied to the Board of Trustees for a franchise to build an electric railway in Genoa.

Peoria, Ill.—The Peoria & Galesburg Railway has accepted the franchise granted it by the City Council to use the tracks of the Peoria Terminal Railway on South Washington Street at Peoria and work will be started at once. This projected 60-mile electric railway will connect Peoria and Galesburg. S. T. Atwood, secretary. [E. R. J., Sept. 17, '10.]

Rockford, Ill.—The Paris (Ill.) Traction Company has asked the City Council for a 50-year franchise to extend its tracks as far as Chrisman.

Owensboro, Ky.—The Owensboro & Rockport Bridge & Terminal Company has been granted a franchise by the City Council to construct a railroad along the entire river front of Owensboro. This was a preliminary necessary to the work of beginning construction of a line from Rockport, Ind., to Owensboro, Ky. Work will begin in the near future.

Ludlow, Mass.—The Springfield Street Railway, Springfield, it is stated, will ask the Council for a franchise to extend its railway into Ludlow.

Bessemer, Mich.—Messrs. Sullivan and Appleyard have been granted a franchise by the Council to build an electric railway in Bessemer. This railway will connect Bessemer and Ironwood. [E. R. J., May 7, '10.]

Saginaw, Mich.—The Saginaw Valley Traction Company has been offered a 17-year franchise extension by the City Council and Board of Trade in exchange for three track extensions in the factory districts.

South Amboy, N. J.—The Jersey Central Traction Company has been granted a franchise by the City Council to install a curve on Main Street connecting with a private right-of-way in South Amboy.

Schenectady, N. Y.—The Schenectady Railway will ask the Common Council on Sept. 26 for a franchise to extend its tracks in Schenectady.

Tonawanda, N. Y.—The Frontier Electric Railroad, Niagara Falls, has reached an agreement with the city authorities of Tonawanda and North Tonawanda by which a franchise through those cities will be granted. This proposed railway will connect Buffalo and Niagara Falls and has acquired all the rights to the old Buffalo, Thousand Island & Portland Railroad between Buffalo and Niagara Falls. James S. Simmons is interested. [E. R. J., Aug. 6, '10.]

Dayton, Ohio—The Dayton, Springfield & Xenia Southern Railway, Dayton, has asked the City Council for a franchise to build a loop in the central section of Dayton.

Allentown, Pa.—The Lehigh Valley Transit Company has secured the signing of all borough franchises and township agreements, which will permit it to build an extension from Quakertown to Perkasie.

Morristown, Pa.—The Philadelphia & Western Railway, Philadelphia, has been granted a franchise to build an electric railway in Norristown. This is part of a plan to build an extension from Villanova to North Wales, via Norristown.

New Castle, Pa.—The New Castle, New Wilmington & Sharon Electric Railway, New Castle, has been granted a six-months' extension of time to its franchise by the City Council to build its railway in New Castle. This proposed 15-mile railway will connect New Castle, Bethel, Five Points, Sharon, South Sharon, New Wilmington, West Middlesex, Sharpsville and Meadville. James Campbell is interested. [E. R. J., Aug. 20, '10.]

Beaumont, Tex.—T. D. Polk and associates have been granted a franchise by the City Council to be adopted for the Beaumont Traction Company to build an electric railway in Beaumont and between Beaumont and Port Arthur.

Logan, Utah.—Leo Neilsen and associates have been granted an amended franchise by the County Commissioners to build an interurban electric railway to connect Wellsville, Hyrum, Logan, Hillville and Providence. [E. R. J., Sept. 3, '10.]

Spanish Fork, Utah—Abel J. Evans and associates have been granted a franchise by the City Council to build a railway in Spanish Fork. This is part of a plan to build an interurban railway through Utah County. [E. R. J., Sept. 3, '10.]

Richmond, Va.—The Virginia Railway & Power Company has applied to the City Council for a franchise to build an extension of the Broad Street and Twenty-fifth Street lines. This proposition is independent of the plan for a general franchise covering all lines, which was before the Council for several months.

Madison, Wis.—The Chicago & Wisconsin Valley Railway, Madison, has been granted a franchise by the Council to build an electric railway in Madison. This projected railway will connect Janesville and Merrill via Friendship, Easton, Portage, Lodi, Middleton and Madison. Allen T. Russell, Chicago, general manager.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has been granted a franchise by the Council to build extensions of its tracks on Seventh Street and Eleventh Street in Milwaukee.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company has made arrangements for several extensions to its lines. An extension of the Indian School line to Glendale with 11 miles of added trackage will be built, also a line north on Second Avenue into the northwestern part of Phoenix.

Little Rock & Hot Springs Electric Railway, Little Rock, Ark.—This company advises that it will let contracts within the next 30 days for the construction of its line from Little Rock to Hot Springs. L. Garrett, 219½ Main Street, Little Rock, general manager.

Vallejo & Northern Railway, Vallejo, Cal.—This company has begun the work of grading at Woodland for its proposed branch from Sacramento to Woodland. T. T. C. Gregory, Suisun, president. [E. R. J., Sept. 17, '10.]

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—This company, recently incorporated, has organized by electing the following officers: Costello Lippitt, president; H. M. Pollock, secretary, and Albert L. Potter, treasurer. Work has been begun at the Hartford end of the line. [E. R. J., Sept. 10, '10.]

Chicago (Ill.) Railway.—This company is receiving proposals for furnishing rails and ties with which to carry forward the work of rehabilitation of the Consolidated Traction Company's lines. The purchases will include 6000 tons of steel rails and between 45,000 and 60,000 ties.

***Bristol, Ind.**—Herbert E. Bucklin is promoting the building of an electric railway to connect Bristol, Mottville, Constantine, Battle Creek and Kalamazoo. It will be operated to connect with the Northern Indiana Railway, South Bend, at Bristol. It is expected to begin the work of grading this fall.

***Liberty, Ky.**—Plans are under way for building an electric railway to connect Liberty and Moreland.

Louisville, Lincoln Farm & Mammoth Cave Junction Company, Glasgow, Ky.—It is announced that this company has completed financial arrangements and will begin work within 90 days on its projected 60-mile railway to connect Louisville and Mammoth Cave. J. M. Richardson, president. [E. R. J., July 30, '10.]

***Lafayette, La.**—At a meeting in Lafayette, Sept. 6, plans were considered to establish an interurban line to connect Lafayette, Cade, St. Martinville, Breaux Bridge, Arnaudville, Broussard and Port Barre.

Aroostook Valley Railroad, Presque Isle, Me.—This company is said to be making preparations to bridge the Presque Isle stream near the present terminal on Dyer Street.

Frederick (Md.) Railroad.—This company advises that it is building extensions to its lines in Frederick which will form a belt line in that city. The electrification of its line from Frederick to Thurmont for passenger service is now under way, and it is expected that the work will be completed by Dec. 1. The Union Electric Company, Pittsburgh, Pa., has the contract for the material used in connection with this work. The overhead system is being built 22 ft. above the rails so that the present steam freight service can be continued. Direct current will be used. It is also the plan to build an extension to Emmitsburg next spring. Several new bridges are being built along the line to replace the wood trestles now in use.

***Vicksburg, Miss.**—Press reports state that plans are under way for the construction of a 43-mile railway to connect Jackson and Vicksburg via Edwards, Bolton and Clinton.

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—This company has let the contract to the Toledo (Ohio) Bridge Company for building its bridges over the Missouri River at St. Charles and Arrow Rock. D. C. Nevin, Commerce Building, Kansas City, Mo., is president. [E. R. J., Aug. 6, '10.]

Gallatin Valley Electric Railway, Bozeman, Mont.—This company has finished grading work and track laying is now in progress on its proposed 27-mile extension from Bozeman Springs, Mont., to Three Forks on the Chicago, Milwaukee & Puget Sound Railroad. N. C. Van Natta, Bozeman, Mont., chief engineer.

Atlantic Coast Electric Railroad, Asbury Park, N. J.—This company has completed surveys for the Haines City branch and construction will be started in the near future.

Elizabethtown (N. Y.) Terminal Railway.—This company has begun grading on its proposed 8-mile railway to connect Elizabethtown and Westport. It is expected to have it in operation by Jan. 1, '11. George W. Jenkins is interested. [E. R. J., Feb. 5, '10.]

New York & North Shore Traction Company, Mineola, N. Y.—This company has applied for a permit to build a double-track street railway on Bayside Boulevard from Ashburton Avenue to Tenth Street and on Tenth Street from the Bayside Boulevard to Broadway in the Third Ward, Long Island City.

New York, Westchester & Boston Railway, New York, N. Y.—This company announces that it has acquired the entire right-of-way on its main line within the city limits and that between West Farms and the city line about 65 per cent, exclusive of rails and power, has been built. In all 18 miles of railroad has been constructed or is under construction. Contracts have been let for the construction of the entire line between West Farms and Mount Vernon and White Plains and New Rochelle, and it is expected that the line will be completed within a year.

Western Ohio Railway, Lima, Ohio.—This company is receiving bids for the construction of an electric line from Fostoria to Fremont, Ohio, to be used in connection with the Western Ohio Railway for through service to Cleveland. It has already made trackage arrangements with the Toledo, Fostoria & Findlay Railway to use the property from Fostoria to Findlay.

Muskogee (Okla.) Transit Company.—This company has under consideration plans for the construction of a bridge over the Arkansas River so that it can extend its railway to Fort Gibson. This 225-mile railway will connect Wagoner, Tulsa, Sapulpa and Muskogee. M. F. Hancock, Muskogee, is interested. [E. R. J., May 7, '10.]

Southern Oregon Railway & Power Company, Albany, Ore.—This company, recently incorporated, has secured the franchises for its proposed electric railway in Medford, Ashland and Grants Pass. It is expected to begin work soon. Trustees, J. S. Vilas, J. R. Allen and S. V. Beckwith. [E. R. J., Aug. 13, '10.]

***Dillsburg, Pa.**—A company headed by Dillsburg business men and Philadelphia bankers is being organized with a capitalization of $180,000 for the purpose of building a 14-mile electric railway from Dillsburg to Dover via Franklintown, Mountain Top, Wellsville, Rossville and the Picketts, connecting with the York and Dover street railway line, thus making a direct route to York.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—This company is said to be considering plans for building a 5-mile extension from Campbellstown to Bismarck and a 5-mile extension from Bismarck to Lebanon. J. R. Kreider, superintendent.

***Oxford, Pa.**—M. C. Martin, New York, is said to be interested in a plan to build an electric railway between Oxford, Newark and Wilmington, making a belt line with the local railways, and then to Philadelphia.

***Wilkes-Barre, Pa.**—It is reported that Wilkes-Barre and Philadelphia capitalists are working upon a plan to build a street railway between Wilkes-Barre and Berwick, to connect with the Columbia & Montour Electric Street Railway at Berwick. It is said to be the intention to continue the line from Northumberland and Sunbury and from there to Shamokin.

Washington-Virginia Railway, Falls Church, Va.—This company, organized to build a 50-mile electric railway from Bluemont to Vienna, has been authorized to increase its capital stock from $1,000,000 to $3,000,000. M. E. Church, Falls Church, president. [E. R. J., July 16, '10.]

Richmond & Henrico Railway, Richmond, Va.—This company, it is said, will extend its tracks to the National cemetery and thence to Fort Lee. W. S. Forbes, president. [E. R. J., Aug. 6, '10.]

Waterville (Wash.) Railway.—This company has nearly completed work on its 7-mile railway between Douglas and Waterville. George C. Wiley, secretary. [E. R. J., Oct. 30, '09.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—The State Railroad Commission has issued a certificate of necessity permitting the construction of a line from Beaver Dam to Fox Lake.

SHOPS AND BUILDINGS

Los Angeles (Cal.) Railway.—This company will erect a reinforced concrete paint shop on Fifty-fifth Street, between South Park and San Pedro Street. The Aiken Reinforced Concrete Company has received the contract.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has awarded a contract to Peter T. Longachre and Frank Kelly for the construction of its new passenger and freight station in Elkhart on Marion Street, between Second Street and Third Street. The structure is to be two stories high and built of ornamental concrete blocks. It is to furnish accommodations for a passenger and freight depot and warehouse and for the local offices of the company. The estimated cost will be in excess of $9,000.

Frederick (Md.) Railroad.—This company advises that it is making preparations to build terminal stations for freight and passengers and is also building a new car house.

Detroit (Mich.) United Railway.—This company contemplates the construction of a 1 and 2 story brick depot and car house in Pontiac, and will receive bids about Mar. 1, 1911, Smith, Hinchmann & Grylls, architects, Detroit.

Springfield (Mo.) Traction Company.—This company is preparing plans and will receive bids about Dec. 1 for the construction of a 2-story brick and concrete addition to its car house at Division Street and Park Street, in Springfield. The cost is estimated to be about $35,000. W. A. Bixby, general manager.

Cohoes (N. Y.) Railway.—It is reported that this company has awarded the contract for the building of the station and waiting room at the corner of Broadway and Third Avenue, Rensselaer, to George Van Allen.

Ottawa (Ont.) Electric Railway.—This company has let the contract to Sanders Brothers, Ottawa, for building its new car house in Ottawa. Construction will begin at once. The cost is estimated to be about $50,000. The company will also erect a freight house at Princeton and Spring Valley, and it will double the capacity of its freight house at De Pue.

Erie (Pa.) Traction Company.—This company has awarded the contract to Constable Brothers, Erie, for building its new brick station at Cambridge Springs.

Pittsburgh & Allegheny Valley Railway, Leechburg, Pa.—This company has purchased land at North Vandergrift on which it expects to build a car house.

Aberdeen (S. D.) Street Railway.—This company is building a temporary car house at Aberdeen to be used until a location for the permanent structure is determined.

Roanoke (Va.) Railway & Electric Company.—This company is said to be making preparations for the erection of its new car house on Walnut Street, Roanoke, near its power house.

POWER HOUSES AND SUBSTATIONS

Montgomery (Ala.) Traction Company.—This company reports that it will build a power house in Montgomery. It has been buying power from the Montgomery Light & Power Company for its railway. W. J. Ginnivan, purchasing agent.

Philadelphia & Wilmington Company, Wilmington, Del.—This company has purchased through J. G. White & Company, Inc., New York, a 500-kw motor-generator set from the Westinghouse Electric & Manufacturing Company.

Southwestern Interurban Railway, Arkansas City, Kan.—This company has begun the work of building a power house at Hackney. The structure is to be 80 ft. x 40 ft.

Yonkers (N. Y.) Railroad.—This company has purchased a 1000-kw rotary converter from the General Electric Company for installation in its power station.

Pittsburgh & Allegheny Valley Railway, Leechburg, Pa.—This company has recently purchased land at North Vandergrift, on which it will erect a power station.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company is said to have plans in progress for the building of a 1-story, 150 ft x 250 ft., brick, concrete and steel car house, fireproof doors and windows. W. B. Voth, 428 Eighth Street, Sheboygan, Wis.

Manufactures & Supplies

ROLLING STOCK

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., it is reported, will soon purchase 10 new cars.

Philadelphia & Wilmington Traction Company, Wilmington, Del., has ordered, through J. G. White & Company, Inc., New York, 100 railway motor equipments from the Westinghouse Electric & Manufacturing Company.

North Jersey Rapid Transit Company, Paterson, N. J., which was noted in the ELECTRIC RAILWAY JOURNAL of July 16, 1910, as considering the purchase of several cars, has placed an order with the Jewett Car Company for three cars.

New York, New Haven & Hartford Railroad, New Haven, Conn., will require from 75 to 100 motor cars for service on the New York, Westchester & Boston Railway, a third-rail line under construction from 180th Street, New York, to White Plains.

Boston & Worcester Street Railway, South Framingham, Mass., which was reported in the ELECTRIC RAILWAY JOURNAL of April 9, 1910, as contemplating the purchase of five new cars, has placed an order with the Osgood-Bradley Car Company for five closed car bodies. These cars will be equipped with the Standard Motor Truck Company's trucks.

Jacksonville (Fla.) Electric Company, reported in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, as having ordered 10 double-truck closed prepayment cars from the Cincinnati Car Company, has specified the following details for this equipment:

Length body.....29 ft. 6½ in.	Destination signs....Hunter
Over vestibule.....39 ft. 1 in.	Hand brakes,
Width over sills....8 ft. 4 in.	Sterling Meaker
Body .....composite	Headlights.....U. S. Incan.
Interior trim.....mahogany	Motors.....2 G. E. 219-A
Underframe .....composite	Push button signal..Consol.
Air brakes.....G. E.	Roofs.....turtle back
Bolsters, body.....cast steel	Sash fixtures..Edwards 13-O
Bumpers.....channel iron	Seats, style.....H. B. & W.
Car trimmings,	Seating material.....rattan
mall. iron & bronze	Trolley retrievers...Knutson
Curtain fixtures....Forsythe	Trucks....Stand. max. trac.
Curtain material...Pantasote	Ventilators .....Star

TRADE NOTES

John Franklin Robinson, the senior member of the firm of Robinson & Orr, Pittsburgh, Pa., died on Sept. 9, 1910.

Yale & Towne Manufacturing Company, New York, N. Y., has appointed John B. Milliken treasurer with headquarters in New York. Mr. Milliken was formerly controller of the Crocker-Wheeler Company, Ampere, N. J.

Mann Indicator Company, Pittsburgh, Pa., announces the appointment of A. W. Hargett as manager of its equipping department. Mr. Hargett was formerly manager of the Meadville-Cambridge Springs Street Railway, Meadville, Pa.

Pawling & Harnischfeger Company, Milwaukee, Wis., which designs and builds electric traveling cranes and hoists, has appointed Arthur Fritsch manager of its Chicago branch in the Monadnock Block, succeeding W. E. Kreamer, resigned. Mr. Fritsch was formerly connected with the engineering and sales department of the Allis-Chalmers Company.

H. W. Johns-Manville Company, New York, N. Y., has opened new branch offices in Atlanta, Ga., and Rochester, N. Y. The Atlanta office is located in the Empire Building, in charge of W. F. Jones, who has been traveling in this territory for the company for several years. The Rochester office is located at 725 Chamber of Commerce Building, in charge of H. P. Domine, formerly with the Buffalo branch of the company.

Mathias Klein & Sons, Chicago, Ill., manufacturers of linemen's and electricians' tools, report that they are actively engaged in both of their factories filling the numerous orders which they have on hand. The old Van Buren Street factory is now almost exclusively employed in the production of Klein pliers of various styles and sizes. Various

items comprised in the general line of the company's products are manufactured at the new plant on Clybourn Avenue.

The Ackley Brake Company, New York, has an exhibit of its brake at the Brussels International Exposition. A sample platform is shown, equipped with the ordinary brake and with the Ackley brake. By means of a dynamometer the demonstrator shows how a pull of 70 lb. on the handle of the ordinary brake is changed to 600 lb. on the brake chain, while on the Ackley brake the same effort is converted to 1800 lb. The exhibit is in the Transportation Building.

Glacier Metal Company, Richmond, Va., is placing on the market a new ribbonized plastic metallic packing for steam, air, gas, ammonia, water, etc., manufactured from the finest alloy of white metal which can satisfactorily be made into fine shreds or ribbons. It is very pliable, will not score the rods, and shows no corrosion when it comes in contact with acids. No sizes are required to be carried in stock, as a rope can easily be made with the hands to the size required for packing the rods.

National Brake & Electric Company, Milwaukee, Wis., at the Atlantic City convention will occupy spaces 539 to 545, inclusive, comprising about 648 sq. ft. of floor space, which will be used to display its large and comprehensive line of air brake equipments and air compressors. Among the apparatus shown will be a complete line of National motorman's valves, National emergency and variable release valves and various types of National governors. In addition to these the company will exhibit motor-driven air compressors in both stationary and portable types.

Charles Goble, mechanical superintendent of the Railway Audit & Inspection Company, was tendered a banquet by the officers of the company prior to his leaving Philadelphia to take charge of the new office of the company, in the Calumet Building, No. 189 La Salle street, Chicago, Ill. Mr. Goble will be district manager of this office. Previous to entering the service of the Railway Audit & Inspection Company as mechanical superintendent five years ago, Mr. Goble had charge of several electric railway properties and had considerable experience in steam railroad work.

Whipple Supply Company, New York, N. Y., selling agent for the Tool Steel Gear & Pinion Company, of Cincinnati, has just closed a contract with the Chicago Railways Company for the supply over a period of two years of the Tool Steel Gear & Pinion Company's specially hardened and toughened gears and pinions. This contract was taken on a definite mileage guarantee, like all similar contracts negotiated by the Whipple Supply Company. The "Cincinnati" make of tool steel gears and pinions is always guaranteed against wear and breakage and a definite mileage is guaranteed, based upon results obtained from materials in use.

Western Electric Company, New York, N. Y., reports that there has been no occasion so far to revise the estimate of a gross business for the year of $61,000,000, which was made last February. Three-quarters of the company's fiscal year had elapsed on Aug. 31. The gains which the company has recorded consistently in the current year continue. August showed an increase of 50 per cent over the corresponding month in 1909. This year's business will be divided among approximately 800,000 orders as compared with 475,000 orders received in 1906, with an average value per order of $71 for 1910, as compared with an average value of $145 per order in 1906. There are at present 23,000 persons on the company's pay roll. Plans are now being considered for the erection of further extensions to its buildings at Hawthorne, Ill.

Middle West Engineering Company, Cincinnati, Ohio, of which James E. Hewes is president, was recently organized under the laws of Ohio, with a capital of $100,000, to do a consulting engineering business and to take charge of construction work. Mr. Hewes, the president of the company, has had 10 years' experience in construction and engineering work. He was associated with the General Electric Company in railway engineering work for five years. During this connection he had charge of the installation of electricity on the West Jersey & Seashore Railroad, under the direction of W. B. Potter, of the General Electric Company, and George Gibbs, consulting engineer of the Pennsylvania Railroad. Prior to entering the service of the General Electric Company, Mr. Hewes was consulting engineer to the Water Board of Baltimore. He also served as engineer in charge of the installation of the Kanawa Water & Light Company at Charleston, W. Va.; the Hagerstown Municipal Electric Power & Light Plant, Waynesboro, Pa., and the Shepardstown electric light plant at Shepardstown, W. Va. During the Spanish-American War Mr. Hewes served on the staff of Col. Eugene Griffin. Prior to this Mr. Hewes had charge of several electric railway installations in different parts of the country.

General Electric Company, Schenectady, N. Y., has furnished the Metropolitan Electric Company, Reading, Pa., which is controlled by the United Power & Transportation Company and supplies power to the United Traction Company, Reading, with four switchboards for use in its main generating station and main substation. The main generating station will have 41 panels, made up as follows: A 2-panel exciter board, 17-panel railway and feeder board and 22-panel controlling benchboard to control 5625 kva. The main substation switchboard will consist of a 25-panel benchboard with incoming line panels and rotary converter panels. The General Electric Company is also building a 16-panel board for the Metropolitan Electric Company, which will be installed in the main substation and will control 1275-light 4-amp 60-cycle 13,200-volt (primary) constant current transformers, which will be used with mercury arc rectifiers for arc lighting, and 4 16-kw. 60-cycle 13,200-volt primary, 5.5 amp secondary constant current transformers for incandescent lighting. The General Electric Company furnished the entire switching equipment for the panels, which are now being installed in the main generating and main substation of the Metropolitan Electric Company, and will also furnish the entire equipment for use with the 16-panel lighting board, which is to be installed in the main substation later.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its September, 1910, list of second-hand electrical machinery.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., is mailing a post card showing a sky photograph of its main offices and factories at Rochester.

Ohmer Fare Register Company, Dayton, Ohio, has issued a booklet entitled "What It Means to the User," in which the Ohmer indicating, printing and recording fare registers are described.

Peter Smith Heater Company, Detroit, Mich., has issued an illustrated folder containing data relative to the three sizes of forced ventilation, hot-air car heaters which it manufactures.

Thomson Electric Welding Company, Lynn, Mass., describes and illustrates, in a new 32-page catalog, its various types of machines used in the Thomson process of electric welding. It also contains several extracts from reports on electric welding made by well-known scientists. A folder containing a list of some of the users of Thomson welders accompanies the catalog.

Railway Roller Bearing Company, Syracuse, N. Y., has issued a catalog describing and illustrating its roller bearing journal box. This publication also contains a brief account of the anti-friction bearing tests conducted by the engineering department of the Philadelphia Rapid Transit Company, also several statements quoted from the official report of these tests which was published in the Electric Railway Journal of Aug. 27, 1910.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 4749, which is descriptive of alternating-current switchboard panels. The panels illustrated are of the sectionalized type, and each section has a separate catalog number. These panels are in three sections, and the pages of the bulletin are sectionalized so that the user may have before him a picture of the complete panel desired, together with a full description of the equipment. The company has also issued bulletin No. 4755 describing and illustrating the electrical equipment of the Great Northern Railway.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, OCTOBER 1, 1910 No. 14

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 1, 1910.

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Ventilation of Closed Cars

As the time approaches when open cars are taken off and closed cars are substituted for the winter season electric railway managers must look forward to the usual number of complaints from passengers about heating and ventilation. From the standpoint of the passenger most of the complaints are justifiable and deserve something more than to be ignored because, apparently, nothing can be done to remedy the trouble. The problem of supplying enough warm fresh air for a car full of passengers and of exhausting the vitiated air from all parts of the car at the same time is admittedly difficult. Its complete solution has baffled many of the best ventilating engineers who would undertake to supply fresh air to a theater or a school without a thought of failure. Nevertheless, there are numerous devices of one kind or another which, when used singly or in combination, will effect a decided improvement in the ventilation of an ordinary car. It is as much the duty of a street railway company to keep closed cars reasonably warm and well supplied with fresh air as it is to keep the cars clean and in a sanitary condition. Of the two evils insufficient heat is much more endurable than lack of fresh air, as during cold weather passengers are dressed to withstand low temperatures. Fewer complaints will be heard if the ventilators and occasionally the doors are left open than if all the avenues of escape for the bad air are tightly closed in an attempt to keep the interior of the car warm.

Safeguarding Shop Workers

The recent enactment of a more stringent employers' liability law in the State of New York calls attention to the necessity of exercising more care in the installation and running of machine and woodworking tools. It is, of course, impracticable to eliminate belting and counter-shafting entirely because individual drive for every tool would be too costly in many cases. On the other hand, it is frequently possible to minimize danger from this source by having the drive from below. In English and German shops it is customary to screen off the belting by wire netting to a height of 4 ft. to 5 ft. and the dangerous parts of a tool are painted a brilliant red where auxiliary safety devices cannot be applied. These methods have proved very effective abroad, but it is doubtful whether the benefits in this country would be as great owing to the average American's habit of "taking a chance" if he can lighten his work by doing so. A typical instance is afforded by the motorman who ties down the dead-man's handle with a bit of string, thus endangering his passengers and himself through unwillingness to keep a small spring in compression. In spite of this factor of human perversity, the employer is not performing his full duty unless he uses every feasible means not only to safeguard the lives and limbs of his men, but to instil in them a spirit of carefulness for their own safety.

Express Service on the New York Elevated

It will indeed be welcome news to the residents of the northern part of New York City if the elevated divisions of the Interborough Rapid Transit Company are to be equipped with express tracks. This is a remedy for the present overcrowded condition of the subway which should have been applied long ago. As far back as Feb. 19, 1903, William Barclay Parsons, chief engineer of the then Rapid Transit Commission of New York, strongly recommended the construction of these tracks to provide "real express service" on the elevated lines. He repeated these recommendations in 1904 and still again after the present subway was opened for traffic in words which could be quoted to-day with even greater force. He said in part: "The lesson to be learned from the present subway is the great advantage of an express service, and especially an express service that runs continuously in both directions. * * * * The borough of the Bronx, especially that portion of it contiguous to the suburban division of the Manhattan system and to the Westchester Avenue line of the subway system, has lately increased tremendously in population. This increase will, with the proposed facilities to be furnished by the New York, New Haven & Hartford Railroad Company and other companies in the easterly portion of the Bronx, demand additional facilities. Such facilities can be offered by converting the Second Avenue line into a four-track system." In considering these proposals, the commission "found that various persons, particularly residents of the Bronx, favored the application as affording ready relief for that section." But after consulting the representatives of the City Club, the Merchants' Association, the Municipal Art Society and others, the commission concluded that "if the city entered upon the policy of increasing the facilities of the elevated roads, it would tend to discourage people who otherwise might be bidders for the new municipal subway systems" and so refused to give assent to the plan.

The Quickest Form of Transit Relief

The arguments of the engineers, the pleas of the residents in the Bronx, the indifference or open opposition of the civic bodies mentioned to the only prompt reform possible and the fear of the city authorities about frightening off possible bidders for new subways—all have a familiar ring. Bronx Borough has increased enormously in population since Dec. 29, 1904, when Mr. Parsons repeated his recommendation for these elevated express tracks, yet it possesses no more or no better means of transit down town than it did then. The intervening 5½ years have brought forth no "bidders for new municipal subways." Yet it has been clearly shown that an express service on the Second Avenue elevated road would furnish the quickest means of reaching the New York City Hall and downtown New York from a large section of Bronx Borough and would greatly relieve the present subway. Moreover, the relief would be afforded far more quickly than in any other possible way. This question is not one of building new elevated lines, although we believe that the bugaboo of elevated lines is not so frightful as many people seem to believe. The additional tracks proposed would make little difference in the light on the streets through which the present structures pass. By the time that new subway lines are built, there will be plenty of passengers for them. We earnestly hope the plan of the present Public Service Commission to permit the construction of these additional tracks will be formally promulgated.

RECENT WAGE ARBITRATIONS

Two important decisions in street railway wage arbitration cases were announced last month. One was in Albany, N. Y., and the other, affecting all of the employees of the Connecticut Company in 14 cities in that State, was in New Haven. The main issues were substantially the same in both cases, as were the findings, which recommended slight increases over the prevailing scales, but neither decision received the concurrence of the full board which heard the evidence of both sides. Perhaps it is too much to expect unanimous decisions from such boards, but it would have been far more satisfactory to all concerned if the findings had been based on evidence in each case so conclusive as to have overruled any prejudices which might have existed in the minds of the representatives of the men or of the companies on the boards. In Albany the representative of the men refused to sign the decision. In New Haven it was the appointee of the company who declined to accept the majority report, not entirely because he disagreed with its findings *per se,* but because the majority disregarded a phase of the question which seemed to him paramount in his consideration of the case. This was the violation by the men of an agreement as to wages, made with the company prior to the demand for the increase which was submitted to the board for arbitration. It was the old story of labor unions making a contract and breaking it when they thought by so doing they could get more money. According to the ideas of Mr. Deming, the minority member of the New Haven board, there was nothing under such a condition of affairs to arbitrate. Any other conclusion seemed to him a "weird dictum of morals," even when approved or accepted by the arbitrating majority, as well as illogical, inequitable and improper when viewed from the standpoint of any code of ethics. The position of the majority, on the other hand, in regard to this particular point was that any earlier bad faith of this kind was outside its purview, not being directly connected with the subject of the proposed increase in wages which had been assigned to the board for decision.

Outside of this particular point the three principal questions before the board to be determined in settling the question of wages were: (1) the relative cost of living in Connecticut during the first six months of 1907, when the former scale of wages was established, and during the corresponding six months of 1910; (2) the ability of the company to pay the increased rate of wages, and (3) the ability of the company to secure plenty of competent labor at the existing rate wage. Somewhat curiously both sides laid but little stress upon the third question, although the company showed that it had 598 men on its waiting list, or practically one to three of those on the regular list. The first point was analyzed more carefully in the report of the company's appointee than in that of the two other arbitrators, and the conclusion was reached, "though with some hesitancy" on account of the conflicting evidence, that any such increase had been counterbalanced by an increase in wages of 4 per cent made by the company in April of this year. On the second point the testimony presented by both company and men seemed vague to all three members of the board. The majority concluded that "the company's ability to pay any reasonable increase in wages which other established conditions demand has not been successfully disputed," while the minority member called the evidence both for and against the prosperity of the company "nebulous." It is idle to conjecture what the result of

the arbitration might have been had the company shown it was operating on only a narrow margin of profit.

On the third and final point the dicta of the majority briefly were that any new men engaged would probably be far less efficient than the older ones, and even if the company should cut its present wage schedule in half, it would still find applicants enough to man its cars. They claimed that the community should insist on the employment of skilled, efficient labor, but nothing in their report indicates that any evidence was presented that the present men were especially efficient or that the proposed advance in wages would make them more so. It is true that the men had asked for a raise in pay, but this fact alone, if considered a valid reason for an increase, could be used to justify any increase in wages which the men might ask.

The only permanent basis for wages, it seems to us, is that established by the law of supply and demand. If the pay is too low for the service which a company requires of its employees and low compared with the wages paid in other industries requiring equal physical strength and intellect, the fact will be indicated by the inability of the company to retain permanently its best men, and in the lack of applicants possessing the requisite intelligence and character. The number of men who remain in the service less than one year is hardly a criterion of the attractiveness or lack of attractiveness of the service. As in every other large industry in which the employees require a comparatively short training, a large number of men will engage in electric railway work temporarily, either to tide over a period of inactivity in the business in which they have been previously engaged or else to learn whether they care for the work. On the other hand, the natural disinclination of a man long engaged in any one class of work to change his vocation makes the percentage of men long in service equally unreliable as a basis for judging the adequacy of the pay. Hence the best gage which we are seeking is the proportion of men who desert the service after one year and up to, say, five years of connection with the company. If this percentage should be abnormal, it is safe to say it would be well for the company to consider its wage schedule.

THE HUMAN ELEMENT IN TRAIN OPERATION

Last week two head-on collisions between interurban cars in Indiana cost the lives of 47 persons and maimed a score more. The Kingsland accident, in which 41 passengers were killed, is the worst of its kind which has ever occurred on an electric railway and it might have been even more disastrous had both cars been full of passengers. It was a curious coincidence that both collisions occurred at about the same time of day, on curves where the view ahead was obscured by woods, and that neither of the cars which were occupying the track without right carried any passengers.

The investigation of the Kingsland collision which was held promptly by officers of the railway company makes it clear that the crew of the extra car tried to beat the regularly scheduled local car to a meeting point nearly 6 miles beyond the siding where the two cars should have met. The dispatcher's orders were complete and explicit and there is no reason to believe that they were not clearly understood at the time they were issued. There were circumstances antedating the accident, however, which, while they do not lessen in any respect the criminal aspects of the conduct of the motorman and conductor at fault, explain, perhaps, the mental processes of the men. The motorman of the extra car had been running for 60 days previous to the accident the very train with which he collided. He knew the schedule of this regular train perfectly and probably assumed from his experience on the run that the car would be running late on the day of the collision. Without ascertaining from the dispatcher that the regular car was late the motorman of the extra car went on at high speed, expecting to meet the regular car at the second siding beyond the proper meeting point. The conductor of the extra car, who should have been as familiar with the orders as the motorman, did not hold the car at the scheduled meeting point and so must share the responsibility with the motorman.

Two points stand out clearly in considering the operating aspects of the accident. The first of these is that the collision resulted from positive and direct violation, on the part of both members of the extra-car crew, of explicit rules framed to prevent just such an occurrence. The second is that the operation of extra cars is attended with extraordinary risks which require unusual precautions to prevent accidents. In spite of the most complete and rigid code of rules and the use of elaborate and expensive safety devices "man failures" will occur, not always with such serious results as in this instance. Discretion and care in employing and training motormen and conductors and the constant maintenance of discipline will not wholly eradicate the men who will forget or take chances occasionally. The two men who were responsible for the Kingsland wreck had had considerable experience and enjoyed good records. The reputation of the operating organization of the road in enforcing discipline among its employees always has been excellent.

The dangers incurred in operating extra cars at times are necessary and incident to the service. It may be asked, however, if the requirement that extra cars shall clear the time of regularly scheduled cars by five minutes is a sufficient precaution. Once out on the road an extra car is a free agent and likewise a menace to every opposing or following car. Would it not be safer to require the crews of extra cars to report to the dispatcher at every siding regardless of the delay, or to fix meeting points by train order for all opposing regular, as well as extra, trains?

No details of the Tipton collision between a limited car and a motor freight car, except those contained in the newspaper dispatches, are available at this time, but it is reported that the motorman of the freight car admitted after the accident that he had overrun the meeting point. It is not clear whether the freight car was a regularly scheduled car or an extra, but this matters little. In this instance also the presumable failure of a responsible employee to obey the rules laid down for his guidance caused the collision. The fault does not lie with the rules, and we do not see how it can be laid in these two cases on the operating organizations which employed and supervised the work of the men who proved themselves criminally negligent or disobedient. If anyone can devise a method of train operation which will preclude all possibility of human fallibility it will be welcomed on every hand. Mechanical safety devices such as automatic block signals undoubtedly tend to prevent collisions, but experience with them has shown that they cannot be depended upon absolutely. Final dependence for safety must be placed in the human element which failed in the two cases mentioned here.

THE CONNECTION BETWEEN CITY PLANNING AND TRANSPORTATION SYSTEMS

A science which has been conspicuous in this country more by its neglect than by its practice is that of city planning. Few cities have been created like Washington, D. C., from the drawings of an architect, and it is a well-known fact that even in this case the city did not develop along the lines expected either by Congress or the designer, Major L'Enfant. Nevertheless, the purpose in mind was an excellent one, and the results are far more satisfactory than if the city had grown as most of our cities do, either in a most haphazard way, or along the commercial plans of local real-estate companies. A view often taken is that the locations of all the most important streets in a city are now permanently established and that the order in which the suburbs develop is of comparatively minor importance. But this theory can hardly be maintained in the face of the recent census figures, which show an enormous and rapid increase in the size of most of the cities in the country. In the vastly older cities of Europe, where the percentage of annual growth is usually far less than in this country, the subject of city planning is considered of the greatest importance. Indeed, in some European countries the general government demands the most rigid adherence by cities to certain well-defined principles of extension. In Holland, for instance, every city of more than 10,000 inhabitants and every community which shows a more rapid growth for five years than 4 per cent a year must possess an approved plan of extension and this plan must be revised at least once every 10 years.

The close connection between city planning and electric railway operation is set forth in a paper presented during the first week in September at the International Street & Interurban Railway convention at Brussels and published in abstract in this issue. As the author clearly shows, the drift of the population toward the cities has been a marked development everywhere during the past few decades, and this movement has produced a congestion of population, particularly in the poorer quarters of the city, which possesses great danger to the entire community from the standpoints of morals and hygiene. The only solution is through the high development of transportation systems so as to allow the city to extend laterally rather than upward. As has been aptly said, the question is one of a choice between stairs and the electric car, and it is needless to say that the interests of the city lie in the selection of the electric car.

It is a very curious fact that in spite of the almost complete dependence of municipalities upon rapid and safe transportation in solving this problem of congestion the best method of providing transportation in new communities is often one of the last matters to be considered. Common sense dictates that work of this kind should be undertaken jointly by a transportation engineer and by a municipal engineer, using the latter term in its broadest sense, and that if esthetic and practical conditions should prove incompatible the latter should govern because the work is primarily utilitarian in its character. In spite of this obvious condition, experience abroad is that transportation engineers are rarely called into consultation in work of this kind until it is too late, and we believe the record is similar in this country. It is needless to explain to railway men how a municipal engineer by overlooking a few obvious transportation necessities can perpetually hamper, if not practically stifle, the growth of a city suburb, or how, by a slightly different arrangement of streets, he can greatly facilitate electric railway service. The area reached within a given time by electric cars varies directly as the square of the speed of the cars in a city which extends in all directions. Hence the relations between area available for residence and speed and between speed and the design of the streets are obvious. The question of speed, as the author of the paper in question points out, is not merely one of maximum speed, but other important questions are the number of stops to take on or discharge passengers and the number of slow-downs to avoid collision with teams and pedestrians. Where it is not practicable to increase the maximum speed above a certain amount it is often easily within the range of possibility to decrease both the number of stops to receive or discharge passengers and the number of slow-downs. The latter is best effected by the location of tracks of city roads on reservations, and we believe that the elaborate methods of reservations used abroad and described in the paper will be a matter of great interest to readers of this paper. The use of reservations by cars has been followed in a few cities in this country, notably Boston, Brooklyn, Memphis and New Orleans, but that it presents great advantages for both cities and railway companies will be admitted without question.

Finally, the matter is one which does not interest large cities only; it concerns every community which has an electric railway system.

THE REORGANIZATION OF SECURITIES AND VALUE

Announcement is made that the courts will be asked to pass upon the important decision of the New York Public Service Commission for the First District in the long-pending Third Avenue Railroad reorganization case. As the rejection of the reorganization plan by the commission is based upon the application of doctrines of value of property and of the law affecting the reconstruction of bankrupt railways, the attitude of the courts will concern seriously the other companies in Greater New York which are still in receivership.

It was three years ago that receivers were first appointed for the New York City Railway. In January, 1908, a separate receiver was named for the Third Avenue Railroad. The first application to the commission by the committee representing holders of the consolidated mortgage bonds of the Third Avenue company for approval of the proposed new issue of securities was denied on Sept. 23, 1909. The second plan was disapproved on July 29, 1910, and now, on request of counsel for the committee, this application has been finally rejected. Application for a rehearing will be made and, it is expected, will be refused by the commission, making the record clear for appeal to the courts. A curious feature in the entanglement is that all of the property of the unfortunate Third Avenue Railroad Company is owned at present by the committee of holders of the consolidated bonds. This committee bought the property at foreclosure sale on March 1, 1910, anticipating a speedy transfer to the newly organized Third Avenue Railway Company, which intervened in the proceedings before the commission. The anomalous situation thus created will last presumably until final reorganization is effected. It may be stated that the par value of the securities of the old company was $58,560,000, divided as follows: First mortgage, $5,000,000; consolidated mortgage, $37,560,000; stock, $16,000,000.

Under each plan of reorganization it was intended to continue in existence an issue of $5,000,000 of first mortgage bonds. The first plan provided in addition for the issue of

$16,516,800 in first refunding mortgage bonds, $32,000,000 in cumulative adjustment mortgage bonds and $20,000,000 in common stock, a total with the first mortgage bonds, of $73,516,800 par value. The second plan provided for the issue of $15,790,000 first refunding mortgage bonds, $22,536,000 cumulative adjustment mortgage bonds, and $16,590,000 stock, making, with the first mortgage bonds, a total of $59,916,000 par value. The difference between these two totals is $13,600,800 and it will be of interest to show how this large sum was eliminated.

Between the rejection of the first plan and the formation of the second the following reductions were made by the committee in the proposed issue of securities: In the first refunding mortgage bonds, $726,800; cumulative adjustment mortgage bonds, $9,464,000; common stock, $3,410,000. To offset this reduction of $13,600,800 in new securities the committee had to scale its proposed apportionment of securities.

The first plan stipulated that the holders of old consolidated bonds were to receive: First, $10,516,800 of refunding bonds, being 20 per cent of principal and defaulted interest for two years, or 8 per cent; second, $30,048,000 of adjustment bonds, or 80 per cent of principal. Of the other refunding bonds $5,000,000 were to be delivered to an underwriting syndicate and $1,000,000 were to be issued to pay for extensions. The remaining adjustment mortgage bonds were to be divided between $1,000,000 for the underwriting syndicate and $952,000 for issues of subsidiary companies. The stock was to go to holders of the old stock on payment by them of an assessment of $25 per share. If the old holders failed to meet the assessment the syndicate could do so and acquire the stock on the same terms, $125 par value for $25. For the total of $6,000,000 refunding and adjustment mortgage bonds the syndicate was to provide $3,500,000 cash.

In the second plan holders of the consolidated mortgage bonds were to receive: First, $9,390,000 of refunding bonds, being 15 per cent of principal and 10 per cent for interest; second, $22,536,000 of adjustment income bonds, being 60 per cent of principal, and, third, $9,390,000 in stock, being 25 per cent of principal. Stockholders, on payment of an assessment of $45 per share, were to receive $6,400,000 of refunding bonds and $7,200,000 in stock.

With the first plan the cash requirements were $7,500,000, of which the syndicate was to furnish $3,500,000 and the stockholders $4,000,000. But under the second plan the cash requirements were $7,200,000, all of which was to be furnished by the stockholders, while the syndicate was apparently eliminated except so far as one might be formed to supplant stockholders who failed to meet their assessments. Therefore, the second plan would have borne more heavily upon the stockholders, while the holders of the consolidated bonds would have received a less favorable distribution of securities.

The distribution of the uses to which the cash was to be put was different under the two plans. In each case provision was made for the payment of receivers' certificates, franchise taxes, renewals of tracks, reorganization expenses and "other companies." Capitalization of these items as well as of unpaid interest is criticised by the commission. Analysis would probably show that some of these items are fairly chargeable to capital account.

From its consideration of the securities the commission passes to the legal questions affecting its powers and then to the value of the property. The principal point concerning the attitude of the commission toward the applicant appears to rest upon the judgment of the commission as to whether the applicant is to be regarded as seeking a new capitalization or whether the old property, with its familiar career of costly conversion from one motive power to another and then to still another form, is to be accepted as the real applicant. It is the conclusion of the commission that it may not approve any issue of securities except in "such new amount as shall be equivalent to the money or property acquired." That is to say, the Third Avenue road, in the decision of the commission, lost the tacit acceptance of its past capitalization which it might have received had it not defaulted, but, retaining its old stocks and bonds, had sought the approval of the commission only for such additional securities as it might issue.

For the purposes of the commission a physical appraisal was made of the property, and in this computation no allowance appears to have been made for the reasonable expenses arising from changes due to progress in the art. Some of the discussion of the commission as to the necessity for integrity of the capital investment and as to the unpardonable policy of charging repairs and renewals to capital account is admirable. But we believe some allowances should be made for the reasonable costs of making improvements due to developments of the art which could not be foreseen and are so radical as to require complete reconstruction. We make no plea for improper enlargement of the capital account, but submit that capitalization on a reasonable basis of the costs of great changes in motive power has been accepted for many years in many communities and that, whatever policy may be adopted in the future, the elimination of the securities representing past costs of this character is revolutionary. It appears that in this respect the commission does not meet justly the fair wants of the unfortunate investors in the stocks and bonds, who were in peril from bad financial practices and are now in peril from State regulation.

It is evident that the commission is actuated by a desire to make a fresh start with the smitten Third Avenue road; to have the property show physical value and capitalization near equality. But if the commission has its own way, for how many years can it guarantee to preserve such equality, if the road keeps up the service which is now and will be required? When other changes are demanded by progress, where can the money be secured to meet them? Expenditures of this nature must be met either from capital account or from earnings. By its opinion the commission announces a policy that precludes future advancement of radical nature and cost at the expense of capital account. And by its estimates of earnings the commission does not convey assurance that profits will be large enough to meet such requirements.

It may be true, as the commission ventures to say, that dividends of 6, 7 or 8 per cent probably could have been declared from the beginning and yet enough accumulated to write off the old horse cars and cable roads that have disappeared. Such dividends were below the going rates for money in the early days. Even if a maximum capital account and maximum dividends prevailed, it is not cant to say that they did so under authority of existing laws and under conditions which led to the easy sale of securities to investors who were without clear knowledge or good advice. The community owes these investors some reasonable protection.

OPERATION OF THE ELECTRIC PACKAGE AGENCY

The business of the Electric Package Agency at Cleveland is the most successful illustration in this country of a large and well-developed organization which conducts an express business solely in the interest of electric railways and the public served. This agency is an association which is owned by the following five companies: The Cleveland Railway Company, the Lake Shore Electric Railway Company, the Cleveland, Southwestern & Columbus Railway Company, the Northern Ohio Traction & Light Company and the Cleveland, Painesville & Eastern Railroad Company.

The agency is unincorporated and in this respect its organization is like that of some of the larger express companies which operate on steam railroads. The service which is afforded by the agency extends in the main between Cleveland and the communities within a radius of about 100 miles in each direction excepting north, where Lake Erie lies. By a traffic arrangement, however, between the agency and the Detroit & Cleveland Navigation Company, through shipments are handled between Detroit and points in Ohio reached by the lines of the agency. There is also considerable local business between the communities in different sections of Ohio where there is interchange of trade that does not pass through Cleveland.



Electric Package Agency—Interior View of Cleveland Station

The agency is solving a problem regarding the operation of express services which was a difficult one. The agency operates cars over a total of about 614 miles of track divided as follows: The Cleveland Railway Company, 35; the Lake Shore Electric Railway Company, 171; the Cleveland, Southwestern & Columbus Railway Company, 217; the Northern Ohio Traction & Light Company, 126; the Cleveland, Painesville & Eastern Railroad, 65. The reason for the interest of the Cleveland Railway Company in the operations of the agency is the ownership by that company of the tracks within the city of Cleveland over which all the interurban lines entering the central business district of that city have to be operated. The agency has a warehouse and general office building in the central business district of Cleveland in which its operations in that city are conducted.

The business of the Electric Package Agency was started in 1898. Edgar H. Hyman, the present general manager of the property, entered the service in June, 1899, as assistant auditor and was made auditor on Aug. 1 of that year. Later he was made treasurer and auditor and continued in that position during the period when Charles A. Kenworthy held the office of superintendent. When Mr. Kenworthy died, in 1908, Mr. Hyman was made general manager, also retaining the positions of treasurer and auditor. The general organization under Mr. Hyman comprises a superintendent and auditing department. In addition there are the forces of employees at the 79 offices of the agency and messengers on the cars, making a total number of employees of the agency of 200. Thus the agency has a much larger organization at its command than any one of the individual companies could afford to maintain.

Outside of the advantages which the existence of a large and more able organization provides there are other advantages in unified management which have been found to result in increased business, better facilities for service and economy. In view of the successful results obtained by the agency and the long study which has been devoted to the development of its service Mr. Hyman has been asked by the Electric Railway Journal to express his opinions regarding various features of the business and their possible application to the express service of other electric railways.

Mr. Hyman believes that the introduction of express or freight service on an electric railway is a development which should be considered with reference to the particular opportunities afforded by each locality. No electric railways, in his judgment, should attempt to inaugurate a business of this character unless they are fully prepared to give such good service that they will please patrons, attract business from other directions and develop new sources of traffic. No company should endeavor, in his opinion, to provide both a freight and an express service. After careful investigation of the territory either one class of service or the other should be adopted. The two classes cannot be combined successfully. The territory justifies either an express service or a freight service and judgment in each individual case should determine which service is the better to install.

The method of operation as well as the organization of the agency is similar to that of the large express companies. It includes wagon delivery and pick-up service wherever such service is afforded by the larger express companies with which the agency is in competition. Every effort is made to originate new business. While the agency secures all the business it can for its own cars, it has tonnage arrangements with the American Express Company, the Wells Fargo Express Company, the Pacific Express Company and the United States Express Company and carries packages as far as it can on its own lines with transfer to other companies where goods are consigned to points which can be reached only in that way. The agency

advertises that it conducts the package freight business of the companies by which it is controlled.

The financial operations of the agency are entirely separate from the general operations of the railway companies. The agency collects its own revenues and after paying its expenses divides the balance of the earnings among the five companies in an equitable manner.

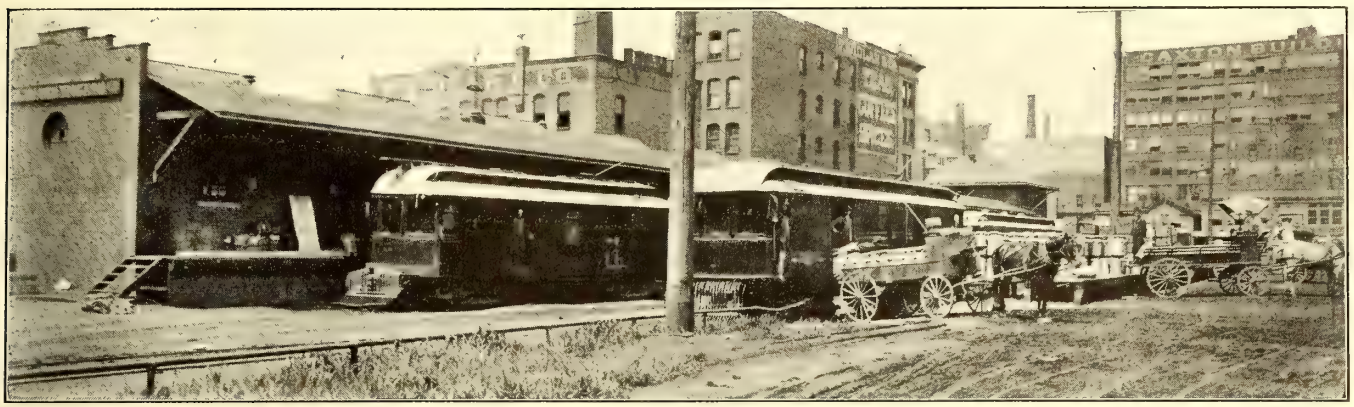
Three men are carried on every express car, a motorman, a conductor and a messenger. Baggage of passengers on the regular interurban passenger cars operated by the various companies is carried on the cars of the Electric Package Agency. No charge is made for the transportation of baggage unless it is of excess weight, in which case rates are charged that correspond with the regular steam railroad rates for similar service. Credit is given on outgoing shipments of some shippers, but ordinarily collections are made within two or three days of the time the service is rendered. With large shippers weekly accounts are carried. Every endeavor is made to provide good service and about 25 cars are operated each day from Cleveland to points on the four interurban lines. For the various short trips between local points on various lines and other points which can be reached without sending the shipments through Cleveland about 25 more cars are operated a day, making a total of 50 cars.

Until 1909 the rates of the agency were the same as the express rates charged by the large express companies. At that time the latter companies raised their rates. No changes have been made by the Electric Package Agency. The number of offices is increased gradually as the opportunities for business develop. No regular solicitors are maintained at the offices. Mr. Hyman believes that the practice of maintaining regular solicitors to circulate among the different communities served by the agency is not desirable. He thinks that such solicitors are not sufficiently acquainted with local conditions prevailing in each community to accomplish the same results that a local agent can secure. It is the business of each agent to solicit business in his territory. The Cleveland agent devotes a large part of his time to the solicitation of business. An endeavor is made to secure intelligent drivers for the 50 wagons maintained at different points served by the agency. It has been found that these men, if carefully instructed and attentive to business, become well acquainted with the shipping interests and are able to keep in close touch with whatever business is likely to be offered for shipment.

Some agents are employed on a commission basis and others are paid salaries. Practically civil service rules prevail in advancement from one position to another. Reports are made by some offices every month and by others each week, according to the amount of business transacted. Nearly every place occupied as an agency throughout the territory covered is rented. In all of the communities except Cleveland very little space is sufficient for the needs of the agency.

The business in summer is largely increased by traffic to the summer homes of residents in Cleveland and by the fruit traffic. Hundreds of residents of Cleveland have summer homes between Cleveland and Willoughby on the line of the Cleveland, Painesville & Eastern Railroad Company and also on the line of the Lake Shore Electric Railway Company, and many receive boxes of provisions from Cleveland each day. During the fruit season the cars are heavily loaded. When the movement of fruit is heaviest the superintendent of the agency spends all of his time on the system in order to see that the business is properly handled. At times one car has carried 20 tons of fruit. Such loads have been experienced generally in the peach season. All shipments are weighed on scales and the charge is made in accordance with the weight.

It has been found advantageous to adjust claims by the call of a representative of the agency rather than by mail. When a claim is paid it is delivered in person by a representative of the agency. From 40 to 50 men are employed at the Cleveland warehouse, which is open day and night in order that shipments may be handled without delay.



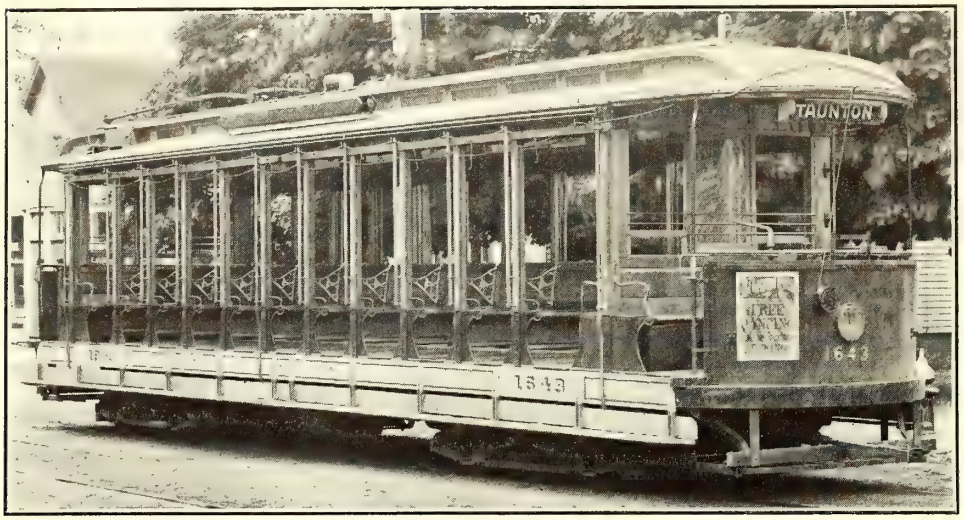
Electric Package Agency—Yard and Station at Cleveland



Electric Package Agency—Delivery and Receiving Side of Cleveland Station

NEW OPEN CARS OF THE MASSACHUSETTS ELECTRIC COMPANIES

The management of the Massachusetts Electric Companies, operating the Boston & Northern Street Railway and the Old Colony Street Railway, fully appreciates the value of open cars in stimulating summer pleasure travel on cross-country lines. To enable these companies to handle the 1910 summer traffic more satisfactorily it was decided last January to add 40 new open cars to the equipment of the two systems, 24 cars being assigned to the Boston & Northern and 16 to the Old Colony. Thirty-two of the new cars have 14 benches and the remainder are 12-bench cars. The new rolling stock was designed and constructed under the direction of E. W. Holst, superintendent of equipment of the Boston & Northern and Old Colony. The interesting features of this order for rolling stock are the rapidity with which the work of design, manufacture and erection took place, and the determination of the weights in detail of each type of car, the latter work being done with the same degree of thoroughness as was the case with the new light-weight semi-convertible cars designed by Mr. Holst and described at length in the Electric Railway Journal of April 2, 1910.



Massachusetts Electric Companies—Fourteen-Bench Open Car

Recommendations for open cars for the season were called for on the morning of Jan. 11, and estimates of the cost of the cars were submitted in the afternoon. Instructions were given to proceed on Jan. 12. The leading car and truck builders were immediately called by telephone, and between Jan. 11 and 14 specifications were prepared by the superintendent of equipment. On Jan. 14 the contracts were closed for the bodies, trucks and electrical equipment. Detail designs of the car bodies were completed on Jan. 25. The work of the manufacturers of the bodies and trucks was closely followed, the system of keeping track of progress in the shop being that described in the Electric Railway Journal of April 2, 1910, page 622. A typical progress sheet of these cars is shown. The general plan of following the work is by tabulating the car numbers in a primary column, with sub-columns headed by each of the more important steps in the construction of the equipment from the drawing board to the operating car house. As fast as a car reaches a given stage of completeness the date is entered in the table opposite the car number and in the proper column. The data are obtained from the company's inspectors, and blue prints are prepared periodically and sent to the proper officials showing at a glance the progress of the work. The typical sheet reproduced shows that erection was begun on Feb. 10 upon four of the 14-bench cars, and that the first car was shipped on March 26. The last car was shipped on May 10. All cars were completed and in operation on May 28; the first car was placed in service on May 7. There was a delay of about 10 days in receiving the 12-bench cars. The final work of equipping the cars was performed at the Chelsea shops of the Boston & Northern Street Railway Company and at the Campello shops of the Old Colony Street Railway Company. For the sake of convenience and on account of limited shop capacity the cars for the Boston & Northern were received at Lowell, Mass. The motors were mounted on the trucks at this point, the trucks were placed beneath the bodies, and the cars then hauled to Chelsea. Motors, trucks and car bodies were shipped separately to Lowell. The cars for the Old Colony were received at East Weymouth and hauled to Campello.

An exterior view is shown of one of the 14-bench cars. The bodies were built by the John Stephenson Company, of Elizabeth, N. J., and are 37 ft. 1 in. long between corner dasher posts, 40 ft. 11 in. long over bumpers, and 22 ft. between truck centers. The width over the side sills is 7 ft. 5 in. and the width over all is 9 ft. The seating capacity is 70 persons. The electrical equipment includes four GE-80 motors, with a gear ratio of 22 to 64; General Electric K-28-J controllers, Mosher arc headlights and General Electric air-brake equipment with CP-27 compressors and MC governors. The trucks were built by the Standard Motor Truck Company and are of the 0-50 type, with a wheel base of 4 ft. 10 in., 33-in. cast-iron Griffin wheels, 3¾ in. x 7 in. M.C.B. journals. Other special

14 BENCH OPEN CARS. **PROGRESS SHEET.**

Car Bodies - Built by The John Stephenson Co.
Trucks - Built by Standard Motor Truck Co.
Equipment - Furnished by Gen. Elec. Co.

Boston & Northern St. Ry. Co. 1910.

Car No.	Erection Begun	Bottom Frame Erected	Posts, Bulkheads and Roof	Flooring in Place	Roof Canvas in Place	Wiring Begun	Outside Painting Begun	Outside Painting & Varnishing Completed	Brake Rigging Completed	Inside Trimmings Completed	Wiring Completed	Ready to Ship	Shipped	Car Bodies Received	Trucks Received	Equipment Received	Equipping Begun	Trucks Equipped & Mounted	Equipping Completed	Tested	Put into Service	Car No.
1216	2-10	2-15	3-4	2-18	3-11	3-11	2-16	3-23	3-25	3-25	3-11	3-26	3-26	4-1		3-16	4-5	4-21	4-25	4-26	5-10	1216
1217	2-10	2-16	3-4	2-19	3-10	3-12	2-17	3-23	3-25	3-25	3-12	3-26	3-26	4-1			4-4	4-23	5-4	5-5	5-10	1217
1218	2-11	2-17	3-10	2-21	3-11	3-15	2-19	3-24	3-31	3-31	3-15	3-31	4-6	4-15			4-20	5-2	5-4	5-6	5-11	1218
1219	2-20	2-21	3-14	2-28	3-14	3-10	2-19	3-24	3-31	3-31	3-15	3-31	4-6	4-15		to	4-19	5-1	5-1	5-2	5-11	1219
1220	2-22	2-25	3-17	3-2	3-14	3-16	3-4	3-25	4-6	4-6	3-16	4-6	4-11	4-22		4-1	4-23	4-29	5-2	5-2	5-12	1220

Electric Ry. Journal

Massachusetts Electric Companies—Form Used for Recording Progress of Construction of Cars

equipment includes U.S.-13 trolley base, Pfingst fenders and two International registers. The cars are equipped with Kilbourn sand boxes, one being installed under each end seat. Motormen's seats are also provided. The kicking coil, lightning arrester, arc headlight resistance and fuse are mounted on the roof. In addition to the contactor box beneath the car an enclosed ribbon fuse is provided in the main circuit. There are four lighting circuits per car, including headlight wiring and sign connections. All wiring beneath the car is placed in conduit, and each circuit is provided with a separate fuse. The circuit-breaker switches are mounted under the platform hoods. The two air reservoirs are installed beneath the floor and the pump governor is mounted under one of the end seats where it can be examined easily.

The under framing of both types of cars is similar to that used in the construction of recent semi-convertible cars purchased by the company. This type of framing was used in order to simplify the placing of equipment brackets on the cars. One of the principal features of the underframe is the spacing of the center sills far enough apart to permit the installation of all piping and conduit between them. The floor covering on top of the center sills is filled in with corrugated steel plates 5/16 in. thick for the entire length of the car. This materially simplified the installation of the electrical equipment and enabled the company to get the conduit close to the floor, bringing the car body nearer the ground. The sills are of hard pine with cross members of ash. The side sill plates are of steel ¾ in. x 9 in. in section. The bolsters are of M. C. B. construction with a 9-in x ¾-in. top plate and a 9-in. x 1-in. bottom plate. The distance from the floor to the side plates was made 4 in. higher than in the semi-convertible cars to facilitate the entrance and exit of passengers. The gutter drainage of the lower deck roof is unique. There are six 1-in. brass tubes, three on each side of the car, carried from the roof down the sides to a point within a few inches of the ground. These tubes conduct all the water from the roof gutters and also serve as post grab-handles. The other grab-handles are made of ash. End curtains over the bulkhead windows are provided to shut out the light on the motorman's platform at night.

The general design of the 12-bench cars is the same as that of the 14-bench cars. The car body length is 32 ft.; the length over bumpers is 35 ft. 6 in., and the distance between truck centers is 16 ft. 9 in. The total width is 8 ft. 3 in. and the height of the trolley board above the rail is 11 ft. 6 in. These cars are equipped with four GE-80 or GE-67 motors, with a gear ratio of 22 to 62. Five-inch trolley wheels are used. The trucks are the same as those used under the 14-bench cars. The 14-bench cars weigh 36,160 lb. complete and ready for service and the smaller cars weigh 33,974 lb. The second and the fourth vertical columns of figures below give in detail the weights of the 14-bench and 12-bench cars respectively.

DETAIL WEIGHTS OF 12-BENCH AND 14-BENCH OPEN CARS FOR BOSTON & NORTHERN AND OLD COLONY STREET RAILWAYS.

	12-bench open cars		14-bench open cars	
	No. per	Total lbs.	No. per	Total lbs.
Side sills	2	583	2	728
Center sills	2	217	2	265
Cross bars	21	255	19	383
Crown pieces	2	191½	2	200½
Bottom braces	8	79	8	79
Bottom braces	8	79½	8	85
Sill plates	2	1404	2	1650
Needlebeam truss anchor plates	6	6	10	10
Tie bar	16	150	16	176
Total		2965		3576½
Flooring	..	258	..	356½
Trap doors	4	32	4	32
Trap doors	8	120	8	120
Trap doors	4	40	4	40
Trap doors	8	144	8	144
Sill wear plates	26	65	26	88
Cable box covers	..	387	..	387
Cable box brackets	8	64	8	64
Trap door lifts, complete	12	4	12	11½
Total		1114		1243
Corner irons	4	19	4	19
Side post strap bolts	16	14	20	17½
Side posts	16	230	20	430
End post panels	8	15	8	15
Total		278		481½
Ventilator glass	..	35	..	45
Putty	..	4¾	..	5
Bulkhead glass	6	12	6	12
Bulkhead bead and screws	..	2	..	2
Sash lift plates	6	1½	6	1½
Ventilator glass bead	..	7	..	7
Window guard sockets	24	2½	24	2½
Window guard rods	6	8	6	8
End sash parting strips	12	3	12	3
End sash, complete	6	61½	6	66
Total		137¼		152
Dashers	2	114	2	187
Dasher stanchions	8	62	8	68
Brackets on dash rail	10	22	10	22
Bumpers	2	195	2	200
Dash rail	2	25	2	25
Dash caps	2	6	2	6½
Total		424		502¼
Rafter tins	16	2½	20	3
Iron rafters	8	175	10	227
Side rafters	74	48	92	65
Top rafters	37	83¼	44	102½
Sub-rafters	8	16	10	21¼
Lower deck canvas	2	15	2	23
Upper deck canvas	1	27	1	31½
Ends	2	314	2	324
Top plates	2	132	2	194
Ventilator frames	2	138	2	156
End transom frames	2	18	2	39
Top deck rails	4	13	4	17½
Drip rails	2	81	2	83½
Roof boards	..	280	..	315
Letter boards	2	109	2	93
Roof molding	..	13	..	15
Roof blocks and wire furring	..	82	..	93
Upper deck headlining	..	50	..	70
Lower deck headlining	..	50	..	70
Headlining molding	..	84	..	90½
Wire Furring	68 ft.	30	79 ft.	37
Wire cover strip	1	1	1	1
Head moldings	4	2¼	4	2¼
Roof tin sheet	1	2¼	1	2¼
Steam hoods	2	228	2	236
Panels and moldings, steam hood	4	9	4	9
Trolley hooks	2	14	2	12½
Trolley rope guards	2	16¼	2	16¼
Trolley boards	2	136	2	202
Trolley brackets	10	15	12	18
Total		2184½		2570
Step hangers (bolts, etc.)	20	222	24	312
Steel toe backs	8	13	8	37
Wheel box plates	8	37½	24	26
Complete running board	2	308	2	340
Wood toe backs	51 ft.	53	47 ft.	49
Running board hooks	..	..	4	11
Total		633½		775
Seat back rubbers	32	2⅜	40	3
Seat back holders	32	2⅜	40	2⅝
Center seat panels	16	213	20	226
End seat panels	8	104	8	114
Foot rest castings	16	16	20	20
Foot rests	32	48	40	65
Seat back turn-over castings	16	48	20	55
Seat back turn-over pivots	16	4 13/16	20	5
Beveled seat washers	40	4⅛	48	5
End seat legs	8	3½	8	3½
Seat division boards	8	74	10	95
End panels under seat	4	56	4	58
End seats, complete	4	120	4	126½
Cross seats, complete	8	234	10	305
Seat backs	8	286	10	350
Seat arms	8	33	8	33
Seat arms	32	27¾	40	34¾
Total		1270¾		1501⅜
Sign stick	1	1	1	1
Hood sign boxes	2	38	2	38
Side sign, complete	2	52	2	52
Center adv. sign	1	1½	1	1½
Center adv. sign holder	1	3 oz.	1	3 oz.
Hood sign pivots	4	9 oz.	4	9 oz.
Hood sign holders	4	6 oz.	4	6 oz.
Sign brackets	4	7	4	7
Total		100⅝		100⅝
Guard rail loops	4	2½	4	2½
Top grab handle sockets	20	47	24	58
Grab handles	14	21	18	27
Roof handles	2	3	2	3
Guard rails	4	40	4	50
Upper roof mat	2	23	2	23
Guard rail latches	16	24	16	24
Grab handles and sockets	6	52	6	52
Guard rail wear plates	8	11½	8	11½
Dash post grab handles	4	16½	4	16½
Bottom grab handle sockets	14	9¾	18	12½
Center grab handle sockets	14	8½	18	11
Motorman's steps	1	5	1	5
Bronze grab handle and socket	6	52	6	52
Outside horn rails	1	9½	4	9½
Drain blocks	4	4	4	4
Entrance guard slide	8	5	8	5
Lower roof mats	2	13	2	13
Total		337¼		369½
End curtain guides	4	3	4	3
Side curtain guides	16	12	20	15
Curtain guide strips	36	36	44	45
Curtain guide fillets	4	2¾	4	3½
Side curtains	14	310	18	400

	12-bench open cars No. per	Total lbs.	14-bench open cars No. per	Total lbs.
Side curtains	4	62	4	62
End curtain guards	4	2	4	2
Curtain guide screws	..	1½	..	1½
Curtain stops	40	2	48	2⅝
Total		431¼		534⅝
Side bearing plates	4	108	4	108
Side bearing castings	4	58	4	58
Side bearing spool and bolts	..	40½	..	40½
King pin spools	2	20½	2	20½
Side bearing filler plate	4	66	4	66
Bolts for end plates	8	4	8	4
Bolts for center sills	6	3½	6	3½
Bolts for bolster	8	6	8	6
Bolster side bearing castings	4	58	4	58
Bolster side spools and bolts	8	40½	8	40½
Bolster center casting	4	120	4	120
King pins	2	35	2	35
Bolsters	2	724	2	724
Tie rods	2	39	2	39
Bolster center casting	4	120	4	120
Total		1443		1443
Signal bells	4	14	4	14
Bell cord bushing	12	9 oz.	12	9 oz.
Bell cord hooks	4	9 oz.	4	9 oz.
Bell cord pulleys	4	11 oz.	4	11 oz.
Bell cord anchors	6	3 oz.	6	3 oz.
Bell cord carrier	18	1¾	22	2¼
Entrance guard chain eyes	4	10 oz.	4	10 oz.
Register cord crank	4	3½	4	3½
Brass screw eyes	4	6 oz.	4	6 oz.
Brass tubes for register cord	4	1	4	1
Registers	2	52	2	52
Register blocks	2	8½	2	8½
Total		83¾		84¼
Gongs	2	31½	2	31½
Trolley catchers	2	26	2	26
Headlights	2	35¾	2	35¾
Fenders	2	346	2	346
Sandbox equipment	2	78	2	78
Drawbars	2	164	2	164
Total		681¼		681¼
Brake shaft top eyes	2	2⅛	2	2⅛
Brake shaft pawls	2	4	2	4
Brake shaft staffs	2	55	2	55
Peacock brake and chain	2	132	2	132
Brake cables and connections	2	32	2	32
Hand brake cable rollers	4	16	4	16
Hand brake levers	1	40	1	40
Lever carrier and bolts	1	17	1	17
Hand brake lever chain	1	9	1	9
Hand brake lever chain	1	7	1	7
Brake rod	2	62	2	62
Brake blocks	4	20	4	28
Bolts for hand brake cable roller	..	1½	..	1½
Brake handles	2	12½	2	12½
Total		410		418⅛
Angle iron for fuse box and contractor suspension	1	17½	1	17½
Angle iron for compressor and contractor suspension	1	24	1	24
Rheostat hanger angle irons	2	35	1	17½
Rheostat hangers	2	19½	2	19½
Fuse box and contact box hangers	1	13	1	13
Conduit	..	270	..	320
Fittings and straps	..	20	..	23
345 junction boxes	1	9½	1	9½
362 junction boxes	2	54	2	54
363 junction boxes	2	57	2	57
Made up cables	2	120	2	134
Made up cables (rheostat)	1	55	1	59½
Wire	..	180	..	200
Motor lead boxes	2	36	2	36
Bell mouths	..	25	..	25
MS-8 switches	2	29	2	29
MU-3-A switches	2	14	2	14
Ms-2 switches	1	4	1	4
Ms-40 switches	1	6	1	6
Ms-43 switches	1	3½	1	3½
MA-13 fuse box	1	16½	1	16½
Contractor and arc fuse box	2	7⅛	2	7⅛
Roof fuse box	1	11	1	11
Slate base and fuses	1	6½	1	6½
Contactor box	1	189½	1	189½
Resistance boxes	3	216	3	216
Lightning arrester	1	20	1	20
Kicking coil core	1	6¾	1	6¾
Controllers	2	510	2	510
Splash guards	..	20	..	20
Arc headlights (complete)	..	41⅞	..	41⅞
Lamps	..	10	..	10
Trolley stand, pole, etc	..	153½	..	153½
Spare fuse box	1	5½	1	5½
Total		2206¼		2280¼
Air brake lever	1	22	1	22
Air brake lever	1	25½	1	25½
Air tie rod	1	20	1	20
Hanger for brake cylinder	1	28	1	28
Brace for cylinder brake hanger	1	3½	1	3½
Hanger for brake hanger cylinder	1	25½	1	25½
Air tank brackets	4	48	4	48
Hangers for air compressors	2	42½	2	42½
Air compressor suspension	1	67½	1	67½
Bolts for suspension	..	2	..	2
Air compressor	1	527	1	527
Brake cylinder	1	170	1	170
Motorman's valve	2	38	2	38
M.C. governor	1	29	1	29
Reservoirs	2	94	2	94
Mufflers	2	10	2	10
Intake strainers	1	6½	1	6½
Whistles	2	7½	2	7½
Safety valves	1	2½	1	2½
Drain cocks	2	3	2	3
Shut-off cocks	2	2½	2	2½
Whistle valve	2	1⅞	2	1⅞
Air pipe	..	82	..	94
Pipe fittings	..	18	..	20
Pressure gages	2	3½	2	3½
Total		1280		1283⅞
Screws, bolts, lags, etc		340		420
Paint, varnish, etc		180		221
Trucks and motors (2 GE80 motors, 6-50 trucks		17520		17520
Grand total		34020		36158

MEETING OF INSURANCE COMMITTEE

A meeting of the insurance committee of the American Street & Interurban Railway Association was held at the office of Secretary Henry J. Davies of the Cleveland Railway Company, Cleveland, Sept. 24. The members of the committee present were: Henry J. Davies, chairman; F. A. Healey, Cincinnati, and S. L. Tone, Pittsburgh. Others in attendance at some of the sessions were Henry N. Staats, manager of the American Railway Insurance Company, and W. G. Asmus, engineer of the American Railway Insurance Company; Everett U. Crosby, manager, and H. Walter Forster, engineer, of the Independence Inspection Bureau, and G. L. Radcliffe, superintendent of the Cleveland Railway Company.

The report of the committee as decided upon at the session embodies a number of important recommendations. They will include recommendations for the appointment of an insurance expert with authority to employ all necessary assistants, for the appraisal by independent appraisers of all insured properties and for the employment by each electric railway company of an insurance inspector with authority to criticise and condemn conditions and recommend improvementts in property or methods or the assignment of these duties to some officer of the company. The report will also emphasize the importance of paying particular attention to the inspection of car wiring and the wiring of buildings. It will also recommend a method for the protection of car yards, which have been regarded by insurance companies as hazardous risks, and for which no adequate protection has until recently been suggested, and in this connection will describe the equipment of a Cleveland car yard with standpipes and nozzles. It will recommend that chemical fire extinguishers be carried in interurban cars so that fires in them, when they are far from city fire departments, may be extinguished in their incipiency. In conclusion, the report will call attention to the recommendations made in previous reports and will urge the members to put their properties in such condition that they may demand lower rates of insurance, and failing to get them may safely carry their own risks either by individual insurance funds accumulated from month to month, by a joint fund or by the maintenance of their own insurance company.

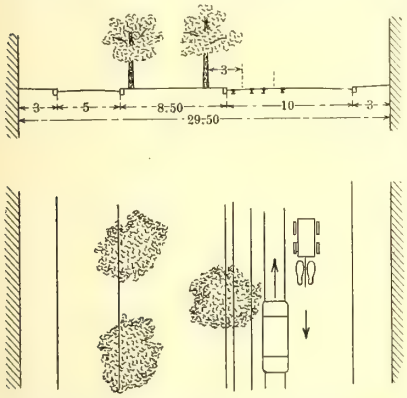
After luncheon at the Union Club the members of the committee and guests were taken in automobiles to witness the operation of the sprinkler system at the Windermere car house and later on to see the first test of a new system of protecting cars in yards at the Woodhill Road yards of the Cleveland Railway Company. This system was designed by Henry N. Staats, manager of the American Railway Insurance Company, and consists of a number of standpipes 20 ft. high, 7 in. in diameter at the base and 4 in. in diameter at the top. Each standpipe is surmounted with a nozzle. Near the top of the standpipe also is a small platform reached by a metal ladder and from this platform a man can direct a stream of water 1⅛ in. in diameter in any direction desired.

A 750-gal. electrically driven centrifugal pump is used and increases the city pressure from 40 to 50 lb. to 150 lb., or any desired pressure. In the test made Sept. 24 Mr. Staats, designer of the system, and Mr. Asmus, engineer of the American Railway Insurance Company, manned the nozzles themselves and demonstrated the value of the system.

CITY DESIGN AND TRANSPORTATION*

BY M. WATTMAN, MANAGER OF THE MUNICIPAL TRAMWAYS OF COLOGNE.

One of the marked characteristics of the last few decades, both in Europe and America, is the rapid growth of city population in contradistinction from country population. The attractions which a city affords to those of leisure in the way of pleasure and intellectual pursuits, the opportunities which it offers to the working classes in the diversity and extent of employment, and the advantages which it provides to manufacturers in the way of shipping facilities and to the public in general in the conveniences of shopping, are making city residence very desirable to all classes. In fact, this has become so distinctly the case that municipal questions are among the most important sociological problems of the age.



City Planning. Fig. 1—Center Reservation with Tracks on One Side

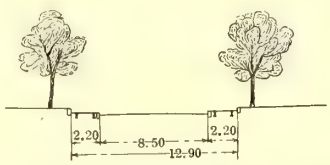


Fig. 4—Street in Dusseldorf; Tracks on Side Reservations

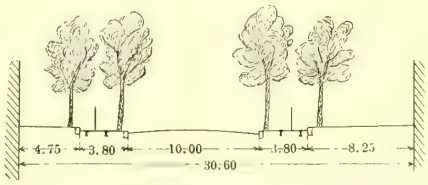
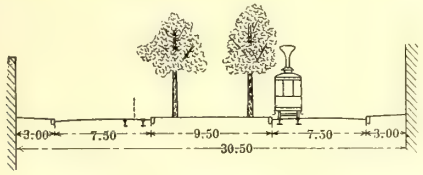
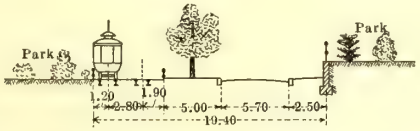


Fig. 5—Rheinstrasse in Friedenau; Tracks on Side Reservations

The most serious of these problems is the housing of the inhabitants. Even the well-to-do can afford to occupy only a small expanse of the ground area and are obliged to live in most cases in apartments rather than in individual houses. The congestion in the poorer sections of the city is necessarily far greater and in the poorest districts municipal authorities are often unable to secure the thorough enforcement of even the most elementary laws of health and sanitation. The impossibility of lateral expansion has forced an expansion upwards, with the inevitable deprivation to a large proportion of the population of the amount of light and air which the laws of health require. The ultimate effect of this, especially upon children, cannot be negligible. An environment of narrow courts, dark stairways, small and crowded rooms, must be detrimental to the physical and moral development of the rising generation.



City Planning. Fig. 2—Center Reservation with Tracks on Each Side



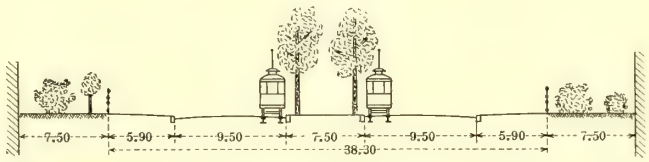
City Planning. Fig. 6—Street in Königsberg Alongside of Parks

The greatest need of our large cities is in the reduction of this evil through lateral expansion, which is made possible only by means of adequate and rapid transportation. With horse cars but little relief could be afforded, but the development of electric railways during the past 20 years provides a possible solution of this problem because it increases enormously the space available for city expansion.

DEPENDENCE OF COMMUNITY ON ELECTRIC CARS

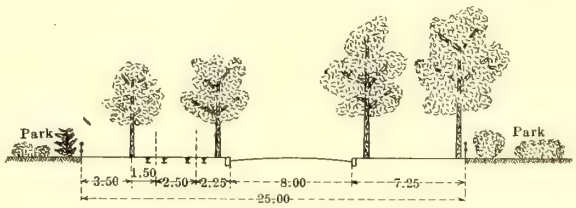
It is difficult to determine the proportion of people who use the electric cars to go from one point to another within the city in preference to other means of movement, but a few figures which have been compiled will be of interest. These figures were obtained by making a record of the number of persons traveling in tramway cars, in other vehicles, by bicycles and on foot, on typical days, past different important points in the cities mentioned.

A record taken at two important points in Copenhagen during November, 1907, shows: number in vehicles, 3181; on bicycles, 4153; foot passengers, 22,289; in tramway cars, 12,000. In other words, the tramway cars carried 29 per cent of the total number of the persons passing the two points considered. At Aix-la-Chapelle during a fête on July 19, 1909, a record was made at ten different points and it was found the number of persons traveling in the tramway cars was 259,574, or almost 50 per cent. In Dresden a similar record was made in 1908 at one of the principal bridges connecting the two parts of the city, and over 50 per cent were found traveling by electric cars. A record made Sept. 18, 1908, in Lucerne showed 20 per cent. In Cologne a count made on two bridges crossing the Rhine showed only 12 per cent foot passengers and 88 per cent tramway passengers.



City Planning. Fig. 3—Kurfurstendamm in Berlin; Track Too Near Trees

In general it can be stated that the number carried in the tramway cars is between 20 and 50 per cent of the entire circulation, and this percentage under special conditions will become much larger, as in the case cited in Cologne. It is safe to say, therefore, that in large cities the tramway system occupies a preponderating position in local communication and that its proper and logical development and extension not only have a most important bearing on the development of the city which it serves, but that the expansion of the city is directly affected by the layout of the transportation system, the service given and the speed attained on these cars.



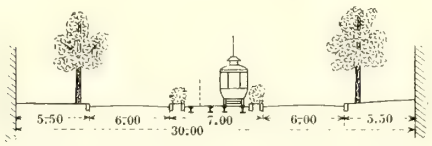
City Planning. Fig. 7—Wide Street in Königsberg Alongside of Parks

RELATION OF TRANSPORTATION FACILITIES TO CITY PLANNING

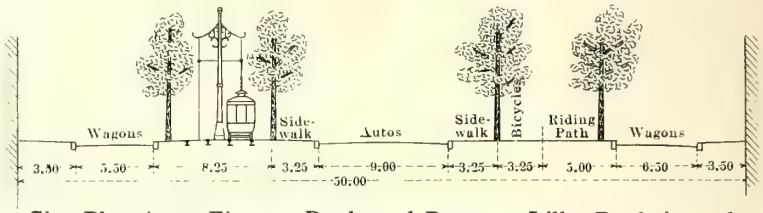
Owing to this close interrelation it would seem almost self-evident that municipal authorities and engineers would obtain the collaboration and advice of the representatives of their

*Abstract of a report presented at the meeting of the International Street and Interurban Railway Association, Brussels, Sept. 6-11, 1910.

local railway systems whenever new portions of the city are laid out so as to determine the best way of serving these sections by tramways. Somewhat strange to say, this is rarely done. Of the 73 companies which have replied to the data sheet of the commitee on this subject, 60, or 70 per cent, stated that they possess no influence with the municipal authorities in regard to this matter and are never consulted when new streets are laid out. Twelve companies reported that they are consulted in regard to the transportation features in work of this kind when it is supposed that they have an interest in furnishing the service. Finally the officers of 10 tramways, for the most part municipal enterprises, are asked regularly to assist in the establishment of plans of this kind.



City Planning. Fig. 8—Agnes-Bernauerstrasse in Munich; Tracks in Reservation, Lined with Shrubbery



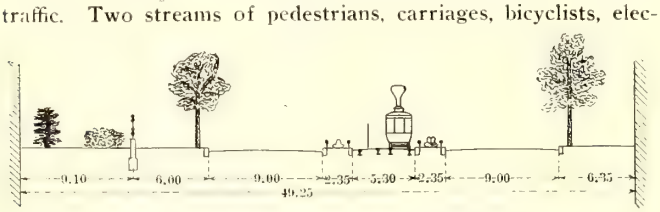
City Planning. Fig. 10—Boulevard Between Lille, Roubaix and Tourcoing, with Roadway, Riding Path, Sidewalk, Auto Road and Trolley Tracks

This condition of affairs undoubtedly explains the very grave errors made in the offices of municipal architects when it comes to providing transportation facilities in new districts. Undoubtedly the intentions of these architects are the best, but by ignoring what in a sense is the most important and vital part of city planning they make mistakes which forever handicap and hamper the district which they have laid out.

An unfortunate feature of the entire situation is that in the older portions of the city all transportation has to be furnished under conditions originally designed for animal traction. It is impossible materially to alter this situation, but in the newer portions of the city full advantage could and should be taken of the great flexibility and adaptability of design possessed by the electric railway system. As will be explained later, among the points which municipal architects through ignorance of the practical conditions of electric railway operation are apt to overlook are the following: width of roadway; position of tracks in the streets; facilities for the establishment of car houses so as effectively to serve the different lines operated by them; facilities for turn-outs and cross-overs; locations of crossings; number of railway lines required to serve the communities of different size, etc.

THE MODERN SCIENCE OF CITY PLANNING

Modern ideas in city planning, very wisely, no longer favor the old idea of the rectangular arrangement of a city with all streets either parallel to or at right angles to each other. Such streets not only give an impression of monotony but their busy corners constitute serious obstacles to the circulation of traffic. Two streams of pedestrians, carriages, bicyclists, electric cars, etc., one on the cross street, the other on the longitudinal street, are forced into the narrow confines of a crossing no broader than each of the streets which meet at that point. The result is not only danger but a cause of delay to all.

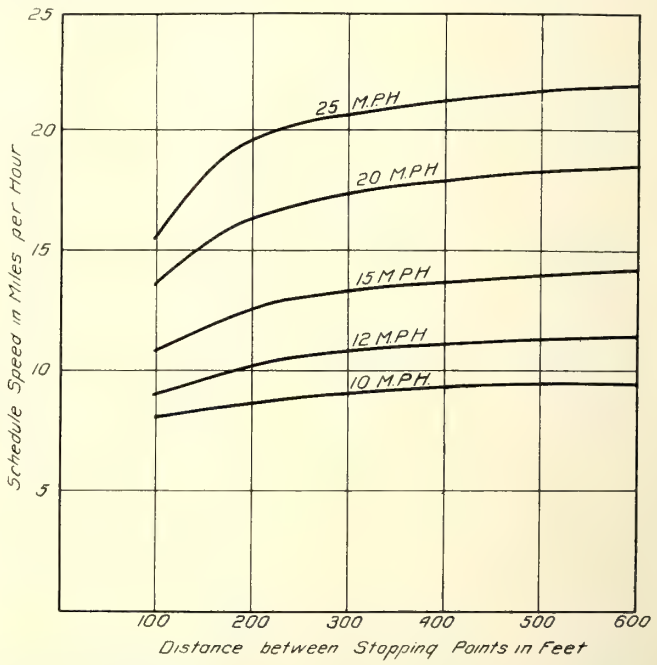


City Planning. Fig. 9—Hardenbergerstrasse, Berlin; Tracks on Center Reservation, Lined with Shrubbery; a Good Arrangement

Modern city architects seek not only to give their creations a picturesque appearance by avoiding so far as possible the interminable perspective presented by a long and straight street, but also to arrange the crossings of the important thoroughfares in such a way as to avoid congestion. The former effect is accomplished by interrupting the straightness of the streets by angles or turns, and by the introduction of squares and plazas, and the latter by providing broad thoroughfares at intervals, still further widening them where they cross other important streets. These broad thoroughfares naturally become the commercial streets of the city, whereas the cross streets are naturally better suited for residential purposes. In the latter greater liberty can be taken in departing from straight lines, whereas the business streets should be arranged so as to facilitate traffic as far as possible. It is indispensable, however, in all work of this character for the engineer or commissioner in charge to realize that the new city or portion of the city which he is designing is not merely a work of art. It is primarily an object of utility and will lose its value if its artistic features hamper or obliterate its useful qualities. Some of the more important of these points, so far as they concern transportation by electric cars, will now be discussed.

WIDTH OF STREETS

The first consideration is the width of the streets. With tracks in the middle of the street and room on each side for one line of carriages the street should have a width of from 33 ft. to 35 ft. when the width of the car is about 7 ft. Cars can make a maximum speed of 10 m.p.h. on such streets



City Planning. Fig. 11—Diagram Showing the Relation Between Schedule Speeds, Distance Between Stopping Points and Maximum Speeds

even if there is considerable traffic, and if the street was slightly wider could make from 11 to 12 m.p.h. It is much better, however, to have the space on each side of the track wide enough to admit the passage of two vehicles side by side or the passage by one carriage of another standing close to the curb. This means a width of street of from 50 ft. to 55 ft., and if the vehicle traffic does not trespass too frequently on the space reserved for the cars the latter can operate at from 12 to 15 m.p.h.

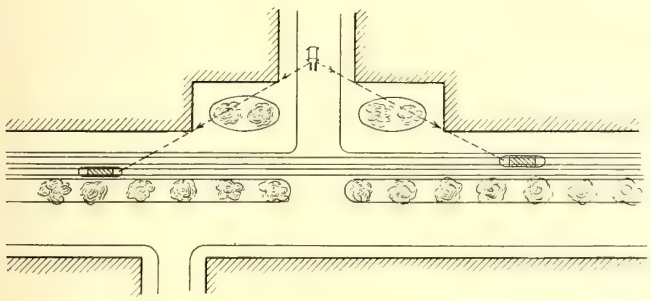
RESERVATIONS

The next step is to provide more or less of a reservation for the cars. This plan will greatly reduce collisions between cars and vehicles. Accidents of this kind can be divided into two classes; one in which the vehicle is crossing the track from a side street and the other in which the vehicle is struck from behind by the car. Of these, the former is not only much less common, because the driver of the vehicle is in a position to see an approaching car, but the consequences are apt to be less serious because the driver is less liable to be pitched forward onto the tracks. A collision between a carriage and a car going in the same direction is impossible if the tracks are on a reservation. When laid in this way, the maximum speed of the cars can be 20 m.p.h. and if the precautions described later are adopted there is no reason why the speeds cannot be raised to 25 m.p.h. with no more danger than at present. Such reservations can be paved, as on Bismarckstrasse in Berlin, or turfed, as on Hartenbergerstrasse. The cost of track construction and track maintenance on reservations of this kind is of course less than in paved streets because T-rails on wooden ties can be used. Typical sections of streets, some with reservations, are presented. The dimensions in all cases are in meters.

Fig. 1 shows a very common construction in which the area in the center of the street is reserved for pedestrians and the two tracks are at one side of this reservation. The chief objections to this plan are that access of passengers to the cars operating on the right-hand track is not easy. It will also be noticed that the cars on one track travel in an opposite direction to the traffic.

Fig. 2 shows an arrangement in which there is a track on each side of the reservation. When these trees are lindens, maples, elms or chestnuts, the maximum distance between the nearest rail to the trees should be not less than 10 ft. Otherwise it will be necessary to trim the trees so much as to injure their appearance. Access to the cars from the sidewalks is rather difficult and the separation of the tracks makes the installation of cross-overs awkward. Fig. 3 shows a section of Kurfurstendamm, in Berlin, where the reservation was so narrow that the trees had to be trimmed excessively. When the two tracks are placed on the same side of the reservation the width of the roadway should be 33 ft. to allow carriages to pass. When they are separated by the reservation 23 to 24 ft. will answer.

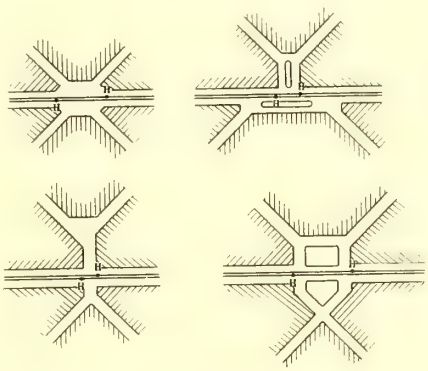
Neither the arrangement shown in Fig. 1 nor that in Fig. 2 is very satisfactory for passengers boarding or leaving the cars, as they are obliged to cross the entire distance of the



City Planning. Fig. 16—Junction of Cross Street and Longitudinal Street; Views of Cars Hidden by Shrubbery

roadway. The writer does not consider the fact that the cars run in an opposite direction to the rest of the traffic a disadvantage, because the motorman and the driver are looking toward each other and collisions are much less liable to occur than if they were going in the same direction.

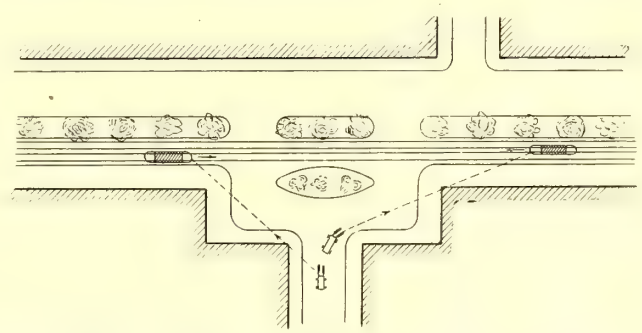
Fig. 4 shows a section of a street at Düsseldorf where the tracks are on a reservation on each side of the street and Fig. 5 a street at Friedenau where the same arrangement is used, but each track is flanked with two rows of trees, which in this case are set too near the track. The most serious objection to locating the tracks next to the sidewalks, as in these two sections, is that drivers of vehicles on cross streets cannot get a good view of the approaching car. The wider the sidewalk or the further back the buildings are set from the street, the less is this danger. On the other hand, a location of tracks on the side or sides of a street is very satisfactory when they pass a park, as shown in Fig. 6, provided the shrubbery in the park is not so high as to conceal a view of the approaching car. The arrangement shown in Fig. 6 is used in Königsberg. The objection has been raised that the location of the track next to the sidewalk interferes greatly with the operation of wagons delivering merchandise to residences. Personally the writer does not think this objection serious, as he has seen this system of construction used satisfactorily even in commercial streets.



City Planning. Figs. 12 to 15—Incorrect and Correct Methods of Planning Plaza; the Points Marked H Show the Proper Stopping Points for the Cars

Fig. 8 shows a system of center reservation used in Munich. Here the vegetation on the reservation is limited to grass and shrubbery. A somewhat similar arrangement in Berlin is shown in Fig. 9. These plans are admirable from every point of view, because the reservation is broad enough to admit of aisles of safety. From an esthetic standpoint also the arrangement is an attractive one.

A most elaborate system of reservation is that adopted on a boulevard 165 ft. wide between Lille, Roubaix and Tourcoing



City Planning. Fig. 17—The Junction of Cross Street and Longitudinal Street; Clear Views of Approaching Cars Are Obtained

(see Fig. 10). Separate portions of the roadway are reserved for wagons and other vehicles, for pedestrians, for bicycles, for persons on horseback, for automobiles and for the electric railway cars. The boulevard is about 12 miles long and in the form of a Y.

THE EFFECT OF STOPS ON MAXIMUM AND SCHEDULE SPEED.

The time required to make a stop can be divided into the time lost while braking, the time lost while accelerating and the actual time during which the car is not in motion. The latter in turn varies with the number of passengers boarding or leaving the car. Observations made on the Cologne tramways indicate that the minimum length of absolute stop is 5 seconds, which is the time required for only one passenger to board or leave the car. For two passengers boarding or leaving the average time of actual stop is 9 seconds, for 3 persons 12 seconds, and for each additional person 2 to 3 seconds.

The average actual stop is 10 seconds. If to this we add the time lost during accelerating and braking as compared with that of the car if it had made no stop we obtain the total time lost by a stop. Assuming an acceleration of 1 m.p.h.p.s., a deceleration at the same rate and an average stop of 10 seconds, the following table is obtained.

Speed of car in miles per hour.	Loss of time for each stop in seconds.
25	35
20	30
15	25
12	22
10	20

From these data the series of curves, Fig. 11, has been prepared to show for different maximum speeds in miles per hour the schedule speed in miles per hour, with different distances between stopping places. The convenience of the public as well as the best interests of the railway company dictates a much greater average distance between stopping points than is now obtained on most roads.

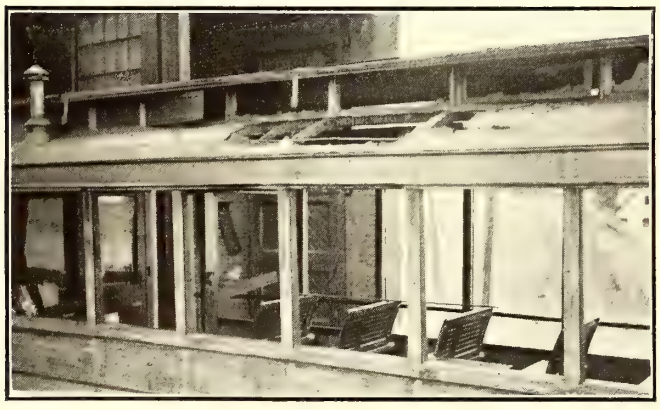
DESIGN FOR CROSS STREETS

Figs. 12-15 show four types of crossing of three streets. Fig. 12 is the old method of designing a crossing of this kind. The streets meet in a plaza, but the plan is objectionable from a transportation standpoint, because a car can cross the plaza only at reduced speed. The designs shown in Figs. 13, 14 and 15 are much superior. The proper points for stopping the car in each case are marked H in the drawings.

Fig. 16 shows an undesirable method of making a junction of a cross street with a main street, because the approaching cars are concealed by the shrubbery. Fig. 17 is a much better arrangement.

CAR FIRE IN THE PAINT SHOP OF THE CLEVELAND RAILWAY COMPANY

The accompanying illustrations show the results of a fire in a car in the paint section at the Windermere shops of the Cleveland Railway Company on Sept. 9. The fire had its origin in one of the window blinds and is supposed to have been caused by the blaze of a torch used in burning paint off the cars. It smoldered there for some time, but finally broke out into a blaze and burned through the roof. The heat opened a sprinkler head not far away. The blaze outside was held in

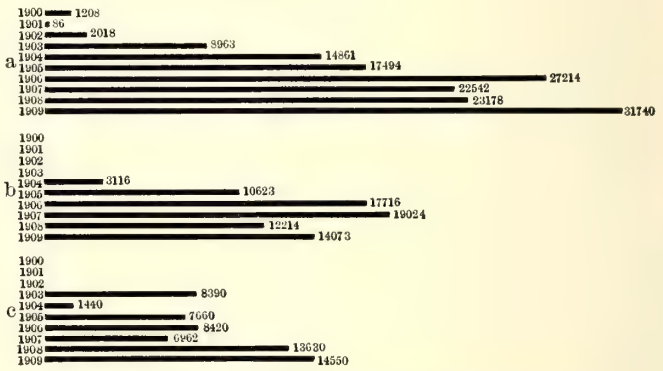


Partial Destruction of Car Roof in Cleveland Paint Shop Fire

check while a water curtain was formed about the car. The fire then ate its way down through the ceiling of the car and spread to some extent on the inside. The seating was set on fire by the fall of a metal curtain roller. By this time the fire was discovered and a hose was turned onto the car by some of the men. The throwing up of the water on the inside made the burned parts in the ceiling and roof give way, thus forming an opening. It is believed that the sprinklers would have controlled and extinguished the fire easily without the aid of the hose line.

EUROPEAN TRACK IMPROVEMENTS

At the Brussels meeting of the International Street & Interurban Railway Association, held Sept. 6 to 11, 1910, a report on recent improvements in track was presented by Arthur Busse, chairman of the track committee and chief engineer of way and structure of the Grosse Berliner Strassenbahn. The report first discussed the subject of operating over parked tracks. This practice has gained in favor both with the municipalities and the railways. Some of the pioneer work done by Mr. Busse in this form of construction was illustrated and described on page 943 of the issue of the Electric Railway Journal for Oct. 30, 1909. The report states that the annual cost of watering and otherwise maintaining the parked or turfed section in Berlin-Charlottenburg has been only 20 pf. per square meter (0.5 cent per square foot). In such places the motor oil cups require special attention to prevent leakage, because oil impairs the growth and appearance of the grass. It is also suggested that concrete ties or stringers would be more desirable in the parked sections, as the wooden ties rot faster than in the ordinary paving. On important streets, where the conditions do not make parkways practicable, Mr. Busse prefers a street construction where the spaces between the rails and for about 1½ ft. on each side are paved with block, while the rest of the street is paved with asphalt. The junction between the two classes of paving is usually well maintained, because both have like coefficients of elasticity.



Progress of Thermit Rail Joint Installations

In this connection the possibility of using a new elastic paving known as Aeberli macadam is suggested. This material, now in use along the tracks of the Montreux (Switzerland) Street Railway, is made as follows: Broken stone is mixed with very soft tar and, after heating, heaps of the mixture are covered with sand to ferment for two weeks to several months. The sand is then thrown off and the stone is spread and used like ordinary tar macadam. It is hoped that this material will prove as noiseless as asphalt and be more durable.

The chapter on rails refers to the standardization report rendered at the 1909 meeting of the German Street and Interurban Railway Association, wherein it was stated that rail standardization in Germany could be considered an accomplished object. The report presents details showing the dimensions of four types of standard rails for tangents and four standard rails for curves. There is an increasing tendency to use guard rails of manganese steel, nickel steel, titanium steel and the like. Mention is made of the excellent results obtained with titanium steel on American steam lines like the Baltimore & Ohio and the New York Central & Hudson River railroads. The results obtained with manganese steel by the Boston Elevated Railway are also quoted.

The section on rail joints contains some interesting data on various types of joints, including the Falk cast-welded joint and the Goldschmidt thermit joint. The Falk joint enjoys great favor in Belgium, Holland, Spain and France, but has not been so widely adopted in Germany. The Brussels Tramways have welded 50 to 60 of these joints in one day at an average cost of 12.5 francs ($2.38), exclusive of paving charges. The

Rotterdam Tramways report only 12 failures of 12,000 Falk joints installed during the last five years. The thermit joint has made notable progress and nearly all the companies using it report very satisfactory results. The diagram on page 504, reproduced from Mr. Busse's paper, shows the increase in the use of this joint from 1900 to 1909, inclusive. The total number of thermit joints at the end of 1909 was reported as 286,182. In the diagram mentioned "a" with a total of 149,314 represents Europe, "b" with a total of 76,766 represents America and "c" with a total of 60,102 represents the installations in the rest of the world. The report concludes with a description of various forms of special work, concrete tie construction, etc.

NEW FRANCHISE CONDITIONS IN PARIS

The new franchise granted to the company controlling the tramway and omnibus systems in Paris assures important improvements. The property comprises two principal undertakings. One, the tramway department, has received from the French Government and the city of Paris a new franchise. The other department, that of motor busses, has received a separate concession. Under this franchise motor busses will replace within three years the horse busses. There were 11,000 horses in the service as it existed prior to the grant of the new franchise. Among the other changes will be the introduction of the overhead trolley for tramways, although the underground conduit is prescribed in certain parts of the city and the surface contact systems will not be converted. Fares have been reduced. Under the former franchise the fares on the tramway cars were 15 centimes for second class and 30 centimes for first class. The latter entitled the passenger to a transfer. Under the new franchise the zone system of fares will be used as described below and transfers are abolished.

CONSTITUTION AND BY-LAWS

The exact name of the company operating both tramways and omnibuses is given in the constitution and by-laws as Entreprise Générale des Omnibus. It is usually called the General Omnibus Company as before. The corporate life of the company, which under the terms of the original charter was to terminate on May 31, 1910, has been extended to Dec. 31, 1955. The capital is to be increased from 17,000,000 francs to 80,000,000 francs, divided into shares of 500 francs each.

The board of directors cannot dispose of immovable property of a value greater than 50,000 francs without authority from the stockholders.

During the period of transformation and up to Dec. 31, 1914, at the latest, the following shall be charged to construction: The amount necessary to pay dividends on the new capital stock in case the profit should be insufficient, the rate to be fixed by the stockholders on recommendation of the board of directors and to be at least 4 per cent per year, but not more than 5 per cent; losses from operation in case they should take place; interest on loans.

The surplus of the company, as shown by the annual inventory, after deducting general expenses, fixed charges and amortization allowances, will constitute the net profit. From this net profit the following will be deducted:

First. Five per cent to constitute the reserve fund prescribed by law. This payment ceases to be obligatory after the reserve fund amounts to one-tenth of the capital stock. It is to be begun again, however, if the reserve fund is reduced below the legal limit.

Second. The sum necessary to pay the stockholders their first dividend of 5 per cent on the amount of capital stock paid up and not amortized. In case the profits for any one year are insufficient to pay this first dividend, the difference must be taken from that part of the reserve fund exceeding one-tenth of the capital stock.

Third. The sum necessary to amortize the capital stock included between certificates No. 1 and No. 34,000, or the first 17,000,000 francs issued, in accordance with the table of amortization charges contained in the annex to the old constitution and by-laws, provided these shares have not been earlier amortized by means of the reserve.

Fourth. On proposal of the board of directors a sum which will be fixed by the stockholders, which in no case will be less than 5 per cent of the net profits, is to be credited to a fund to amortize the other shares of capital stock which will be issued.

The balance after the deduction of that part of the profit which is to be paid in the city of Paris under the franchise will be divided among the shares of the capital stock and certificates of participation except that portion which is to be paid into the reserve and that which is carried over to the following year.

The sums which are transferred from the profits to the fund for the amortization of the capital stock will be employed each year to retire a certain number of shares. In case of an increase of the capital stock the stockholders will decide what payments will be made from the profits for the amortization of the new shares and this amortization will begin only after the number of years so determined.

The selection of the shares to be amortized will be made by means of lot, which will be taken each year, according to the method determined by the board of directors, and the numbers of the shares so drawn are to be published. The owners of the shares designated will receive (1) in cash, 500 francs per share representing the par value, and also any dividends due on Dec. 31 preceding, and (2) a certificate of participation in exchange for each share redeemed. These certificates of participation give the right to a proportional part of the profits (except the first dividend of 5 per cent); also of the assets, after all of the shares have been amortized, and they possess for the surplus all the rights attaching to shares of stock.

In case of the retirement of three-fourths of the capital stock, the board of directors is required to call a meeting of stockholders to consider the question of whether to continue the company or dissolve it. To determine this question the stockholders must represent at least half of the capital stock and the vote should be that of the majority of two-thirds of the votes of the stockholders present.

At the expiration of the charter, or in case of dissolution, the stockholders will decide at the suggestion of the board the method of liquidation and will appoint one or more liquidators. The surplus from the liquidation will be employed, first, in the complete amortization of the capital stock if this amortization has not already taken place. The remainder, after deducting the part due the city of Paris under the franchise, will be equally divided among all the shares.

PRESIDENT'S REPORT

Of the 34,000 shares of stock of the old company it was stated by Eugène Etienne, the president, at a meeting of shareholders on March 23, 1910, that 20,450 had been amortized and 13,550 were outstanding. Owners of the 34,000 old shares had the right to subscribe for 119,000 new shares in the proportion of three and one-half new shares to one old share.

The future fares for the tramways are: For one section of the line, 10 centimes for second class and 15 centimes for first class; for more than one section of the line, 15 centimes for second class and 20 centimes for first class. Special fares will be charged outside of the city. Double fares are to be charged for owl service.

For the omnibuses the same fares will prevail except that for more than one section the fare for first class will be 25 centimes.

For the omnibus lines the length of each section will not exceed 2 miles. A line of more than 4 miles of length is divided into three sections. On the tramways the sections are generally a little longer.

The omnibus system in actual use is about 156 miles in length. In addition there is an extension of omnibus service of about 20 miles which will not be put in operation until the receipts of the first part of the system during twelve consecutive months show at least 1.06 francs per omnibus kilometer. A kilometer is equal to 0.62 mile.

The payment to the city of Paris includes a fixed payment and the payment for maintenance of the paving between the tramway tracks. The latter is practically the same as at present. For the former the principle has been changed. Formerly the tax was based on the number of cars; in future it will be based on the percentage of receipts, i. e., 3½ per cent for omnibus and 6 per cent for tramways, but the latter percentage is to be reduced to a minimum of 3½ per cent if the operations do not give returns of more than 5 per cent on the new capital invested.

If tramway receipts per car kilometer should amount to 1.04 francs, the city of Paris can modify the agreement. No reduction in omnibus fare can be required unless the average receipts per car kilometer exceed by more than 0.05 franc the sum of 1.06 francs.

FRANCHISE FROM THE GOVERNMENT

The franchise granted by the French Government for the Paris tramway system is given for the transportation of passengers and baggage and eventually for packages and freight when the latter shall be authorized by the government following the submission of maximum charges after an inquiry.

On Dec. 31, 1950, all rights of the company so far as the track and its dependencies are concerned pass to the government, which can immediately enter upon the use of the property. The company must keep the track and all permanent structures on the public streets in good condition. During the five years preceding the termination of the franchise the government will have the right to appropriate the income of the railway and use it or any part of it to maintain the track and its dependencies in good condition if the company does not fulfil its obligations in this respect. So far as the movable property is concerned, such as the equipment of the stations, rolling stock and the equipment of shops, and immovable property, such as installation made by the company outside of the streets for the maintenance of rolling stock and the installation which the company will make for the production and transmission of power for the operation of the line, the government reserves the right, without being obliged to exercise it, of taking over either in its entirety or in part any which it considers desirable at the appraised value. This value will be paid to the company within six months after the expiration of the franchise and after the material has been taken over.

The government reserves the right, if it desires, to rent all or any part for a period of not less than one year and not more than three years at a figure of 4 per cent on the purchase price for the structures and an appraised figure for the other material. The city agrees, if the company should require it, to take over also stock, fuel and supplies of all kinds used in the operation of the lines at the appraised value, and, on the other hand, if the government requires it, the company agrees to sell these materials in the same manner. However, the government is not obliged to take over any more of these supplies than would be necessary for the operation of the system during six months. This arrangement applies only in case the government decides that the track is to be retained either in whole or in part.

In case the company should make an arrangement for the supply of all or part of the electric power or other necessary part of the system which is covered in the present franchise, it must include in such contract a clause giving it the right to continue such arrangement for a period of three years after the expiration of the franchise unless it can otherwise compel the execution of such a supply. During the last five years of the franchise the fixed property of the company is not to be sold without the authority of the Minister of Public Works.

In case the government should decide that the tracks are to be abandoned either in whole or in part the tracks shall be taken up and the street returned to its original condition at the expense of the company without indemnity.

Under certain conditions the government can terminate the franchise before the end of fifty years.

All cars on certain lines arriving at their termini before 7:30 a. m. between Nov. 1 and the end of February and before 7 a. m. between March 1 and Oct. 31, except on Sundays and holidays, are to be known as workmen's trains. On certain other lines the hours as set are before 6:30 a. m. between Nov. 1 and the end of February and before 6 a. m. between March 1 and Oct. 1. Passengers on these trains pay the ordinary second-class fare, but pay an increased charge of only 5 centimes for a return ticket. Workmen's trains will not be required on lines whose motive power is being changed.

Outside companies are to have the right to use the tracks of the company on the approval of the government and municipal authorities upon payment to the railway company of a proportional sum based on the ton kilometers operated on the trunk line, of the interest on the value of the track and other material used, amortization, maintenance and repair, as well as a bonus of 25 per cent of the gross receipts based on the proportion of the length of the track used in common with the total length of the track of the outside company. A somewhat similar arrangement is made with regard to power.

The company can reduce the fares at any time, but is not allowed to return to the higher fare without giving three months' notice.

FRANCHISE FROM THE CITY

The franchise from the city, dated March 9, 1910, states that if the gross receipts from passengers from the tramways, after taking into account any insufficiency of receipts in the omnibus business, should average, for two consecutive years, more than 1.04 francs per car kilometer, the city may require the company either to reduce its fare or to increase its service provided the changes do not reduce the average receipts per car kilometer below the minimum specified. The insufficiency of omnibus business referred to relates to a clause in the franchise relating to omnibuses which is of a somewhat similar import. These figures for car kilometers are based on a motor car of 51 seats. If a motor car of different capacity should be employed, the number of seats of each of these cars will be considered as 17 plus two-thirds the actual number of seats and the seats of these cars thus calculated will be totalized and 51 seats will be considered as a car in the calculation of the average car's receipts. For trail cars, five seats will be considered only as three seats for the purpose of this calculation.

If, owing to the improvements in the art or a reduction in taxes, the cost per car kilometer for two consecutive years should be reduced more than 0.02 franc, the city will have the right to ask for a reduction in the limit of 1.04 francs which the company is allowed to earn gross before the city can modify the fare. On the other hand, if, through a change in taxes, imposed by the city of Paris or the department in which it is situated, the expenses per car-kilometer should be increased more than 0.02 francs, the company will have the right to a corresponding increase in this limit of 1.04 francs.

After payment of operating expenses of the tramways and omnibuses, appropriations for the reserve fund for track, rolling stock, and other property, fire and accident insurance (except a reserve for benefit funds), interest on loans, amortization of company debt and capital and legal reserves, the surplus will be divided as follows:

(a) An annual payment during the life of the franchise based on 6 per cent of the total amount of the sums determined by expert testimony or fixed by arbitration as representing the industrial value of all of the assets necessary for the operation of the line on June 1, 1910, but the said amount shall not exceed 4,000,000 francs.

(b) Eight per cent on the new capital stock and 3 per cent on the new certificates of participation.

The amount exceeding this will be divided between the city and the company, and the city's share will be considered as additional taxation. The city will also have the right upon the liquidation of the company to one-half of the assets after payment of the liabilities and amortization of capital. During the period of transformation the company is authorized to charge into capital account any deficits in operation, the inter-

est on bonds issued and a sum which will not exceed the following:

(a) An annual payment of 4 per cent on the total amount determined by expert advice or fixed by a board of arbitration, representing the industrial value of all of the assets necessary to the operation of the line on June 1, 1910, but not to exceed 3,000,000 francs.

(b) Interest at 4 per cent without amortization of the total capital stock which is actually issued.

The city has also required the company to agree that its annual pay roll shall not be less than 4,500,000 francs and has minutely prescribed the hours of labor of the employees and the wages, benefit payments, etc., which the company must make to them.

WATTMETERS AND OTHER CURRENT RECORDERS FOR CARS*

BY M. BATTES, MANAGER OF THE MUNICIPAL TRAMWAYS AT FRANKFORT

This subject was discussed in a report presented to this association in 1906 and in two reports presented at the Munich meeting in 1908. One of these 1908 reports advocated the use of current clocks. The other leaned toward the use of wattmeters. The discussion at the Munich meeting developed such a difference of opinion upon the best method of measuring energy consumption that the subject was continued at the present session. There are three methods in general use: current clocks, wattmeters and ampere-hour meters. A few of the principal facts reported in this connection by important companies are given below:

The Amsterdam municipal tramways have used current clocks on all of their 235 motor cars since 1908 and prefer current clocks to wattmeters. The cost of a current clock installed is $10.50. The cost of maintenance is negligible, and that of accounting is $5.12 per 100 000 car-miles. The current consumption per car-kilometer has been reduced from 877 watt-hours to 776 watt-hours per car-mile, a difference corresponding to a saving of about $5,920 per year.

The Grosse Berliner Strassenbahn has equipped all of its 1491 cars with current clocks. The cost of each clock installed is $10. The expense of maintenance is negligible and that of accounting is $7.50 per 100,000 car-miles. An economy in energy consumption of 7.8 per cent has been attained in spite of an increase in the schedule speed of 10 per cent.

The Cologne tramways have equipped all of their 335 cars with current clocks. The cost of installation was $10.25 per car. The cost of maintenance has been $0.80 per 100,000 car-miles and that of accounting has been $21.20 per 100,000 car-miles. An economy in energy of 8.6 per cent has been attained in spite of an increase in the weight of the cars.

Other companies using current clocks, in most cases on all of their cars, are lines in Düsseldorf, Barmen, Hagen, Nuremberg, Utrecht, Vienna, Wiesbaden and Zurich. The cost of installation on these lines varies from about $10 per car to $15.75. The Vienna tramways, which quoted the last figure, had previously been using wattmeters at $42.50 per car.

On the other hand, the municipal tramways of Dresden have equipped all of their 504 cars with wattmeters. The cost of installation was $18.75 per car. The Stockholm tramways have also equipped all of their cars with wattmeters. The economy secured has been 5.75 per cent and cost of installation $41.25 per car.

The third system in use is that of ampere-hour meters. The Bordeaux tramways have equipped all of their cars with these meters and are well satisfied with them. The cost of installation was $21.40 per car and the cost of maintenance has been $4.80 and of accounting $19.20 per 100,000 car-miles. An economy of 10 per cent in energy has been secured. Marsailles has equipped 10 cars with ampere-hour meters and 15 cars with current clocks, but has not yet decided which system to use generally. One of the Paris companies has installed ampere-hour meters on 287 of its cars, and finds them satisfactory. The cost of installation was $36.25 per car, and the economy secured was 7.27 per cent. The cost of maintenance has been $10.24 and the accounting $21.12 per 100,000 car-miles.

A summary of the replies received from the committee's data sheet indicates that at present a very large proportion of the companies using recorders of this kind prefer the current clock.

One of the questions asked in the data sheet was whether the companies using recorders of this kind expected to attain even greater economy in the future than that quoted by them for the past. The consensus of opinion was that but little additional efficiency in operation could be expected from motormen and that it would be unwise to attempt to urge it, because it would stimulate the motormen to accelerate too rapidly. One of the noticeable effects of the use of these recorders has been to increase the schedule speed. This is explained by the training gained by the motormen in the manipulation of their cars, especially during accelerating. Several companies report economy in operation from this higher speed, in addition to that directly secured.

Another question in the data sheet was whether there was any increase in motor maintenance owing to the use of the recorder. Several companies reported a reduction and no company reported an increase. No company reported any increase in street accidents due to their use, although this question was specifically asked.

One suggestion was made that it would be desirable if the current clocks could be arranged to segregate the times during which the motors were operated in series and in parallel. Other companies suggested it might be well to use some system of automatic regulation to prevent too rapid acceleration. The Hagen and the Brussels tramways have begun to do this. Theoretically the tendency of the use of current recorders is to encourage the motormen to use rapid acceleration and extend their coasting and stopping periods. Practically, however, this objection applies to wattmeters almost as strongly as to current recorders, because, owing to the inertia of the armature of the wattmeter, it does not respond immediately to rapid changes in the current, so that it is not an absolute register of the energy used. The remedy for too rapid acceleration lies in two directions. One is the passenger, who will not tolerate it; the other is in the management. The management can instruct the motormen in regard to the proper rate of acceleration, and can check up those whose economy record is considerably lower than the average.

The final question on the data sheet was in relation to the course, if any, followed with those men who showed high records of energy consumed. Some companies privately reprimand such men and give them further instructions. Others post the names of the economical and the wasteful motormen. A few offer premiums for economy in the use of power.

*Abstract of paper presented at the meeting of International Street & Interurban Railway Association, Brussels, Sept. 6-10, 1910.

SURFACE CONTACT ABANDONED IN TORQUAY, ENGLAND

A hearing was held in London on Sept. 12, 1910, in arbitration proceedings between the Torquay Corporation and the Torquay Tramway Company relative to the company's abandonment of a 9-mile Dolter surface contact system in favor of overhead construction. At this hearing testimony was given on the power requirements and the relative maintenance costs of both methods. It was testified that at Mexboro the substitution of the overhead system cut down the kw-hours per car-mile from 2.3 to 1.7 and the line maintenance from 6 cents to 2 cents per car-mile, whereas the average revenue per car-mile had increased from 15 cents to 20 cents. Among the defects of the abandoned system were carbonization of the oil and penetration of water in the boxes, as well as explosions due to the accumulation of gas in the boxes. It was not unusual for car crews to crowbar a car from a dead stud to a live one. One run showed 63 extinctions of the lights over one mile of line owing to dead studs. In Torquay the value of the power lost through stud leakage was about $3,300 a year.

THE SIXTEENTH CONVENTION OF THE INTERNATIONAL STREET & INTERURBAN RAILWAY ASSOCIATION

One of the most important among the congresses which were held in Brussels this year in connection with the international exposition in that city was the sixteenth convention of the International Street and Interurban Railway Association. This event was interesting not only on account of the subjects considered, but because the association celebrated the twenty-fifth anniversary of its establishment, which took place in Brussels in 1885. More than 600 delegates and 300 ladies were in attendance.

On Monday, Sept. 5, the evening before the first meeting, all of those in attendance met the reception committee at the attractive reception which took place in the Salle des Fêtes. Each delegate received an embossed leather portfolio containing copies of the papers to be presented at the meetings, and the ladies, as a souvenir of their visit to Belgium, were presented with lace handkerchiefs.

FIRST SESSION

The opening session of the association was held Sept. 6 in the Salle du Palais des Académies, which the Belgian Government had placed at the disposal of the association. At this meeting there were, besides the members of the association, a large number of Belgian municipal, provincial and federal officials. In addition, each important European government was officially represented at the meeting. Altogether there were 45 of these delegates, who are high officials in their different countries.

The meeting was officially opened by Mr. Helleputte, Minister of Agriculture and Public Works, Belgium, and ad interim Minister of Railroads, Posts and Telegraphs. After welcoming the delegates in the name of the Belgian Government, Mr. Helleputte reminded them that the association had been organized in Brussels in 1885 and that Belgium is still the headquarters of a large number of electric railway holding companies, operating lines not only in many of the countries in Europe, but in other parts of the world. After having referred to the tremendous development in the industry during the last 25 years and its effect on economic and social progress, especially of cities, he concluded his address by extending a particular greeting to those who had come from other countries to take part in the meeting.

Mr. Max, Mayor of Brussels, then presented an address of welcome in behalf of Brussels.

The president of the association, Baron Janssen, then read the names of those who had attended the organization meeting of the association and were also in attendance at the present session. He stated that the association, which was originally formed by a few horse railway companies, now contained 737 members, representing practically all of the street and interurban railway undertakings, private and municipal, on the Continent of Europe, and representing an investment of more than 4,000,000,000 francs. He then invited Minister Helleputte to preside at the opening session.

Speaking on behalf of the representatives of foreign countries, Mr. Kabierske, government representative from Germany, thanked the association for the invitation which it had extended to the different countries and stated that all were pleased to attend the meetings of the association.

The president then called for the first paper of the day, which was that by C. de Burlet, general manager of the Société Nationale des Chemins de fer Vicinaux.

INTERURBAN RAILWAY LEGISLATION

In his address Mr. de Burlet discussed the legislation of the principal countries of Europe so far as it related to interurban railway construction. He pointed out that in practically all parts of the continent the work of trunk-line railroad construction had been largely completed, but that interurban railway construction was still in a stage of development. According to him, the following are the four methods principally followed in Europe in promoting interurban railway systems: (1) By private initiative, a plan which necessarily is followed only in case a profitable traffic is in sight; (2) direct subsidies paid by the government; (3) guarantees by the government of a minimum return on the capital invested, and (4) guarantee of maximum cost of operation.

After having shown the disadvantages of the last three plans, the speaker described the advantages of the Belgian system, which consisted of participation by the government in ownership of the capital stock, and cited the Société Nationale des Chemins de fer Vicinaux as an example of this method. This company has received a perpetual franchise from the government, which appoints the president, half of the board of directors and the general manager. Part of the capital of the company is paid for and owned by the national government and part by the provinces and cities served by the company. There are also individual stockholders. This plan unites in the organization those who are interested in the service given by the company. The length of the lines for which this company has been granted or has applied for franchises is 6125 km (3828 miles), a greater length than the steam railroad trunk lines in Belgium, which have only 4628 km (2892 miles). The lines actually in operation by the national company are 3550 km (2220 miles) in length, of which 250 km (158 miles) are operated by electricity. The capital investment for the lines for which franchises have been granted or applied for amounts to 320,370,000 francs ($64,740,000), divided as follows: National government, 43.3 per cent; the provinces, 28.1 per cent; towns, 27.3 per cent; individuals, 1.3 per cent. In 1909 the receipts were more than 20,000,000 francs ($4,000,000). Mr. de Burlet then described the method of operation on the lines owned by the company, which is by a system of leasehold.

Mr. Wittek, formerly Minister for Railways in Austria, then gave some information on the new Austrian law upon local railways, introduced by him and adopted Aug. 25 last. He showed the advantages of this new law, which is at the same time broad in its scope and simple in its procedure, and permits autonomy to local railway undertakings whose franchises are granted by the local governments.

TIES

The president then took up the second subject, which was that of life, durability and performance of wood, metal and other ties for local railways and tramways. The speaker on this subject was E. A. Ziffer, president of the Bukowina Railway, Vienna. The principal objection to concrete ties, according to the author, was the difficulty of securing an absolute and durable attachment to hold the rail to the tie. He considered that concrete ties were suitable only to slow-speed lines. His conclusions, based on the present state of the art, were that the wooden tie, when impregnated, has as long a life as the metal tie, and that it is the best and also the most economical for railway operation. He expressed the hope, however, that experiments with metal ties and with reinforced concrete ties would eventually be crowned with success, and that in the future they would be used to some extent at least to supply the deficiency caused by the increased scarcity of wooden ties.

Mr. Liebman, chief engineer of the Magdeburg tramways, Germany, agreed with the conclusions of Mr. Ziffer. He drew attention to very interesting statistics published by several governments to determine the relative durability of wooden and metal ties. These statistics, as well as certain individual studies which he had made on the subject, seemed to establish the average life of wooden ties at from 19 to 20 years and of metal ties at from 15 to 20 years.

CITY PLANNING

The president then called for two papers on city planning. They were presented by Messrs. Wattmann, manager of the municipal tramways of Cologne, and Neiszen, manager of the municipal tramways of Amsterdam.

An abstract of Mr. Wattmann's paper is published in this issue. In continuation of his paper, he referred to a recent conference in Berlin on city planning, where a well-known German engineer, Mr. Blum, had expressed the belief that but little consideration should be given to the transportation needs

of new communities because electric traction could surmount practically any obstacle. Mr. Wattmann thought that this opinion unhappily was held by a great many authorities and that as a result new streets were laid out without consideration of the needs of the tramway companies. He argued especially for a width of street which would permit the use of a reservation exclusively for the use of electric cars and for the establishment of stopping points at long distances apart. If these stopping points were 450 m to 500 m (1450 ft. to 1600 ft.) apart, a speed of from 20 km to 25 km (12 miles to 15 miles) an hour could be obtained; that is, a speed double that ordinarily obtained in large cities.

The report by Mr. Nieszen, the manager of the Amsterdam tramways, contained practically the same conclusions as that of Mr. Wattmann, although reached in a different manner. He quoted the laws in different countries on the subject of city planning, and showed that in some countries the subject was not considered purely a local one, but of such public importance as to demand the supervision of the national authorities. He also gave a summary of recent studies on the subject and quoted the opinion of some prominent German engineers that in extensions of cities one-third of the total area should be reserved for streets, plazas and squares, leaving only two-thirds for buildings, parks, cemeteries, markets, railroad tracks, canals, parade grounds, etc.

At the conclusion of these papers the association adopted resolutions approving the conclusions reached by the authors of the papers. Baron Janssen then extended his thanks to Mr. Helleputte for presiding over the first session.

The afternoon was devoted to a visit to the Brussels Exposition. About 4 p. m. the delegates met at the German pavilion, where the German commissioner-general entertained them by a repast. In the evening they attended the Royal Opera.

Wednesday, Sept. 7, was devoted to a trip to Antwerp as guests of the local tramways company of that city. After an official reception at the City Hall, the delegates were the guests at a banquet served in the salle des fêtes of the Zoological Gardens. In the afternoon they visited the harbor, the repair shops of the local company and other interesting places. In the evening they were again entertained at a reception at the Zoological Gardens and then returned to Brussels.

SECOND SESSION

The chairman of the second session was H. Géron, general manager of the Compagnie Générale des Chemins de fer Secondaires and vice-president of the association. The first subject discussed was that of the maintenance of electrical equipment. Three reports were presented on this subject, one on car bodies by Mr. Spängler, manager of the Vienna municipal tramways; one on framing and platforms by Mr. Delmez, chief engineer of the Antwerp Tramways Company, and one on miscellaneous car equipment by Mr. Stahl, manager of the Düsseldorf municipal tramways.

CARS AND CAR EQUIPMENT

Mr. Spängler's report was devoted very largely to a discussion of the relative advantages of single, double and radial truck cars. Replies to the data sheet sent out by him indicated that the majority of the companies still prefer single-truck to double-truck cars, but present practice leans to making the wheel base longer than formerly. At one time it was thought that it should be one-fifth of the length of the car. The wheel base is now often one-third of the length of the car and even longer. With this long wheel base a reduction in weight of one-third to one-half of the weight of the truck can be secured if the independent truck is abandoned in favor of running gear. The wheel base should also have a relation to the minimum curve radius, of which it can be one-fifth or even one-fourth in cases of radial axle cars. According to tests made in Vienna during the last two years radial axles have been found to reduce the wear of wheel tires, although not to a very great extent. Radial axles, however, are desirable on sharp curves. The speaker then gave some figures in regard to weights of different types of cars per meter of length. These weights vary from 847 kg per meter (568 lb. per foot) for a 4-wheel car to 980 kg per meter (657 lb. per foot) for a double-truck car. He then mentioned the advantages of double-truck cars, which were principally their smoothness of operation and their great capacity, an important fact for suburban lines. Their disadvantages, in his opinion, were their weight, high cost and complicated construction. Concluding, he made a plea that car builders use every effort to keep the weights of their cars low.

Mr. Delmez chief engineer of the Antwerp Tramway Company, then took up the subject of car design and platforms. The length of two axle cars varies generally from 4 m to 5 m (13 ft. to 16 ft.). A car with two radial axles may be as long as 6.50 m (21 ft. 4 in.) and a standard length for double-truck cars is 8.67 m (28 ft.). Of the 96 companies which replied to the data sheet 53 used longitudinal seats only, at least in winter cars, and 17 used cross seats only. The rolling stock of the others is divided. The tendency is to use cross seats on suburban lines. The cross-seat arrangement practically requires 2.4 m (7 ft. 10 in.) width of car. This allows the aisle to be 500 mm (19¾ in.) wide and each of the four seats to be 470 mm (18½ in.) wide. Few companies can operate cars of this width. If half of the cross seats are double width and half single width more passengers can be seated in a car equipped with longitudinal seats than in one equipped with cross seats. Cross-seat cars are desirable for use, however, in suburban lines where there is less limitation on the width of the cars. The use of steel in car construction is increasing, especially in the floor framing and for the outside panels. Steel is also being used for side framing and roof framing. A few companies are using aluminum panels. They do not oxidize and the Berne tramways estimate that aluminum panels reduce the weight of a car 300 kg (660 lb.). Platforms usually have an area of 2½ sq. m (27 sq. ft.). But this area is often exceeded and one of the Parisian companies is using a platform with an area of 5.24 sq. m (56 sq. ft.). The usual rule is to allow 0.25 sq. m (2.7 sq. ft.) for each passenger allowed to stand on the platform and 0.60 sq. m. (6.5 sq. ft.) for circulation. A few companies have center entrance cars. Practice tends toward using half-vestibules on city cars and full vestibules on suburban cars. Pay-as-you-enter cars have not yet come into general use, but the Düsseldorf tramways have cars of somewhat this type. The weight of cars per seat averages about 500 kg (1100 lb.). Long double-truck cars have weighed in some cases as low as 390 kg (858 lb.) per seat, as, for instance, in Breslau. The average weight of car per passenger seated or standing is about 275 kg (605 lb.).

Mr. Stahl then took up the subject of miscellaneous car equipment. He said there was a general tendency to increase the size of axles and several companies are experimenting with nickel steel axles, the percentage of nickel being 3 per cent. A few companies are also using nickel steel and chrome nickel steel for pinions. The Berne tramways are experimenting with herringbone gears, but find that they wear unequally. A few companies are trying roller and ball bearings for their armatures.

OVERHEAD LINES

The next subject discussed was the construction and maintenance of overhead lines by Mr. Otto, chief engineer of overhead lines of the Grosse Berliner Strassenbahn. The author thought that too little attention has been paid to this subject in the past in view of the fact that any break in the overhead system interrupts the entire service. The pressure on the trolley wire varies greatly, but its average is from 6 kg (13 lb.) to 8 kg (17½ lb.), pressures which the author considered high except when the track is poor or speeds are high. High pressure increases the wear of the wire and the danger of its rupture. The average amount of wear permitted on trolley wire is from 20 to 35 per cent.

ENERGY METERS

The next subject discussed was that of current clocks and car wattmeters. Two papers were presented on this subject, one by Mr. Bouton general manager of the Eastern Tramway

Company, of Paris, and the other by Mr. Battes, manager of the Frankfurt municipal tramways.

Mr. Bouton gave a historical review of the discussion of the subject by the association and an interesting table showing for the different companies the number of cars equipped with wattmeters, ampere-hour meters and current clocks, the initial price and cost of maintenance of these instruments, the economy realized and the action taken by the different companies in the case of careless motormen. In conclusion he recommended the use of ampere-hour meters in preference to either current clocks or wattmeters. He claimed they were more rugged than the wattmeter, and had the advantage over the current clocks because they registered exactly the amount of energy used. In proof of the latter statement he gave the result of a series of tests made of the efficiency of motormen with current clocks and ampere-hour meters on the same road. The classification of motormen with the two instruments was quite different. The man who stood first in the list when using the current clock stood eighteenth in the list when checked up by ampere-hour meter.

An abstract of Mr. Battes' paper appears elsewhere in this issue. It strongly endorsed the current clock in preference to any other instrument.

Mr. Wattmann, Cologne, stated in the discussion that in 1906 the average energy consumption per car-kilometer in Cologne was 577 watt-hours. After the introduction of current clocks on one line the consumption had been reduced to 565 watt-hours in 1907 and again to 530 watt-hours in 1908. Current clocks were then installed on all cars and the average consumption was now 490 watt-hours, or about 15 per cent. He also stated that the schedules were better maintained and that the expenses had been decreased.

Mr. Otto, Berlin, thought that any one of the three instruments would give good results and that the question really was which one was the simplest to use.

Mr. Spängler, Vienna, agreed with this remark, and said that since Jan. 1, 1910, current clocks had been installed on all of the motor cars in Vienna and the consumption of energy had been greatly reduced. He concluded by calling the attention of the association to a device recently invented in America in which coasting time is recorded and believed that this device presented some advantages over the current clock.

THIRD SESSION

At the third session, which was held Thursday afternoon, E. A. Ziffer, of Vienna, vice-president of the association, occupied the chair. The first subject discussed was track construction. There were two speakers on this subject, Mr. Rochat, general manager of the Geneva tramways, and A. Busse, chief engineer of way and structures of the Grosse Berliner Strassenbahn.

TRACK CONSTRUCTION

Mr. Rochat referred to the question of rail standardization. In England five standard types of rail have been adopted. In Germany the number of grooved rail sections has been reduced to four. He then discussed rail joints and substructure and advocated an elastic substructure on stone ballast, which besides being low in cost and maintenance affords good drainage. He concluded by discussing the interrelation of rail and wheel sections in securing a maximum coefficient of traction and a minimum track resistance.

Mr. Busse's paper is published in abstract in this issue. In addition to his discussion of rail joints, he referred to a new system of macadam paving known as Aeberli. This macadam pavement not only has great resistance and elasticity, but is cheaper than the ordinary macadam pavement. The city of Montreaux is using it satisfactorily. The advantage from a railway standpoint is that it makes reconstruction of track much more easy. The speaker was opposed to the idea that rails 180 mm and 210 mm (7 in. and 8½ in.) had to be used in paved streets. In Berlin in streets paved with asphalt rails only 100 mm (4 in.) in height have been used and it was the speaker's intention in the future to limit the height of rails in Berlin to 80 mm (3⅛ in.). The results were excellent so far as wear was concerned and these rails showed no tendency to corrugation. He concluded his discussion by describing the good results obtained in Germany, in track laid in asphalt, by using a substructure of reinforced concrete blocks prepared in advance. They permitted operation on the tracks immediately after installation and in this respect were much better than concrete laid in a trench, which required time to set.

RAIL CORRUGATION

Mr. Busse then presented a paper on rail corrugation. An abstract of this paper was published in the issue of this journal for Sept. 17, 1910.

Mr. Puppe, of Dortmund, gave an outline of the tests which he was going to make to investigate this subject in behalf of the International and German associations. The program of these tests has been drawn up by a committee consisting of a number of railway managers, distinguished metallurgists and a representative of the International association. Corrugation has appeared in rails of Thomas open-hearth steel, Martin-Siemens steel basic and acid, and in Bessemer steel. His examinations would include a study both of the methods followed in making the steel and of the methods of rolling, temperature, method of pouring the ingot, chemical constitution, time of cooling, addition of ferro-titanium, nickel and manganese, microscopic examinations, etc. The rails for test have already been selected, and will be laid in a test track 2½ km (1½ miles) in length in Berlin. This track will be laid with different types of subconstruction, such as broken stone and concrete, and with ties of wood and other materials. A careful record will be kept of the different kinds of traffic which pass over it and of the construction and weight of the cars. Mr. Puppe concluded in saying that at the next meeting he hoped to be able to give some very interesting information on the results obtained.

Mr. Petersen, of Dortmund, coincided with the views of Mr. Busse, and reminded the association that the investigations which he had made formerly indicated that the incipient cause of corrugation was in the mill itself. Rails examined by him at the mill before being put into service had shown traces of corrugation. He thought that the cause ought to be sought for in the methods of rolling, the metal being too cold when it is passed through the final passes of the mill. Later investigations had only strengthened this theory in his mind. He then showed those present the results of tests which he had conducted of rolling small lead billets, which showed distinctly the crests and valleys of corrugation.

Mr. Trautweiler, Zurich, said that there had been corrugation for more than 20 years on the tracks of the Brünig railway in Switzerland. He thought that the cause was the vertical vibration of the rails, vibrations which were harmonic with the wheel bases of the trucks.

Mr. Résal, Bordeaux, said he had conducted tests which led him to believe that corrugation was due to the slipping of the wheels on the rail. To eliminate this slipping he had equipped several cars with a loose wheel on each axle. The results obtained had been so successful in reducing corrugation that he had planned to equip all of the cars operating on one of the divisions of Bordeaux in the same way.

Mr. Kuntze, Genoa, believed that corrugation would occur only on tracks that had a very rigid subconstruction.

Finally, Mr. Fischer, manager of the Phoenix rail mills, Ruhrort, Germany, closed the discussion by observing that it would be a mistake to believe that corrugation was due either to the character of the metal or the method of rolling. It had also been observed in forgings and castings used in special work. He quoted the record of some manganese rail, possessing a coefficient of resistance of 120 kg, which has developed corrugation very rapidly. He thought that the place to look for the cause was in the construction of the rolling stock.

The subject will be taken up again at the next meeting.

GAS AND OIL ENGINES

Mr. Thonet, Liége, then presented a report on gas and oil engines. He gave in tabular form statistics of 24 electric railway and lighting stations using producer gas engines and of 10 stations using Diesel engines.

In the evening the delegates were entertained at a banquet extended by the Belgian Government. More than 950 guests were present in the banquet room of the City Hall. Mr. Hellepute, Minister of Railways, Posts and Telegraphs, presided.

FOURTH SESSION

The fourth session was held on Friday and Baron Janssen, president of the association, acted as chairman. The first subject discussed was that of the use of aluminum in the armature coils of railway motors.

ALUMINUM ARMATURE COILS

Mr. Mariage, Paris, who presented a paper on this subject, said that it had already been discussed in an interesting report presented by Mr. Paulsmeier at the meeting of the German Street & Interurban Railway Association in September, 1909. (See ELECTRIC RAILWAY JOURNAL for Jan. 8, 1910, page 67.) He stated that the data sheet sent out on this subject showed that 19 railway companies were using aluminum wire for this purpose. Fourteen employed a rectangular section and five a circular section. Several did not use any insulation between the turns, depending on the layer of aluminum oxide on the outside of the wire for insulation. The others used a thin insulation of paper, fiber or cloth either impregnated or not impregnated.

Theoretically the area of the section of the wire used should be 1.66 times that of copper, but it is practicable to use this section without increasing the size of the coil either by the omission of woven insulation or else by the employment of a rectangular section instead of a circular section. The replies received indicated that the reduction in weight effected by the use of aluminum coils varies from 40 per cent to 65 per cent. As regards cost, the speaker said that he agreed with the author of the German paper that the net cost of aluminum coils is less than copper coils in spite of the fact that with copper coils the scrap can be sold. The maintenance of aluminum coils up to the present had been low. Certain companies buy these coils already wound, others make them for themselves.

According to the author, the advantages of aluminum coils for motors are: (1) A reduction in weight of coil of about 50 per cent with the same ohmic resistance; (2) lower first cost; (3) lower cost of renewal, even taking into account the value of the old material, and (4) less frequent renewal than with copper coils insulated with woven material.

On the other hand, the disadvantages are: (1) If the size of the coil is not increased above that of copper coil and if the same number of coils are used, the resistance will be considerably higher and there will be a greater heat loss and a reduction in efficiency. (2) The joints of the wires with each other and at the ends of the coils with the commutator bars have to be made very carefully in order to avoid a high resistance. The speaker then described the tests made with aluminum coils by the General Omnibus Company of Paris, of which he is manager.

Mr. Loewenthal, Berlin, said that a great deal of progress had been made in Germany in the use of aluminum armature coils. He added that very interesting tests had been made in earlier years by the Hamburg tramways, which now have more than 500 motor cars equipped with motors wound in this way.

RAIL CLEANING

The next subject discussed was that of the different methods of cleaning the grooves in rails. The speaker on this subject was Mr. Schörling, chief engineer of the Hanover Tramways Company. Owing to the narrow rail groove used by most of the companies, this subject is of considerable importance. Mr. Schörling's paper described the principal methods of rail cleaning as follows: (1) The use of scrapers in front of the wheels; (2) the use of scrapers between the wheels; (3) the use of brushes between the wheels; (4) the operation of a trail car with wheel scrapers; (5) the operation of a trail car with rotating brushes; (6) motor car cleaners.

He said that mechanical methods of cleaning out rail grooves in Cologne had reduced the cost over hand cleaning from 250 francs to 72 francs per kilometer per year ($112 to $23 per mile of track).

STANDARD CLASSIFICATION OF ACCOUNTS

Mr. Géron, Brussels, then made a verbal report on the progress of the standard classification of accounts of the association. It had been established at the 1902 convention of the association and it had been adopted by a number of the companies.

BUSINESS MEETING

The association then proceeded to the election of officers. The resignation from the executive committee of Mr. Lavalard, formerly manager of the General Omnibus Company of Paris, was announced and his place was filled by the election of Mr. Mariage, now manager of the General Omnibus Company. The executive committee was also increased by the election to that body of Mr. Rochat, general manager of the Geneva tramways. Mr. Rochat is the first representative of the Swiss roads on the executive board.

The president reported that many invitations had been received by the association to hold its 1912 meeting in different cities. Among them the Spanish Government had extended an invitation to hold the convention in Madrid, the Hungarian Government had asked the association to meet in Budapesth, and the city of Moscow had invited the association to meet in that city. The subject was referred to the executive committee for decision. The session concluded by the presentation to the president of the association, Baron Janssen, of a lifelike bust of himself in marble by the sculptor Charles Samuel. The presentation, in behalf of the members of the association, was made by Mr. Micke, general manager of the Berlin tramways. The day concluded with an evening reception at the City Hall in Brussels.

The following day the delegates made a trip to Ostend, where they were entertained very hospitably by the tramway company in that noted bathing resort.

TWO SERIOUS ACCIDENTS ON INDIANA INTERURBAN LINES

Two head-on collisions between interurban cars occurred last week in Indiana, resulting in terrible loss of life and injuries to passengers. About noon on Sept. 21 a heavily-loaded northbound local car on the Ft. Wayne-Bluffton division of the Ft. Wayne & Wabash Valley Traction Company while running at high speed collided on a curve near Kingsland with an empty south-bound extra car. The north-bound local car was completely telescoped and 40 persons were killed outright. Nine others were seriously injured. Only one passenger who was on the rear platform of the local car and jumped before the cars struck escaped serious injury. None of the members of the crews of the two cars was killed, but all were so badly hurt that reliable statements could not be obtained from them after the accident.

On Sept. 24 a south-bound motor freight car collided with a north-bound limited car about 1 mile north of Tipton on the Indianapolis-Logansport division of the Indiana Union Traction Company. Six persons on the limited car were killed and five others were seriously injured. The circumstances surrounding the accident were very similar to those which marked the Kingsland wreck. Both cars were running at high speed and met on a curve where the view of the track ahead was obstructed by woods. The freight car telescoped the limited car, killing the motorman of the limited car and all of the five passengers who were in the smoking compartment. The motorman of the freight car after the accident is said to have admitted that he ran past the meeting point named in his orders in an attempt to reach the next siding ahead of the limited car, which was about 10 minutes late.

The Kingsland accident was thoroughly investigated by officials of the Ft. Wayne & Wabash Valley Traction Company as soon as the dead and injured had been cared for and the line cleared. The report of this investigation, which was forwarded to the Railroad Commission of Indiana on Sept. 23, appears

to place the blame for the accident entirely on the crew of the extra south-bound car. Train 56, which was Indiana Union Traction Company's car No. 233, was being operated in the regular scheduled local service between Muncie and Ft. Wayne. It was in charge of C. Van Dine, motorman, and E. A. Spiller, conductor. It was running on time and was due at siding No. 106 at 12:16 p. m. and at siding No. 105, about 4 miles north of the point of collision, at 12:22 p. m. Car No. 303 was being operated from Ft. Wayne to Bluffton as a south-bound extra. It left Ft. Wayne at 11:40 a. m. in charge of B. T. Corkwell, motorman, and Del Wilson, conductor. Before leaving Ft. Wayne they received the following train order from the dispatcher, W. H. Frymire:

Ft. Wayne & Wabash Valley Traction Company
Train Order No. 30. 9-21-1910.
To Conductor and Motorman:
Train No. ..... Motor Car No. 303 at Siding No. ..... Wayne.
Train No. ..... Extra Car No. 303 and Train No. ..... Extra Car No. 54 will meet at Siding No. 101.
Train No. ..... Extra Car No. 303 will report at Siding No. ..... Bluffton. Will run extra to Bluffton.
Motorman—Corkwell. Conductor—Wilson.
Train No. ..... Extra 303. Complete—F. H. Time—11.40 a. m.

After this order had been issued the report stated that no other orders were given to the crew of extra car No. 303. The rules of the Ft. Wayne & Wabash Valley Traction Company require both the motorman and conductor to repeat train orders back to the dispatcher before the "complete" is given. Rule 5, printed on the working timetable, reads as follows: "Extra trains must clear the time of scheduled trains 5 minutes, except at meeting points made by order." Rule 118 in the standard rule book of the company is equally clear. "All extra trains must keep out of the way of regular scheduled trains and clear this time at least 5 minutes unless they have been given a meeting or passing order or other order relieving them from this necessity." In order to comply with these rules the crew of the extra car No. 303 should have waited on siding No. 105, 4 miles north of the point of collision. They failed to do this and attempted to make siding 107, 6 miles farther south. Conductor Wilson at first claimed that he received an order from the dispatcher to meet the regular car at siding No. 107, but no copy of such an order has been found and the dispatcher's records do not show that such an order fixing a meeting point for train No. 56 was issued.

The employment records of the dispatcher and the four members of the train crews involved in the accident are given in the company's report. W. H. Frymire, the dispatcher, entered the company's service as conductor on the Bluffton division on July 5, 1907. He was promoted to dispatcher of the Ft. Wayne-Lafayette division and on Jan. 20, 1910, was made chief dispatcher of the Bluffton division. He has an excellent record. For four days previous to the accident he had worked only 8 hours a day. B. T. Corkwell motorman of the extra car, entered the company's service as a motorman on the Ft. Wayne city division Dec. 27, 1909. He was transferred to the Bluffton interurban division on April 1, 1910, and for 60 days previous to the accident had been employed regularly as motorman on the regularly scheduled train No. 56, with which his extra car collided. He had not been on duty the day before the accident and so could not have been overworked. Conductor Wilson worked for the company from Oct. 8, 1909, to March 26, 1910, as an interurban conductor. He left the service, but was employed again on Aug. 17, 1910, as conductor on the Ft. Wayne city lines and on the Bluffton division. During the four days previous to the collision he had worked a total of 16 hours and 55 minutes, his longest day's work having been 10 hours and 25 minutes.

The report of the inspectors of the Railroad Commission of Indiana, who made an independent investigation of the Kingsland collision, had not been made public up to the time this issue of the paper went to press.

INDIANAPOLIS MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

About 125 members and guests of the Central Electric Railway Association attended the first fall meeting, which was held at Indianapolis on Sept. 22. George Whysall, the president, announced that the next meeting would be held at Dayton, Ohio, on Dec. 1. The association, by unanimous vote, instructed Secretary Neereamer to convey some word of sympathy by telegraph to the officials of the Ft. Wayne & Wabash Valley Traction Company, on whose line a disastrous accident had just occurred.

Secretary Neereamer read the minutes of the last meeting held at Toledo on May 26 and reported in the Electric Railway Journal for June 4, page 975. Several features of interest to the member companies were then discussed.

CENTRAL ELECTRIC RAILWAY MAP

During the summer a committee of the Central Electric Traffic Association had been instructed to consider the advisability of the publication of a map showing all the lines in the association territory. This committee had made a favorable report and the Traffic Association as a body, also approving the publication of the map, had passed a resolution asking that the Central Electric Railway Association authorize the purchase of map plates. Secretary Neereamer had sent out Bulletin 35, explaining the plan for preparing and publishing the map. Replies to this inquiry had shown that 21 companies favored the publication of the map and seven did not. Seventeen companies expressed no opinion.

Briefly, the plan is as follows: An engraver would make the four color plates required for a complete map of the electric lines in the Central Electric territory to include all towns of 100 or more people. Such plates would cost from $350 to $1,750, according to the quality of the work. The committee of the Traffic Association had recommended that plates be prepared at a price not to exceed 50 cents per mile of track operated by the member companies and that an assessment be made on that basis. The plates would be copyrighted by the association and be in the custody of its secretary, who would arrange to have imprints made for the different railroads at the actual printer's cost and would also have a number of imprints made which the association could sell at a small profit. Secretary Neereamer estimated that prints could be made from the plates on a good quality of paper at $30 per 1000, which figure would not include any part of the first cost of the plates. Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, moved that the association adopt the plan outlined. This motion carried.

REVISION OF CONSTITUTION

The results of the meetings held by the committee in charge of the revision of the constitution and by-laws of the Central Electric Railway Association and of the Central Electric Traffic Association were announced by F. W. Brown, general passenger and freight agent of the Michigan United Railways, who said that after thorough consideration new constitutions and by-laws for each association had been prepared. As revised, these constitutions would not conflict. It was the sense of the committee that they should be placed before the Indianapolis meeting for first reading and that the secretary should then send copies to each member company so that a vote on their adoption could be taken at the next meetings of the two associations. The most important change provides that all members of the Traffic Association must be members of the Railway Association and that only such member companies of the Central Electric Railway Association as furnish the chairman of the Traffic Association with the power of attorney to file tariffs can be members of the Traffic Association. The articles also provide for voting by proxy.

The agreement for the maintenance of the Central Electric Railway Association provides for obtaining operating revenue by assessing the interurban member companies $1 per year per mile of track and the city companies in proportion to

their gross earnings, the membership assessments to range from $10 to $100 per year for the companies now in the association. The present by-laws of the Central Electric Railway Association are not clear as to the rules for voting and the new by-laws will provide that the highest ranking representative of a company shall cast that company's vote at any meeting.

PROPOSED MERGER WITH ACCOUNTING CONFERENCE

At the last meeting of the executive committee of the Central Electric Railway Association Charles L. Henry had been instructed to confer with the executives of the Central Electric Railway Accounting Conference regarding the affiliation of that now independent association with the Central Electric Railway Association. It was the idea of the executive committee of the Railway Association that all of the different phases of electric railway work should be represented by the Central Electric Railway Association and affiliated associations. The committee proposed that the Accounting Conference and the Traffic Association have like relations with the Railway Association. The Accounting Conference, Mr. Henry said, had done a great good for the industry. It was organized at a time when all the roads were particularly interested in the schedule of accounts as proposed by the Interstate Commerce Commission and immediately showed its value by assisting in the readjustment of the schedule of proposed accounts. Now it was proposed by the executive committee of the Central Electric Railway Association that inasmuch as the members of the Accounting Conference were for the most part employed by companies that were members of the Central Electric Railway Association it should become affiliated with the latter body. The Traffic Association was doing excellent work under the guidance of the parent association and it was Mr. Henry's idea that the claim agents' part of the work in the association might also be expanded so that the claim agents, too, could become an affiliated body similar to the Traffic Association. The Central Electric Railway Association with its affiliated bodies then would be organized along the lines of the American Street & Interurban Railway Association and its affiliated and allied bodies. Mr. Henry asked that each member consider this plan for united organizations, and particularly the question of whether the Accounting Conference should affiliate with the Central Electric Railway Association, so that an intelligent vote would be given when called for.

LARGE STATION UNITS

A talk on "Large Station Units," illustrated with lantern-slide views, was given by George J. Smith, lubrication expert of the Galena-Signal Oil Company, Chicago. Mr. Smith showed about fifty views of the Fifty-ninth and Seventy-fourth street generating stations of the Manhattan and Interborough railways of New York. These stations, he said, contained larger reciprocating units and more of them than any other railway power plant. The equipment of these stations was described by Mr. Smith, who also referred to the oiling system and the oil and waste reclaiming plant. By means of a centrifugal drier from sixty to ninety pails of oil are extracted every day and the cleaned waste is available for wiping. Mr. Smith said that his company lubricated both of the plants.

HIGH-TENSION INSULATORS

A. O. Austin, electrical engineer of the Ohio Insulator Company, then presented a paper on "The Efficiency and Design of High-Tension Insulators." This paper was published in the Electric Railway Journal for Sept. 24, page 465. A number of lantern slides were used to illustrate Mr. Austin's paper. These showed various types of high-tension insulators under test and particularly illustrated features of design and the success of the suspended type of insulator.

STANDARDIZATION COMMITTEE REPORT

H. H. Buckman, chairman of the committee on standardization, presented a report which described the design of a standard coupler and attachment as recommended at the meeting of the standardization committee held at Ft. Wayne on Sept. 1 and reported in this paper in the issue of Sept. 10, page 403. The committee's Indianapolis report was supplementary to that made at the Toledo meeting and reported in the Electric Railway Journal for June 4. With a few additions and with the omission of the recommendation that the coupler anchorages on a car be joined by tie rods the report of the standardization committee was adopted. The secretary was instructed to have copies made for member companies.

CONCLUDING PAPERS

E. B. Entwisle, chief engineer of the Lorain Steel Company, presented a paper on "Track Work" and illustrated his remarks with lantern-slide views. An abstract of this paper was published in last week's issue on page 464.

W. E. Davis, vice-president of the Cleveland Construction Company, Cleveland, Ohio, presented a paper on "The Destinies of Electric Railway Motors." An abstract of this paper appeared in last week's issue, page 468. Charles L. Henry, who had built and managed the Indianapolis & Cincinnati Traction Company's single-phase, high-voltage railway, spoke of the encouragement for development offered in Mr. Davis' paper. Because it was true that electric railway equipment became obsolete after a few years, every energy should be bent toward and sacrifices should be made for the development of better systems. The progress made in interurban railroading during the last ten years had been wonderful. Mr. Henry, as the builder of the first interurban road in Indiana, had had just as much trouble a few years ago in keeping the d.c. equipment in service as some roads had had later in developing the a.c. equipment. Mr. Henry was connected with the railway which erected the first three-phase transmission system in the Central States. That line had low voltage as compared with lines now operated, but troubles were experienced and had to be solved because it was a new system. The worry and expense were worth while because they resulted in improved service. The first interurban car in Indiana operated at 500 volts and the road was so long that a booster line supplied with current at 1200 volts was used to feed the distant part of the trolley circuit.

The association instructed its secretary to furnish the American Street & Interurban Railway Association for its consideration a copy of the standardization committee report as approved at the Indianapolis meeting. W. H. Evans, superintendent of motive power Indiana Union Traction Company, urged close relations between the Central Electric and other sectional associations with the American Association and its affiliated bodies. He thought that any action on standards taken by the Central Electric Railway Association would carry great weight with the committee of the American Street & Interurban Railway Engineering Association. The Central Electric Railway Association represented an important section of the country, and Mr. Evans said that while the standardization report of the Engineering Association probably had gone to press the committee, no doubt, would gladly receive suggestions from the Central Electric Railway Association for consideration before the meeting.

The president appointed H. A. Nicholl, general manager of the Indiana Union Traction Company, to represent the Central Electric Railway Association at the annual convention of the American Street & Interurban Railway Association at Atlantic City. Mr. Nicholl is chairman of the committee of the Central Electric Railway Association on closer relations between the two bodies.

The Central Electric Traffic Association met at Warsaw, Ind., on Sept. 27. On account of fairs at various places, traffic officials of a number of lines were not able to attend the meeting. The subject of the proposed interurban guide was discussed. Plans for a more comprehensive publication than has been considered heretofore were discussed. The guide committee was directed to ask for bids from publishers in accordance with the new plans. Several other matters were discussed, but on account of the light attendance little action was taken. The next meeting will be held on Oct. 18 at Toledo, Ohio, when the guide committee will report again.

CHICAGO MEETING OF CENTRAL ELECTRIC ACCOUNTING CONFERENCE

Twenty-five members and guests of the Central Electric Accounting Conference met at the La Salle Hotel, Chicago, on Sept. 24. Accounting subjects were discussed in the morning and the afternoon was spent in a trip to Milwaukee over the Chicago & Milwaukee Electric Railroad. C. E. Thompson, auditor of that company, provided a special parlor buffet car train which left Evanston at 1.30 o'clock and reached Milwaukee shortly before 4. A dinner was served en route. At Milwaukee the members of the conference were greeted by C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, who escorted the party through the large Public Service Building and terminal of the Milwaukee Electric Railway & Light Company. Two hours' time was spent in inspecting this building and the accounting headquarters of the company. On the return trip to Chicago the special train left Milwaukee at 6 p. m. and made the 75-mile run to Evanston in two hours, during which the conference members completed the program postponed from the morning session.

MORNING SESSION

At the morning session in Chicago L. T. Hixson and W. B. Wright presided until the arrival of W. H. Forse, Jr., president of the conference. The subject of comparative statements was first discussed.

UNIFORM COMPARATIVE STATEMENTS

W. B. Wright, of the Toledo *Blade*, formerly auditor of the Indianapolis & Cincinnati Traction Company, presented a report as chairman of the committee on uniform comparative monthly statements. Mr. Wright exhibited a book containing many sample forms contributed by the members. The report of the committee follows in abstract:

"On consultation by mail it was agreed by your committee that the conference members should be asked to furnish copies of blanks now used in their monthly statement work and also to make such suggestions as they wished regarding the work in hand. In line with this, a circular, copy of which is attached, was mailed to all the conference members and 15 have responded. The blanks, together with letters of transmittal, have been mounted on sheets of uniform size (14 in. x 17 in.) and temporarily bound, loose-leaf style, for record and reference.

"It has not been thought best to attempt to present at this meeting anything in the nature of suggested form work or data lists, but rather to discuss the blanks presented, and arrive, if possible, at some understanding as to what, in a general way, would be acceptable to all of our membership.

"Among the things to be considered are:

"Size of uniform report sheet.

"The grand divisions of the report, what they shall be and in what sequence presented.

"The matter to be presented in each grand division and its arrangement upon the sheet.

"Periods of comparison.

"Ruling of sheets for pencil or preliminary work.

"Statistical Data.—It is the belief of your committee that it might be well to authorize schedules differing in the amount of their detail and planned to meet the needs of companies of varying capitalization, something after the manner of the Interstate Commerce Commission classification of operating expenses.

"Balance Sheet.—This should be a 'condensed' showing.

"Registers.—If registers for recording of fares and other train data are to be a feature of our accounting work, it is likely that this is an opportune time to make a study of them. This committee would like to ask if it would not be well to have another committee authorized to investigate the register question, both present and prospective, with a view to determining whether registers now in use or likely to be offered in the near future will materially affect our record work.

"In general, we would suggest that in all the work under consideration it be ascertained first what is the least amount of information of each class that will safely answer requirements, and then amplify as may seem best.

"It is also suggested that in this work the executive officers of each company be kept closely in touch through their accounting departments, and their requirements studied, since their co-operation and support will be necessary if we are to have a monthly statement which will be in reality uniform."

CAR-MILE STATISTICS

J. D. Maynes, auditor of receipts Illinois Traction System, next presented a paper on "Freight, Passenger and Car-Mile Statistics for Interurban Lines," an abstract of which follows:

"There is an old saying that brevity is the soul of wit. In compiling statistics brevity should be the soul of statistics. It is the rule and not the exception that the managers of the properties we have the honor to represent are busy men. Every moment of their time is valuable; hence statistics for their information should be brief and concise, and the results shown should be in the smallest unit possible, with comparative figures for the same month of the previous year, as well as cumulative figures from a given period.

"The question of traffic and mileage statistics has been thoroughly threshed out by steam road accounting officers and for statistics of that nature I believe that the interurban lines can well follow their ideas. The only difference in operation is that one line is operated by steam and the other by electricity. The same questions are of interest to both operations.

"Effective on July 1, 1909, our company adopted the standard form of steam railroads, modified in certain particulars to meet our requirements, and the report has been entirely satisfactory to our management. The general manager, traffic manager and the chief operating officials are interested in the earnings per ton-mile of freight traffic and per passenger-mile of passenger traffic. This makes necessary the determination of the number of tons carried one mile and the number of passengers carried one mile as the basis of these statistics. The compilation of this information is a simple problem of multiplication and addition readily determined from freight abstracts, ticket agents' sales, conductors' collections, etc. Starting with this basis very interesting statistics covering the movement of traffic can be determined readily, information that up-to-date traffic and operating officials must have in order to satisfy themselves that the rates upon which the traffic is handled are on a remunerative basis.

"The freight tonnage form of report enables the traffic manager to be advised under five general heads with appropriate subheadings of the tonnage and character of freight handled, the tonnage of company freight and revenue freight moved, number of tons carried one mile revenue, number of tons carried one mile company, with the same information concerning the number of tons of each class of freight carried per mile of road, average distance haul of one ton of freight, average amount received for each ton of freight, average receipts per ton-mile, average of revenue per loaded car-mile, etc.

"The passenger traffic form of report also advises the traffic manager of the number of revenue passengers carried, number of passengers carried one mile, number of passengers carried one mile per mile of road, average distance carried, average amount received for each passenger, passenger service revenue per mile of road, passenger service train revenue per mile of road, average rate per passenger-mile.

"The mileage report advises all interested officials of locomotive miles, freight revenue car miles, passenger revenue car miles and non-revenue service miles under their respective headings, with proper subdivisions, made during the month. In fact, in our opinion this form of report details to the management a complete and condensed record of the traffic of the lines for the month in which it is rendered, with comparative data from which increases or decreases in revenue and traffic handled for a given period can be determined readily."

STATISTICS FOR INTERURBAN LINES

Mr. Maynes also read a paper on "General Statistics for Interurban Lines," prepared by A. A. Price, auditor of disbursements Illinois Traction System. An abstract follows:

"The statistics prepared by the auditor of disbursements of the interurban lines are grouped into three divisions viz.:

"1. Statistics affecting earnings.

"2. Statistics affecting expenses.

"3. General statistics.

"A comparison is made of all three groups with the corresponding month of the previous year and accumulated statistics are also compared with the previous year.

"Group 1 comprises the gross revenue, which is further divided to show the principal sources of revenue, such as passenger, baggage, milk, freight, switching, revenue from other than transportation. The daily average of the gross and net earnings is then shown, and also such information as the revenue from transportation per mile of roadbed, passenger and freight revenue per car-mile and car-hour, earnings per pay passenger.

"In group 2 are included the expenses, which are divided in much the same way as the revenue. The gross operating expenses are divided into five principal groups as provided by the Interstate Commerce Commission. We also include the daily average expenses, expenses of ways and structures per mile of roadbed, platform expense per car-mile and car-hour, cost of conducting transportation, traffic expense, etc., these latter being figured on a mileage basis. We next deal with the cost of power produced on an alternating-current kw-hour and car mileage basis.

"Group 3 contains the general statistics, such as number of passengers carried, which are divided into revenue, complimentary and employees. We then take up the car mileage, passenger, freight and work; freight and passenger car-hours; average daily freight and passenger trains operated. We deal finally with the statistics relating to coal consumption, alternating and direct current generated and pounds of coal per alternating-current kw-hour generated. We show the percentage of operation, expenses and taxes to earnings and the ratio of complimentary passengers to pay passengers.

"Our interurban lines comprise nine different roads, and while it is not practicable or desirable to make a separate report on each, in order to give the salient features of each division we include a special report showing the passenger earnings of each road, car earnings per car-mile and earnings per car-hour."

LOCAL UTILITIES STATISTICS

Following the reading of Mr. Price's paper Mr. Maynes presented a paper on "Local Utilities Statistics—Interurban Lines," by George T. McComb, assistant to the general auditor of the Illinois Traction System. An abstract follows:

"The Illinois Traction Company is now operating nine electric light properties, nine city railways and four gas properties, and for the sake of comparison of the operating expenses of these properties we have adopted the plan of figuring the per cent of each operating account to the gross earnings. We have considered figuring the per cent of each expense account to the total expense, which to my mind would be of more value, and still a better method might be to figure all of the expenses of the railway properties on the 1000 car-miles run, the expenses of the electric properties on the kilowatts generated and the expenses of the gas properties on the 1000 ft. of gas made. While such statistics as these are of much value in making a comparison of one property with another, I consider them of practically no value for the individual property.

"Our statistics on power house operation are quite brief, consisting of the following items: Kilowatt output, tons of coal used, cost of coal, operating cost, maintenance cost, total cost, both operating and maintenance; operating cost per kilowatt, maintenance cost per kilowatt, total cost per kilowatt, pounds of coal per kilowatt, total cost per kilowatt deducting one-half the heating revenue.

"We have never found a method satisfactory to ourselves of figuring the actual cost per kilowatt where a heating system is operated in connection with the power plant and the same boilers are used for generating steam for both purposes.

"Our statistics on the operation of city railways are also brief. We figure both the earnings and expenses on a car-mile and mile of roadbed basis, the cost of power per mile, maintenance of equipment per car-mile, passengers carried per car-mile and the ratio of complimentary to pay passengers.

"Some of our local properties prepare a more elaborate report on the individual property for the information of the local superintendent and engineer."

DISCUSSION

The report of the committee on comparative statements and the three papers read by Mr. Maynes were discussed together. Mr. Wright thought that one of the most important things which the conference could do would be to prepare a standard form for a monthly comparative statement.

Irwin Fullerton, Detroit United Railway, said that the Interstate Commerce Commission had indicated what form of statistics it desired and that the railroad commissions in Ohio and Michigan had approved the Interstate Commerce Commission forms. Mr. Fullerton noted that the directors wished information in one form and each department head wished it in another and more detailed way about his own department. Therefore, the auditing department of the Detroit United Railway prepared detailed statements for the heads of the operating department and combined these, giving the board of directors a condensed statement and the detail figures.

One member suggested that the form of report used by the Illinois Traction System was in too great detail for smaller properties. Mr. Hixson thought a skeleton form of comparative statement could be prepared which might contain all the headings in a standard form and be so arranged that a company, according to its size and its need, could subdivide the headings to show operations in greater detail. Mr. Fullerton favored using the form of report designated by the Interstate Commerce Commission in so far as possible, because it would be more likely to meet the requirements of State commissions.

After a general discussion of what information should be shown on a monthly comparative statement and how it should be arranged, the conference voted for the appointment of a committee to consider statistical forms of reports for large and small companies. This committee will ask each member of the conference to submit an ideal form of comparative monthly statement and will then crystallize the suggestions of the different members and later will submit a standard form of statement for the consideration of the conference.

ADVANTAGES AND DISADVANTAGES OF FARE REGISTERS AS COMPARED WITH CASH-FARE RECEIPTS

This topic was introduced by Mr. Wright, who had been so firmly convinced of the advantages of cash-fare receipts that he had had the registers removed on one of the roads with which he had been connected. Mr. Hixson said that his company was using cash-fare receipts, but was now testing a new form of register which would not only record the amount of fare collected, but also show the stations between which each fare had been paid. Mr. Maynes wished a more complete analysis of the receipts than that to be obtained by the fare register. It was essential to know where each passenger boarded or left the car. With the Ohmer fare registers, however, the accounting department of the Illinois Traction System had been able to analyze its receipts fairly well because nearly all fares were based on the 2-cent a mile rate. A careful investigation had shown that the average cash-fare haul was about 7 miles. Thirty-five per cent of the passengers on the Illinois Traction System paid cash fares. The round-trip rates were approximately 175 per cent of the one-way rate and when these fares in connection with commutation rates were taken into account the receipts per fare passenger were about 1½ cents per mile. If the receipts between any particular points fell below this average an investigation was made. Mr. Maynes held that it was very desirable to know the receipts between any two points on the line, because, on account of steam competition which existed at practically every point on the road, the traffic department frequently could be assisted greatly if it had complete data about the station-to-station receipts. This information was useful when a reduction of fares was being discussed. The electric line was not required by law to announce

changes in rates, provided the fare was not more than 2 cents per mile.

F. Pantel, auditor Chicago, Lake Shore & South Bend Railway, stated that his department prepared station-to-station earnings several times each year. In July it had been found that 24.4 per cent of the receipts were cash. Mr. Pantel favored the use of the Ohmer fare register because it greatly simplified the work of the auditing department. The Ohmer fare registers gave the auditor everything he wished to know except the points between which the passengers rode.

Mr. Forse then took the chair. In reply to a member who objected to the use of a register because of the confusion resulting when the register became inoperative Mr. Forse said that it was customary with most companies to furnish conductors with pads of receipts which were punched and issued to passengers whenever a register became out of order.

Walter Shroyer, auditor Indiana Union Traction Company, described the operation of the Ohmer registers. These indicate fares from 5 cents to $1.50 and it is the practice to register tickets for their full face value the same as cash fares. Commutation tickets are rung up as full one-way fares and this face-value registration had been found satisfactory.

Mr. Fullerton said that the practice on the Detroit United Railway was to ring up tickets only as "tickets" and to issue receipts punched to show on-and-off stations of the tickets. Such receipts were also given for passes and so the company has either fare register indication or a duplex for every passenger transported.

DIFFICULTIES OR INCONSISTENCIES ENCOUNTERED IN PREPARING ANNUAL REPORTS FOR COMMISSIONS

C. E. Thompson, auditor Chicago & Milwaukee Electric Railroad, called attention to the differences between the reports required by the Wisconsin Railroad Commission and the Interstate Commerce Commission. The maintenance of buildings and structures account had to be subdivided into three heads in the Wisconsin report. Mr. Thompson also stated that the report required by the Wisconsin State Tax Commission differed from that required by the Wisconsin Railroad Commission. One of these reports required the company to distribute its payroll according to States and also to show the total payroll.

Mr. Fullerton said the Ohio and Michigan railroad commissions accepted the report which was sent to the Interstate Commerce Commission.

Mr. Forse said that the Interstate Commerce Commission had considered the advisability of changing the date of annual reports from June 30 to Dec. 31. A test vote showed that the members of the conference were almost unanimous in favoring making reports as of Dec. 31.

IS IT MORE PRACTICAL TO COMPUTE INTERURBAN PASSENGER EARNINGS FROM REPORTS OF TICKETS SOLD OR BY USING THE FACE VALUES OF THE TICKETS WHICH HAVE BEEN LIFTED?

Mr. Fullerton said that the Detroit United Railway computed the revenue from the value of the tickets lifted. This practice was started when the road was a small property, and it furnished information as to the obligation of the company to the public. About 80 people were employed in the accounting department on this road, which had 800 miles of track and lifted in the neighborhood of 300,000 tickets daily. Twenty-five girls were employed to check the tickets.

Mr. Maynes favored the computation of earnings from the reports of ticket sales rather than by using the values of the tickets lifted, stating that he thought the cost of determining the revenue by the latter method was too great in comparison with the benefit obtained. At the end of one month practically the only ticket liability which the company had was that from round-trip tickets and commutation books. The monthly reports of the agencies on the Illinois Traction System were prepared according to steam railway practice and the auditor of receipts had three traveling auditors who spent all their time visiting the stations. The balance sheet prepared by the traveling auditor showed not only the count of the cash in an agency, but also the kinds of that cash.

Mr. Thompson favored the computation of earnings from the values of the tickets lifted, because he had found that on some days the comparative figures of revenue obtained in the two ways varied as much as 25 per cent. Mr. Shroyer did not think that the computation of earnings based on the values of the tickets lifted daily was worth the expense necessary for five or six additional clerks in his office. The revenue determined in the two ways would practically balance at the end of any one month.

On the return trip from Milwaukee the conference again discussed the computation of earnings from tickets sold and tickets collected. Mr. Thompson said that about 1 per cent of the gross sales were not lifted in a year on the Chicago & Milwaukee line. Mr. Wright said that his company had not yet balanced its unredeemed ticket account. He had heard it stated that the difference between the values of the tickets lifted and tickets sold varied from 2 to 7 per cent of the gross earnings. Mr. Maynes held that the difference was not great enough to warrant the additional expense for computing earnings from the values of the tickets lifted.

E. D. Gault, auditor Mahoning & Shenango Railway & Light Company, favored the computation of earnings from the values of the tickets lifted. He based his arguments on the more accurate comparative figures obtained in this way. He had found that on the two pay days each month more tickets were purchased than on any other three days and it would be unfair to compare the earnings of these days with those of other days on the basis of tickets sold. About 90 per cent of the tickets mentioned were for city fares. He argued for using the values of the tickets in computation, because it gave the best idea of one day's earnings, although he said if the earnings were compared year by year the variation would be small.

ADVANTAGES AND DISADVANTAGES OF AN INTERLINE BAGGAGE CHECK HAVING A SEPARATE COUPON FOR EACH ROAD

Mr. Shroyer favored the use of separate coupons for each road. He said that while the earnings from baggage are not so large as from freight and passengers, neverthless the companies should have the same kinds of records because of the liability. At present the intermediate company has neither any coupon nor any record of the interline baggage transferred. He had not heard of any opposition to the use of a separate coupon for each road. Mr. Hixson had just started the use of a new form of baggage check made up in three parts with two tissue carbons. He thought that each road should have a record of the baggage handled free as well as the paid baggage, because of the liability involved.

THE UNIT TYPE WAY-BILL VERSUS THE BLANKET WAY-BILL USED BY STEAM RAILROADS

Mr. Forse explained the difference between unit way-bills made separately for each shipment and the blanket way-bills which covered a number of shipments. A majority of the conference at an earlier date had voted to adopt the unit way-bill. Later the committee of the American Association had recommended the adoption of the unit way-bill. Since then some objection had been raised and some members favored the blanket way-bill in preference to the unit way-bill.

O. Burgett, freight auditor Western Ohio Railway, presented the following arguments favoring the blanket form:

"1. Unit way-bill shows one consignee only on each way-bill.

"2. Too small—cramps contents.

"3. No room for checking without defacing.

"4. Inadequate for full sheet way-bills, and if enlarged would not be practical.

"5. Less work for auditor on full sheet.

"6. Less work for agents in report, by using a full sheet.

"7. Expense bill is a carbon copy indistinct and not permanent, and when this is attached to claims and is shuffled around it is impossible to read it.

"8. Expense bill copy is not needed. Prefer to have receiving agent make out the expense bill as he will be more likely to catch errors in rate and weight.

"9. Blanket bill much preferable as all bills are written with ink and are permanent, whereas bills even with indelible pencil become indistinct in time.

"10. With a unit bill copies pinned together often get detached and parts are lost."

Mr. Hixson said that the Terre Haute, Indianapolis & Eastern Traction Company was still using the unit form, but that he had found many points in favor of the blanket way-bill. Freight crews were better able to check shipments if on one piece of paper, especially if there were only one or two freight runs a day over each division. Mr. Shroyer thought that the use of the blanket way-bill, while relieving the forwarding agent of clerical work, made more work for the receiving agent.

In reply to Mr. Burgett's criticism that the unit way-bill did not provide room for checking without defacement, especially if the bill were through several junction points and each agent did his checking separately, Mr. Shroyer said that it was good policy to keep passing records.

Mr. Pantel favored the unit way-bills and spoke of their use on a line with which he formerly had been connected. He made four copies and each bill was numbered at the printer's. All the writing was done by the forwarding agent. The freight was checked on by the agent and the conductor and checked off by the receiving agent. Agents had statements sent them daily, and all they owed the company at the end of the month was the freight charges on the shipments on hand. In one year the claims amounted to only $32. Mr. Pantel did not favor putting additional work on the receiving agent; neither did he favor numbering the bills with a pencil. The numbers should be printed on them so that the bills could be checked in properly at the auditing office.

Several of the members did not agree with Mr. Burgett in his statement that the blanket form of bill made less work for the auditing department.

It was Mr. Wright's experience that an agent would rather use a unit way-bill. Mr. Hixson said that his agents, except at the Indianapolis office, which did most of the receiving, would rather have the unit way-bill.

President Forse exhibited a new pamphlet which the conference had prepared, showing an alphabetical list of the items of expense in the operation of electric railways classified according to the Interstate Commerce Commission and the American Street & Interurban Railway Association standard classification of accounts. Copies of this list would be furnished to members of the conference without charge, or would be sold at the rate of three copies for $1.00 to non-members. The pamphlet comprises 32 closely printed pages bound in a substantial cover.

A letter ballot will be taken on the place for the next meeting of the conference.

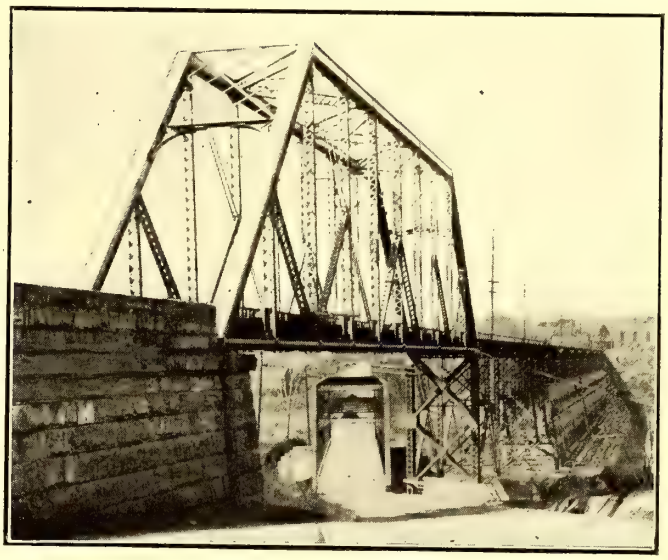
GERMAN ACCIDENT STATISTICS

The Strassen und Kleinbahn Berufsgenossenschaft (Street and Interurban Railway Brotherhood) of Germany, which is a mutual accident insurance organization organized in accordance with State laws, has just issued its accident statistics for the year 1909.

The membership consists of 474 undertakings, including lines operated by steam, cable, gasoline or animal traction. Each member is assessed a certain premium per 1000 marks wages, the percentage rate of the premium depending on the risk factor of the mode of traction used. The total number of accidents reported was 5780 (5994 in the year 1908), but the number actually settled was 3081 for a total cost of 881,374 marks ($214,173). These accidents occurred on 161 railways over which 2,076,180,783 passengers were carried for a total distance of 575,300,688 car-km (356,686,426 car miles). This car mileage was composed of 436,293,723 motor car-km (270,562,108 car-miles) and 139,006,965 trailer car-km (86,124,318 car-miles). There was one accident per 635,996 motor car-km (394,317 car-miles) and one accident per 2,044,220 trailer car-km (1,267,416 car-miles). Thus the motor car was 3.2 times as dangerous as a trailer car. Another table in this report relates to accidents to employees. It appears that 36.36 per cent of the accidents occurred to first-year employees. It is concluded from this condition that much remains to be done in instructing new men regarding the dangerous features of their work.

NEW STEEL BRIDGE OF CLEVELAND, PAINESVILLE & EASTERN RAILROAD

The new bridge of the Cleveland, Painesville & Eastern Railroad at Willoughby, Ohio, is illustrated herewith. This bridge is 644 ft. in length and is of steel. It was constructed in the spring of the present year by the King Bridge Company, of Cleveland. The new structure was placed in the exact position occupied by the former wooden bridge. The work of construction occupied about two months and during that period trains were operated on an hourly schedule in each direction over the bridge. The accompanying photographs of the new improvement have been received through the courtesy of E. L. Schmock, assistant secretary and purchasing agent of the railroad company.



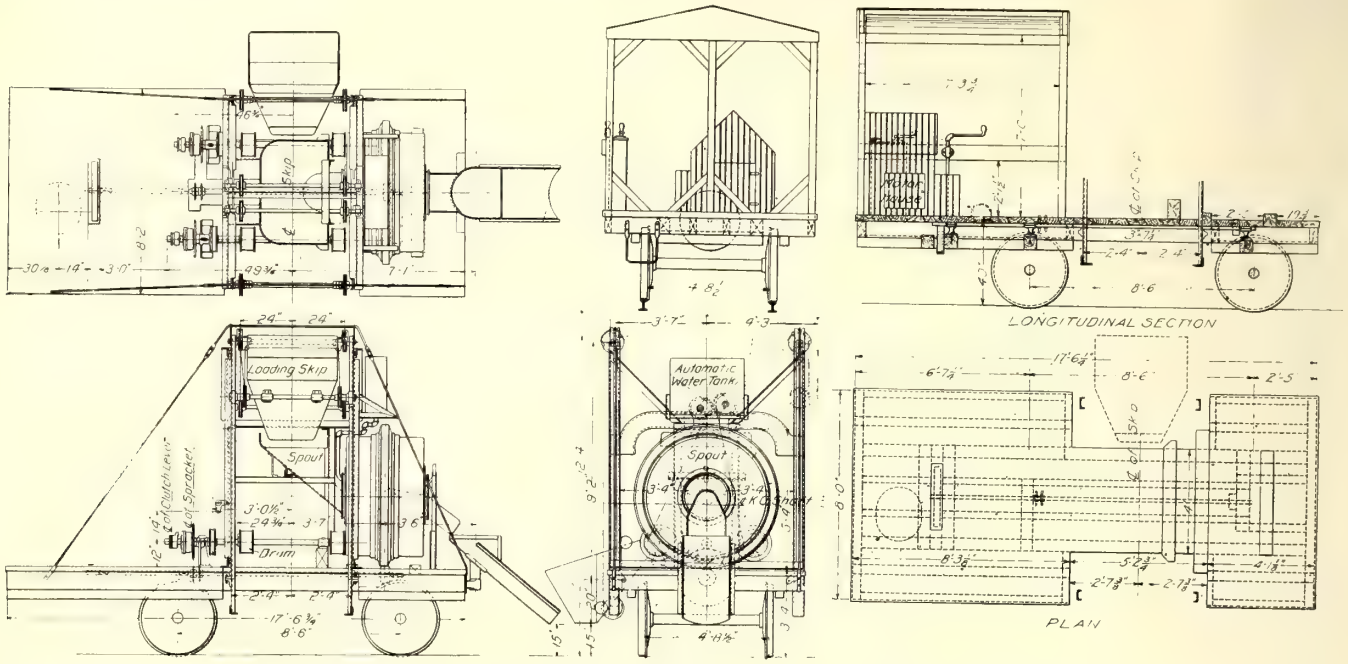
Highway Crossing Under the Willoughby Steel Bridge of the Cleveland, Painesville & Eastern Railroad



Cleveland, Painesville & Eastern Car on Willoughby Bridge

BIRMINGHAM PAVING MIXER

The Birmingham (Ala.) Railway, Light & Power Company has adopted the plan of laying a 5-in. foundation of concrete in paving between and outside its tracks and then using pressed brick. Heretofore, the mixing of this concrete has been done by hand, but owing to the continual increase of street paving it became necessary to adopt some form of mechanical mixer. Consequently the company purchased a Chicago No. 1 street railway paving mixer and mounted it on a small motor car built in its own shops. This car is equipped with two GE-1000 motors for operating the car and an individual 15-hp, 500-volt motor for operating the mixer.



Details of Birmingham Concrete Mixer and Car on Which It Is Mounted

For the benefit of those not so familiar with the operation of a mechanical mixer the following information will be of some importance. Referring to the drawing it will be noted that the mixer is equipped with a swinging discharge spout and a skip bucket on each side which raises the batch after it has been loaded by wheelbarrows and empties it into the feed spout. A gangplank is arranged on the side of the car, and wheelbarrows filled with sand and slag mount this gangway and empty into the skip buckets. The skip buckets are fitted with guide rollers which work in steel channels as a track, these channels also forming the main framework for the mixer. Each bucket has its individual hoist drum, friction clutch and prony brake, which operates on a shaft driven by a chain from the main shaft. This permits each bucket to operate independently of the others and hence either bucket or both buckets may be in operation at any time. The discharge spout at the end of the car is in two parts. The upper spout is pivoted to the floor of the car, and can be swung into the discharge opening of the mixer drum to catch the concrete. This upper spout discharges into the lower spout, which swings in a horizontal plane, thus distributing the concrete at any point across the entire width of the track. The machine when using both skip buckets requires nine laborers on each side to load the buckets; one on each side to handle the skip and to put in the cement; one at the feed spout; one at the discharge spout, who also operates the water tank; four behind the car to spread the concrete; and the foreman, who also operates the car and mixer. This gives a total of 27 men, including the foreman.

During the first five days of operation the mixer laid the concrete for 3000 ft. of double track, making an average of 600 ft., or practically 1200 sq. yd. per day. The best record yet obtained is 750 ft. of double track, or 1500 sq. yd. per day. Labor costs 11 cents per hour and the foreman's time is figured at 27½ cents per hour. Thus the daily cost for labor is $31.35. The cost of the mixer and car complete was $2,250, and figuring interest and depreciation, taxes and power consumed, the total cost a day would be $33. This makes a cost of 2¾ cents per square yard. The same concrete mixed by hand costs on the average 7¾ cents for labor, thus giving a saving of 5 cents per square yard. Although the mixer is a comparatively new addition to the company's assets, it has proven thoroughly satisfactory and economical in every respect.

WELDING RAIL IN JAPAN

Some very interesting rail welding has recently been executed by the Thermit process in Tokio, Japan, for the Tokio Tramways Company, under the direction of C. Weinberger & Company, the Japanese agents for Th. Goldschmidt, Essen-Ruhr,



Thermit Welding in Japan

Germany, the proprietor of the well-known Thermit welding process. One of the claims made for this process is that ordinary labor, if intelligently directed, can be used for the welding work. In Tokio only native labor has been employed.

THE PURPOSE AND WORK OF THE CENTRAL ELECTRIC TRAFFIC ASSOCIATION

BY A. L. NEEREAMER, CHAIRMAN.

In the fall of 1907 the members of the Central Electric Railway Association decided to take up traffic matters on a more systematic and uniform scale. The outcome of this decision was the organization of the Central Electric Traffic Association, which was completed in January, 1908. The work of this organization actually began about April 1 of that year. One of the first steps made necessary was that of changing the basis of membership in the Central Electric Railway Association from individual memberships issued to officers of the various companies to that of interurban companies recognized on a mileage basis. This scheme has been found to be practicable and has placed both associations in a position to accomplish better results.

Since its inception the traffic association has been an organization of energetic members, who have worked faithfully to advance interurban interests. It is impossible to describe adequately within a short space the various problems that have been confronted and surmounted during these two years. The first proposition was the selection of an interchangeable 1000-mile ticket which would be acceptable to the traveling public and at the same time meet the conditions existing on roads that were members of the association or parties to the ticket. After full consideration a ticket was finally adopted. This is participated in by 27 lines, representing approximately 2500 miles. About 10,000 of these tickets are now in use and their popularity is rapidly increasing.

Next after the 1000-mile ticket the association undertook to adopt a uniform basis for handling and transporting baggage. One of the greatest obstacles in the way of the adoption of uniform and standard regulations was the variety of laws in the different States. This obstacle was overcome finally and a joint and local baggage tariff was adopted and placed in the hands of the agents of the member companies to govern this class of traffic. In connection with this, standard forms of baggage checks were adopted. These are rapidly being put in general use. Both local or interline baggage may now be checked on interurban roads in the territory covered by this association on the same plan as that used by the steam railroads.

By far the largest proposition that has confronted the association was the compilation and publication of joint passenger tariff No. 3. This tariff, whose compilation and printing required nearly a year, contains 291 pages and quotes rates between 34 common or headline points and 450 stations, showing every available route that is open to the public for travel between different points. Lines parties to this tariff have found considerable increase in revenue due to the fact that their agents are enabled upon application from a prospective passenger promptly, accurately and intelligently to furnish rates and tickets to any point in the territory. In connection with this tariff a set of standard forms of interline tickets covering every class of transportation, both one way and round trip, was adopted. These new features, so far as passenger traffic is concerned, have placed interurban lines on the same basis as the steam roads between points in this territory. The adoption of standard baggage rules and standard forms of interline tickets and the publication of through rates have enabled some of the interurban lines to make traffic arrangements and agreements with their neighbors, the steam roads, and have opened up a new field for business.

Regarding freight traffic it may appear on the surface that very little has been done, yet this matter has been under consideration for the past two years and is being gradually developed. All of the lines handling freight have adopted the official classification, which is published by a committee of the steam railroads, and is filed for the interurban roads by the chairman of the Traffic Association.

There is also under consideration the publication of an official interurban railway map covering the entire territory and showing all cities, towns, villages and settlements of 100 or more inhabitants. The publication of an official interurban railway guide is also under consideration. This guide will show timetables of the interurban lines in such shape that the traveling public can intelligently plan trips. These two innovations are now in the hands of able and energetic committees.

The members of the Traffic Association hold monthly meetings at practical and convenient points in the territory and at these meetings propositions in which all of the lines are more or less interested are thoroughly considered and the question of the best service to the public is finally worked out. These meetings are of great benefit to the representatives of member companies for the reason that an opportunity is given for the exchange of views on all subjects. Many a knotty problem has been found to have a simple solution after conference at these meetings between members in the same business.

Under its organization the association does not presume to dictate what any individual company shall do, the main object being to maintain friendly relations and to develop in the most practical manner the best way of handling the through or long-distance traffic. The association also holds the unique position of being the only traffic association in the United States composed of electric railways.

COMMUNICATION

A POSSIBLE MEANS FOR PREVENTING COLLISIONS

Southeastern Ohio Railway, Light & Power Company
Zanesville, Ohio, Sept. 22, 1910.

To the Editors:

The collision at Kingsland on the Ft. Wayne & Wabash Valley Traction Company on Sept. 21 only emphasizes the need for some means to prevent train crews from forgetting orders and to assist train dispatchers in preventing wrecks as the result of wrong orders being issued. It seems to me altogether practical to make a long stride in this direction without a great expenditure of money.

The selective signaling devices that are on the market are rapidly coming into use and are proving very trustworthy for the control of semaphores and various types of telephone relays. My plan for an emergency control of trains by the dispatcher is as follows:

A circuit controlled by a master selector, located in the dispatcher's office, is strung the entire length of the road. Each section of the trolley is to be controlled by a releasing device which actuates a heavy short-circuiting switch between the track and trolley. This device, operated by the selector, is installed at any convenient point on each section of trolley. When the dispatcher has issued a meeting order to two trains he could set a semaphore against them at the meeting point as a further protection. If the crew of the train due first at the siding overlooks the orders or fails to see the semaphore the dispatcher will note that this train has not reported and is past due at the meeting point. Immediately he can start his emergency selector controlling the section or sections of the trolley on which the train may be running and in an instant he has "killed" that section. He can then notify the substation operators handling the circuit breakers and take any other steps that are necessary to straighten matters out. Such a plan could be made to fit the conditions on any road operated by a dispatcher.

Again, instances are on record where the dispatcher issued wrong orders and realized the fact before a collision occurred, but too late to prevent the accident. With the plan outlined, he could cut off the current and stop the trains in danger without going to the extremity of ordering the circuit breakers out at the station.

Leland R. Adams, Electrical Engineer.

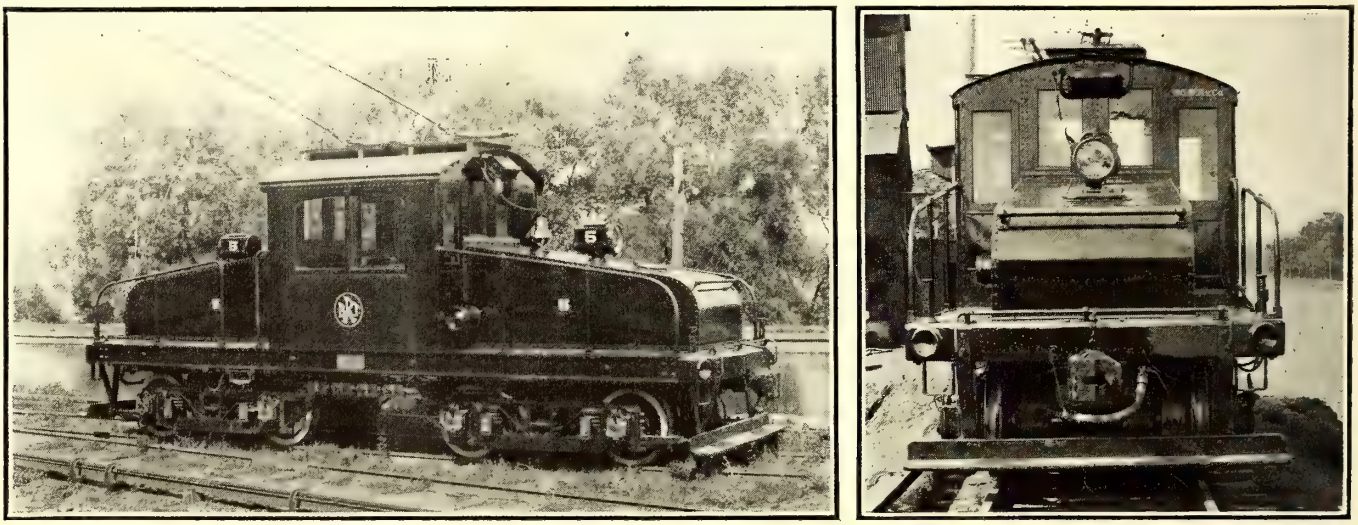
NEW LOCOMOTIVE FOR THE BROOKLYN RAPID TRANSIT SYSTEM

The locomotive illustrated and described below was designed for use in switching and freight service over the Brooklyn Rapid Transit System and was built by the General Electric Company and the American Locomotive Company jointly.

The rapidly increasing demand for freight service over the Brooklyn lines and the peculiarities of this service have demanded a locomotive having several special features. The collection of heavy freight from railway terminals and docks, and the occasional short sharp grades encountered, particularly along the water front, have necessitated a heavy type of locomotive, while the distribution of freight to shops and factories as far distant as South Brooklyn and Coney Island, and the requirement that such service shall not interfere with passenger service, made it imperative that the locomotive should be capable of operating at high speed. To fulfil all these requirements it was essential that this locomotive be more heavily motored than one designed for ordinary switching service.

In general appearance it resembles the General Electric Company's standard switching locomotive with center cab and sloping end cabs.

The trucks are of the M. C. B. equalized type with double elliptic bolster springs and swinging bolster. They are similar to the standard two-bar equalizer trucks built for the Brooklyn Rapid Transit System by the American Locomotive Company for use under the Brooklyn elevated motor cars and are duplicates of these trucks, all wearing parts being interchangeable excepting springs, equalizers and such other parts as have required a heavier construction on account of the greater weight to be carried.



Side and End Views Brooklyn Electric Locomotive

The locomotive platform is built up of longitudinal sills of 10-in. channels extending the whole length and is fitted with cast-iron end frames and heavy built-up bolsters, the latter being built of 17¾-in. x 1-in. plates with center-pin castings riveted to them. Drawhead castings are attached to the center sills and end frames, thus giving them great rigidity. The draft rigging consists of Tower M. C. B. No. 3 couplers with 5-in. x 5-in. shank. The whole platform is squared and braced by heavy floor plates extending the whole width of the locomotive and riveted to the longitudinal sills. The locomotive has been designed for a weight of 55 tons and the ballast required to bring it up to this weight consists of 10-in. x 2-in. bars running the whole length of the platform, notched over the bolster plates, and bolted to the longitudinal sills.

The cab consists, as said above, of a main operating cab in the center of the platform with auxiliary end cabs and side platform extending out toward the ends of the locomotive. This type of cab gives an extended view to the operator in all directions from his operating seat and on this account was preferred to the box type used on previous B. R. T. locomotives. The auxiliary cab contains sand boxes, air reservoirs, rheostats, and contactors; while the main cab contains the controllers, brake valves, switches and other apparatus for the direct control of the locomotive.

Turning now to the electrical equipment of the locomotive there are several features of interest. As stated, it is furnished with high-power motors, the equipment consisting of four GE-212-B motors. The GE-212 is a commutating pole motor with a rating on the standard one-hour basis of 225 hp. Commutating pole motors have demonstrated their satisfactory operation under severe fluctuation of load and voltage and motors of this type and capacity are needed in the present case in order to meet the requirements presented by heavy tractive effort under starting conditions and high speeds upon the level. The locomotive is capable of exerting a tractive effort of 16,880 lb. at 20 m.p.h. at the one-hour rating of the motors, or of maintaining a tractive effort of 6000 lb. at a speed of 30 m.p.h. Stated in other words, it is capable of operating a 500-ton trailing train on the 2 per cent grades or of pulling the same train at a maximum speed of 30 m.p.h. on the level.

A distinctive feature of the locomotive is the type of control. Sprague General Electric type-M control has been furnished, which provides three combinations of motors with a total of 18 steps, seven of the steps with all four motors in series, six steps with motors in series parallel, and five steps with all motors in parallel. Such a three-speed control is demanded by the conditions of service because a high speed is required for level running with through freight and an economical slow speed for heavy switching work. Three-speed control has been used previously on locomotives for heavy railway service, but until lately such a control has not been required upon electric roads and is a recent development made by the General Electric Company. The type of control required for electric locomotive service differs from that for ordinary car service in that it must be arranged to work the motors as close as possible to the slipping point of the wheels throughout the entire range of acceleration without sudden fluctuations of tractive effort. In the present case the large number of steps and the rheostat divisions have been very carefully designed and proportioned to the weight of the locomotive. The transfer from one combination of motors to another has been arranged in connection with the rheostat steps so as to secure a uniform gradation of tractive effort throughout the entire range of control. As an illustration of the range of this control it may be noted that the locomotive will develop a tractive effort of about 6500 lb. on the first step of the controller with a current from the trolley of 150 amp. On the series steps it will develop 27,500 lb. with 450 amp and will attain a maximum speed of about 7 m.p.h. with a 500-ton train. On the parallel steps the motors will require about four times these currents to develop the same trac-

tive effort, but with the same train the locomotive will attain a maximum speed of about 30 m.p.h.

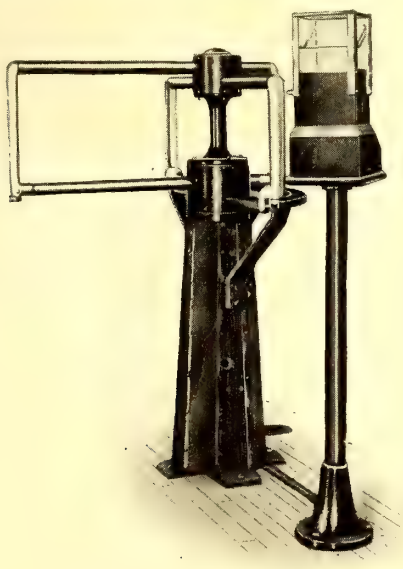
Controllers are placed at the engineers' operating seats at diagonally opposite corners of the main cab and contactors are mounted in the auxiliary cabs where they are convenient for inspection and repair. The controller handle is of the lever type with a spring attachment which indicates to the motorman by the feel the running and the resistance notches. Third-rail shoes and trolley poles collect current either from a third-rail or from overhead trolley as demanded by the equipment of the various Brooklyn elevated and surface lines. A double-throw switch in the main cab connects the power circuits of the locomotive to one or the other of these collecting devices as occasion demands. Air compressors are mounted in the main cab, and the air-brake equipment is supplied to correspond to the B. R. T. standards. All wiring is in conduit and so arranged as to give the interior of the cab a neat and workmanlike appearance.

The following table gives the principal dimensions of the locomotive:

Type of motors	GE-212-B
Number of motors	4
Gear ratio	3.37
Number of driving wheels	8
Diameter	34 in.
Total wheel base	22 ft. 2 in.
Rigid wheel base	6 ft. 8 in.
Length inside knuckles	31 ft. 1 in.
Length main cab	8 ft. 0 in.
Length of cab over all	27 ft. 0 in.
Total weight	110,000 lb.
Tractive effort at 25 per cent coefficient	27,550 lb.
Speed at maximum T. E.	17 m.p.h.

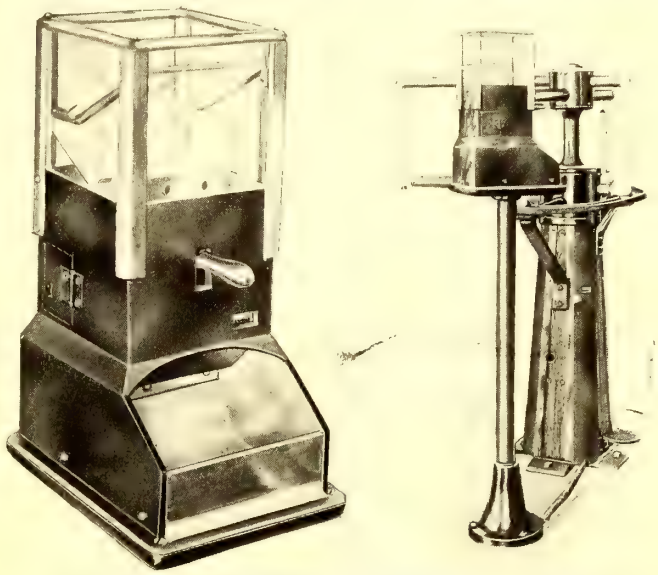
COMBINED FARE BOX, REGISTER AND TURNSTILE

The H. R. Langslow Company, Rochester, N. Y., has recently perfected and is placing on the market a novel system of fare collection for prepayment cars. It includes a new type of fare box and a folding turnstile so connected with each other that each time a nickel is deposited in the fare box the turnstile is released for the passage of a passenger. The number of nickels deposited and the number of passengers admitted through the turnstile are registered on separate registers and the difference between the fares registered and the passengers registered should correspond to the number of passengers riding on tickets and transfers. If the company wishes also to register tickets and transfers automatically, the manufacturer has designed a slightly different type of fare box in which the tickets and transfers can be deposited in the same hopper as the cash fares. The paper tickets are then separated automatically from the coins and separately registered. The fare box is of the "open" type; that is, all fares after passing through the box fall into a cup, where they are available for change by the conductor.



Turnstile and Box from Passenger Entrance

Every contingency in the collection of fares seems to have been taken care of in the construction of this machine. If two or more nickels are thrown into the fare box at the same time to pay fares of two or more passengers, each is registered independently, and by means of an escapement and ratchet wheel controlling the movement of the turnstile the latter is automatically released to admit the proper number of passengers, or the number for which fares have been paid. The turnstile then becomes locked until another nickel is dropped into the box. The machine will register fares and make the corresponding number of releases on the turnstile more rapidly than passengers can pass into the car.



Fare Box and Turnstile from Position of Conductor

If a cent, a dime or any other coin smaller than a nickel is dropped into the fare box it passes through without registering or releasing the escapement of the turnstile. If a quarter or any larger coin than a nickel is dropped into the box the larger coin automatically is diverted into a separate compartment covered by glass so that the passenger's attention can be directed to the fact that he has inserted the wrong coin. The conductor then makes the proper change in nickels and the passenger pays his fare or fares in 5-cent pieces. The registration and release mechanism on the turnstile is very simple and is operated by electricity from the trolley current, so that levers connecting the fare box and turnstile are eliminated. If the current should go off the line the passengers can still be admitted to the car by a foot lever, which releases the turnstile latch. Such passengers, of course, are automatically registered in the turnstile register as they pass into the car, and upon a resumption of current the coins deposited in the meantime in the box are automatically passed through the box and registered thereby.

The turnstile itself is of ingenious construction. It consists of an upright spindle with two sets of sliding arms at right angles to each other. The lower ends of these arms are provided with rollers which engage in a grooved guide on the inside of the turnstile so that as the turnstile is revolved the arms slide out across the passageway and then in again after they have passed the passageway. This arrangement not only takes up the least amount of room, but also avoids accident, because there is but one projecting arm and that is at right angles to the movement of passengers. The Langslow Company will exhibit this apparatus at Atlantic City.

The municipality of Bogota, Colombia, has bought for $800,000 the property of the Bogota City Railway Company. The latter was a United States corporation which had operated under a street railway franchise from the Colombian Government.

STEEL PORTABLE SUBSTATION OF THE FORT WAYNE & WABASH VALLEY TRACTION COMPANY

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., recently completed for the Ft. Wayne & Wabash Valley Traction Company a steel portable substation which is now in operation on the latter company's lines in the vicinity of Ft. Wayne, Ind. The all-steel car was made in accordance with M. C. B. rules and regulations. Its dimensions are: Length over the end sills, 40 ft.; width, over all, 9 ft. 5 in.; truck centers, 27 ft.; and height from floor to underside of roof at center, 8 ft. 9 in.

The general arrangement of the electrical apparatus in the car includes no great departure from previous practice. The lightning arresters are located at one end of the car; close to this end are the oil circuit-breaker and the transformers; the switchboard is near the center, and the rotary converter is near the opposite end. Liberal space is allowed near the switchboard in the middle of the car and there are no high-



Steel Portable Substation for the Ft. Wayne & Wabash Valley Traction Company

voltage wires in the neighborhood of the board; hence complete safety is secured for the operator.

The 500-kw, 500 r.p.m., 550-volt, 6-phase, 25-cycle rotary converter is of Westinghouse standard type. The switchboard comprises two panels of black marine-finished slate. The 10-amp, three-pole, 35,000-volt, type E, oil-circuit-breaker is operated by hand from the switchboard, to provide distant control of the high tension, incoming line. The three-phase transmission circuit of 33,000 volts and 25 cycles is brought into the car through three 300-amp, 33,000-volt, single pole disconnecting switches. There are two 33,000-volt primary, lowering transformers of the oil-insulated self-cooled type; they are double-V connected. Three low equivalent lightning arresters are also provided.

RAILWAY ARMATURE BEARING

The accompanying cut shows the standard Westinghouse railway motor armature bearing. The armature bearings of this type have large oil wells especially fitted for thoroughly filtering the oil. Each well is divided into a waste pocket and oil reservoir by a partition, communication between the two sections being provided at the bottom. In the central section or waste pocket woolen waste is packed against the shaft or axle through an opening in the bearing lining. The oil is poured into the reservoir and through the opening at the bottom it is filtered and fed to the bearing by capillary action. By this means dirt, grit, and impurities are kept from the bearings and held under the waste. An economical level can be maintained, as the oil in the reservoir is readily gaged.

Suitable wiper rings prevent an oversupply of oil from working into the motor and damaging the windings. The bearing also has a drain chamber which catches the oil as it works out of the bearings. This oil may be siphoned or sopped and used for lubricating side bearings, brake levers and the like. The principal function of the drain chambers, however, is to prevent any oil from dripping to the track or streets at crossings or stations or in the car houses.

An examination of any of the modern Westinghouse motors will show that the armature bearings are lubricated on the low-pressure side, that is, on the side that receives the least thrust when the car is in motion. This is a very important feature.

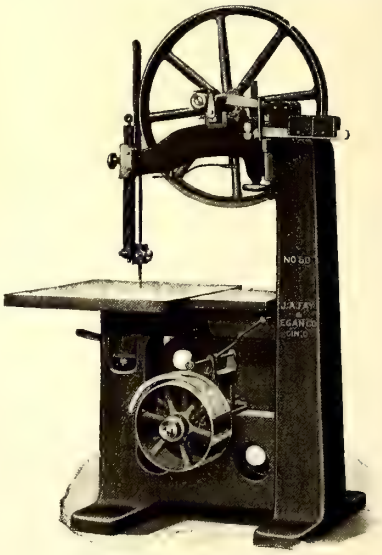


Railway Motor Armature Bearing

The waste is applied directly to the side of the journal that is not rubbing against the babbitt, and the oil is carried around into the bearing. This arrangement affords a very desirable element in bearing lubrication, as it insures a uniformly thorough distribution of oil to every point of contact.

PATTERN SHOP BAND SAW

The woodworking tool shown in the accompanying illustration is the No. 50 band saw of the J. A. Fay & Egan Company, Cincinnati, Ohio, by which it was originally designed for shops where much scroll-sawing is done. Consequently this tool has been found well adapted for pattern shops where similar work is turned out daily. When used in pattern shops the table of this saw is arranged with a tilting device which has a microm-



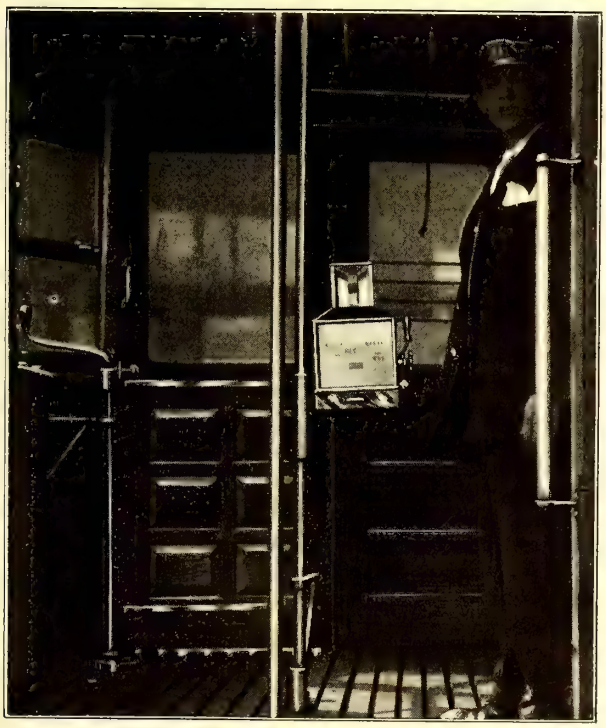
Pattern Shop Band Saw

eter adjustment, whereby the operator is enabled to adjust the table instantly to any angle up to 45 deg. to the right and 10 deg. to the left. The most important feature in the construction of the machine is the straining device known as the knife-edge balance. The upper wheel is hung solely on a knife-edge and the tension of the blade is given by a compound lever mechanism. This has been found a most satisfactory device for straining the blade, as the action is instantaneous under all conditions and the machine can be run at a high speed with no danger of breaking even the finest blade.

REGISTERING FARE BOXES USED IN NEW YORK

The Johnson Fare Box Company, New York and Chicago, began to install last July a number of its latest registering fare boxes on the 125th Street crosstown pay-as-you-enter cars of the Third Avenue Railroad Company, New York. The traffic on this line is very heavy during the summer, as the western terminus is opposite the piers of the principal Hudson River and Coney Island excursion boats. It is not at all uncommon for the cars to take on as many as 90 passengers at one time during the height of the excursion season. For this very reason, it was decided to introduce the boxes on this route. They were found capable of handling this heavy business, and as a result more of them are being installed by the railway.

This registering box, as its name indicates, includes a complete registering mechanism which registers the total number of fares, the total number of passengers, the trip number and the direction. In addition, a bell rings for every fare collected. These features are combined with a glass chamber in which the fares are dropped, a coin-selecting mechanism and separate cash compartments. The mechanism is contained in a steel box which does not differ materially in appearance and size



Registering Type Fare Box Installed on One of the Cars of the Third Avenue Railroad, New York

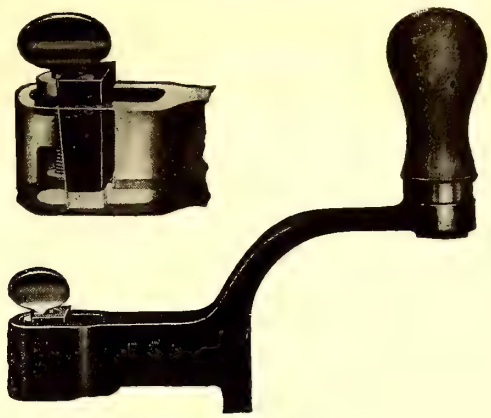
from the ordinary cash box. Like the latter, it is mounted on the platform dividing rail and can be easily removed by the conductor from one end of the car to the other.

The new box handles dimes, nickels, and pennies, as it was found that provision for 25-cent pieces was unnecessary. The money on being deposited by the passenger falls through a zigzag chute to the examination plate of the fare chamber. This chute has closed sides of glass and toothed jaws at the bottom so that it is impossible to take out from the top any money that has gone through. At the same time, the conductor can examine the deposited coin after it has been dropped on the inspection plate until he permits it to fall into a hopper by one movement of a handle, which announces the fare on the gong. The coin passes from the hopper to a revolving feeding plate, which carries the coins to selecting cams which count and deposit them in compartments for each denomination. This cycle of operations occurs so rapidly that there is no likelihood of the hopper becoming clogged from the rapid deposit of coins.

The conductor has a key which gives him access to the registered fares at any time. He can also remove the operating handle to prevent tampering with the box when his car is in for lay-overs. The passenger and fare numbers coincide exactly in the standard design of this registering mechanism. It is possible, however, to adapt the cyclometer for 3-cent, 6-cent and other unusual fares but in that event, the passenger and the fare totals would not be the same. Careful attention has been given toward making these devices easy to maintain and proof against damage from the insertion of slugs, nails, etc. Like parts of the boxes of the same type are absolutely interchangeable and all of them except the hopper are made to dies. The cams are of case-hardened steel and have been tested to 175,000 movements without showing signs of wear. When replacements are to be made, the whole mechanism can be taken from its case merely by removing two sealed rods.

WEDGE TYPE CONTROLLER HANDLE

Usually a worn controller handle is kept in service by such annoying makeshifts as pieces of wire, shims or anything else which will make it grip the shaft. This practice is very undesirable because a loose handle is not only liable to slip in emergencies but to lead also to improper contact of the controller fingers, thereby causing blowups and serious arcing. To overcome these difficulties, the Electric Service Supplies Company, Philadelphia, recently placed on the market a wedge type controller handle which it calls the "Lock-On." As shown in the



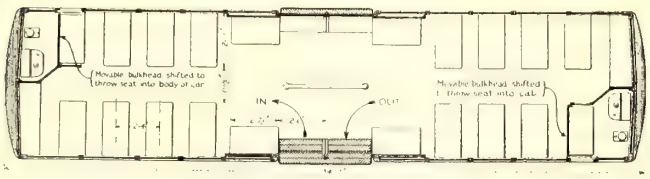
Wedge Type Controller Handle with Detail of Locking Device

accompanying phantom cut, the handle has a socket which conforms to three sides of the shaft; the fourth side is formed by a downwardly tapered wedge which is controlled in its downward movement by an adjusting screw of drop-forged steel. This screw is threaded into a lug cast on the inside of the handle. Its motion is transmitted to the wedge by means of a flange which works in a groove in the wedge. The mechanical motions of this handle are similar to those of a worm gear. A slight pressure on the screw transmits a heavy clamping effect to the wedge, thus making it grip the shaft so tightly that accidental release is impossible. It is stated that a single turn of the screw is amply sufficient to lock on the handle, to prevent its removal until desired by the motorman, who then releases the screw. The handle is arranged to adjustments of 8-in., which permits it to be used on badly worn shafts and also makes it interchangeable in all the controllers of a given type.

It is believed that the "Lock-On" controller handle is superior to handles of the split type wherein a thumb screw is provided for tightening to the shaft. As handles of the latter type are usually made from brass or malleable iron, the spring effect of the thumb screw is soon lost, after which the handle must be discarded. It is held, furthermore, that split handles suffer from lack of adjustment and cannot be interchanged. The manufacturer of the "Lock-On" controller handle recommends strongly its use in connection with the Automotoneer to combine perfect safety in controller handling with the advantages of proper acceleration.

NEW TYPE OF CENTER ENTRANCE CAR

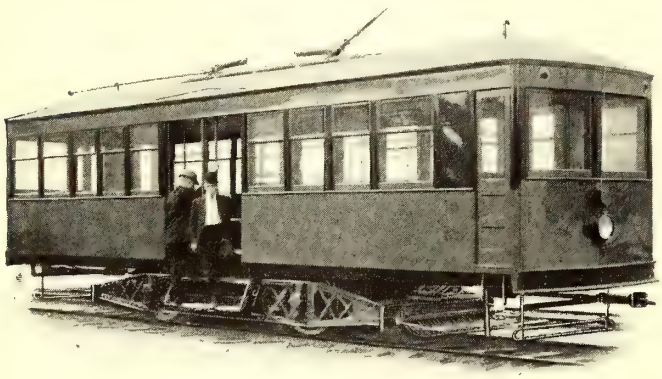
The Barber Car Company, of York, Pa., has recently brought out and put on the market a modification of its well-known type of car arranged for center entrance and exit. The car possesses the same features, good ventilation and lightness, which characterized the earlier end entrance cars which have



Plan of Center Entrance Car

been built by the company, and has the turtle-back roof, square ends and straight sides which have also been characteristics of its end entrance cars.

The car illustrated in the accompanying engraving is for double-end operation and has an entrance on each side. The



Center Exit and Entrance in Use

door not in use is protected by a wooden bar on uprights which also serve as a support for standing passengers. The open space over the steps on the side not in use is covered to prevent accident.

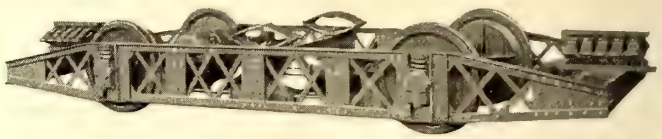
By an ingenious form of movable bulkhead the motorman's cab can be enlarged to include one end seat when in use, and when not in use can be closed up so as practically to include



Interior of Center Entrance Car, Showing the Seating Plan and Dividing Rails

only the controller and air valve. The motorman's cab provides ample room for the motorman and gives him a commanding view of the track in a place where he is free from distraction. The car is equipped with the Barber hydraulic brake.

The car body shown in the engraving contains 44 seats and weighs 11 tons, including truck and all electric equipment, including motors.



Single Truck for Center Entrance Car

Although the body length is 34 ft. 7 in. over all, the car is mounted on a standard Barber single truck with a wheel base of 10 ft. The Barber Car Company expects to have one of these cars on exhibition at the Atlantic City convention.

IMPROVED UNDER-FEED STOKER

The Under-Feed Stoker Company of America, Chicago, Ill., has recently brought out what it terms the "New Jones" high-duty, self-cleaning, automatic mechanical stoker. This type was devised to secure a mechanically cleaned stoker the refuse of which would contain practically no combustible matter. The possibilities of this type are indicated by data from the manufacturer on two stokers of this design which were placed in operation about May 1, 1910, under a 360-hp Heine boiler of the safety water-tube type. The stokers in question have been in constant use night and day since their installation and up to the present time all parts are reported to be in perfect condition. The only repairs were due to the breakage of two improperly installed levers of the self-cleaning mechanism. This accident, however, did not interfere with the regular operation of the stoker.

The fuel used consisted mainly of low-grade coals from Iowa, Illinois and Indiana, although this type of stoker has also used high-grade Pennsylvania bituminous fuel. With two of these self-cleaning stokers a smokeless consumption of 7000 lb. bituminous coal per hour has been obtained in a water-leg furnace 5 ft. 6 in. wide x 8 ft. long. This consumption was at the rate of approximately 160 lb. coal per square foot of furnace area per hour. It is stated that the stoker has operated without any clinker whatsoever, although Iowa coals are noted for the heavy clinker which they usually produce. The refuse which drops into the ash pits at the rear of the furnace consists of fine particles and few pieces are more than an inch square.

The new stoker embodies no change in its system of automatic control of fuel and air supply over the company's standard stoker. The greater fuel capacity of the self-cleaning stoker is not due entirely to the self-cleaning attachment, but to the fact that the tuyère area of the self-cleaning stoker has been increased fully 200 per cent. This makes it possible to obtain excessive fuel-burning capacity with a materially reduced air pressure, as will be noted by referring to the test report at the end of this article.

CONSTRUCTION DETAILS

The view, Fig. 1, on page 525, shows a longitudinal cross-section through the furnace. The parts of the self-cleaning stoker that are outside of the furnace proper are exact counterparts of the company's standard stoker. Inside the furnace the following changes have been made: The depth of the retort at its forward end is over double the depth of the retort in the standard stoker, the depth gradually decreasing toward the rear of the stoker until at its extreme rear the depth is practically the same as the retort of the standard stoker. The bottom of the retort is horizontal, while the bottom of the standard stoker is inclined upward slightly.

The self-cleaning mechanism is operated by an auxiliary cylinder *C* located beneath the floor line. However, this cylinder may be placed on the floor line at any accessible point. The operation of this cylinder is controlled by a separate Cole automatic attachment, the same device that controls and properly proportions the fuel and air supply of the stoker proper.

In lieu of the solid dead plates used with the standard stoker

sectional dead plates *A* are used, each section locking into its mate. These dead plates have a longitudinal movement varying from 2 in. to 6 in. or more if desired. They contain rectangular openings for receiving dogs *B*, which are placed at intervals of approximately 9 in. lengthwise of the plates. Beneath each dead plate and actuated by the auxiliary cylinder *C* there are two bars *D* connecting the lower portion of the dogs together to effect a movement of all of the dogs in the dead plates in unison with the movement of the dead plates themselves. Each connecting bar *D* is moved by the lever *E* beneath in unison therewith. The dogs give an upward and downward motion to the refuse which accumulates on the dead plates. They thereby assist the forward motion of the clinker on the dead plates at the time when the dead plates are moving

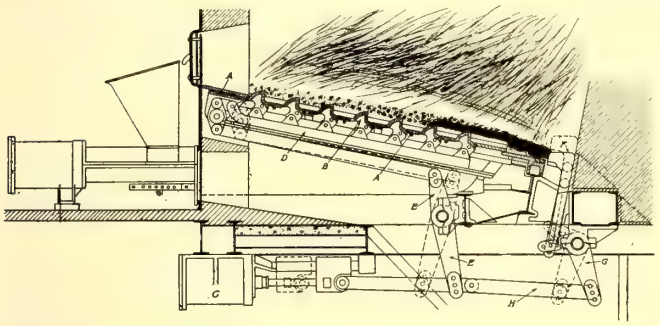


Fig. 1—Longitudinal Cross Section Through the Furnace

longitudinally forward. The dogs, the dead plates and the refuse breaker begin operating at the same time and remain in unison. The movement of the refuse breaker first is upward so that the clinker which is farthest downward and forward from the dead plates extends beyond the end of the retort proper under the refuse breaker *F*.

When these three parts have completed their forward and upward movement they return to the starting point and are again placed in operation automatically by means of the auxiliary cylinder *C*. The lever *G*, operated by the connecting bar *H*, which also operates the lever *E*, directly controls the movement of the refuse breaker *F*. When the dead plates are

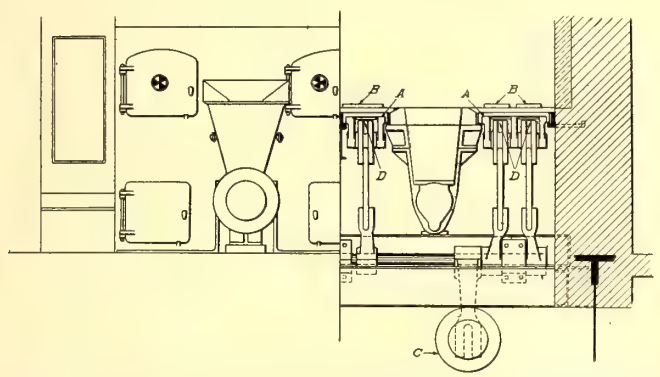


Fig. 2—Vertical Cross Section Through the Center of the Furnace, Showing the Self-Cleaning Mechanism

at rest the backs of the dogs lie flat in the dead plates to present a smooth surface for the refuse.

The complete cycle of operation may be described as follows: When the cleaning stroke begins the noses of the dogs rise above the dead plates about 1½ in., facing the bridge wall; the dead plates themselves do not move until the dogs have risen to their extreme stroke, when the plates and dogs move forward to the end of their travel, carrying the refuse a predetermined distance. The upward movement of the refuse breaker is completed when the dogs and dead plates are at their extreme forward position. On the return stroke of the moving parts the dogs first return to their normal position level with the dead plates. The dead plates then start on their return movement, as does the clinker breaker, carrying with it such refuse as may be of sufficient solidity as not to have fallen into the ashpit. The entire cycle described is accomplished by one forward and one backward movement of the auxiliary cylinder piston. To produce a shearing motion the cutting face of the refuse breaker is set on a slight angle with the lower cutting edge of the dead plate at the rear of the stoker retort proper. The normal position of the clinker breaker is down, so that its top is about level with the rear dead plate.

DATA DERIVED FROM STOKER TESTS UNDER ONE 360-HP BOILER.

Date, (1910)	July 28.	Aug. 19.
Boiler	One 360-hp Heine	
Duration of test (hours)	5.	5.
Coal	Enterprise, Ia.	Enterprise, Ia.
Steam gage (lb.)	143.6	151.
Blast gage (in.)	1.65	1.8
Furnace draft (in.)	.194	.13
Stack draft (in.)	.65	.60
Feed water temperature (deg. Fahr.)	75.	74.
Uptake temperature (deg. Fahr.)	628.	698.
Total coal (lb.)	16,698.	12,000.
Coal per hour (lb.)	3,339.6	2,400.
Coal per hour, per stoker (lb.)	1,669.8	1,200.
Total water evaporated (lb)	123,314.	95,288.4
Factor of evaporation	1.1912	1.1923
Equivalent evaporation from and at 212 (lb.)	146,881.	113,621.
Actual evaporation per lb. coal (lb.)	7.38	7.94
Equivalent evaporation from and at 212 per lb. coal (lb.)	8.79	9.468
Horsepower developed	851.	658.
Per cent rating developed	236.	183.
Per cent efficiency	70.7	76.2
Analysis.	Percentage of Coal and Refuse.	
Volatile combustible	42.89	5.98
Fixed carbon	41.78	9.61
Moisture	8.01	0.00
Ash	7.32	84.41
Total	100.00	100.00
B. T. U.	11,996.	2,421.

The frequent agitation of the fuel in the retort by means of the introduction of fresh fuel, and over the dead plates by means of the self-cleaning attachment, is said to insure practically perfect and smokeless combustion. The report of two tests, given above, shows a remarkable increase in capacity with a very low percentage of combustible matter in the ash.

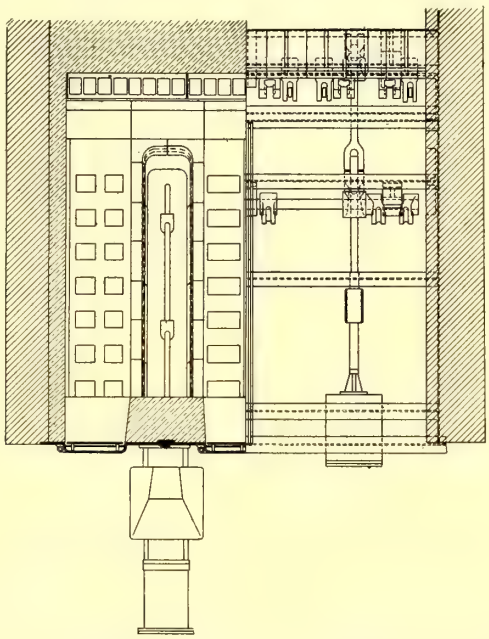


Fig. 3—Half Plan of Furnace and Half Plan of Self-Cleaning Mechanism

The decrease in capacity shown by the test of Aug. 19 is due to the fact that the owners of the plant where the stokers are installed did not desire to have the boiler operated at as great a capacity as was obtained in previous tests.

Arrangements are being made in Pittsburgh for a mammoth "Land Show," which is to be held Oct. 17 to 29. The exhibits will include those of the United States Government, of various States, commercial bodies, irrigation companies, etc.

LONDON LETTER

(From Our Regular Correspondent)

The Lancashire & Yorkshire Railway, encouraged by the success with electricity on its system between Liverpool and Southport, contemplates adopting electricity on the section to Ormskirk. Steam as a motive power is practically superseded by electricity between Maghull and Exchange station in Liverpool. It is stated that the company has in contemplation an electric belt route between Liverpool, Ormskirk and Southport. Current will be carried across country from the power station at Formby.

The daily newspapers have recently had a good deal to say about the tramway jubilee. The first tramway in Europe was opened in Birkenhead on Aug. 30, 1860, the projector being George Francis Train. Mr. Train selected Liverpool as the city in which to introduce tramways in England, but his efforts were not received auspiciously. With the assistance of John Laird, a prominent shipbuilder in Birkenhead, however, Mr. Train established in Birkenhead a standard-gage line 1¼ miles long which was laid with 50-lb. rails. The cars seated 48 passengers and were drawn by two horses. Mr. Train, despite opposition, finally succeeded in obtaining a sanction for an experimental line in London to extend from the Marble Arch along Bayswater Road to Nottinghill Gate. This line was followed by the construction of short lines from the Westminster Palace Hotel to Victoria Station, and from Westminster Bridge to Kensington Park. As all of these lines were equipped with a step rail which proved a hindrance to traffic, the tramways were removed and Mr. Train withdrew to the provinces and constructed a successful tramway in the Potteries district. A few years later acts of Parliament were passed authorizing systems in Liverpool and in the metropolitan area of London, and the beginning was made of the network of tramways in every important town in Great Britain. Two cable tramways were installed in London, one from the Archway Tavern to the summit of Highgate Hill, the other on the Brixton and Streatham Hill. The motive power of the Brixton line was changed to electricity seven or eight years ago, but the motive power on the Highgate Hill line was changed to electricity only recently. In the "Black Country" around Birmingham and Leeds and in many of the Midland towns steam was used as motive power on the tramways, but nearly all these lines have since been equipped with electricity. The overhead trolley system was first installed in England at Leeds in 1891. Bristol was the first city to adopt electricity for all of its tramways. The first electric tramway was not placed in operation in London until 1901, one of the lines of the London United Tramways operating in the western suburb being the first to be equipped with electricity. The horse tramway, though existing here and there in London, is rapidly being succeeded by electricity.

Louis Brennan, Gillingham, Kent, has been awarded the Grand Prix by the Japan-British Exhibition authorities, the highest possible award, for his gyroscopic monorail invention.

The Mersey Railway, which connects Liverpool with Birkenhead and the various residential districts of the Worral peninsula by underground line under the River Mersey, continues to make steady progress. At the recent half-yearly meeting it was stated by the chairman that the receipts had increased during the year nearly £4,000 and that the operating expenses had decreased £5,000. Compared with the half year that the road was operated by steam before electricity was installed the results are very striking. During the last half year that steam was used 3,357,000 passengers were carried. During the half-year recently ended 7,395,000 passengers were carried. The passenger traffic thus increased 120 per cent and the receipts increased £25,183, or 85 per cent.

For the first time since the annual returns of railways have been recorded by the *Blue Book*, the receipts from third-class passengers show a decrease. More than 8,000,000 fewer third-class passengers traveled on the various railways of Great Britain during 1909 than during 1908, and the revenue decreased by nearly £500,000. The decrease is undoubtedly due largely to the fact that the exhibition at Shepherd's Bush in 1909 was not so attractive as the one of 1908. The *Blue Book* also attributes the decrease to tramway competition.

The British Association for the Advancement of Science met this year at Sheffield. Several electrical engineering subjects were discussed. Prof. Danby took the subject of "British Railways" for his presidential address to the Engineering Section. In his opinion electrically operated trains have a decided advantage over steam locomotives where a quick, frequent service is required over a comparatively short line, due principally to the ability of the electric train to accelerate rapidly. Philip Dawson presented a paper describing the main features of the South London Elevated Electric Railway, frequently referred to in these columns. E. W. Cowan presented a paper, "Economic Science and Statistics," dealing chiefly with electric tariffs and the manner of charging for electric current. The committee on electrical standards presented a report which showed the progress that had been made the last year, and Mr. Wimperis described an accelerometer invented recently for measuring road resistance. This instrument was constructed by Elliott Brothers. Other papers on electrical subjects were read by Dr. Sand, of Nottingham University, and by Prof. S. P. Thompson. The subject of Prof. Thompson's paper was "Electro-Mechanics."

Arbitration has been resorted to between the Torquay Tramways Company and the Torquay Corporation. The Board of Trade has refused to renew the license for the Dolter system on the nine miles of track in Torquay, and the company is anxious to substitute the overhead system. The Torquay Corporation, for esthetic reasons, has refused to allow the overhead system and hence the arbitration. From the evidence it would appear that the operation of the Dolter system in Torquay has been very costly and that the service since the installation of the system has been very unsatisfactory on account of breakdowns.

The ninth annual conference of the Municipal Tramway Association was held in August at Bradford. Members and friends were received by the Lord Mayor in the Town Hall. After the presidential address by C. J. Spencer, general manager of the Bradford Tramways, a paper entitled "The First Decade of Municipal Tramway Working" was read by Alderman S. Flint, Leicester. Luncheon was tendered by the Corporation in the banquet hall of the Town Hall. After lunch Mr. Dawson, Bradford, read a paper, "The Comparative Durability of Brake Shoes and Tires." The second day of the conference was devoted to a paper, "Tramways in Relation to Town Planning," by A. Baker, Birmingham, and a report, "Lubrication of Car Bearings," by E. Cross, R. L. Acland, P. J. Pringle and T. R. Smith. In the afternoon special cars conveyed the members and friends to Halifax via Queensbury. Tea was served by the Corporation of Halifax at the Town Hall. In the evening the annual dinner was held, and the last day was as usual devoted to pleasure, a special excursion being arranged to Bolton Abbey and Ilkley.

A. C. S.

Sustaining the contention of the Hudson & Manhattan Railroad that the assessment of its franchises and property at $6,900,000 is too high, Judge Le Boeuf, of the Supreme Court of New York, in an opinion of considerable length, values the intangible property of the company at $1,753,244 and the tangible property at $2,287,671, a total of $4,040,816. Taking into account that "other real estate in New York City was locally assessed at 89 per cent of the full valuation," he makes a reduction of 11 per cent, leaving the company liable to taxes on an assessment of only $3,596,326. In reaching his conclusions as to total valuation Judge Le Boeuf says: "The relator's tunnels in New York, when completed, were to be 9.8 miles in length. This was a structure which was figured to produce $900,000 gross earnings. Four and four-tenths miles was the equivalent of completed structure at the time of the making of the assessment. Taking the proportionate part which this bore to the whole enterprise, the net earnings of the completed portion would have been estimated to be $404,081.61. Sixty per cent of this, or $242,448.96, would be the net after deducting operating expenses and taxes, but not deducting the return upon tangible property. Capitalizing this sum at 6 per cent, the resulting $4,040,816.12 would represent on a basis of 6 per cent a fair valuation of the tangible and intangible property, based upon the earning power of the whole enterprise. This will doubtless include rolling stock, but as no figures for deduction are given the disadvantage must be the relator's."

News of Electric Railways

Transit Affairs in New York

The Public Service Commission of the First District of New York has called a public hearing for Oct. 1, 1910, to consider the proposition made by the Interborough Rapid Transit Company, New York, on June 10, 1910, to third-track the Second, Third and Ninth Avenue elevated lines and to make certain additions to its system and to put into operation of the Steinway Tunnel. A number of conferences have been held recently between representatives of the commission and representatives of the company concerning various details of the proposal.

In a statement issued on Sept. 27, 1910, W. R. Willcox, chairman of the commission, says:

"These conferences have now reached the point where apparently it is possible for the commission to take immediate action upon the application of the company to the end that such additions to transportation facilities be made. Before taking the matter up, however, for formal action the commission is desirous of giving the public an opportunity to present its views for or against the additions and extensions asked for by the company.

"The Steinway Tunnel is probably that part of the subject which will arouse most interest. The proposition of the Interborough Rapid Transit Company is that the commission will lay out a rapid transit route extending from near Vanderbilt Place under Forty-second Street and the East River to a point near Jackson Avenue, in Long Island City, following the present line of the Steinway Tunnel; that the company will turn the title of this over to the city and then agree to operate it under the terms of Contract No. 1, which governs the operation of the present subway from City Hall northward. The city is to pay only the amount necessary to complete the tunnel ready for operation, including a connection with the Grand Central Station, which amount is estimated not to exceed $1,500,000.

"Even this amount, of course, will be amortized as well as interest paid by the company, the same as the company amortizes and pays interest on the money invested by the city in the present subway. The company will then operate the tunnel as an integral part of the present subway system—that is, passengers will be allowed to transfer without additional fare between the subway and the Steinway Tunnel at Forty-second Street.

"As to the connection with the Queensboro Bridge, the company agrees to operate Second Avenue elevated trains to the Long Island City Bridge Plaza without additional fare."

The Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad have petitioned the Public Service Commission for a rehearing in the case of the application of the Manhattan Bridge Three-cent Line for a certificate of convenience and necessity. In their petition for the re-hearing the companies say:

"The evidence establishes the fact that the new company on completing its franchise will be unable to acquire by voluntary contract the legal right to operate the principal portion of its route and will not have the legal ability to acquire such right compulsorily and, therefore, it will be unable to operate any portion of its route and will stand helpless, a mere paper corporation, for the indefinite and probably the permanent future, unable to raise any funds for construction purposes, because of its inability to operate if construction should be completed."

Henry B. Seaman Resigns as Chief Engineer of the Public Service Commission

Henry B. Seaman, who has been chief engineer of the Public Service Commission since its organization, in 1907, announced on Sept. 23, 1910, that he had resigned. He sent to the commission a letter, in which he stated that the engineering department of the commission had become completely demoralized through interference with details of its management; that he had been expected to approve drawings for the Broadway-Lexington Avenue subway against his professional opinion and to sign drawings which he had prepared under protest. In his letter of resignation Mr. Seaman said:

"The disposition to control and direct the detailed management of the engineering department without regard to recommendations of the chief engineer has led to its utter demoralization. This disposition to supersede the engineer culminated during your recent visit to Europe, when I was expected to approve drawings regardless of my professional opinion, and to recommend the adoption of plans which I had previously made under protest. There should, in my opinion, be individual responsibility at the head of every department, and proper help and full authority for outlining and conducting its work. Without this no great public work can be successfully performed."

After the letter of Mr. Seaman to the commission had been made public, Acting Chairman McCarroll issued a statement, in part as follows:

"The resignation of Mr. Seaman was asked for by the commission some time ago; consequently his letter should be read in that light. Months ago, when the triborough plans were approaching completion, the commission considered that because of their importance they should be most carefully studied. Commissioners Maltbie, Bassett and Eustis were appointed a committee and were aided by consulting engineers. This review of the plans was resented by Mr. Seaman. Unity and hearty co-operation in the force were lessened by the attitude taken by Mr. Seaman and by what the commission felt was lack of executive ability. Conditions finally, however, became such that the commission felt it necessary to ask for the resignation of its chief engineer. As a matter of fact, for over a month Mr. Seaman has been on leave of absence, and Alfred Craven has been acting chief engineer. Immediately on receipt of the letter from Mr. Seaman he was suspended and relieved from all duties as chief engineer."

George S. Rice, who was chief engineer of the Rapid Transit Commission and continued with the Public Service Commission in charge of the Brooklyn extension of the Interborough Rapid Transit Company and the arbitration on that company's claims for extras under Subway Contract No. 1, has tendered his resignation. The commission issued the following statement in explanation of Mr. Rice's resignation:

"The resignation of Mr. Rice as chief of the bureau of subway construction has nothing to do with the situation as to Mr. Seaman. Mr. Rice resigned voluntarily. He made the original determination on the $6,000,000 claims filed by the Interborough Rapid Transit Company and felt that as long as they were in litigation he should stay with the commission to help sustain its case. In view, however, of the favorable settlement of the matter in the Saratoga conference, he felt that he could now resign."

It is understood that Alfred Craven, who is now acting chief engineer of the commission, will be appointed chief engineer to succeed Mr. Seaman.

Columbus Strike

E. K. Stewart, general manager of the Columbus Railway & Light Company, conferred on Sept. 20, 1910, with the representatives of the employees of the company who are on strike. The men agreed to waive the questions of the recognition of the union and wearing union buttons while on duty on condition that the company re-employ all the men on strike. Mr. Stewart informed the men that he could not comply with this condition, as there were now only 125 to 150 positions open, the remainder having been filled permanently with new men. He would, however, consider individual applications from former employees for re-employment.

There has been an absence of disorder recently and the people have felt no anxiety about using the cars both day and evening. The temporary injunction issued by Judge Dillon and continued by agreement has stopped soliciting at the depots and the distribution of circulars vilifying the company.

Damage suits to the amount of $20,000 have been filed

against Franklin County, in which Columbus is located, by men injured while operating cars during the period of disorder.

Fifty representatives of labor organizations of Ohio met on Sept. 21, 1910, to discuss the strike. Previous to the meeting a committee was sent to Governor Harmon to request him to declare publicly for arbitration. He told the committee that he had been working privately to bring about a settlement, but that his province, as he saw it, did not warrant a public declaration. He was also requested to make public the steps which he had taken toward bringing about arbitration, but it was announced from his office that no statement would be made. A resolution introduced at this meeting condemning Governor Harmon for his attitude was tabled. Members of all the organizations represented at the meeting will be asked to contribute weekly, if possible, to the cause of the men on strike, and it was agreed that efforts should be made to finance the automobile transportation company which has been organized by the strikers to operate in opposition to the company.

On Sept. 24, 1910, petitions were filed with the Governor asking him to remove Mayor Marshall on the charge of gross misconduct in office in connection with the strike. Mr. Long, secretary to the Governor, stated that the petitions would not be considered as formally filed until the Governor returns to the city from his campaign trip.

The grand jury has found true bills against 13 men for throwing stones at street cars and two for obstructing cars. The jury is still at work, and charges may be brought against some of the other men under investigation. With few exceptions, the invitation issued to the people of Columbus to appear before the grand jury and testify against offenders has not been accepted.

Earnings of Cleveland Railway for August

The report of the Cleveland (Ohio) Railway for August, 1910, shows that the operating expenses exceeded the allowance of 11.5 cents per car mile, provided for in the Tayler ordinance, for the first time since the new franchise became effective in March, 1910. The increase in wages caused an operating deficit of $2,567, whereas there was a surplus of $2,260 in July, 1910. The company carried 21,226,354 passengers in August, which is the largest number in the history of the company and 452,103 more than in July, 1910. The car-mileage was 2,416,152 miles, or 31,851 miles more than in July, 1910, also a new record. The deficit for August, 1910, was $7,036.73, as compared with $7,769.76 for July, 1910. The report for August, 1910, follows:

Gross earnings	$554,055
Operating expenses	422,827
Net earnings	$131,228
Miscellaneous earnings	3,190
	$134,418
Taxes	$28,259
Interest	113,195
Deficit	$7,036

J. J. Stanley, president and general manager of the Cleveland Railway, said that the deficit of $2000 or over in the operating fund was caused by the increase in wages. This excess will be paid out of a surplus accumulated during previous months.

Franchise Rental Suit in Detroit

Corporation Counsel Hally, of Detroit, has filed a bill in equity in the Circuit Court at Detroit to enforce the payment of the $200 a day which, it is claimed, is due from the Detroit United Railway in rental of the Fort Street lines, on which the last franchise is alleged by Mr. Hally to have expired on July 24, 1910. The company has been paying $300 a day for the use of other streets under the original resolution of the Council, but has refused to pay the increased amount, the arrearages totaling $14,700, including Sept. 15, 1910. The bill demands that the company be declared to have accepted the terms of the various resolutions increasing the rental and compelled to pay the amount due and to be due, or be compelled to abandon the operation of cars on the Fort Street line. The bill quotes the language of the company denying that its rights have expired in the streets involved and continues:

"Its position and claim by way of a denial of the expiration of the said franchise rights constitutes a wrong and an irreparable injury to your orator, and clouds your orator's title of control of said street, which it is lawfully entitled to enjoy, and embarrasses your orator in dealing with other operators of street cars who wish to operate cars in Detroit on said streets on terms more favorable to the traveling public."

Mr. Hally has been notified that the suit started by several Detroit citizens to test the legality of the municipal ownership vote will be heard by the court on Oct. 10, 1910, and it is thought likely that a decision will be rendered by the court in time for the question of a constitutional amendment authorizing municipal ownership to be presented to the voters at the election in November.

The Common Council of Detroit has adopted the recommendation of the committee on franchises that the corporation counsel be instructed to draw up and submit at the earliest date possible an ordinance which will permit the Michigan United Railways to operate in Detroit.

San Francisco Municipal Railway

On Sept. 12, 1910, Judge Van Fleet in the U. S. Circuit Court, San Francisco, Cal., issued an order restraining the city from building the contemplated municipal railway along the proposed routes, with the exception of five blocks on Geary Street, which the city may use. The court decided that the city has no right to use Market Street from Geary Street to the terminus of the ferry from Oakland for the municipal railway, nor to use the nine blocks on Point Lobos Avenue now occupied by the United Railroads. With these exceptions, the city may build on Point Lobos Avenue and Geary Street to Kearney Street. The ordinance for the sale of the bonds must be taken as the intention of the municipal authorities to build the road along the route stated in the ordinance, and the route cannot be changed unless by referendum. In his decision Judge Van Fleet said:

"I am satisfied that the rights of both parties to this action should be brought to an early determination. The city does not want to go ahead and build a road that may be stopped by legal defects. I have therefore determined not to sustain the demurrer entered by the city to this petition. This matter should be carried to the highest court. In the meantime the city can go ahead and build its road with the exception of those blocks where there is a conflict of claims. I shall not stop the sale of the bonds nor interfere with the completion of the road from Kearney Street out Geary Street to Tenth Avenue to the park and from Tenth Avenue out to Thirty-third Avenue. If in the meantime any arrangements can be made with the United Railroads to use nine blocks of its tracks near the western terminus or a way selected to avoid the clash, there need be no delay in the construction of that part of the system."

The committee on public utilities of the Board of Supervisors of San Francisco has recommended to the board that $5,000 be immediately appropriated out of the available bond issue fund for use by the Board of Public Works and the city engineer in preparing plans and specifications for the construction and operation of the proposed municipal railway over the route formerly operated by the Geary Street, Park & Ocean Railroad. An ordinance has also been passed authorizing the Board of Public Works to enter into contracts for rails for the proposed road at a cost not to exceed $130,000.

Association Meetings

Central Electric Railway Association.—Dayton, Ohio, Dec. 1.

Central Electric Traffic Association.—Toledo, Ohio, Oct. 18.

Oklahoma Public Utilities Association.—Oklahoma City, Okla., Sept. 30 and Oct. 1.

American Street & Interurban Railway Association.—Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

Eliminating Grade Crossings on Long Island.—The Long Island Railroad has accepted the proposal of the city of New York with regard to the improvements to be made on the line between Woodside and Winfield in Queens. In return for a contribution from the city of $450,000 the Long

Island Railroad is willing to eliminate all grade crossings on its present line between Winfield and Jamaica Avenue, near Dunton, on its Montauk division through Richmond Hill, and on its main line through a part of Jamaica, all of which are electrified.

Opening of the McKinley Bridge at St. Louis.—A preliminary trip was made across the McKinley Bridge of the Illinois Traction System at St. Louis on Sept. 20, 1910, preparatory to establishing regular service over the structure on Oct. 1, 1910. The wires had not been strung on the bridge and a dummy engine was used to haul the interurban car from East St. Louis, Ill., to the approach to the bridge in St. Louis, Mo., whence the car proceeded with its own power to Twelfth Street and Franklin Avenue. The bridge was described in the Electric Railway Journal of Jan. 22, 1910, page 138.

Annual Banquet of the Suburban Railway Club.—The annual banquet of the Suburban Railway Club, composed of employees of the Boston Suburban Electric Companies, Newtonville, Mass., was held at Norumbega Park, Auburndale, Mass., at night, on Sept. 21, 1910. About 150 persons were present. George M. Cox, assistant treasurer of the Middlesex & Boston Street Railway, who is president of the club, presided. Among the speakers were Mayor Walker, of Waltham; Carl Alberte, manager of Norumbega Park, and Carl A. Sylvester, general manager of the Boston Suburban Electric Companies, who told about his experience during an aeroplane flight in the recent Harvard-Boston aviation meet.

Secretary Appointed for National Stock and Bond Commission.—William E. S. Griswold has been appointed secretary of the new stock and bond commission consisting of Arthur T. Hadley, president of Yale University; Frederick N. Judson, St. Louis; Frederick Strauss, New York; Walter L. Fisher, Chicago, and Prof. B. H. Meyer, Madison, Wis., selected by President Taft on Sept. 3, 1910, to investigate the question of bringing future issues of railroad securities under the supervision and control of the Interstate Commerce Commission. Mr. Hadley sailed for Europe on Sept. 23, 1910, in the interest of the commission. It is expected that regular sessions of the commission will be held in Washington beginning with the week of Nov. 28, 1910.

Franchise Renewal Ordinance in Dayton.—An ordinance for the renewal of the franchise of the Dayton (Ohio) Street Railway has been presented to the Council of Dayton. Fourteen years are yet to run on the present franchise of the company. In the new ordinance the company asks for an extension by double tracks commencing on Lorain Avenue at Bowen Avenue in the eastern part of the city and looping to Linden Avenue by a private right of way. The grants are requested subject to all the previous conditions and limitations of the franchise. The company offers to pay, beginning March 1, 1911, and for two years, an annual income of 1 per cent of its gross receipts. This amount is to be increased by one-half of 1 per cent annually after the first two years until the percentage amounts to 3 per cent of the annual gross receipts. In addition the company offers to open and dedicate for street purposes its private right of way between Lorain Avenue and Linden Avenue. The ordinance has been referred to the committees on improvements, street railways and law. The company has also voluntarily agreed to sell seven tickets for 25 cents. In its application to the Council the company says: "To facilitate the original plans of the company, we were compelled to purchase a certain franchise, granted to another company in 1899, and which had become practically useless to the company owning it, and this franchise, having only 14 years to run, is the municipal grant under which the Dayton Street Railway occupies the streets and public places and conducts the operations incidental to its business. It must be plain to you, as it is certainly to this company and its stockholders, that it is exceedingly difficult, if not impossible, to market securities to meet the extraordinary cost of extensions, betterments, street paving burdens and other pressing obligations, in a rapidly growing city, with a franchise limitation of 14 years, and we do feel that our request should appeal to your sense of fairness and justice, that this local enterprise may be placed, in so far as the law will permit, upon a relatively equal basis with other organizations in the same line of business."

Financial and Corporate

New York Stock and Money Market

September 27, 1910.

There has been evidence of returning life in the stock market during the last week, although transactions are still below normal and advances in price have been unimportant. There is undoubtedly a better sentiment generally in Wall Street. Interborough-Metropolitan issues continue to be among the most active and are being traded in near the top levels.

In the bond market there has been considerable improvement. Inquiries are rather plentiful and the volume of trading is larger. The position of the money market is not changed. Rates to-day were: Call, 1⅞ to 2¼ per cent; 90 days, 4¼ per cent.

Other Markets

During the week trading in Rapid Transit stock on the Philadelphia Exchange has been fairly active. As there seemed to be more disposition to buy than to sell, the price has advanced about 1 point. Other tractions have been less active.

In the Chicago market the prices of various series of Chicago Railways certificates have not improved materially and the trading has been confined mostly to small lots.

Massachusetts Electric issues again show activity in the Boston market. The price for the common has advanced 2 points, while that of the preferred is practically unchanged. Boston Elevated is active at a slight advance.

In Baltimore there has been some buying of the certificates of the United Railways during the week, the prevailing price being in the neighborhood of 15. The bonds continue to be active at former quotations.

Quotations of various traction securities as compared with last week follow:

	Sept. 20.	Sept. 27.
American Railways Company	a43½	a43¼
Aurora, Elgin & Chicago Railroad (common)	a46	*46
Aurora, Elgin & Chicago Railroad (preferred)	a85¼	85¼
Boston Elevated Railway	127	129½
Boston & Suburban Electric Companies	*15	a14¼
Boston & Suburban Electric Companies (preferred)	*74	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	35	*35
Brooklyn Rapid Transit Company	74⅜	76¼
Brooklyn Rap. Transit Company, 1st ref. conv. 4s	83	84
Capital Traction Company, Washington	a131½	a130
Chicago City Railway	a102¾	*102¾
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a65	a63
Chicago Railways, ptcptg., ctf. 2	a15	a16½
Chicago Railways, ptcptg., 3	a8	a8
Chicago Railways, ptcptg., ctf. 4	a4¼	a5
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	*73	a73
Consolidated Traction of N. J., 5 per cent bonds	*104	a104
Detroit United Railways	*45	*45
General Electric Company	142½	145
Georgia Railway & Electric Company (common)	a111	a116
Georgia Railway & Electric Company (preferred)	*86	a86½
Interborough-Metropolitan Company (common)	21	20⅞
Interborough-Metropolitan Company (preferred)	55¼	55⅞
Interborough-Metropolitan Company (4½s)	81¼	81⅞
Kansas City Railway & Light Company (common)	a26	a23
Kansas City Railway & Light Company (preferred)	a79½	a79
Manhattan Railway	135	138
Massachusetts Electric Companies (common)	a18	a18¾
Massachusetts Electric Companies (preferred)	a82	82½
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a62	a62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	64⅞	67½
Northwestern Elevated Railroad (common)	a18	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a44¾	a45
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a17¾	a18⅛
Philadelphia Traction Company	a82	82
Public Service Corporation, 5 per cent col. notes	95	a95
Public Service Corporation, ctfs	101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	58	59
Third Avenue Railroad, New York	9¾	9⅞
Toledo Railways & Light Company	*7	8¼
Twin City Rapid Transit, Minneapolis (common)	110⅜	111¼
Union Traction Company, Philadelphia	a42¾	a43¼
United Rys. & Electric Company, Baltimore	14¼	14¼
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	56	56
Washington Ry. & Electric Company (common)	a32¼	a33
Washington Ry. & Electric Company (preferred)	a88	a89
West End Street Railway, Boston (common)	a88	a84
Westinghouse Elec. & Mfg. Company	60	62½
Westinghouse Elec. & Mfg. Company	60	62½
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	*125

a Asked. * Last sale.

Annual Report of the American Railways Company

Gross earnings of the subsidiary companies of the American Railways Company for the fiscal year ended June 30, 1910, were $3,431,039, an increase of $242,999, or 7.62 per cent over the previous year. The report of the American Railways Company, whose income is derived chiefly from the subsidiary companies, compares as follows:

Year ended June 30:	1910.	1909.	1908.
Gross income	$693,678	$527,114	$498,758
Expenses, taxes, interest, etc.	340,385	216,385	171,645
Net income	$353,293	$310,729	$327,113
Dividends	342,072	305,706	305,706
Surplus	$11,221	$5,023	$21,407

J. J. Sullivan, the president, says in the report:

"The total number of passengers carried was 76,572,106, showing an increase of 4,579,007, or 6.31 per cent.

"The surplus account as of June 30, 1909, was $504,703, and the addition of the gain as of June 30, 1910, makes your surplus stand at the end of the fiscal year $515,924.

"The fire insurance fund has been increased in the sum of $19,205, making the amount in that fund $200,512.

"The accident insurance fund has decreased during the year $6,181, leaving a balance to the credit of that account of $30,984.

"During the year this company bought the control of the Johnstown (Pa.) Passenger Railway Company by purchasing 38,000 of the 40,000 shares of stock of that company, paying for it by issuing $1,500,000 5 per cent collateral trust bonds and 16,511 shares of the American Railways Company stock. Shortly after the purchase a lease was made to a responsible corporation, giving it an option of purchase under which your company receives a satisfactory rental and in case of sale a substantial profit.

"We bought during the year the Roanoke Traction & Light Company, of Roanoke, Va., also the Lynchburg Traction & Light Company, of Lynchburg, Va., paying for them by issuing $987,500 5 per cent collateral trust bonds and 10,850 shares of stock of the American Railways Company. Both of the Virginia properties are the owners of large water powers on the James and Roanoke rivers, from which they obtain more than 90 per cent of the power used by them.

"During the year the growth of the business warranted the expenditure of considerable money to add to the facilities for improving the service and adding to its reliability. Many things were done, such as additional sidings, lengthening existing sidings and supplying additional feeders, both copper and aluminum, to enable the cars to be operated successfully on holidays and in times of excessive load.

"There has been expended for construction and equipment on the different properties a total of $635,499.

"During the year we formed the Peakland Corporation, with a capital stock of $50,000, to acquire and own real estate in the vicinity of Lynchburg, Va., the American Railways Company subscribing for the entire capital stock of that company. The DuPage Construction Company, of Illinois, was dissolved and its assets taken over by the American Railways Company."

Discussing the affairs of the subsidiary companies Mr. Sullivan says, in part:

"Altoona & Logan Valley Electric Railway.—During the year the wages of our employes were increased 7½ per cent. This applies to all departments.

"As a result of the test of the bonding with the test car, 1966 bonds were replaced with new ones. During the year the company entered into a contract with Herrick & Stebbins, of New York, for the installation of a system developed by them for the testing of the track bonding, and purchased a set of bond-testing equipments, which can be used on all of our properties.

"People's Railway Company, Dayton, Ohio.—In reviewing the operation of the road for the fiscal year just closed, we find a substantial increase in gross receipts over the previous year, due to improvement in general business conditions and growth of the city. There has been an increase in the wages of trainmen, which became effective May 1 last. The new schedule increased the payroll approximately $800 to $900 per month or about $10,000 per annum. An increase in the wages of other employees has been made in order to retain the men in our service.

"Chicago & Joliet Electric Railway Company.—The results obtained from operation for the past year are not satisfactory. The receipts were affected by the severe weather during the months of December, January and February. Heavy snow and ice storms occurred during the winter, and for a period of between seven and eight weeks the road was blocked for hours at a time, due to the heavy snow and ice, which severely overtaxed the electrical equipment, damaging it to such an extent as to make it necessary to employ additional help in the shops to make repairs. The insulation on the motors was baked to such an extent, due to overloading, that they are gradually breaking down, and when breakdowns occur it is necessary to renew the entire windings. The gross receipts for the year show an increase of 8.6 per cent, while operating expenses have increased about 19 per cent, 11 per cent being due to extra maintenance and 8 per cent to conducting transportation.

"Springfield (Ohio) Railway.—The business has shown a substantial increase in gross receipts due to the improved working conditions in the city. The operating expenses have increased to a considerable extent, due to the high price of all materials and the higher wages which we have paid in order to hold our employees. This, with the increase which it was necessary to spend on the maintenance of the equipment, accounts for the high operating cost.

"Scranton Railway.—In 1909 an agreement was entered into between the Scranton Railway and the Scranton, Dunmore & Moosic Lake Railroad, providing for the electrification of the Moosic Lake road from its terminus in Dunmore to Moosic Lake, a distance of approximately 9½ miles, and after the work was completed, the taking over of the latter road by the former under an operating lease. Subsequently an agreement was made in which the Scranton Railway Company undertook to electrify the road at cost plus 10 per cent. The estimated cost to do this work as outlined was $100,000. Work was begun in the early spring and has been pushed as rapidly as possible.

"Bridgeton & Millville Traction Company.—For the fiscal year the company shows a slight increase in gross earnings of about 2½ per cent, and in operating expenses about 2¾ per cent."

Annual Report of the Northwestern Elevated Railroad

An increase of $91,155, or 3.59 per cent, was made in the gross earnings of the Northwestern Elevated Railroad, of Chicago, in the year ended June 30, 1910, as compared with the previous year. Earnings and expenses for two years were as follows:

Earnings, year ended June 30:	1909.	1910.
Passenger earnings	$1,913,515	$1,969,833
Other earnings (including loop net earnings)	627,368	662,205
Total earnings	$2,540,883	$2,632,038
Operating expenses:		
Maintenance of way and structure	$45,037	$56,435
Maintenance of equipment	147,045	149,593
Conducting transportation	699,843	737,671
General expenses	103,893	111,987
Total operating expenses	$995,818	$1,055,686
Net earnings	$1,545,065	$1,576,352
Charges:		
*Taxes	$261,846	$244,379
Bond interest	848,852	944,100
Other interest	78,590	11,775
Total charges	$1,189,288	$1,200,254
	$355,777	$376,098
Dividends:		
Dividends on preferred stock	.....	150,000
Surplus for year	$355,777	$226,098
Ratio of operating expenses to earnings (excluding loop net earnings)	49.82	51.25
Ratio of operating expenses, loop account and taxes to earnings (excluding loop net earnings)	68.24	68.49

* Includes compensation to city on account of loop. Reserve for maintenance has been kept at $250,000.

M. B. Starring, the president, says in the report:

"The total expenses increased $59,867, or 6.01 per cent. This increase was due:

"(a) To an increase in car miles from 12,034,490 in 1909 to 12,550,306 in 1910.

"(b) To increased expenditures for maintenance.

"(c) To an increase of $5,524 in the 'damage' account. During the current year the company paid out $11,244 for

accidents occurring during preceding years, which amount was charged against the $25,000 'reserve for damages' set up last year. The company, however, to maintain this reserve at $25,000 charged a like amount to 'general expenses' and credited 'reserve for damages' therewith, thus maintaining intact the amount heretofore established for said reserve. Were it not for the conservative method of caring for future disbursements on this account, 'general expenses' would have decreased.

"From the accident of May 18, 1909, have arisen 232 claims, of which 208 have been terminated, leaving outstanding 16 claims for which no suit has been brought, and eight claims upon which suit has been brought. The progress of adjustment of these claims has been satisfactory.

"On May 31 the contract between the company and its employees, in force for the past year, expired, and a new contract is now being negotiated, which negotiation will probably result in such an increase in the wage scale as seems fair, taking into consideration the increased cost of living and the wage increases granted by railroads in general.

"The physical condition of the property has, as customary, been properly and conservatively maintained.

"Twenty additional motor equipments have been ordered and will be delivered during the coming year. It was the intention at the time these motors were purchased to purchase 20 combination motor cars, complete; but the bids on car bodies and equipment other than motors were so high and showed such a great increase in cost over the cost of those hitherto purchased that it was decided that the company would for the present do without the additional equipment.

"The territory along the Evanston line continues to develop and during the year 2,980,087 10-cent fares were collected from that zone covered by the 10-cent fare, an increase of 101,186 of such fares over the preceding year.

"The North Water Street terminal shows a steady growth, and as high as 2732 passengers have been carried from this station during the evening rush hours, an increase of 591 passengers over the highest number carried during the same hours in the preceding year. This service is a model one, the only six-car trains operated on an elevated railroad in Chicago being operated from this station."

The daily average number of passengers carried in the 1910 fiscal year was 117,301, an increase of 5094, or 4.54 per cent, over the preceding year.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been postponed from Oct. 18, 1910, to Nov. 16, 1910.

Lake Shore Electric Railway, Cleveland, Ohio.—The directors of the Lake Shore Electric Railway have declared operative the plan which provides for the exchange of the original $3,000,000 of 5 per cent cumulative preferred stock of the company for a new issue of $1,000,000 of 6 per cent cumulative preferred stock and $2,000,000 of 5 per cent non-cumulative preferred stock on the basis of one share of the new 6 per cent cumulative stock and two shares of the new 5 per cent non-cumulative stock for three shares of the original 5 per cent preferred stock.

Metropolitan Street Railway, New York, N. Y.—The plan of reorganization of the Metropolitan Street Railway has been unofficially filed with the Public Service Commission of the First District of New York. The following statement in explanation of this action by the company is attributed to a banker who is closely identified with the reorganization proceedings: "In taking our plan to the commission at this time we merely ask their opinion and suggest that they go over the entire plan and point out whatever changes they think necessary. After the commissioners have studied carefully the proposition and made their changes, we will then take back the plan, incorporate the suggestions of the commission and then file it officially with them for public hearings." Judge Lacombe, in the United States Circuit Court, has denied a motion by the contract creditors of the New York City Railway that preference be given to their claims as regards immediate payment out of the proceeds of the settlement which Receiver Ladd of the New York City Railway negotiated with the Metropolitan Securities Company and its former directors. There are about $1,130,000 of the contract claims which have been approved by the special master appointed by the United States Court. Mr. Ladd has about $6,000,000 available to pay the debts of the New York City Railway.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The Newport News & Old Point Railway & Electric Company has retired with the proceeds of a new loan the $300,000 notes due on March 1, 1910, which were secured by the pledge of bonds with the Continental Trust Company, Baltimore, Md., as trustee. The collateral which had been pledged to secure the original notes was advertised to be sold on Sept. 20, 1910, to satisfy the notes.

Ocean Shore Railway, San Francisco, Cal.—Judge Van Fleet of the United States Circuit Court at San Francisco has fixed $1,000,000 as the upset price for the property of the Ocean Shore Railway, which is to be sold under foreclosure at San Francisco on Oct. 15, 1910. Each bidder will be required to deposit $200,000 in cash. The court has allowed $100,000 for preferred claims against the company, which include $7,500 as compensation to the receiver, $15,000 to the attorney for the receiver, and $12,000 to the Mercantile Trust Company for expenses involved in the foreclosure.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—The Wisconsin Railroad Commission, at the request of the Sheboygan Light, Power & Railway Company, has revoked the certificate of authority granted to the company in January, 1910, to issue $114,000 of 5 per cent bonds to cover the cost of extensions and improvements and has granted the company authority to issue $205,000 of stock, the proceeds of which are to be used to liquidate outstanding indebtedness.

Dividends Declared

American Cities Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Carolina Power & Lighting Company, Raleigh, N. C., quarterly, 1½ per cent, preferred.

Chattanooga Railway & Light Company, Chattanooga, Tenn., quarterly, 1¼ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2½ per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, five-eighths of 1 per cent, common.

Denver & Northwestern Railway, Denver, Col., quarterly, 2 per cent.

Gary & Interurban Railway, Gary, Ind., quarterly, 1 per cent.

Knoxville Railway & Light Company, Knoxville, Tenn., quarterly, 1½ per cent, preferred.

Louisville & Northern Railway & Lighting Company, quarterly, three-quarters of 1 per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, common.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred and first preferred.

Seattle (Wash.) Electric Company, 3 per cent, preferred; quarterly, 1¾ per cent, common.

Syracuse (N. Y.) Rapid Transit Company, quarterly, 1[illegible] per cent, preferred.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

Traffic and Transportation

Don'ts for Conductors and Motormen

W. S. Heaton, claim agent of the Los Angeles-Pacific Company, Los Angeles, Cal., has prepared the following don'ts for motormen and conductors and they have been printed on small cards and distributed among the employees of the company:

DON'TS FOR MOTORMEN

"Don't think you own the street.

"Don't abuse your car in any shape or manner.

"Don't drag your car; either stop or go ahead.

"Don't hit the rig, if it stays on the track all day.

"Don't pay attention to passengers on the front of the car.

"Don't be careless at cross streets; always ring your bell.

"Don't forget there is a speed limit of 20 m.p.h. in Los Angeles.

"Don't start your car with a jerk, or take a curve too quickly; feed the car up slowly.

"Don't take chances with anything or anybody; be sure you are right before going ahead.

"Don't get too near the car ahead; always keep your distance, and stop your car in a safe place to alight.

"Don't talk about your car being late, or about any accident that has happened to any one.

"Don't fail to warn passengers when boarding or alighting from your end of the car, calling out, 'Wait until car stops!'

"Don't forget the bulletin which calls attention to the speed of your car in foggy weather—this bulletin must be strictly obeyed.

"Don't start your car until you have received the signal from the conductor and collector; also look at your entrance and see that the passengers have alighted or boarded the car safely, as the case may be."

DON'TS FOR CONDUCTORS

"Don't be impolite to any one; always treat everybody with respect.

"Don't talk to passengers about accidents, but attend strictly to business.

"Don't let passengers stand outside of gates or on the back or front of the car.

"Don't fail to report all accidents in or near your car, and get plenty of witnesses.

"Don't start your car until all passengers have boarded or alighted safely from your car.

"Don't be in a hurry about starting your car before your passengers are in a place of safety.

"Don't let passengers alight in unsafe places; either back or run your car ahead to a place of safety.

"Don't fail to warn passengers about alighting when car is in motion; call out: 'Wait until car stops!'

"Don't catch hold of signal cord until all passengers have alighted or boarded your car and are in a safe place.

"Don't fail to treat old persons with respect and give them their time to board or alight from car; also persons carrying children.

"Don't forget the bulletins calling your attention to the speed of your car within the city limits, and also the one calling your attention to the speed of your car in foggy weather."

Ruling in New Jersey Regarding Transportation of Police Officers

The Board of Public Utility Commissioners of New Jersey has rendered the following opinion regarding the free transportation of police officers by railways:

"Section 9, Chapter 41, Laws 1910, provides that nothing therein contained shall prevent the free transportation of uniformed public officers while engaged in the performance of their public duties.

"Question is raised as to whether members of the municipal police force known as detective sergeants come within this exception.

"Detective sergeants wear no distinguishing costume. The wearing of such costume would interfere with the performance of, if it did not render nugatory, the work of detection to which they are assigned.

"They wear a badge, as evidence of their authority, which badge, however, is so worn as to be concealed.

"In the judgment of the board these officers are not 'uniformed public officers,' as this designation is employed in the statute, and do not come within the operation of the exception contained therein.

"It may well be that the legislative policy which leads to excepting those members of the police force who are uniformed from the effect of the statutory prohibition should lead to the exception of the non-uniformed members of the force therefrom. With legislative policy the board has, however, no concern. Its powers are confined to the administration of the legislative enactments as it finds them."

Fender Ordinance in Trenton.—The City Council of Trenton, N. J., has passed the ordinance which was introduced in the Council recently to compel the electric railways which operate in Trenton to equip their cars with fenders to be approved by the Mayor.

Pay-as-You-Enter Cars in Syracuse.—The Syracuse (N. Y.) Rapid Transit Railway has announced that on Oct. 2, 1910, it will establish service on its Dudley-East Genesee Street line with 23 new cars built for pay-as-you-enter operation under license from the Pay-as-You-Enter Car Corporation.

Complaint Against Service on Nassau County Railway.—Complaint has been made to the Public Service Commission of the Second District of New York about the service furnished by the Nassau County Railway on its line between the station of the Long Island Railroad at Sea Cliff and the village proper, about a mile distant, on Long Island Sound.

Conference Regarding Wages in Boston.—Representatives of the employees of the Boston & Northern Street Railway and the Old Colony Street Railway, Boston, Mass., conferred with P. F. Sullivan, president of the companies, on Sept. 25, 1910, regarding a new agreement covering wages and terms of service to replace the three-year agreement which expires in October, 1910. The employees have requested a wage increase of about 20 per cent, a nine-hour day and other important concessions.

Instructions to Passengers Regarding Disputes About Fares.—The Los Angeles-Pacific Company, Los Angeles, Cal., has addressed the following notice to the traveling public regarding disputes about fares: "Should the conductor decline to accept transportation tendered, kindly pay fare and have conductor fill in the reverse side of this card. Bring the card, with transportation rejected by the conductor, to the office of traffic manager, room 103 at 431 South Hill Street, Los Angeles, for adjustment. The conductor has no discretionary power in such matters, but is governed by rules of the company which he is not authorized to change."

Protest Against Transfer Changes in Brooklyn.—John J. A. Rogers, a lawyer of Brooklyn, has filed a complaint with the Public Service Commission of the First District of New York against the proposed action of the Brooklyn Rapid Transit Company, in the matter of distributing transfers, and the commission has ordered the company to make answer to the complaint within 10 days. On Sept. 15, 1910, the Brooklyn Rapid Transit Company filed with the commission a new passenger tariff, as noted in the Electric Railway Journal of Sept. 24, 1910, page 483. Mr. Rogers maintains that the proposed regulations are unjust, unreasonable and unlawful and that the company should be compelled to give out transfers at or near the transfer point and not only at the time fare is paid.

Special Fair Folder.—In anticipation of the State Fair at Syracuse the Syracuse (N. Y.) Rapid Transit Railway printed a special folder entitled "Trips by Electric Railway in and Around Syracuse, the City of Opportunity—See Syracuse by Trolley." Thirteen thousand of these circulars were distributed during the fair from Sept. 12, 1910, to Sept. 17, 1910, 10,000 being distributed by the conductors of the company, 1000 being placed in the hotels and 2000 being distributed in the cars of the Oneida Railway, which operates between Utica and Syracuse. The 2000 remaining booklets are being held for future use. The purpose of the folder was to direct strangers about the city. The

company says that these folders were read with interest by the public. The folders cost the company $33.25.

Record for Spokane Lines.—Sept. 5, 1910, Labor Day, was a record day for the Spokane Traction Division of the Spokane & Inland Empire Railroad. This division of the Spokane & Inland Empire Railroad has a trackage of more than 50 miles of city lines and on Labor Day carried more than 85,000 passengers. Sixty-four cars are used on the city lines and the average run per car on Labor Day was 155 miles. The regular Labor Day travel was increased by the patronage of persons in attendance at Buffalo Bill's circus, which showed on the grounds of the railroad company, and at the last game of the season of the Northwestern Baseball League played at Recreation Park, which is served exclusively by the Spokane & Inland Empire Railroad. A one-minute schedule was maintained throughout the afternoon and evening, and this service was augmented in the evening by several trains of the suburban division. The day is reported as a record to date by F. C. Farr, superintendent of the Spokane Traction Division of the Spokane & Inland Empire System.

Details of Service Furnished Utilities Board in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., in response to the request of the Public Utilities Board of Kansas City, has furnished that body with information regarding the maximum number of cars operated daily in Kansas City, according to the schedule in force on Sept. 10, 1910. The list of cars totals 521. There are 51 cars in the shops to be overhauled, and since June 1, 1910, 12 double-truck pay-as-you-enter cars have been added. J. M. Egan, president of the company, is reported to have said: "A few days ago the Utilities Board asked for information giving the total number of cars operated in Kansas City, the number of cars in our shops waiting to be repainted and repaired, and the total number added to the equipment as of June 1, 1910. There was also furnished a schedule showing the number of cars on each line in Kansas City, Mo., in the morning and evening and at noon, the number of trips these cars make, the hours occupied in making the trips, the number of miles run, the time per trip, the schedule speed, and the miles per trip. We also furnished a book which shows the schedule on each line, the hours in which cars commence to run, when their runs end, and the changes in the headway that occur at any time during the day. The officials of the Metropolitan Street Railway do not consider themselves infallible, and we stand ready to meet, assist and aid any parties in improving the service that is now being rendered the patrons of the company."

Destination and Route Signs in Providence.—A. T. Potter, vice-president of the Rhode Island Company, Providence, R. I., has issued the following statement regarding the plan of the company to equip its cars with destination and side route signs: "The Council committee was interested in having signs show only the destination of cars, and requested the company to use them as quickly as possible. The end signs are small and require only one or two words, and they were the first ones painted. We put them on without waiting for the re-lettering of the side signs, in order to meet the views of the Council committee. Then suggestions about the side signs came in, and they were so varied that we took time to discuss their merits. Some passengers want both destinations and routes shown at the sides of cars. Others favor the use of numbers to designate the different routes. So far as practicable, the company is endeavoring to do what the public wants, and when space permits destinations and streets traversed will be painted on the side signs. It should be remembered, however, that there are limitations; if many long words are put on a sign the letters may be too small to be of practical value. Since 1907 the company has been working in the direction of destination signs. The new cars built in 1907 and those delivered last spring show the destinations, and now the signs showing both destinations, instead of the one to which the car is going, are being abolished. The new side signs will be put on the cars as soon as possible, and, while all details have not been definitely decided, the general plan is to show destinations at the sides and the ends of cars. Where routes can be included it is probable that the names of streets and destinations will appear on the side signs."

Personal Mention

Mr. D. B. Clark has resigned as master mechanic of the Cincinnati (Ohio) Traction Company.

Mr. H. L. McNulty has resigned as electrical engineer of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., to engage in business for himself in Waynesboro.

Mr. Frank Belden has been appointed superintendent of the Dover and Somersworth division of the New Hampshire Electric Railways, Haverhill, Mass., to succeed Mr. A. B. Leighton, resigned.

Mr. George L. Ford has been appointed auditor of the Evansville (Ind.) Railways to succeed Mr. F. P. Vogt, whose resignation from the company was announced in the Electric Railway Journal of Sept. 24, 1910.

Mr. Eugene Slingluff, superintendent of shops of the Cincinnati (Ohio) Traction Company, has had his jurisdiction extended to cover the duties of master mechanic, from which position Mr. D. B. Clark has resigned.

Mr. B. J. Schramm, formerly with the Knox Engineering Company, Chicago, Ill., has been appointed superintendent of electrical construction of the Fort Dodge, Des Moines & Southern Railroad, with headquarters at Boone, Ia.

Mr. Andrew F. Gates, for the last five years a member of the Connecticut Board of Railroad Commissioners and at present chairman of the commission, has tendered his resignation to Governor Frank B. Weeks, of Connecticut.

Mr. C. J. Erickson has been appointed superintendent of the railway department of the Texarkana Gas & Electric Company, Texarkana, Tex., to succeed Mr. R. G. Stewart, who has become connected with the Stewart Automobile Company, Memphis, Tenn.

Mr. Guy K. Dustin has been appointed general manager of the Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., to succeed Mr. William Elliott, who has become associated with Mr. R. B. Herbert in the practice of law in Columbia.

Mr. W. C. Forbes, general passenger and claim agent of the Northern Texas Traction Company, Fort Worth, Tex., has been appointed general superintendent of the company to succeed Mr. G. H. Clifford, who has been appointed general manager of the company.

Mr. F. A. Bushnell has been appointed purchasing agent of the United Railways and the Oregon Electric Railway, Portland, Ore. Mr. Bushnell was formerly purchasing agent of the Spokane, Portland & Seattle Railway and the Astoria & Columbia River Railroad.

Mr. John L. Fishback, assistant superintendent of the Louisville (Ky.) Railway, has been elected first vice-president of the Transylvania Casualty Company, Louisville, Ky., which has been organized with a capital stock of $300,000. Mr. Fishback will not relinquish his connection with the Louisville Railway.

Mr. Carl E. Pelz has been appointed by the Public Service Commission of the Second District of New York civil engineer of grade crossings to supervise the work on behalf of the State for the elimination of grade crossings of the New York Central & Hudson River Railroad in the electric zone in Westchester County.

Mr. D. S. Hahn has resigned as treasurer of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., to become assistant treasurer and assistant secretary of the Chattanooga Railway & Light Company, Chattanooga, Tenn., to succeed Mr. J. C. Lightfoot, Jr., resigned, who will return to the home office of E. W. Clark & Company, Philadelphia, Pa., who control both the Lewiston, Augusta & Waterville Street Railway and the Chattanooga Railway & Light Company.

Mr. G. H. Clifford, general superintendent of the Northern Texas Traction Company, Fort Worth, Tex., has been appointed general manager of the company to succeed Mr. H. T. Edgar, who has been appointed general manager of the Seattle (Wash.) Electric Company. Mr. Clifford has been connected with the Northern Texas Traction Company for nine years. He entered the service of the company as a clerk and was advanced from time to time until

his appointment about five years ago to the position of general superintendent of the company.

Mr. George W. Mantz, secretary to Mr. Charles O. Kruger, president and general manager of the Philadelphia (Pa.) Rapid Transit Company, has had delegated to him in addition to his duties as secretary to Mr. Kruger most of the work of the welfare department of the company, the work connected with the administration of the pension and insurance funds of the company and other work formerly performed by Mr. Daniel T. Pierce as executive assistant to Mr. Kruger, that position having been abolished following Mr. Pierce's resignation from the company.

Mr. H. T. Edgar, manager of the Northern Texas Traction Company, Fort Worth, Tex., has been appointed general manager of the Seattle (Wash.) Electric Company, effective Oct. 1, 1910. Mr. Edgar has been connected with public service corporations during his entire business career. In March, 1898, he became connected with Stone & Webster, Boston, Mass., as manager of the Lowell (Mass.) Electric Light Corporation. In September, 1901, he was transferred by Stone & Webster to El Paso as vice-president and manager of the El Paso Electric Railway. In October, 1905, he was appointed manager of the Northern Texas Traction Company. Mr. Edgar was prominent in civic affairs in Fort Worth and was president of the board of trade of that city.

Mr. C. G. Taylor has been appointed superintendent of the Cleveland, Southwestern & Columbus Railway, Norwalk, Ohio, to succeed Mr. George F. Faber, who, as noted in the Electric Railway Journal of Aug. 27, 1910, resigned to become superintendent of transportation of the Michigan United Railways, Lansing, Mich. Mr. Taylor was connected with the Cleveland Electric Railway for a number of years, but resigned from this company in August, 1905, to enter the accounting department of the Cleveland, Southwestern & Columbus Railway. Mr. Taylor accepted a position with the East Cleveland Railway in the pioneer days of electric railways in Cleveland. While he was with the East Cleveland Railway Mr. Taylor was connected with the shop, track, accounting and operating departments of the company.

Mr. W. H. Hitchcock, whose appointment as superintendent of transportation of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, Wilmington, Del., was announced in the Electric Railway Journal of Sept. 17, 1910, began his railway career with the Metropolitan Railway, Washington, D. C., as a conductor. In 1900, when the Washington Railway & Electric Company absorbed the Metropolitan Railway and several other companies, Mr. Hitchcock was appointed depot clerk. As vacancies occurred and the business increased he was advanced from time to time and filled the several positions between that of depot clerk and division superintendent, including those of street inspector and instructor of motormen and conductors. In January, 1906, Mr. Hitchcock was appointed division superintendent of the Washington Railway & Electric Company and continued in that capacity until he was appointed to the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company.

OBITUARY

L. C. Justus, general manager of the Bluffton, Geneva & Celina Traction Company, Bluffton, Ind., is dead. Mr. Justus succumbed to injuries which he received in the accident on the Ft. Wayne & Wabash Valley Traction Company's line on Sept. 21, 1910.

William Anderson, managing director of the Dublin (Ireland) United Tramways, is dead. Mr. Anderson was very well known in traction circles in the United Kingdom. He was connected with the omnibus lines in Dublin which antedated the tramway system, and entered the service of the tramways in Dublin on their inception in 1872.

The Lehigh Valley Transit Company is said to have broken all records during the week ended Sept. 24, 1910, in the number of passengers carried and in receipts, due principally to the patronage of visitors to the fair which was held at Allentown.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Gough Street Railroad, San Francisco, Cal.**—Application for a charter has been made in California by this company to build an electric railway in San Francisco to connect with existing lines. It will be about 1 mile long and it will be operated as part of the United Railroads. Capital stock, $60,000. Incorporators: A. J. Pond, Charles Loesch and David Livingston.

***Fairview Interurban Railroad, Delta, Colo.**—Application for a charter has been made in Colorado by this company to build a line through the fruit and coal sections of Montrose County and Delta County. One branch of the line will extend from Delta to Cedaredge and another to the coal mines at Fairview. A third branch will be built from Delta along the California mesa. Capital stock, $250,000. Incorporators: Charles G. Montz, Denver; Mudge Zeigler, Henry Zeigler and Watson Zeigler, Fort Collins, and B. F. Hubbard, Chicago.

***Kentucky & Tennessee Traction Company, Hopkinsville, Ky.**—Application for a charter has been made in Kentucky by this company to build an interurban railway to connect Hopkinsville and Guthrie. Charles Vandenberg, Toledo, Ohio, is in charge of the preliminary work.

***Lake Michigan & Kalamazoo Railroad, Kalamazoo, Mich.**—Application for a charter has been made in Michigan by this company to build an interurban railway from Kalamazoo to Benton Harbor. Capital stock, $25,000. Incorporators: William A. Baker, Coloma, president; William C. Klumb, Kansas City, secretary and treasurer; John H. Notley, Kalamazoo, attorney.

***Minneapolis Northern Suburban Railway, Minneapolis, Minn.**—Incorporated in Minnesota to build an electric railway from Minneapolis to Little Falls. Capital stock, $250,000. Incorporators: Charles Sherman, John J. McCarthy, Paul J. Marvin, L. L. McCulloch and William Lampert.

***American Subway Company, Cleveland, Ohio.**—Chartered in Ohio to construct and operate a subway for the transportation of passengers and freight in Cleveland. Capital stock, $200,000. Incorporators: A. B. duPont, John N. Stockwell, Jr., Fred C. Alber, E. C. Hibbs and C. A. Nau.

***Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.**—Incorporated in Ottawa to build a 60-mile railway from a point near Ironsides, Que., about 5 miles from Ottawa, Ont., south through Ottawa and the counties of Carleton, Grenville and Leeds to Brockville, Ont., on the St. Lawrence River opposite Morristown, N. Y., where connection will be made by ferry with the New York Central & Hudson River Railroad.

***Wilkes-Barre & Luzerne Street Railway, Wilkes-Barre, Pa.**—Chartered in Pennsylvania to build an electric railway in Kingston. Capital stock, $6,000. Directors: E. L. Hessler, president; Don A. Gilbert, F. J. Northcote and John A. Stenger, Wilkes-Barre.

***Olympic Railway & Power Company, Elma, Wash.**—Incorporated to build an electric railway from Moclips, Wash., to Tacoma, with a branch to Portland. Capital stock, $3,000,000. It is the intention to furnish power to manufacturing plants and other enterprises in Southwestern Washington. Incorporators: M. H. Lynch, D. E. Servis, Thorvald Hvam, Frank Groundwater, J. A. Vance, W. J. Maize, J. J. Anderson, C. C. Brown, J. B. Kirkaldie, W. F. Downs and C. N. Long.

FRANCHISES

Little Rock, Ark.—The Argenta Railway has asked the City Council for a franchise to cross the free bridge in Little Rock and extend its tracks on Main Street as far as Markham.

Alhambra, Cal.—The Pacific Electric Railway, Los Angeles, has been granted a 50-year franchise by the City Council to build an extension of its line in Alhambra.

Amboy, Ill.—The Northern Illinois Light & Traction Company, Ottawa, has been granted a 20-year franchise by the City Council to build an electric railway on Main Street in Amboy.

Clear Lake, Ia.—The Mason City & Clear Lake Railway, Mason City, has been granted a franchise by the City Council to extend its lines in Clear Lake.

Hyattsville, Md.—The Washington, Spa Spring & Gretta Railroad, Washington, D. C., it is stated, will ask the State Highways Commissioners of Maryland for a franchise to extend its railway through Bladensburg over the Washington-Baltimore Boulevard as far as the Baltimore & Ohio Railroad depot in Hyattsville.

Marlboro, Mass.—The Boston & Western Electric Railway, Boston, has applied to the Aldermen to build a railway in Marlboro. This proposed 16-mile railway will connect Marlboro, Weston, South Sudbury and Waltham. At South Sudbury a 5-mile spur track will be built to connect the main line with Maynard. [E. R. J., Sept. 17, '10.]

***Kalamazoo, Mich.**—It is stated that the Lake Michigan & Kalamazoo Railroad will ask the City Council on Oct. 3 for a franchise to build an electric railway in Kalamazoo. This company is planning to build a railway from Kalamazoo to Benton Harbor.

Oneida, N. Y.—It is announced that the Rome & Oneida Electric Railway, Rome, will apply to the City Council to build an electric railway in Oneida. This proposed railway will connect Rome and Oneida via Verona, Blackman's Corners, Greenway and Hatches Corners. D. C. Hadcock, Oneida, is the promoter. [E. R. J., Apr. 30, '10.]

Tecumseh, Okla.—The Rapid Transit Interurban Company has been granted a franchise by the City Council to build its tracks in Tecumseh. The Commissioners of Pottawatomie County have also given the company permission to cross all highways in Pottawatomie County. It is expected to begin construction at once.

Corvallis, Ore.—The Portland, Eugene & Eastern Railway, Portland, has asked the City Council for a 30-year franchise to build an electric railway in Corvallis. The company proposes to begin construction within six months after the franchise is granted and have 2 miles of track in operation within two years.

Dravosburg, Pa.—The Duquesne & Dravosburg Street Railway, Duquesne, has been granted a franchise to extend its tracks in Dravosburg.

Erie, Pa.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has been granted a franchise by the Commissioners to extend its tracks in Erie.

Gettysburg, Pa.—The Hanover & McSherrystown Street Railway, Hanover, has been granted a franchise by the Council to extend its tracks in Gettysburg.

Scranton, Pa.—The Scranton & Lake Ariel Railway has been granted a franchise by the City Council to build an electric railway in South Scranton. John J. Brown, president. [E. R. J., July 22, '10.]

Memphis, Tenn.—It is stated that the Lake View Traction Company, Memphis, will ask the City Council for a franchise for an entrance of its line into Memphis.

Seattle, Wash.—The Seattle Electric Company has been granted a franchise by the Council to build double tracks on West Alaska Street et al. and to pave Jackson Street and Union Street in Seattle.

TRACK AND ROADWAY

Esquimalt & Nanaimo Railway, Vancouver, B. C.—This company advises that the proposed extension of its railway between Oyster River and Campbell River will be operated as a steam railway instead of an electric line. [E. R. J., June 11, '10.]

Los Angeles-Pacific Company, Los Angeles, Cal.—This company has begun work on its Hollywood and Colegrove extension.

Pacific Electric Railway, Los Angeles, Cal.—H. C. Dunn has been awarded the contract by this company for laying the rails for its extension between Claremont and Upland.

***Montrose, Col.**—J. N. Pepper, Montrose, is promoting the building of a 29-mile electric railway to connect Montrose and Delta via the west side of the Uncompahgre River, along Spring Creek and California mesa and through Sharano and Coal Creek Valley.

Washington, Spa Springs & Gretta Railroad, Washington, D. C.—This company has recently placed in operation an electric line extending from Fifteenth Street and H Street, Washington, to the junction of Sand Street and Main Street, Bladensburg.

Macon Railway & Light Company, Macon, Ga.—This company advises that during the next three months it will place contracts for building 2 miles of new track. J. T. Nyhan, Macon, general manager.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company has awarded to J. J. Scott & Son, St. Louis, Mo., the contract for constructing the roadbed and bridging for the 17-mile extension of its railway from Godfrey to Jerseyville.

North Kankakee Electric Light & Railway Company, Kankakee, Ill.—This company advises that it is now building 2 miles of new track with 70-lb. rails.

***Kansas City, Kan.**—William Barclay, Kansas City, is reported to be surveying for a proposed street railway to connect Argentine and Rosedale.

Cincinnati, Louisville, Lexington & Maysville Traction Company, Dry Ridge, Ky.—This company announces that construction will begin Jan. 1 from Covington to Owenton, about 45 miles. This proposed 250-mile railway will connect Cincinnati, Ohio, and Lexington, Ky., also Maysville and Louisville, with a connecting line at Dry Ridge. W. T. S. Blackburn. [E. R. J., April 16, '10.]

Berkshire Street Railway, Pittsfield, Mass.—This company is reported to have awarded the contract to the Woronoco Contracting Company for the construction of a 20-mile extension in the Berkshires. Surveys are now being made between Huntington and Lee. It is expected to begin work soon.

Escanaba (Mich.) Electric Street Railway.—D. A. Brotherton has the contract for surveying a 10-mile extension for this company to connect Rapid River with Gladstone.

Brooklyn Rapid Transit Company, Brooklyn, N. Y.—This company has been granted permission by the Public Service Commission and will apply for a permit from the borough authorities to begin work on a new extension of its lines, which will run through that section of East New York and Brownsville known as the South Side. This extension will be a continuation of the Church Avenue line, which ends at Rockaway Avenue.

Rome & Oneida Electric Railway, Rome, N. Y.—D. C. Hadcock, Oneida, promoter of this proposed 13-mile railway, announces that preliminary arrangements have been completed and all is in readiness for the organization of this company to build a line between Rome and Oneida. [E. R. J., Apr. 23, '10.]

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—The Public Service Commission, Second District, has approved the exercise of franchises granted by the Auburn Council to the Auburn & Syracuse Electric Railroad to double-track East Genesee Street east of the present terminus of the tracks of the company near the intersection of Seward Avenue with Genesee Street to the east corporation line of Auburn; also to double-track East Genesee Street, between the easterly end of the present double track west of Fulton Street and the intersection of East Genesee Street and Seward Avenue.

Grand Forks (N. D.) Street Railway.—This company states it expects to soon build a 1-mile extension of its line to East Grand Forks.

Alliance-Akron Railroad, Alliance, Ohio.—This company is said to have succeeded in securing financial backing and all plans are made to begin work this fall on its proposed 26-mile electric railway to connect Alliance and Akron via Tallmadge, Brimfield and Rootstown. Charles Keith, president. [E. R. J., July 2, '10.]

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio—It is announced that this company will use electricity as motive power instead of McKeen gasoline cars as at first proposed for its proposed 13-mile railway to connect Nelsonville, Gloucester and Athens. [E. R. J., July 9, '10.]

Tri-State Traction Company, Steubenville, Ohio.—This company reports that it will rebuild within the next four weeks 1 mile of track in Wellsburg, W. Va. Material has been ordered.

Guthrie (Okla.) Railway.—It is said this company has begun work building several extensions of its lines in Guthrie.

***Niagara Falls, Welland & Lake Erie Railroad, Niagara Falls, Ont.**—This company has announced that it will apply at the coming session of Parliament for permission to construct its electric railway from Niagara Falls and Port Colhorne to points on Lake Erie between Port Dover and Fort Erie, opposite Buffalo.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company is reported to be considering plans for building an extension of its railway from Fonthill to Fernwick. Definite details have not yet been announced.

Portland Railway, Light & Power Company, Portland, Ore.—This company has grading under way for the construction of its proposed extension from West Oregon City to within one-half mile of Oswego. It is also at work relaying its double tracks and building new tracks on some of its streets in Milwaukee.

Cumberland Railway, Carlisle, Pa.—This company has awarded the contract for the 3-mile extension of the Tye Fork spur and also a 3-mile extension of the main line to the Gibson-Carr Construction Company, Middlesboro, Ky. The extension is planned to reach Jellico, Tenn., a distance of 27 miles.

Pittsburg, McKeesport & Westmoreland Railway, McKeesport, Pa.—At a recent meeting of the stockholders of this company it was decided to make 10 extensions of its lines in McKeesport and in Mifflin. The extensions total about 13 miles.

Philadelphia & Western Railway, Philadelphia, Pa.—It is stated that this company will soon build an extension branching off from the main division at a point between Villa Nova and Radnor, extending into West Conshohocken.

Chambersburg, Greencastle & Waynesboro Electric Railway, Waynesboro, Pa.—This company reports that within the next few weeks it will let contracts for building 2½ miles of track from Pen Mar to Blue Ridge Summit.

***Dallas, Tex.**—Press reports state that the Stone & Webster Engineering Corporation, Boston, has made surveys paralleling the line of the Houston & Texas Central Railroad for the construction of an electric railway between Houston and Dallas connecting with the North Texas Traction Company from Dallas to Sherman and the Galveston-Houston line between Houston and Galveston, ultimately forming a complete electric line from the northern border of Texas to the gulf.

***Puget Sound, Chelan & Spokane Railway, Tacoma, Wash.**—This company is undertaking development of about 30 hydro-electric properties in Washington aggregating more than 300,000 hp and the construction of 1200 miles of railway to be operated by electric power derived from the proposed hydro-electric installations. W. K. Palmer Company, 717-720 Dwight Building, Kansas City, Mo., has been awarded a contract to serve as consulting engineer for the company and to take charge of all the engineering work and supervise construction. Correspondence relative to engineering matters may be directed to the engineering company at Kansas City.

SHOPS AND BUILDINGS

Connecticut Company, Middletown, Conn.—This company reports that it now has under construction a new car house and repair shops at Middletown.

Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.—This company, it is said, will soon build a 2-story, 72-ft. x 120-ft. brick freight depot, waiting room and office building at Market Street, Fort Wayne.

Joplin & Pittsburg Railway Company, Pittsburg, Kan.—This company is said to be considering plans for remodeling its brick freight station and office building in Pittsburg. Estimated cost is about $5,000.

Central Kentucky Traction Company, Frankfort, Ky.—This company, it is said, will soon erect a concrete and brick depot in Nicholasville. I. L. Oppenheimer, general manager.

Chautauqua Traction Company, Jamestown, N. Y.—This company is said to have secured a site on North Portage Street, Westfield, on which it will build a freight depot and car house.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—This company has awarded the contract to Dan Sweeney & Company and M. Ryan Brothers & Company for building a terminal and car houses, freight house and a 200-ft. steel bridge for its proposed line from Stillwater to Guthrie and also from Stillwater to Sapulpa. Lewis Lamke, Stillwater, is interested. [E. R. J., Sept. 17, '10.]

Erie (Pa.) Traction Company.—This company reports it has awarded the contract to Constable Brothers Company, Erie, for the construction of a passenger and freight station at Cambridge Springs. The cost is estimated to be $5,000.

Warren (Pa.) Street Railway—This company is said to be considering plans for building a new car house at North Warren.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—This company reports that it will build an addition to its car house for storage for eight summer cars at Waynesboro.

POWER HOUSES AND SUBSTATIONS

Power, Transit & Light Company, Bakersfield, Cal.—This company has awarded a contract to J. G. White & Company, Inc., New York, N. Y., for the engineering and construction of a steam and electric power plant at Bakersfield. The building will be 82 x 140 ft., with substructure of concrete, self-supporting steel frame, and walls of metal lath and plaster, and will be designed to accommodate two 2,000-kw horizontal turbines, with boilers, condensers and necessary auxiliaries. 750-kw turbine will be temporarily installed at the earliest possible date. As the boilers will be installed with oil burners, there will be no basement under the boiler room. The station will be designed electrically to deliver practically full load at either 60,000, 10,000 or 2,300 volts, and will operate at all the above pressures simultaneously. The estimated cost is approximately $400,000.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company reports that it will soon install 500 kw units to take care of its present requirements at its power house.

New Hampshire Electric Railways, Haverhill, Mass.—This company expects to purchase 500 hp in boilers with superheaters and stokers. D. A. Belden, president.

Berkshire Street Railway, Pittsfield, Mass.—This company, it is said, will soon erect a new power house at Zylonite.

Meridian (Miss.) Light & Railway Company.—This company advises that it has placed contracts for building an extension to its boiler rooms and that it is installing a 500 hp Babcock & Wilcox boiler.

St. Joseph & Savannah Railway, St. Joseph, Mo.—This company, it is said, will build a power plant at St. Joseph. It has let the contract for construction. John H. Van Brunt, St. Joseph, president.

St. Lawrence International Electric Railroad & Land Company, Alexandria Bay, N. Y.—This company advises that during the next two months it will purchase a 400 hp Corliss engine, a 200 kw G. E. generator to increase the capacity of its lighting plant in Alexandria Bay. B. M. Martin, Alexandria Bay, superintendent.

Oklahoma Public Service & Interurban Lines, Stillwater, Okla.—This company, it is said, will build a power house at Stillwater. Contracts for work have been awarded to Dan Sweeney & Company and M. Ryan Brothers Company.

Richmond & Henrico Railway, Richmond, Va.—This company will build a power house on Lester Street between Louisiana Street and Orleans Street, in Richmond. The structure, one story high, will be built of brick and reinforced concrete. It is estimated that the cost will be about $23,000.

Manufactures & Supplies

ROLLING STOCK

Boston & Northern Street Railway and Old Colony Street Railway, Boston, Mass., will purchase 12 snow plows at once.

Niagara Gorge Railroad, Buffalo, N. Y., has recently added to its rolling stock equipment several 10-bench, single-truck open trailers which were built in its own shops at Niagara Falls.

St. Lawrence International Electric Railroad & Land Company, Alexandria Bay, N. Y., expects to purchase four 50-hp railway motors for a snow plow. The company has recently purchased a new freight car from the Hicks Locomotive & Car Works.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C., has received from The J. G. Brill Company four new cars. Mention of the fact that the company was contemplating the purchase of these cars was made in the Electric Railway Journal of Feb. 5, 1910.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., is having two cars built by The J. G. Brill Company. An item to the effect that the company was considering the purchase of these cars was published in the Electric Railway Journal of Feb. 26, 1910.

Selma Street & Suburban Railway, Selma, Ala., noted in the Electric Railway Journal of July 2, 1910, as being in the market for three cars, has ordered two semi-convertible cars from the J. G. Brill Company. These cars will be 26 ft. long over vestibules and will be equipped with Brill 21-E trucks. The electrical equipment will be taken from cars now in use and installed on the new cars.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., reported in the Electric Railway Journal of Sept. 24, 1910, as considering the purchase of 10 new cars, has placed an order with the Niles Car & Manufacturing Company for 10 50-ft. passenger and smoking interurban car bodies, also 20 Baldwin class 78-25-A trucks, all prepared for G. E. 600-1200-volt direct-current equipment. The new cars will be similar to the equipment now being operated on the line.

Chicago, Ottawa & Peoria Railway, La Salle, Ill., expects to receive from the Danville Car Company during October eight 55-ft. 6-in. interurban cars with turtle-back roofs. Mention was made in the Electric Railway Journal of March 26, 1910, that the company was preparing specifications for these cars. Each car will be equipped with four Westinghouse No. 303, 90-hp motors; Westinghouse unit switch control; Westinghouse automatic air brakes; Baldwin trucks; Hale & Kilburn seats and Peter Smith hot water heaters.

Interborough Rapid Transit Company, New York, N. Y., which was noted in the Electric Railway Journal of June 4, 1910, as having ordered 20 elevated motor car bodies from the Cincinnati Car Company, has specified the following details for this equipment:

Bolster centers, length, 33 ft. 2 in.	Curtain fixtures....C. S. Co.
Length of body...39 ft. 8 in.	Curtain material..Pantasote
Width over sills....8 ft. 6 in.	Hand brakes.....hor. wheel
Body .....wood	Head lining.....Agosote
Interior trim ....mahogany	Posts.....Forsythe steel
Underframe .....composite	Roofs.....monitor deck
Bolsters, body..built-up steel	Sash fixt.....Dayton locks; Forsythe sash shoes.
Bumpers, Hedley anti-climbers	Seats, style.....H. & K.
Car trimmings, oxidized bronze	Seating material.....rattan
Couplers.....Van Dorn	Step treads.....Mason
	Ventilators.....deck sash

TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., is supplying ventilators for the 50 cars now being built for the New Orleans Railway & Light Company, New Orleans, La., at the works of the St. Louis Car Company.

Griffin Wheel Company, Chicago, Ill., has awarded a contract to Kelly Brothers, Tacoma, Wash, for building an addition to its Tacoma plant. The addition to the main shop will be 436 ft. x 100 ft. and it is estimated will cost about $49,000 without equipment. Several small accessory buildings are included in the contract.

General Electric Company, Schenectady, N. Y., has closed contracts with the National Fire-Proofing Company for the construction of two large buildings on the tract of land recently acquired at Erie, Pa. These buildings will be used for a gray iron foundry and for a pattern shop and pattern storage room. The buildings will be 800 ft. long and of fireproof construction. It is stated that these are the only buildings that are contemplated on the site at Erie at the present time, and that no plans have as yet been formulated for the construction of an elaborate manufacturing plant in that city.

Warner Engineering Company, Ltd., London, Eng., announces that licenses are being arranged in France and Germany for the manufacture and sale of its non-parallel axle trucks. At an early date 10 works will be manufacturing these trucks under license in each of these countries. There will be two manufacturers in each of the following classes: Mining, railways (freight), railways (passenger), street railways, locomotives. The United States manufacturer is the St. Louis Car Company, St. Louis, Mo. The latter company is now making these trucks for 10-ft., 12-ft. and 14-ft. wheel bases.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has purchased the entire common battery business of the American Electric Telephone Company, and to augment its engineering staff and to assist it in giving former customers of the American Electric Telephone Company the best possible attention it has retained in its service Henry P. Clausen, formerly chief engineer of the American Electric Telephone Company. The Stromberg-Carlson Telephone Company has recently received an order to equip the Stark Electric Railway, Alliance, Ohio, with its dispatcher signals. The work of installing these signals will be pushed rapidly.

J. G. White & Company, Inc., New York, N. Y., have been awarded a contract by the New York, Ontario & Western Railway for the erection of railroad shops at its Mayfield yards, Mayfield, Pa., near Carbondale. The work to be carried out consists of the erection of a 10-stall roundhouse with a 75-ft. turntable, machine shop, carpenter shop, with complete power plant; storehouse, office building, oil building, sand storage, drier and loading house and a complete coaling station with a storage capacity of approximately 1000 tons. The buildings will be of the usual type of brick and steel construction. The estimated cost is approximately $150,000.

ADVERTISING LITERATURE

Wickes Brothers, Saginaw, Mich., have issued their September stock list of new and second-hand boilers, engines, pumps, machine tools, electrical machinery, etc.

Under-Feed Stoker Company of America, Chicago, Ill., prints in the September issue of *Publicity Magazine* several articles which illustrate and describe briefly manufacturing plants where Jones under-feed stokers are in use.

Ohio Brass Company, Mansfield, Ohio, prints in the August issue of the *O. B. Bulletin* the following interesting articles: "O. B. Suspension Insulators," by C. T. Anderson; "Tracing Freight Shipments," by A. N. Hill, and "The A. B. C. of Electricity as Applied to Mines," by W. H. Kempton.

Bryant Electric Company and Perkins Electric Switch Manufacturing Company, Bridgeport, Conn., have issued the 1910 edition of their catalog of wiring devices. Because of the listing of so many new devices the catalog has been enlarged from the standard pocket size to its present size, 6 in. x 9¼ in. It contains 120 pages.

Carnegie Steel Company, Pittsburgh, Pa., is distributing the first edition of a booklet recounting certain special engineering conditions which led to the introduction of vanadium steel. The booklet contains descriptions of the methods and temperatures for the heat treatment of different grades of vanadium steel. The physical properties of different grades of vanadium steel are given in the form of a table.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. ‡After allowing for other income received.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Aug. '10	$263,149	$135,833	$127,316	$ 43,496	$83,821
	1 " " '09	231,062	115,724	115,338	43,703	71,634
	8 " " '10	1,612,504	892,001	720,504	346,769	373,734
	8 " " '09	1,432,015	784,740	647,275	350,414	296,861
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., Aug. '10	58,065	24,185	33,880	13,525	20,355
	1 " " '09	57,593	22,436	35,157	13,060	22,097
	8 " " '10	112,073	47,230	64,843	27,177	37,666
	8 " " '09	108,548	45,027	63,526	26,284	37,242
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., July '10	9,708	6,221	3,487	1,945	1,542
	1 " " '09	8,351	5,538	2,813	1,951	862
	7 " " '10	61,791	40,044	21,747	.....	.....
	7 " " '09	53,819	40,256	13,563	.....	.....
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., July '10	32,660	21,038	11,622	8,856	2,765
	1 " " '09	34,485	18,363	16,121	8,061	8,060
	12 " " '10	416,394	240,440	175,954	102,360	73,594
	12 " " '09	383,394	220,297	163,096	101,815	61,281
BIRMINGHAM, ALA. Birmingham Ry. Lt. & Pwr. Co.	1m., July '10	216,505	109,061	107,444	.....	.....
	1 " " '09	183,187	101,971	81,213	.....	.....
	7 " " '10	1,496,110	787,774	708,336	.....	.....
	7 " " '09	1,276,482	711,880	564,602	.....	.....
CHATTANOOGA, TENN. Chattanooga Ry. & Lt. Co.	1m., Aug. '10	77,085	38,320	38,765	23,719	15,046
	1 " " '09	67,798	38,916	28,882	23,724	5,158
	8 " " '10	573,925	295,133	278,792	187,209	91,583
	8 " " '09	506,979	292,904	209,617	169,550	41,067
CHICAGO, ILL. Aur., Elgin & Chic. R.R.	1m., July '10	182,387	87,612	94,775	32,569	62,206
	1 " " '09	167,614	77,895	89,719	28,899	60,820
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., July '10	41,880	*17,041	24,840	9,201	15,639
	1 " " '09	38,026	*16,249	21,777	8,324	13,453
	7 " " '10	195,459	*96,156	99,303	61,999	37,304
	7 " " '09	174,456	*88,004	86,452	58,492	27,959
Lake Shore Electric Ry.	1m., July '10	132,032	*60,084	71,948	34,751	37,196
	1 " " '09	121,185	*55,650	65,534	33,786	31,748
	7 " " '10	658,759	*358,782	299,978	243,362	56,616
	7 " " '09	595,862	*334,027	261,835	240,436	21,399
DALLAS, TEX. Dallas Electric Corporation.	1m., July '10	117,270	85,473	31,797	26,842	4,955
	1 " " '09	103,340	68,107	35,233	28,404	6,830
	12 " " '10	1,408,744	923,843	484,901	322,218	162,683
	12 " " '09	1,247,675	783,120	464,555	341,392	123,163
EAST ST. LOUIS, ILL. East St. Louis & Suburban Ry.	1m., Aug '10	215,316	112,539	102,777	51,280	51,497
	1 " " '09	177,210	90,953	86,257	49,123	37,133
	8 " " '10	1,545,513	824,762	720,751	402,300	318,451
	8 " " '09	1,304,677	730,682	573,995	395,766	178,229
EL PASO, TEX. El Paso Elec. Co.	1m., July '10	49,351	29,557	19,794	8,215	11,579
	1 " " '09	46,362	29,204	17,158	8,085	9,073
	12 " " '10	629,620	361,626	267,994	101,300	166,694
	12 " " '09	562,858	371,885	190,973	92,143	98,830
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	1m., July '10	133,797	73,350	60,446	45,216	15,230
	1 " " '09	123,547	72,385	51,162	44,614	6,547
	7 " " '10	857,415	489,491	367,925	314,596	53,328
	7 " " '09	772,202	463,220	308,982	293,661	15,321
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., July '10	125,943	68,147	57,796	20,273	37,523
	1 " " '09	109,212	59,835	49,378	17,190	32,188
	12 " " '10	1,367,246	737,475	629,771	218,299	411,472
	12 " " '09	1,186,590	663,239	523,351	198,241	325,110
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., July '10	122,097	65,989	56,108	26,609	29,499
	1 " " '09	109,747	62,070	47,678	21,596	26,082
	12 " " '10	1,255,297	766,376	488,921	273,858	215,063
	12 " " '09	1,171,764	674,402	497,362	253,342	244,020
GRAND RAPIDS, MICH. Grand Rapids Ry. Co.	1m., Aug. '10	111,814	49,744	62,070	19,958	42,112
	1 " " '09	99,838	42,457	57,381	19,035	38,346
	8 " " '10	755,642	363,787	391,855	158,984	232,871
	8 " " '09	678,396	319,762	358,634	151,812	206,822
HOUGHTON, MICH. Houghton County Trac. Co.	1m., July '10	30,036	14,380	15,656	6,640	9,017
	1 " " '09	30,653	14,702	15,951	6,242	9,709
	12 " " '10	320,231	169,837	150,393	76,556	73,837
	12 " " '09	298,732	162,958	135,774	67,943	67,830
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., July '10	46,906	26,207	20,699	9,489	11,210
	1 " " '09	39,300	22,353	16,947	9,367	7,580
	12 " " '10	543,723	284,920	258,802	112,499	146,304
	12 " " '09	458,076	260,205	197,870	111,081	86,789
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Aug. '10	621,929	367,759	254,170	188,460	65,710
	1 " " '09	591,112	330,805	260,306	174,032	86,274
	3 " " '10	1,862,685	1,122,384	740,301	560,607	179,694
	3 " " '09	1,717,955	983,422	734,533	517,825	216,708
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Aug. '10	412,339	283,455	128,884	48,363	80,521
	1 " " '09	378,256	238,882	139,374	47,535	91,838
	8 " " '10	3,096,477	2,185,316	911,161	374,862	536,299
	8 " " '09	2,778,677	1,825,830	952,847	374,224	578,622
Milwaukee Lt., Ht. & Trac. Co.	1m., Aug. '10	159,894	65,415	94,479	55,500	38,979
	1 " " '09	152,102	55,520	96,582	52,596	43,989
	8 " " '10	1,073,719	428,335	645,385	443,429	201,955
	8 " " '09	967,265	357,298	609,967	408,626	201,341
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., July '10	682,611	318,594	364,018	140,112	223,905
	1 " " '09	640,094	277,571	362,523	140,251	222,273
	7 " " '10	4,264,859	2,066,722	2,198,137	981,254	1,216,883
	7 " " '09	3,890,160	1,900,053	1,990,107	968,009	1,022,099
MONTREAL, CAN. Montreal St. Ry.	1m., Aug. '10	398,829	216,314	182,514	69,890	112,624
	1 " " '09	355,230	180,583	174,647	62,027	112,620
	11 " " '10	3,889,475	2,237,830	1,651,645	516,744	1,134,901
	11 " " '09	3,492,777	2,046,598	1,446,179	450,602	995,577
NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1m., July '10	487,541	280,149	207,392	176,272	31,120
	1 " " '09	466,416	286,890	179,526	172,187	7,334
	7 " " '10	3,648,092	1,954,259	1,693,833	1,236,300	457,533
	7 " " '09	3,508,400	1,917,083	1,591,317	1,208,023	383,294
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., July '10	196,898	107,054	89,845	66,576	23,269
	1 " " '09	180,228	101,163	79,064	63,351	15,713
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., July '10	21,577	11,697	9,880	7,022	2,857
	1 " " '09	19,152	11,592	7,560	6,624	936
	12 " " '10	240,492	143,406	97,086	82,411	14,675
	12 " " '09	222,910	130,749	92,162	82,161	10,000
PENSACOLA, FLA. Pensacola Elec. Co.	1m., July '10	24,235	13,654	10,582	5,279	5,303
	1 " " '09	23,461	12,603	10,858	4,305	6,553
	12 " " '10	258,490	151,189	107,301	57,076	50,225
	12 " " '09	232,983	137,015	95,967	51,997	43,970
PHILADELPHIA, PA. American Railways Co.	1m., July '10	368,673	.....	.....	.....	.....
	1 " " '09	347,955	.....	.....	.....	.....
	2 " " '10	745,343	.....	.....	.....	.....
	2 " " '09	696,446	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1m., July '10	16,658	8,833	7,825	1,766	6,059
	1 " " '09	18,022	9,090	8,932	1,675	7,257
	12 " " '10	123,724	90,753	32,972	21,098	11,874
	12 " " '09	128,337	86,334	42,003	23,514	18,489
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., Aug. '10	479,944	209,190	270,754	151,411	119,343
	1 " " '09	429,276	190,225	239,051	124,981	114,070
	8 " " '10	3,616,280	1,544,687	2,071,593	1,096,338	975,255
	8 " " '09	3,126,870	1,457,791	1,669,079	982,411	686,668
ROCKFORD, ILL. Union Ry., Gas & Elec. Co.	1m., Aug. '10	232,494	124,513	107,981	66,209	41,772
	1 " " '09	219,083	117,231	101,852	68,914	32,938
	8 " " '10	1,895,832	1,068,032	827,800	526,474	301,326
	8 " " '09	1,792,412	914,123	777,311	521,685	356,604
ST. JOSEPH, MO. St. Joseph Ry., Lt., Ht. & Power Co.	1m., Aug. '10	89,775	47,528	42,245	23,183	10,062
	1 " " '09	90,526	44,166	46,358	21,758	15,600
	8 " " '10	674,715	368,118	306,597	180,600	125,997
	8 " " '09	634,522	333,721	300,801	170,022	130,779
ST. LOUIS, MO. United Railways.	1m., July '10	988,079	649,216	338,863	233,439	‡109,373
	1 " " '09	943,811	597,509	346,302	232,450	‡118,281
	7 " " '10	6,593,581	4,465,557	2,128,024	1,634,221	‡515,150
	7 " " '09	6,317,487	4,028,702	2,288,785	1,637,079	‡674,029
SAVANNAH, GA. Savannah Elec. Co.	1m., July '10	59,140	40,492	18,198	18,193	5
	1 " " '09	55,812	38,246	17,565	17,444	121
	12 " " '10	615,165	401,655	213,510	213,193	317
	12 " " '09	608,333	381,517	226,817	209,314	17,503
SEATTLE, WASH. Seattle Elec. Co.	1m., July '10	459,059	261,509	197,550	110,375	87,175
	1 " " '09	592,587	305,028	287,559	108,702	178,857
	12 " " '10	5,852,062	3,420,061	2,432,001	1,287,517	1,144,484
	12 " " '09	5,181,859	3,050,470	2,131,389	1,193,445	937,944
SIDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., July '10	28,876	14,407	14,469	6,182	8,287
	1 " " '09	26,616	15,624	10,992	6,217	4,775
	12 " " '10	310,680	169,178	141,502	74,048	67,454
	12 " " '09	280,994	168,450	112,544	73,675	38,869
TACOMA, WASH. Puget Sound Elec. Ry.	1m., July '10	182,986	102,204	80,782	51,292	29,491
	1 " " '09	184,531	106,044	78,487	48,508	29,979
	12 " " '10	1,943,290	1,280,796	662,494	599,316	63,178
	12 " " '09	1,749,826	1,172,759	577,067	542,220	34,848
TAMPA, FLA. Tampa Elec. Co.	1m., July '10	51,507	28,900	22,607	6,711	15,895
	1 " " '09	47,172	30,403	16,769	4,700	12,069
	12 " " '10	619,517	349,716	269,800	57,310	212,491
	12 " " '09	576,101	352,859	223,243	56,406	166,837
TOLEDO, OHIO Toledo Rys. & Lt. Co.	1m., July '10	239,906	154,022	85,884	78,202	7,682
	1 " " '09	226,832	134,222	92,610	75,507	17,103
	7 " " '10	1,702,250	1,041,959	660,291	534,329	125,962
	7 " " '09	1,529,691	884,407	645,011	501,076	143,935
TORONTO, ONT. Toronto Ry.	1m., July '10	367,211	181,027	186,184	.....	.....
	1 " " '09	329,804	161,603	168,201	.....	.....
	7 " " '10	2,386,424	1,148,926	1,237,498	.....	.....
	7 " " '09	2,144,087	1,045,246	1,098,841	.....	.....

CONVENTION ISSUE

Electric Railway Journal

1910

The subject selected this year for consideration in the annual Souvenir Issue of the ELECTRIC RAILWAY JOURNAL is the development of traffic. While remarkable progress has been made in the engineering and operating features of electric railway practice, traffic promotion work until recently has not been given by most companies the attention which it deserves.

On steam railroads the traffic department has long been one of the most important parts of the organization, and some of the first efforts in the direction of stimulating traffic by the publication of traffic circulars and other literature undoubtedly were undertaken by electric railway managers who had had steam railroad training.

The old horse-car lines never felt the need of traffic promotion, or the managers of these lines thought they did not, and many city lines have not yet realized the necessity for it. The business depression of 1907 and 1908 awakened the interurban electric roads to a full appreciation of the creative work of active traffic departments, although they did not suffer in the same proportion as the steam railroads, which derived the major part of their operating revenue from freight. Actual decreases in earnings over previous years were shown in only a few instances, but to stand still or have only a small increase was as much a source of anxiety to the managements of many companies as a real loss would have been. Undoubtedly the experiences of these two lean years have been responsible in large measure for the recent widespread interest in traffic promotion methods and the activity shown by the electric railways in getting more nearly their proper share of the business in the respective territories which they occupy.

Traffic departments organized along much the same lines as the traffic departments of steam railroads have been formed by a large number of electric interurban railways to promote both passenger and freight business. The personnel of these departments has been recruited largely from the steam railway ranks and the methods in use of soliciting and keeping records of possible new business naturally resemble closely those which have been found most successful by the steam railroads. Advertising on a liberal scale has been undertaken and prospective travelers or shippers are solicited in person or by letter. Some roads have branched out into industrial development work and co-operate actively with local boards of trade and similar organizations in inducing factories to locate along their tracks or in promoting settlement of new real estate developments. Many other novel and successful traffic promotion methods might be mentioned to indicate how far the electric railways have gone to create new and profitable business where none existed before.

The object in view in compiling the Souvenir Issue this year has been to present in connected form the principal features of the traffic promotion work of a large number of representative urban and interurban electric railways in all parts of the United States. The companies from which data were obtained have been divided into five geographical groups and each group is considered in a separate chapter. This is a logical method of presentation inasmuch as the character of the service offered and the amount of traffic handled differ greatly in the East and in the West. The New England roads devote a large share of their traffic promotion work toward encouraging pleasure travel, while freight and express business has been neglected. In Central New York and the Eastern Atlantic States the interurban roads do a large local passenger business and package freight business, but the development of long-distance interline traffic has not been looked on with favor. Nearly all of the important cities in the Central Electric Railway Association territory, comprising Indiana, Ohio and Michigan, are interconnected with high-speed interurban roads working in co-operation with each other to build up interline freight and passenger business in active competition with the steam roads. The interurban lines in the Mississippi Valley States for the most part are isolated from each other, but they have affiliated themselves with connecting steam railroads and many of them derive a large part of their income from carload freight business received or delivered at interchange points. On the Pacific Coast tourist traffic to pleasure resorts constitutes an important source of passenger revenue and freight traffic is handled in the same manner as on the steam roads. The electric railways in the Southern States and in Canada have not been included as additional groups on account of limitations of space, but inasmuch as their operating conditions are not greatly different from those of many of the roads which are considered it is believed that the summary here presented is fairly complete.

The methods of traffic promotion which have been found most successful in New England may not be approved on the Pacific Coast, nor will the solicitation of carload freight as practised in the Middle West especially interest the roads in Central New York which are prohibited by city ordinances from hauling freight cars through the streets. Nevertheless, if a perusal of the following pages should suggest to the management of any electric railway some ideas for developing traffic and increasing revenue, this issue will have served its purpose.

TRAFFIC PROMOTION IN NEW ENGLAND

ELECTRIC railway administration in New England during the past half decade has been characterized by close attention to two important problems, the satisfactory solution of which is vital to the financial success of traction enterprises everywhere. The necessity for increasing net earnings has been imperative. Net earnings can be increased in only two ways—by building up traffic and increasing gross revenue or by the reduction of operating costs. In the face of advancing expenses for labor and materials and confronted by a general demand from the public for faster, more frequent and more comfortable service, the New England companies have come to a full realization of the possibilities of traffic promotion while at the same time they have endeavored to work economies in the conduct of their business. Progressive managers have been working along these dual lines on many of the electric railways in New England since 1905; but it is only within the past year or two that traffic promotion has been seriously undertaken by all companies with marked success.

Electric railway transportation in New England differs widely from the service rendered in less thickly settled parts of the country. Most of the New England electric railway systems are the outgrowths of urban properties which have been extended and interconnected as the demand for through service became more pressing. The cross-country lines in general follow the highways, although operation on private right of way is now standard practice among the newer high-speed roads. The needs of local service have always been paramount in New England, but within the past two or three years there has been a marked advance in the character of through service furnished on these lines. The natural attractions of the New England territory have facilitated the creation of traffic, and the improvement in the service offered by many lines has done much to retain a patronage first secured through vigorous publicity.

SCENERY AS AN ASSET

Conspicuous among the pioneers of traffic promotion in New England are the larger electric railway systems, such as the Boston & Northern and Old Colony Street Railways, which furnish a service catering especially to the comfort and convenience of pleasure riders, occupying as they do territory of much historical and scenic interest. The association of New England with many of the great events of early American history and the varied natural scenery of great beauty are invaluable traffic assets of the interurban electric railways. The New England landscape lacks the awe-inspiring panoramas which draw the tourist to the mountains and canyons of the Far West, but it never is monotonous. Its variety makes possible attractive publicity matter along lines entirely free from hackneyed repetition.

WORK OF CO-OPERATIVE ORGANIZATIONS

The co-operative work of the New England Street Railway Club and the Boston & Northern and Old Colony Street Railway Companies in the stimulation of traffic frequently has been referred to in recent issues of the ELECTRIC RAILWAY JOURNAL. For about six years trolley information bureaus have been maintained by each of these organizations in the business center of Boston. The headquarters of the New England Street Railway Club are at 12 Pearl Street, and the Boston & Northern and the Old Colony Street Railway companies have offices at 309 Washington Street, in a large front room, one flight up from the street. In the busy season of the year, from June to September, inclusive, the New England Street Railway Club maintains a clerk at the Washington Street office, and the two bureaus co-operate with each other in every way. The work of the Boston & Northern and Old Colony in-



CITY TICKET OFFICE OF BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES IN BOSTON

formation bureau has grown continuously, and at the present time six employees are on duty at the office. This office is located in the heart of the business district of Boston and is close to all the railroad and steamship city ticket offices. It is within easy reach of the large railroad terminals and the stations and surface lines of the Boston rapid transit system. The increased patronage of the office has necessitated a rearrangement of the interior. The information and ticket counter has been lengthened so that more persons can be served without delay. The services of the office force in supplying information, folders and other printed matter are rendered free of charge to the public. The publications of the New England Street Railway Club, which include the *Trolley Wayfinder* and a relief map of electric railways in New England, are sold here at the regular price of 10 cents.

The trolley information bureau of the Boston & Northern and Old Colony Street Railway companies is in immediate charge of H. A. Faulkner, general passenger agent. Nearly 1000 miles of track in Massachusetts, Rhode Island and New Hampshire are included in the system, but the efforts of the office to promote electric railway traffic are also applied for the benefit of every electric railway company in the East



INTERIOR OF CITY TICKET OFFICE, BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES

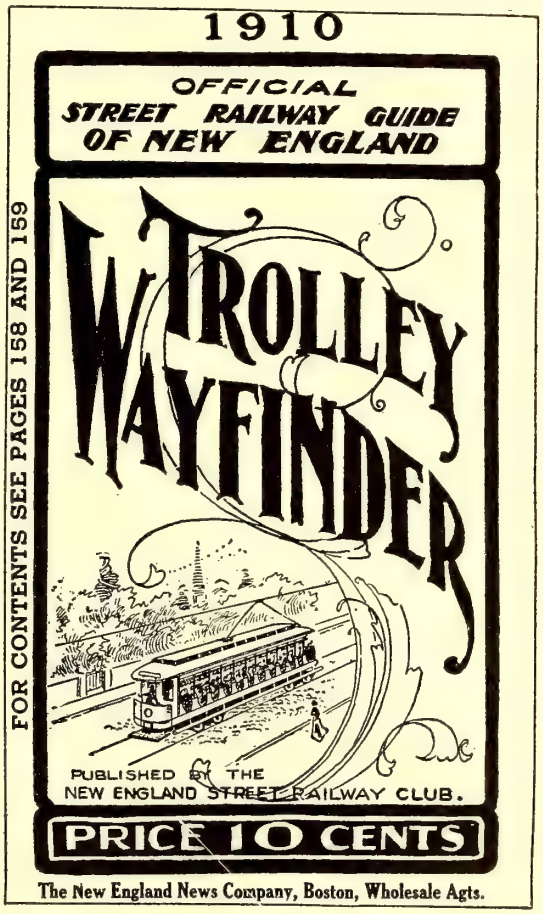
which will take the trouble to furnish the bureau with its publicity matter, especially folders and timetables. In addition to answering inquiries, the bureau originates a large amount of traffic promotion work, particularly in connection with social, benevolent, professional, fraternal and commercial organizations and conventions. These activities, together with the preparation of publicity matter for newspaper advertisements, car signs, billboards, folders and the renting of special cars, constantly occupy the attention of the staff. During the present season



OFFICE OF TROLLEY INFORMATION BUREAU OF NEW ENGLAND STREET RAILWAY CLUB

about 1,500,000 pieces of advertising matter will be sent out or given away by the bureau, including folders, dasher signs, car cards, billboard posters and timetables.

Inquiries reach the office from all parts of America and Europe, relative to trolley service and the accessibility of historic and picturesque spots in New England. During the present season an unusually large number of inquiries have been received about the electric railway route between Philadelphia and Portland, Maine. Another popular trolley trip is between Boston and New York, via Providence or Fall River steamships. A longer trip to New York by all-rail trolley service is also featured this summer. Ten-ride strip-tickets are sold at this office for the convenience of the public at the regular rate of 50 cents. One style of ticket is good on the Boston & Northern and another on the Old Colony Street Railway lines. Other tickets sold cover trips to Plymouth, Gloucester, the Cape Ann Loop, Fitchburg and New York by trolley and boat. The bureau subscribes to Russell's *Convention Dates* and usually establishes a temporary trolley information booth at all important conventions which are held in the Boston district. The windows of the Washington Street office are appropriately labeled, so that visitors will be attracted and seekers after information can find



COVER OF 1910 "TROLLEY WAYFINDER"

the office readily. Excursions to the seashore from interior points on the system are arranged by the bureau for certain days of the week, the tickets being valid on regular cars and including trips on steamship lines running out of Boston to points on the harbor and adjacent coast line.

NEW ENGLAND STREET RAILWAY CLUB

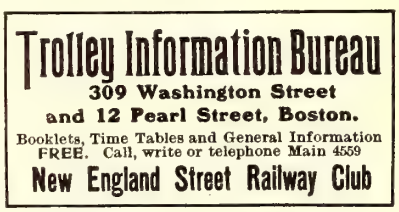
The New England Street Railway Club distributes from its offices at 12 Pearl Street, Boston, a large quantity of printed matter intended to facilitate and encourage trolley travel. In addition to the individual folders and timetables of all the electric railways in New England, the office sells the *Trolley Wayfinder*, which is published

by the club, the price being 10 cents per copy, and the "Relief Map of the Street Railway Lines of New England," which also sells for 10 cents per copy. These publications are also on sale at all news stands, and they are specially advertised by posters in the elevated and subway stations in Boston. Most of the electric railway timetables in New England also contain advertisements of the *Trolley Wayfinder* and the service which is rendered to the traveling public by the railway club's information bureau in Boston and also at the city ticket office of the Boston & Northern and Old Colony Street Railway companies.

The 1910 edition of the *Trolley Wayfinder* is a 160-page booklet printed on sheets 6½ in. x 8 in. and folded double to a convenient pocket size of 6½ in. x 4 in. It contains an index of all cities and towns in New England which can be reached by trolley, the index being followed by complete timetables and small route maps of all lines. The distances, fares and running times are given in each instance. Interspersed between the timetables are numerous display advertisements of electric railway companies, trolley parks, hotels and merchants. This is the eighth year of publication of this convenient guide and the current edition is 33,000 copies. The *Wayfinder* is self-supporting, the receipts from advertising and sales during 1909 being $2,492.43 and cost of publication $1,997.01, leaving a net profit of $495.92.

The relief map published by the club is printed in black and white and is prepared in the form of a bird's-eye view of New England showing all trolley lines, parks, rivers, lakes, seaside resorts, mountain ranges, connection points and the principal cities and towns. Detailed route maps are published in the *Wayfinder*. In 1909 the receipts from the sale of these maps were $559.55 and the cost of publication $448.14, leaving a net profit of $111.41. Both the map and the *Wayfinder* are distributed through the New England News Company, which last year sold over 20,000 copies of the *Wayfinder* through its numerous agencies.

The New England Street Railway Club spends several hundred dollars each year in newspaper and general advertising designed to promote traffic on electric railways. Advertisements calling attention to the facilities of the Boston office for supplying information are carried in all the Boston daily newspapers and in the prominent suburban weekly newspapers. Tickets are sold at the club's office for the special car trips, including lecture service, which are operated through the historic region surrounding Boston. All inquiries for chartered car service are referred by the club's representatives directly to the railroad companies.



NEWSPAPER ADVERTISEMENT OF NEW ENGLAND STREET RAILWAY CLUB

At the beginning of each season the club sends out several hundred post cards to electric railways in the East asking for a supply of folders, timetables and other advertising matter for distribution. Most of this printed matter is shipped directly to the Boston office from the printers, some packages containing as many as 5,000 folders. The same post cards are used later in the season when making requests for additional printed matter to replenish the depleted stock on hand.

The club's quarters consist of a public reception room 20 ft. long by 10 ft. wide and a private office for the secretary, John J. Lane, who is in charge of the traffic promotion work and publications of the club. Mr. Lane is assisted by a clerk. The office is open every week day, but not on Sundays or holidays. In 1909 the cost of conducting the information bureau was $726.

RAILWAY TRAFFIC PROMOTION

In New England the electric railways traversing the country and shore districts devote more attention to the promotion of traffic in general than the urban lines, although the latter have taken up newspaper advertising to a large extent during the past few years. With the exception of the Boston & Northern and Old Colony the traffic organization is usually of the simplest character. Few companies maintain a separate traffic officer who gives his whole time to such work, although on the larger systems the tendency is for the work of promoting traffic to absorb much of the time of the person in charge of publicity and advertising. The Boston Elevated Railway Company maintains a general publicity bureau under the direction of J. Harvey White, who is in constant touch with President Bancroft and who follows the work of the departments as occasion requires. The publicity bureau of this company prepares all the advertising matter issued for newspapers and other mediums. A small clerical force is attached to this office, but a large part of the work of the bureau is related to other than traffic-promoting matters, preparing announcements of changes in service, opening of new lines and other matters of a news interest to the public.

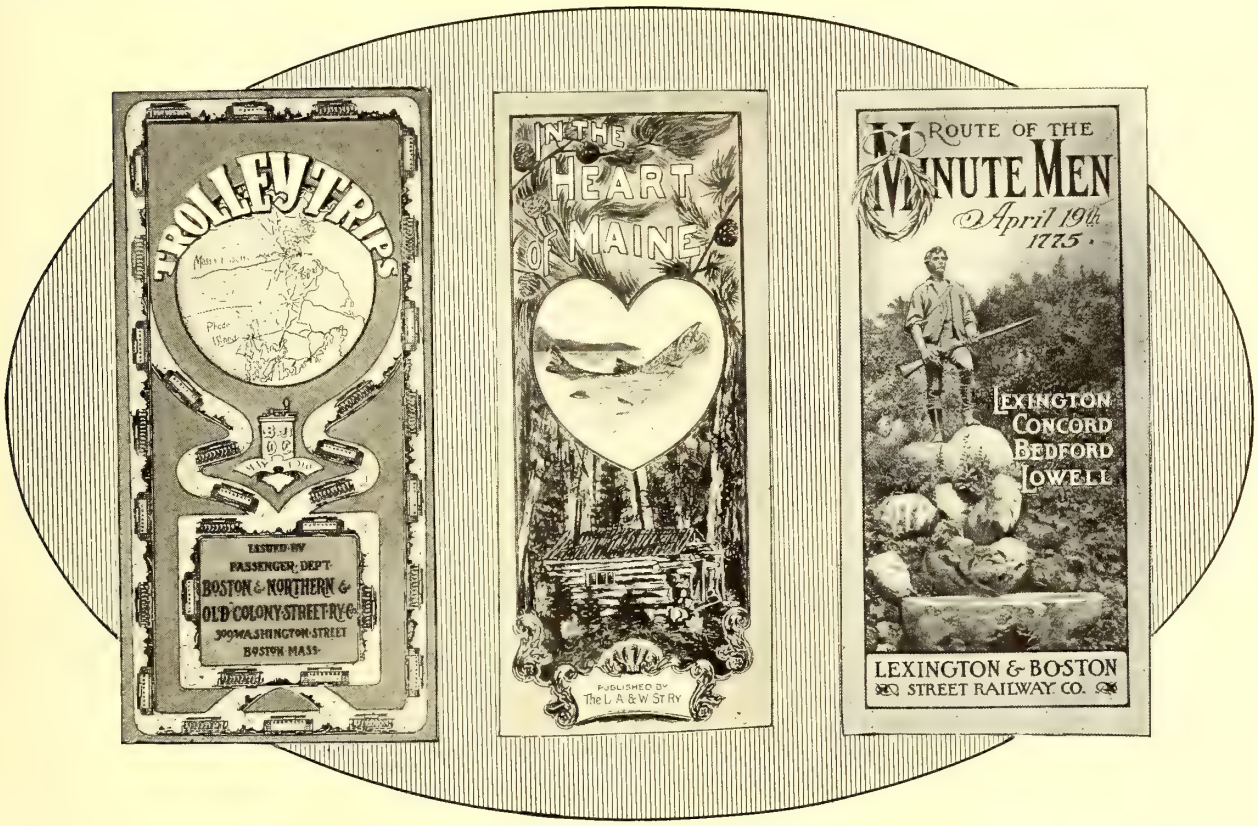
The New England Investment & Security Company maintains a traffic department at its headquarters offices in Springfield, Mass., in charge of C. V. Wood, traffic manager. The department has an office in the Massachusetts Mutual Building, and handles all the publicity work of the organization, including the promotion of both passenger and trolley express traffic. About 700 miles of track are included in this system, which extends from the extreme northwestern part of Massachusetts to within about 30 miles of Boston, and in addition to interurban lines connecting points in Vermont, Connecticut and Rhode Island includes the large city systems of Springfield and Worcester, Mass., with the smaller urban system of Pittsfield, Mass. The traffic manager reports directly to L. S. Storrs, president. Mr. Wood is also vice-president and general manager of the Electric Express Company, which handles all the freight and express business on the system. A small clerical force assists the manager of the department, who has jurisdiction over agents in various parts of the territory served.

The Boston & Worcester Street Railway Company, one of the most prominent interurban lines in New England, devotes considerable attention to the promotion of traffic, and at its headquarters in South Framingham, Mass., about half way between the two terminal cities, a large amount of publicity work is handled under the direction of A. E. Stone, general passenger and ticket agent, who reports to E. P. Shaw, Jr., general superin-

tendent. On other prominent systems the promotion of traffic is largely in the hands of the general manager or superintendent. The Lewiston, Augusta & Waterville Street Railway Company, Portland Railroad Company, Middlesex & Boston Street Railway Company, the Atlantic Shore Line Railway, Brockton & Plymouth Street Railway Company, and many other lines issue publicity matter under the immediate oversight of the executive officers. As a rule, it is not the practice to maintain a separate office for traffic promotion unless the system covers several hundred miles of track, extends over a wide area of diversified country, or is subjected to sharp competition. In the case of the Bangor Railway & Electric Company a traffic department is maintained under the supervision of Howard Brett, but most of the work consists in the management of a well-established electric express business. The Middlesex & Boston Street Railway Company employs an advance agent who devotes practically his whole time to securing parties to patronize the Boston suburban lines and parks, this employee working under the immediate direction of Carl A. Sylvester, general manager. On Sundays and holidays this advance agent is placed at the terminus of the system at its junction with the lines of the Boston Elevated Railway Company, and by a megaphone attracts a large amount of traffic to the suburban lines which would otherwise be lost through the dissipation of travel and scattering of patrons of the city system upon arriving at the terminus of their initial trip. The New Hampshire Electric Railways issue publicity matter for general circulation under the supervision of Franklin Woodman, general manager. At times an employee of the claim department is utilized on publicity work.

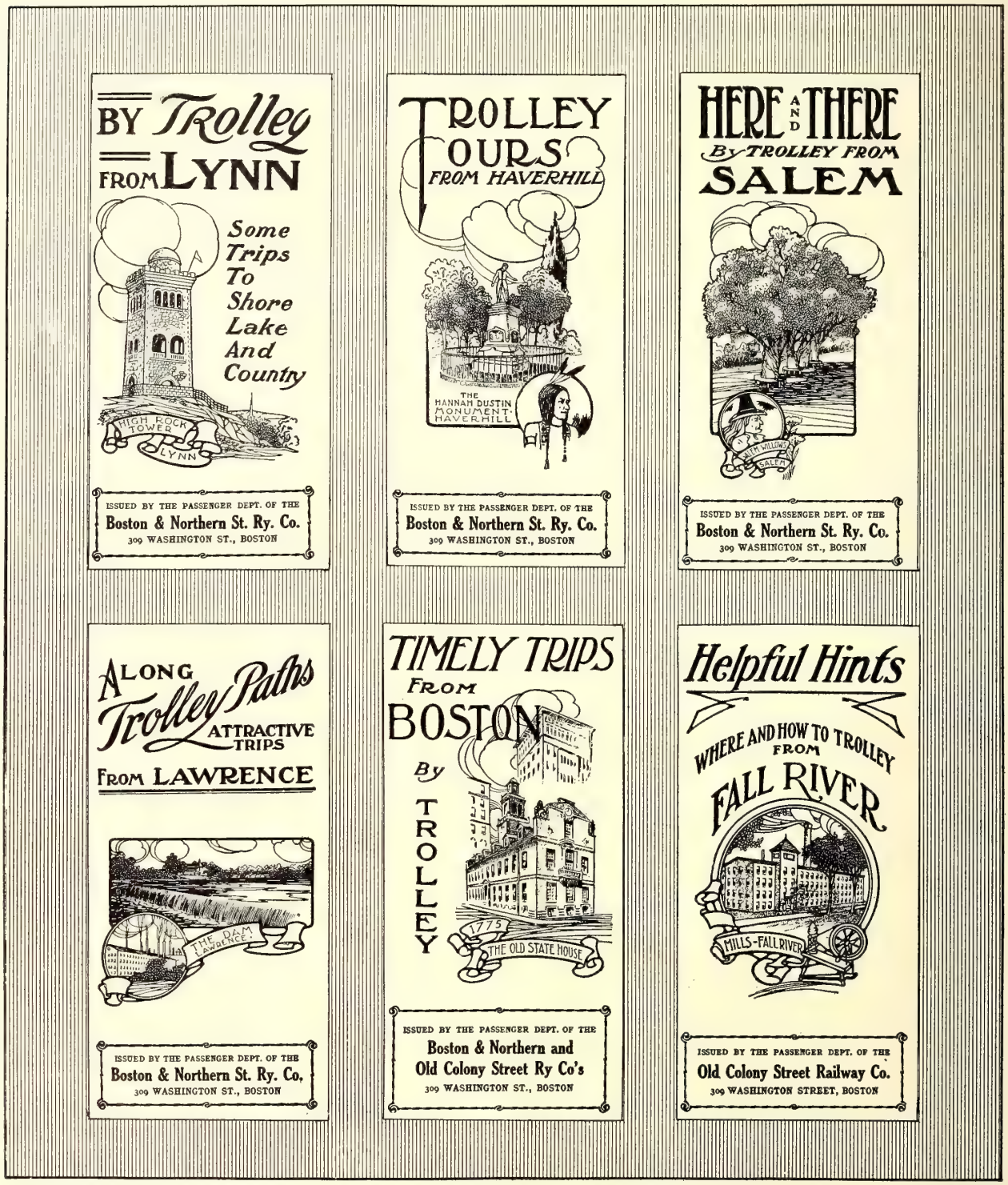
ADVERTISING MATTER

The practice of issuing timetables, circulars, descriptive pamphlets, folders, posters, dash and window cards, and fliers has reached a high stage of development in New England. Early hesitation as to the advantages of this kind of advertising for traffic promotion has given way to vigorous efforts to acquaint the public in the most direct manner with the attractions of each system. In a few cases some of the smaller roads issue timetables and advertise their service on the cars without distributing illustrated folders, but nearly all of the important companies are now spending time and money liberally for publications of sufficient individual attractiveness to induce the public to keep them for constant reference. In this way a stimulus to riding is given which is not as a rule a feature of steam railroad timetables. The majority of the folders issued contain excellent maps of the various systems and their connections, the limits of each company's territory being differentiated by colors. It is difficult to separate timetables and descriptive folders in New England, as the functions of the two are often combined. Among the many publications of this character which are issued reference can be made only to a few which are representative of the manner in which the attractions of the various systems are placed before the public. Among the companies issuing elaborate descriptive pamphlets are the Boston & Northern Street Railway, Old Colony Street Railway, Connecticut Valley Street Railway, New Hampshire Electric Railways, New England Investment & Security Company, the Lewiston, Augusta & Waterville Street Railway, Berkshire Street Railway, Atlantic Shore Line Railway, Lexington & Boston Street Railway, and Middlesex & Boston Street Railway. In gen-



COVERS OF TYPICAL DESCRIPTIVE FOLDERS ISSUED BY ELECTRIC RAILWAYS IN NEW ENGLAND

eral, these pamphlets are characterized by excellent typography, numerous half-tone illustrations of natural scenery and points of interest, clear-cut maps, and detailed information as to fares, distances, schedules, park attractions, trolley express service, hotels, boarding-houses and ticket agencies.



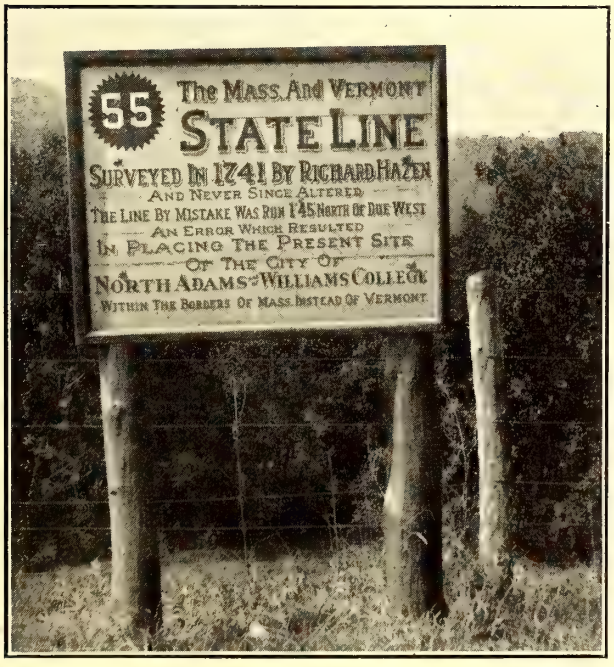
REPRESENTATIVE COVERS OF SERIES OF FOLDERS FOR STIMULATING LOCAL TRAFFIC, ISSUED BY BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES

A representative series of folders has recently been issued by the companies' passenger department for the particular purpose of stimulating local travel in the vicinity of important cities and towns on the Boston & Northern and Old Colony Street Railway lines. One folder is entitled "Summer Jaunts by Trolley from the Spindle City"; another, "Trips by Trolley Around and About the Shoe City"; another, "Trolley Tours from Haverhill," and a fourth, "Helpful Hints, Where and How to Trolley from Fall River." Each of the 10 folders in the series outlines the principal features of interest, fares, running time and changes of cars, if any, of 15 or 20 round trips starting from the local center named in the title of the folder. A map of the Boston & Northern

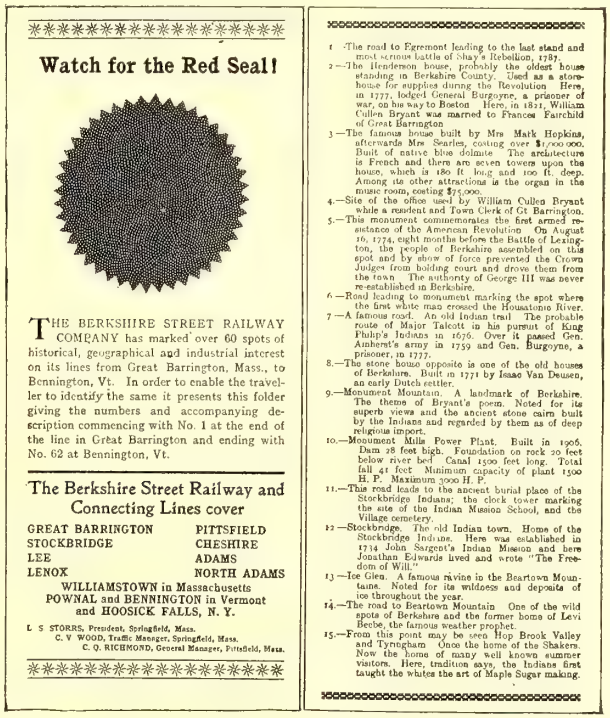
or Old Colony system is printed on the back of each folder. The company has made a special effort by house-to-house delivery of these pamphlets to interest the public in long-distance trips which many persons would not work out for themselves. Duplication of any portion of the route is avoided as far as possible. Most of the trips are arranged with different outward and homeward routes. Many of the trips are planned by the passenger department as combinations of routes which are little known to the public. Both long and short trips are advertised in this way, and a considerable amount of new riding has been developed.

The 1910 book of trolley trips published by the Boston & Northern and Old Colony Street Railway Companies contains 24 pages and has a striking and appropriate design on the front and back covers, which is reproduced. It shows the distances, fares, running times and connections to several hundred cities and towns, figured from Boston as a center; it also advertises special car facilities, besides showing about 30 representative views of the scenery and artificial attractions along the company's lines. A large map in the back shows all steam and electric railways in Eastern New England, with the location of car houses, power stations, parks, municipalities, seaside and interior points of interest. This year a special feature is made of the summer residence of President Taft, at Beverly, which is illustrated with a half-tone engraving and plainly indicated on the map.

A 24-page timetable folder is issued by the New England Investment & Security Company under the title "From the Mountains to the Sea." In addition to complete passenger timetables, this folder advertises electric express service, and gives the schedules of the cars in detail, with information concerning special cars, a map of the system, advertisements of the company's limited car service without extra charge between Worcester and Springfield, and the location of ticket agencies in Springfield, Worcester and Fitchburg. Parks are also noted in this folder. The Lewiston, Augusta & Waterville Street Railway Company has issued this year a 64-page illustrated booklet which describes the system in the order of a trip from end to end. A map of electric railways in Central Maine is printed on the back cover inside of a large heart. The booklet contains views of the company's equipment in addition to many views of natural scenery of interest which can be seen from its cars. Advertisements of local business houses are also printed in the folder.



"RED SEAL" SIGN ERECTED ALONG LINES OF BERKSHIRE STREET RAILWAY



Watch for the Red Seal!

THE BERKSHIRE STREET RAILWAY COMPANY has marked over 60 spots of historical, geographical and industrial interest on its lines from Great Barrington, Mass., to Bennington, Vt. In order to enable the traveller to identify the same it presents this folder giving the numbers and accompanying description commencing with No. 1 at the end of the line in Great Barrington and ending with No. 62 at Bennington, Vt.

The Berkshire Street Railway and Connecting Lines cover

GREAT BARRINGTON	PITTSFIELD
STOCKBRIDGE	CHESHIRE
LEE	ADAMS
LENOX	NORTH ADAMS

WILLIAMSTOWN in Massachusetts
POWNAL and BENNINGTON in Vermont
and HOOSICK FALLS, N. Y.

L. S. STORRS, President, Springfield, Mass.
C. V. WOOD, Traffic Manager, Springfield, Mass.
C. Q. RICHMOND, General Manager, Pittsfield, Mass.

1.—The road to Egremont leading to the last stand and most serious battle of Shay's Rebellion, 1787.
2.—The Henderson house, probably the oldest house standing in Berkshire County. Used as a storehouse for supplies during the Revolution. Here, in 1777, lodged General Burgoyne, a prisoner of war, on his way to Boston. Here, in 1821, William Cullen Bryant was married to Frances Fairchild of Great Barrington.
3.—The famous house built by Mrs. Mark Hopkins, afterwards Mrs. Searles, costing over $1,000,000. Built of native blue dolimite. The architecture is French and there are seven towers upon the house, which is 180 ft. long and 100 ft. deep. Among its other attractions is the organ in the music room, costing $75,000.
4.—Site of the office used by William Cullen Bryant while a resident and Town Clerk of Gt. Barrington.
5.—This monument commemorates the first armed resistance of the American Revolution. On August 16, 1774, eight months before the Battle of Lexington, the people of Berkshire assembled on this spot and by show of force prevented the Crown Judges from holding court and drove them from the town. The authority of George III was never re-established in Berkshire.
6.—Road leading to monument marking the spot where the first white man crossed the Housatonic River.
7.—A famous road. An old Indian trail. The probable route of Major Talcott in his pursuit of King Philip's Indians in 1676. Over it passed Gen. Amherst's army in 1759 and Gen. Burgoyne, a prisoner, in 1777.
8.—The stone house opposite is one of the old houses of Berkshire. Built in 1771 by Isaac Van Deusen, an early Dutch settler.
9.—Monument Mountain. A landmark of Berkshire. The theme of Bryant's poem. Noted for its superb views and the ancient stone cairn built by the Indians and regarded by them as of deep religious import.
10.—Monument Mills Power Plant. Built in 1906. Dam 28 feet high. Foundation on rock 20 feet below river bed. Canal 1500 feet long. Total fall 41 feet. Minimum capacity of plant 1500 H. P. Maximum 3000 H. P.
11.—The road leads to the ancient burial place of the Stockbridge Indians; the clock tower marking the site of the Indian Mission School, and the Village cemetery.
12.—Stockbridge. The old Indian town. Home of the Stockbridge Indians. Here was established in 1734 John Sergent's Indian Mission and here Jonathan Edwards lived and wrote "The Freedom of Will."
13.—Ice Glen. A famous ravine in the Beartown Mountains. Noted for its wildness and deposits of ice throughout the year.
14.—The road to Beartown Mountain. One of the wild spots of Berkshire and the former home of Levi Beebe, the famous weather prophet.
15.—From this point may be seen Hop Brook Valley and Tyringham. Once the home of the Shakers. Now the home of many well known summer visitors. Here, tradition says, the Indians first taught the whites the art of Maple Sugar making.

COVER AND SAMPLE PAGE OF "RED SEAL" FOLDER ISSUED BY BERKSHIRE STREET RAILWAY

The Berkshire Street Railway Company issues a booklet describing the territory which it traverses, a special feature being an advertisement of limited through service between Great Barrington, Mass., and Bennington, Vt. Another publication of this company is a folder entitled "Watch for the Red Seal," which briefly describes 62 points of interest on the system, each of which is marked by a numbered sign with a large red seal and suitable inscription. This plan has proved very popular with tourists who are making their first trip over the line. The Boston Suburban Electric Companies issue a 64-page booklet containing illustrations and descriptions of the principal points of interest on the lines to the west of Boston and also a folder entitled "Around the Hub by Trolley," which describes the parks and historical attractions reached by the company's lines, notably the route of Paul Revere in 1775, the Concord and Lexington battlegrounds, Norumbega and Lexington Parks.

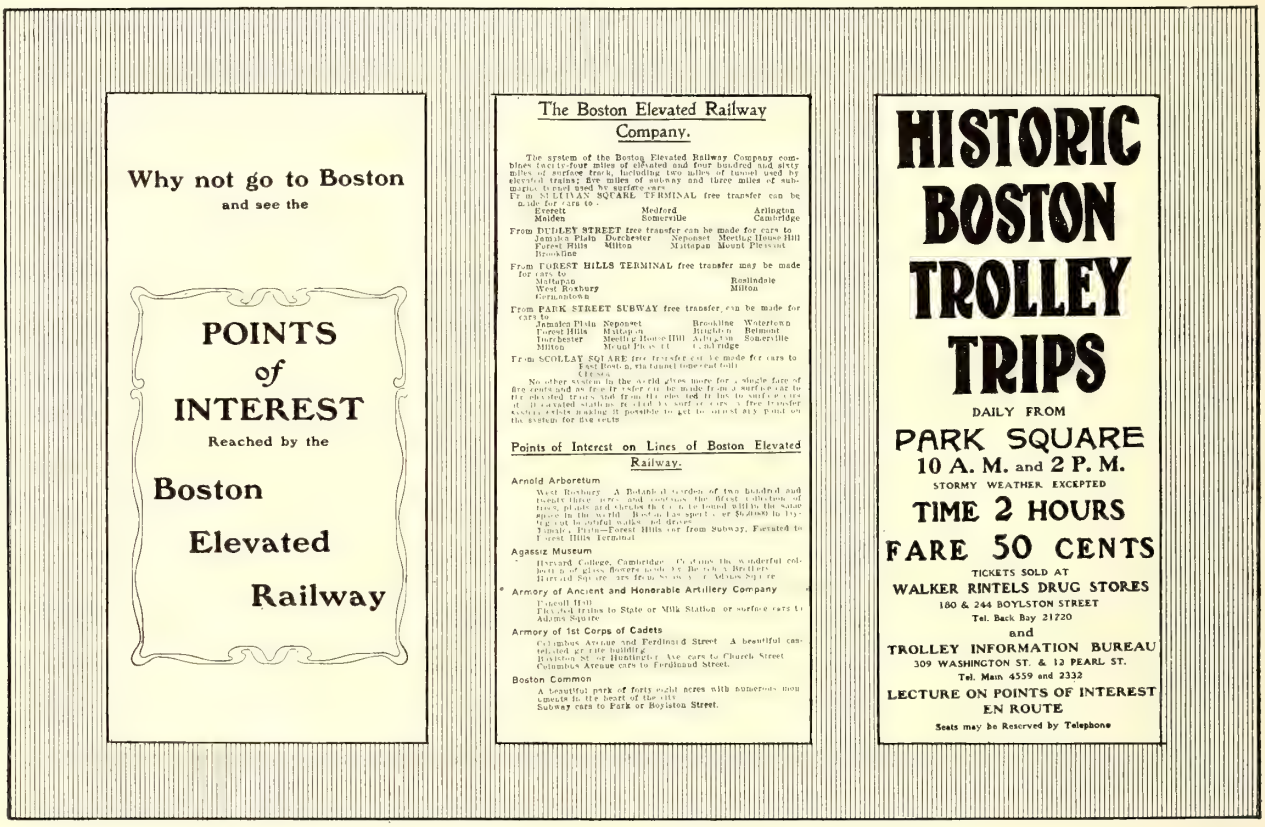
URBAN PUBLICATIONS

Among the urban systems which issue folders may be cited the Boston Elevated Railway Company and the Portland Railroad Company. The Boston company advertises a large number of special pleasure trips to points within the metropolitan park system, classifying them ac-

cording to the fares charged on the cars. The company also advertises in its cars and on folders "Historic Boston Trolley Trips," with lecture service covering over 100 points of interest in the city and its vicinity. The Portland Railroad Company issued this year a new booklet of 15 pages, the special feature of which was the illustrations of unusually liberal size. W. F. Berry, manager of the company, is of the opinion that small and narrow photographic reproductions do not attract travel. The folder also gives the particulars of trips of different lengths, fares and other details.

CITY GUIDES

The practice of advertising schedules in city guides is followed somewhat in New England, notably in the case of the Bangor Railway & Electric Company and the Springfield Street Railway Company. Night car service



COVERS AND SAMPLE PAGE OF BOSTON ELEVATED RAILWAY TRAFFIC FOLDERS

is extensively advertised in the *Boston Pocket Manual*, and the Boston Elevated Railway Company makes good use of the numerous suburban newspaper advertising columns in connection with its service. In the *Strangers' Directory* of New Bedford, Mass., the *Guide to Portland*, and other similar publications, electric railway trips and service are not overlooked. Weekly guides which are posted in the hotels, department stores, post offices, banks and other public places of many smaller cities are also utilized by many electric railway companies in New England. The Boston & Northern and Old Colony Street Railway Companies issue thousands of pocket-size and large card timetables for each of their 16 divisions.

TIMETABLES

In the publication of timetables some unique ideas have been incorporated. The Lewiston, Augusta & Waterville Street Railway issues a strip in graphic form for its Mechanic Falls line which has been well received. The strip is designed according to the usual dispatcher's diagram and shows by zig-zag lines the times of arrival at and departure from the termini of all cars on the division. The schedule on this line is one calling for an 80-minute interval, so that the strip greatly facilitates ascertaining the time of cars by the public. It can be read easily and can be carried in the vest pocket like any other ticket. The Atlantic Shore Line Railway, with headquarters in Sanford, Maine, has made a special effort to produce a timetable which can be read without difficulty by women. L. H. McCray, superintendent, has arranged the published schedule to show the leaving times of cars for all points on the system at every important point, the printing being executed in the form of paragraphs instead of the usual tables. A somewhat unusual feature of this publication is the inclusion of the through schedules of the Boston & Maine Railroad, in the interests of promoting travel. Fifteen thousand of these timetables have been issued this year to date.

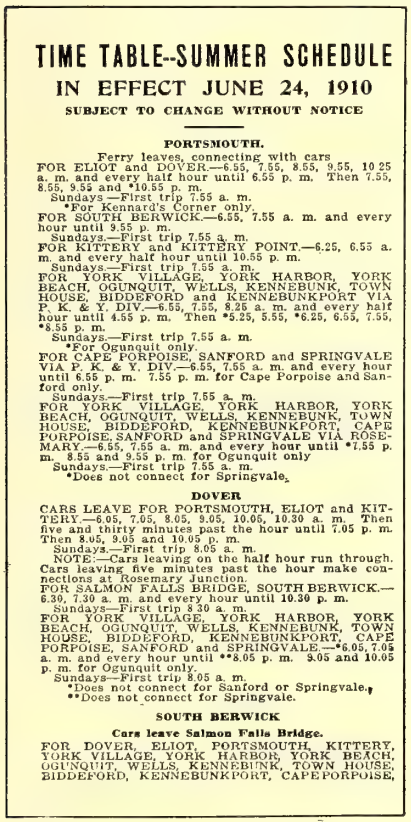
DISTRIBUTION

In addition to newspaper advertisements of schedules, printed matter is distributed to the public by the electric railways of New England through numerous agencies, such as waiting rooms, hotel lobbies, electric railway stations, by mail, from boxes in cars, and by transportation employees. On the lines of the New England Investment & Security Company and the Boston & Northern and Old Colony Street Railway Companies the conductors of through cars are provided with publicity matters of various kinds, including the *Trolley Wayfinder*. The latter is also used extensively as a guide-book by the police in the larger cities of New

England. Wall maps and circulars are largely used in waiting stations, and most companies take pains to advertise thoroughly the opening of new routes. An instance of the effect of this kind of advertising is shown in connection with the opening of the new line of the Boston Elevated Railway Company to the Middlesex Fells district about a year ago. It was decided to open the line for service on Sunday morning, although the officials of the company did not know that it could be done until the day before. A front-page notice was inserted in all the Boston Sunday morning papers calling attention to the fact that the line was open. The public could in no other way have learned this fact until the press notified it. On the first day of service the company carried 11,000 passengers on the new line. Vigorous advertising of a new branch line was also carried out by the Boston & Worcester Street Railway Company early in the season in the newspapers and on company publications in connection with the recently completed extension to Natick.

"WRITE-UPS"

In addition to regular newspaper advertisements, the insertion of articles of a descriptive and instructive character in special industrial issues of the daily press is practised by New England lines. In a recent article of this kind the New England Investment & Security Company occupied a full page in the *Worcester Gazette*, industrial



TIME TABLE--SUMMER SCHEDULE

IN EFFECT JUNE 24, 1910

SUBJECT TO CHANGE WITHOUT NOTICE

PORTSMOUTH.

Ferry leaves, connecting with cars
FOR ELIOT and DOVER.—6.55, 7.55, 8.55, 9.55, 10 25 a. m. and every half hour until 6.55 p. m. Then 7.55, 8.55, 9.52 and *10.55 p. m.
Sundays.—First trip 7.55 a. m.
*For Kennard's Corner only.
FOR SOUTH BERWICK.—6.55, 7.55 a. m. and every hour until 9.55 p. m.
Sundays.—First trip 7.55 a. m.
FOR KITTERY and KITTERY POINT.—6.25, 6.55 a. m. and every half hour until 10.55 p. m.
Sundays.—First trip 7.55 a. m.
FOR YORK VILLAGE, YORK HARBOR, YORK BEACH, OGUNQUIT, WELLS, KENNEBUNK, TOWN HOUSE, BIDDEFORD and KENNEBUNKPORT VIA P. K. & Y. DIV.—6.55, 7.55, 8.25 a. m. and every half hour until 4.55 p. m. Then *5.25, 5.55, *6.25, 6.55, 7.55, *8.55 p. m.
Sundays.—First trip 7.55 a. m.
*For Ogunquit only.
FOR CAPE PORPOISE, SANFORD and SPRINGVALE VIA P. K. & Y. DIV.—6.55, 7.55 a. m. and every hour until 6.55 p. m. 7.55 p. m. for Cape Porpoise and Sanford only.
Sundays.—First trip 7.55 a. m.
FOR YORK VILLAGE, YORK HARBOR, YORK BEACH, OGUNQUIT, WELLS, KENNEBUNK, TOWN HOUSE, BIDDEFORD, KENNEBUNKPORT, CAPE PORPOISE, SANFORD and SPRINGVALE VIA ROSEMARY.—6.55, 7.55 a. m. and every hour until *7.55 p. m. 8.55 and 9.55 p. m. for Ogunquit only
Sundays.—First trip 7.55 a. m.
*Does not connect for Springvale.

DOVER

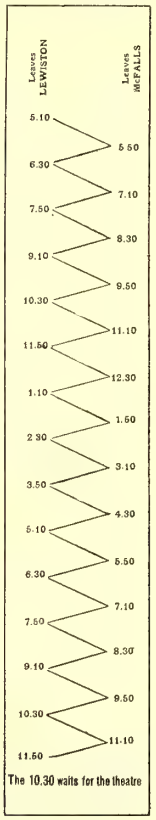
CARS LEAVE FOR PORTSMOUTH, ELIOT and KITTERY.—6.05, 7.05, 8.05, 10.05, 10.30 a. m. Then five and thirty minutes past the hour until 7.05 p. m. Then 8.05, 9.05 and 10.05 p. m.
Sundays.—First trip 8.05 a. m.
NOTE:—Cars leaving on the half hour run through. Cars leaving five minutes past the hour make connections at Rosemary Junction.
FOR SALMON FALLS BRIDGE, SOUTH BERWICK.—6.30, 7.30 a. m. and every hour until 10.30 p. m.
Sundays—First trip 8.30 a. m.
FOR YORK VILLAGE, YORK HARBOR, YORK BEACH, OGUNQUIT, WELLS, KENNEBUNK, TOWN HOUSE, BIDDEFORD, KENNEBUNKPORT, CAPE PORPOISE, SANFORD and SPRINGVALE—*5.05, 7.05 a. m. and every hour until **8.05 p. m. 9.05 and 10.05 p. m. for Ogunquit only.
Sundays—First trip 8.05 a. m.
*Does not connect for Sanford or Springvale.
**Does not connect for Springvale.

SOUTH BERWICK

Cars leave Salmon Falls Bridge.

FOR DOVER, ELIOT, PORTSMOUTH, KITTERY, YORK VILLAGE, YORK HARBOR, YORK BEACH, OGUNQUIT, WELLS, KENNEBUNK, TOWN HOUSE, BIDDEFORD, KENNEBUNKPORT, CAPE PORPOISE,

SAMPLE PAGE OF ATLANTIC SHORE LINE TIMETABLE



GRAPHIC TIMETABLE L. A. & W. ST. RY.

number, June, 1910. The Boston Elevated Railway Company issues matter of this kind giving the details of its "Historic Boston" lecture service, trips for various sums in various times, and describing the company's folders and guides. The Lexington & Boston service to Concord and Lexington was similarly treated in the recent issues of the Boston dailies. The Boston & Northern and Old Colony Street Railway Companies are especially active in preparing articles for the newspapers.



BOSTON ELEVATED

The New Line to

MIDDLESEX FELLS

Is Now in Use

Boston Elevated Railway Co

NEWSPAPER ADVERTISEMENT OF BOSTON ELEVATED RAILWAY

These companies are constantly having a wide variety of articles printed in the newspapers in all towns along their lines.

CAR ADVERTISING

Most companies realize that one of the best places in which to advertise service is on a car, and to this end dasher signs, rack cards, and aisle notices are extensively used in New England. An attractive card of this type is issued by the Springfield Street Railway Company for advertising the limited service to Worcester, including connections to Boston and other points. A skeleton diagram of the system is shown in colors, and fares and ticket agencies are given. Conductors also sell through tickets on this system. A similar card is used on the Berkshire Street Railway. In future advertising of this kind the company plans to include the running times of limited service on diagrams. The use of window cards is regarded with disfavor in some quarters, on account of the annoyance to passengers when they swing to and fro, and also on account of their interference with the view of passengers and with ventilation. Handbills are extensively used by the Lewiston, Augusta & Waterville Street Railway to attract park patronage, the bills being attached by cords to the seat handles in the cars. This company also employs posters on the streets, in its waiting rooms and shelter stations, on the backs of seats, at parks and on dashers. The New Hampshire Electric Railways use billboards effectively and also employ posters at turnouts and other points where the cars stop for a short time. Park attractions are chiefly advertised by this method. The Atlantic Shore Line Railway advertises in the publications of various benefit associations in its territory. The New England Investment & Security Company employs the tourist agency service of Foster & Reynolds, which directs traffic to the company's lines from many distant parts of the United States and as far south as Cuba. Where the companies use newspapers the plan of paying for space in cash appears to find general favor. Handbills are used satisfactorily in the smaller cities and towns, where the cost of canvassing is relatively low, mail deliveries few, and the density of

population moderate. The Middlesex & Boston and Lexington & Boston companies distribute about 5000 pieces of advertising per day at the elevated and subway stations in Boston, and in the winter season, when the company ran through limited suburban cars from South Framingham to Boston, this service was extensively advertised in the local papers and by posters in prominent places.

LIMITED SERVICE

Little has been done in New England in connection with the establishment of limited interurban service except in one or two recent instances. The development of inter-city routes along the highways is probably responsible for this, together with the relatively great density of population in Eastern New England. The Boston & Worcester Street Railway, however, has taken up this question with most satisfactory results. Limited service has been given on this road for about a year, the fast time being inaugurated shortly after the completion of double tracking over practically the entire main line. In place of the former 15-minute service between Boston and Worcester the company operates a combination of limited and local schedules which has resulted in a gain of 17 per cent in the through riding. The management of this company is convinced that the solution of the rapid transit problem lies in the separation of local from through business. Limited service is given hourly between Boston and Worcester in each direction, and a half-hourly local service in also maintained in each direction. The limited cars pass the locals on the road by suitable cross-over and flagging arrangements, and the running time between terminals is 30 minutes faster with the limiteds, which make a schedule speed of about 30 m.p.h. on the tracks of the Boston & Worcester. By this schedule local patronage is handled without interfering with the comfort and speed of the through service and decided economies in operation have resulted. In July, 1910, the company carried 9310 more through passengers than in July, 1909; the earnings were 12.8 per cent higher, or $8,800 more than a year ago; about 100 tons of coal were saved at the power station by the new schedule; the car mileage was reduced by 19,224 car miles; and the service of 5 crews and 3½ cars was saved. These limited cars make but three stops on the Boston & Worcester tracks, and run the 31 miles between Lake Junction, near Worcester, and Chestnut Hill in 62 minutes. This service is extensively advertised in folders and regular timetables, and during the past summer the company has promoted riding to a considerable extent by front-page advertisements in the Worcester daily press. The company also advertises a two and three-day trip by trolley from Boston to New York, the total running time being 18 hours 52 minutes, and the fare $3.13. The company publishes a folder giving the particulars of a number of excursion trips via its lines, some of which include journeys on other systems and some water trips. Tickets at reduced rates are sold by the company and its numerous agencies for these trips. An experienced guide accompanies each excursion. Special cars are run on the time of the limiteds so far as practicable. Excursions have been run from Worcester to Salisbury Beach in a single day, the round trip covering a little less than 200 miles.

PARK ADVERTISING

Park advertising in New England is characterized by an adherence to well-tried methods, and there is little that is novel in this work. Billboards are used to a considerable extent, though these are seldom illuminated. Fliers, dash and interior car signs are used principally, in conjunction with the newspapers. Distinctive in character, however, are the park advertisements of the Boston Suburban Electric Companies and the Boston & Northern and Old Colony. The former almost invariably utilize the slogan "Follow the Flag" to Norumbega or Lexington Park, as the case may be, a blue flag being used on all posters advertising the former, and a red flag for the latter. The letters are white in each instance. These flags are also attached to the trolleys of all cars making direct connection with the parks. The company uses this emblem on much of its printed matter. The Boston & Northern Street Railway and the Old Colony Street Railway issue a great variety of posters in connection with parks. The value of symbols in addition to plain lettering is recognized in a recent dasher advertisement of Highland Park, Brockton, where a red heart is printed in the center of the poster in place of script. In a few instances parks are advertised by separate booklets illustrated with numerous attractive engravings, as in the case of Canobie Lake Park, on the lines of the New Hampshire Electric Railways, and Whalom Lake and park, on the lines of the Fitchburg & Leominster Street Railway Company. The practice is general of illustrating park attractions with groups of half-tone engravings in the regular timetables and folders.



ADVERTISEMENT OF LIMITED CAR SERVICE INSERTED ACROSS FULL WIDTH OF FRONT PAGE OF WORCESTER NEWSPAPER

ILLUMINATED SIGNS

Illuminated bulletin boards are used effectively by the Middlesex & Boston Street Railway and the Boston & Worcester Street Railway in connection with schedule advertising. The former places these signs, about 30 in. square, at important points on the system, calling attention to the speed, comfort and low fare of the service, the connections and leaving times. Two 16-cp lamps are ordinarily used to illuminate each side of these signs, with a fifth lamp in the center. Current is supplied from the trolley circuit, and the lamps are cut in and out by car service employees. They have proved very profitable. The Boston & Worcester signs are about 3 ft. high x 6 ft. wide, and call attention to the cities reached and the speed and frequency of service. The signs are placed about 15 ft. above the street level and are illuminated by a row of incandescent lamps with reflectors along the tops of the signs.

POSTAL CARDS AND CIRCULAR LETTERS

The practice of sending circular letters to attract traffic has not become general in New England, although the Boston & Northern and Old Colony Street Railway Companies occasionally do this in connection with convention meetings. Typical letters of this kind sent out by the Boston & Northern passenger department are reproduced.

DEAR MADAM: I am informed that you are at the head of a committee in charge of the arrangement for the gathering of clubs in this city in June.

It occurred to me that in making up your plans for the entertainment of visitors you might desire to include some trips to the various historical points or seashore resorts of Eastern Massachusetts, a large portion of which are upon our lines. In making these trips it would be advisable and add much to the pleasure if they were made by special cars. We can make arrangements to furnish special cars from any point in Boston to practically any point outside at a very reasonable figure. These cars could leave at any time and return at any time, and arrangements could be made to make such stops as might be desirable. In this way strangers in the district would be able to avoid all bother of timetables and making connections and could make the trips in congenial parties. I should be very glad to make up a number of trips in the way of suggestions, with the cost of the same.

If it would be possible to do so I would appreciate it very much as a favor if I could secure from you a list of clubs which are to be represented. We issue maps and other literature containing information about our lines which I should be very glad to send to some of those who are to visit here in June, and which I think would be of a great deal of interest and value to them. I could also provide you, or such committee as might have the matter in hand, with various literature of this kind for your headquarters in Boston.

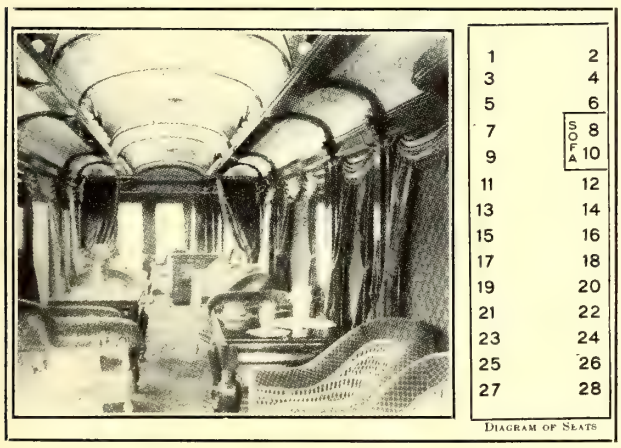
Thanking you in advance for such information, etc., I am, etc.

Another letter, addressed to the secretary of an organization composed of men, is as follows:

DEAR SIR: I understand that your association is to convene in this city from July 28 to 31, inclusive. Permit me to call your attention to the fact, that should any of your members care to visit any of the famous inland shore resorts or historical places in Eastern Massachusetts during their stay here, we should be very glad to make arrangements at a very reasonable rate to provide you with special trolley cars for such trips.

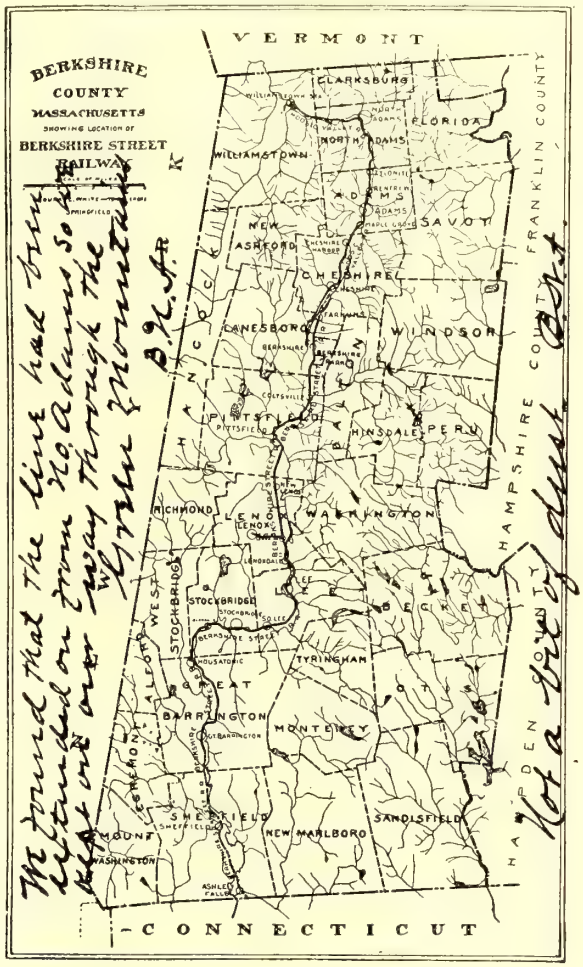
If there is nothing which you have in mind in this line that you could arrange in advance upon a few hours' notice after arrival here we could look something up for you.

Whether you see fit to charter special cars or not, I wish to extend to the members of your organization the privileges of this office, and ask you to feel free with other members of the association to call upon us at any time for trolley or any other information which might be desired. We will do what we can to give it, help the members plan individual trips, offer the use of a telephone service and in general try to make their stay here as pleasant as possible. Yours, etc.



SOUVENIR POST CARD GIVEN TO PASSENGERS ON PARLOR CARS OF BERKSHIRE STREET RAILWAY

A novel use of picture post cards is made by the New England Investment & Security Company. A canvass is made of hotel registrations, and post cards showing the attractiveness of trips in the Berkshire Hills by trolley are mailed to new arrivals. A representative card shows the territory served by the Berkshire Street Railway Company. A map is printed on the back with a note in handwriting to the effect that the line was recently extended from North Adams into Southern Vermont. The lines of the Manchester (N. H.) Street Railway distribute picture postal cards showing views on and below



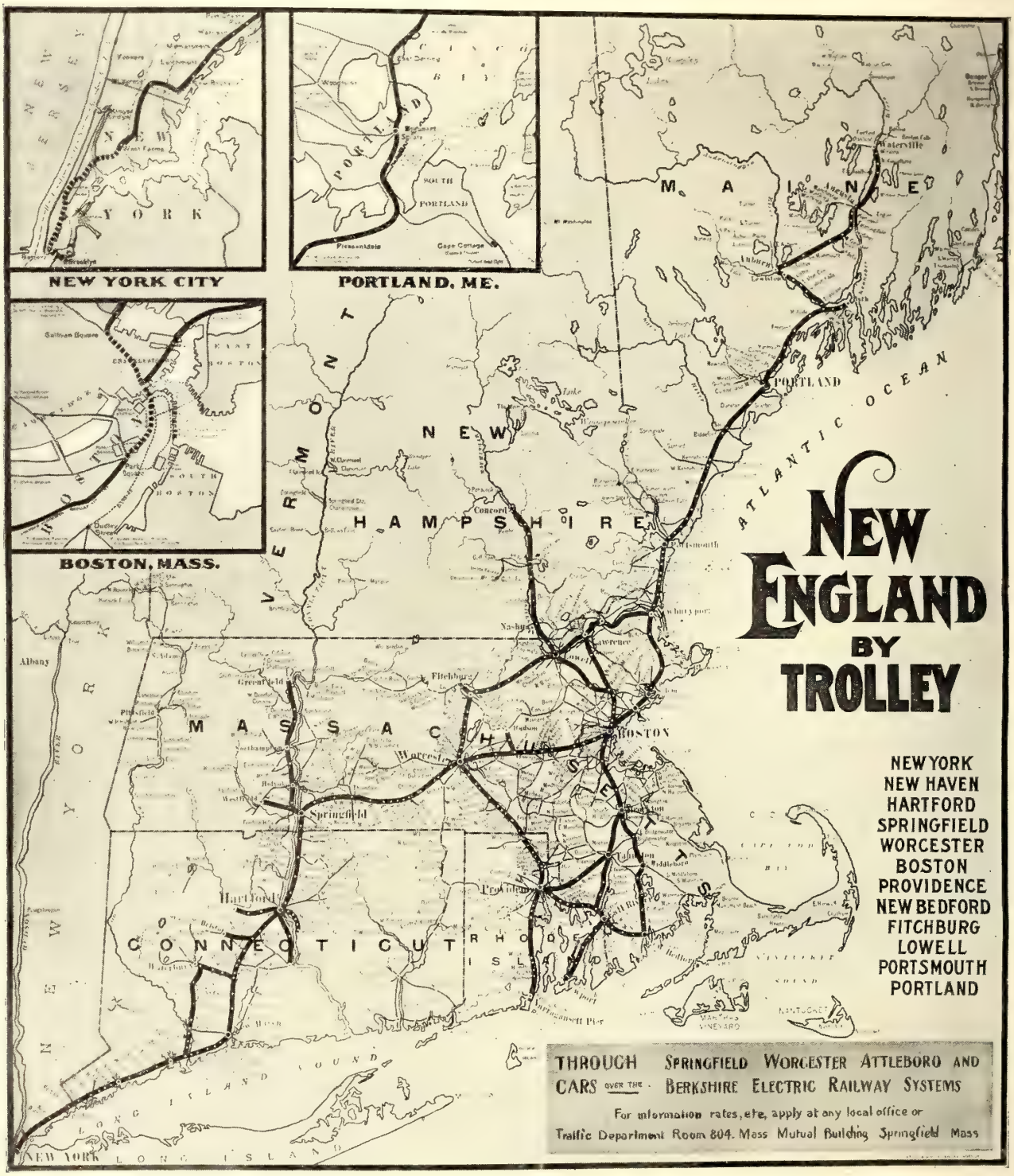
SOUVENIR POST CARD OF BERKSHIRE STREET RAILWAY

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TRANSFER ADVERTISEMENTS

Comparatively few companies advertise their own service upon the backs of transfers, this space frequently

being rented to merchants or to the proprietors of remedies, toilet articles, confections or other commodities appealing directly to the individual. The New Hampshire Electric Railways, however, advertise the resorts at Canobie Lake, Hampton and Salisbury Beach on the backs of transfers.

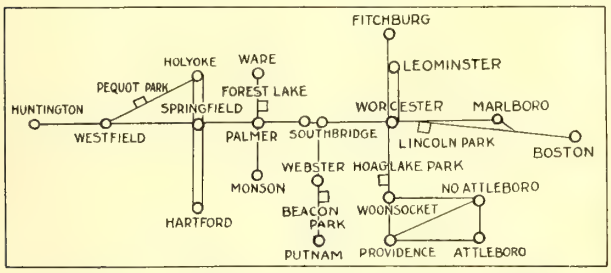


WALL MAP OF TROLLEY LINES DISTRIBUTED BY NEW ENGLAND INVESTMENT & SECURITY COMPANY TO HOTELS AND BOARDING HOUSES

MAPS

Maps of the various New England systems are freely distributed to the public in connection with folders and timetables. On many roads excellent maps are also posted in the waiting stations, but there is still an opportunity for further work of this kind. The Boston Elevated Railway Company maintains a large poster map printed in colors at all its principal stations and car houses, showing transfer points, connections for outlying towns, the relation of the elevated and subway lines to the surface system, location of foreign lines, and 5-cent fare limits. This company also has made some use of a bird's-eye map of its system, notably at conventions, where the routes and points of interest have been illustrated in colors. Three hundred of these were distributed to schools. One of the most complete maps issued for public distribution is a 20-in. x

22-in. four-color map of all the through lines in New England, issued by the traffic department of the New England Investment & Security Company. One of these wall maps was sent by the company, together with folders, to every hotel and summer boarding house in the territory



MAP USED IN TIMETABLES OF NEW ENGLAND INVESTMENT & SECURITY COMPANY

served by it. Maps of the Boston & Northern and Old Colony Street Railway Companies are sent out in large numbers to schools, libraries and insurance companies. They are hung in all waiting rooms and are generally used by traveling men in making up routes.

WAITING ROOMS

The value of the waiting room as an adjunct to comfortable travel is recognized by most of the New England lines. Special types of waiting rooms have been developed an attractive design of out-door waiting room for various important transfer points, and recent structures of this kind at Coolidge Corner and Brookline Village embody moderate first cost with handsome appearance and serve the public convenience admirably. Um-



SPECIAL PARLOR CAR OF LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY

brella type roofs are used, and the platforms are equipped with seating sections separated by appropriate wind shields. The Sea View Railroad, of Rhode Island,



WALL MAP OF BOSTON ELEVATED RAILWAY DISTRIBUTED TO PUBLIC SCHOOLS IN BOSTON

oped to meet different conditions. In Boston the waiting rooms are frequently combined with news stands, lunch rooms and fruit merchants' stands, while druggists cooperate with the railway companies in practically every instance. The Boston Elevated Railway has de-

employs old box cars for waiting stations on its Narragansett Bay line. The Boston & Worcester Street Railway, the Lewiston, Augusta & Waterville Street Railway, the Bangor Railway & Electric Company, Atlantic Shore Line Railway, and many other companies

realize the fact that good waiting room facilities encourage travel which would otherwise seek other avenues. A typical urban waiting room of the best class is that of the Portland Railroad Company. This is located in the heart of the city at the principal transfer point on Monument Square, the company's general office being on the floor above. This room is 40 ft. long x 15 ft. 6 in. wide, and is equipped with settees capable of seating about 40 persons. It is lighted by tungsten lamps, contains a number of neatly framed photographs of scenes on the company's lines, telephone booth, women's lavatory, information bureau, ticket office and parcel checking window, the last being equipped with a double push button and buzzer installation to call the attendant from a store on the other side of the wall which leases the parcel checking privilege from the railroad company. In Bangor and Lewiston the same general type of waiting room is in use, though the Portland room is the most modern.



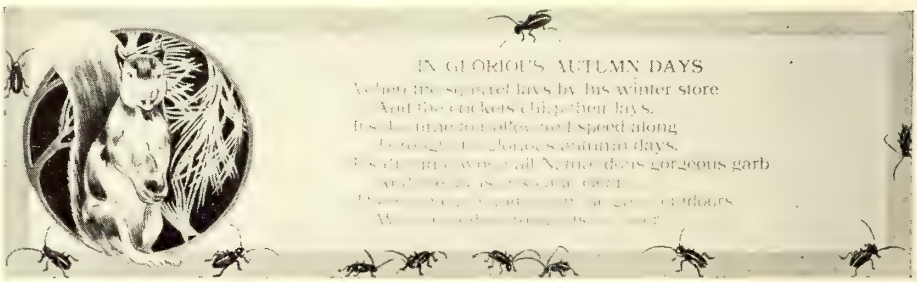
OBSERVATION CAR ON INCLINED RAILWAY UP UNCANOONUC MOUNTAIN

CONVENTIONS AND EXHIBITS

Conventions meeting at important New England cities receive much attention from the more progressive electric railway companies. The publicity work done at various Boston conventions of national organizations is most prominent, and within the past few years an effort has been made to secure trolley patronage from visitors to the city whose time is especially limited. Usually a branch trolley information bureau is established at the convention headquarters, and one or more persons are detailed to work up interest in electric railway travel. In addition to the usual descriptive matter which is given away there are often exhibits of selected views accessible by trolley, moving pictures, lantern slide displays, and occasionally working exhibits of mechanical and electrical apparatus used in railway service. The Boston Elevated Railway Company has displayed at several conventions a working exhibit of its third-rail and block signal equipment, with a model electric locomotive, electro-pneumatic switch mechanism and complete electrical details as in actual service. Revolving pictures of noted historic points reached by its lines have also been shown, and the method of mounting motors and other electrical details have been displayed. The Boston Elevated exhibit of equipment at conventions aims to encourage travel by demonstrating its safety. At the recent convention of the National Educational Association in Boston, the Boston & Worcester Street Railway maintained two attendants to answer questions about trolley travel and to distribute printed matter. These men were provided with uniforms and "Trolley Air Line Guide" badges. The company distributed about 50,000 trolley folders in the cot beds which were set up in Boston at another convention a few years ago. The Boston & Northern and Old Colony Street Railways also maintain bureaus at conventions, establishing a representative on the ground as soon as possible after the meetings begin, and affording visitors every facility for learning about opportunities for electric travel.

SPECIAL CARS

The renting of special cars in New England has attained large proportions of late years. The practice of different companies varies greatly as to charges for this service, there being in some instances reductions from the regular fares and in others additions. Generally speaking, the large urban properties are sufficiently occupied with the handling of routine traffic to render special-car business something of a side issue. Companies serving the country and seaside districts tend to encourage special car service more than the city roads, since the revenue is likely to be greater and the traffic density is low enough to cause no embarrassment of the regular service. The Boston Elevated Railway rents to parties a large number of special cars annually, but it is a question whether the business is as desirable as on systems like those of the Boston & Northern, the Boston & Worcester, and the New Hampshire Electric Railways. The renting of special cars is regarded with little enthusiasm in Maine. On the lines of the New England Investment & Security Company the special-car charge is approximately 1 cent per passenger mile, based on the actual seating capacity of the car, with a minimum of 36 passengers per car. The minimum charge is $5. On this system the division superintendents handle all special-car business, and there are frequently 15 special cars per day hired at both Springfield and Worcester. The Massachusetts Electric Companies and the Boston & Worcester Street Railway



AISLE SIGN USED BY BOSTON & NORTHERN AND OLD COLONY STREET RAILWAY COMPANIES TO ADVERTISE SPECIAL-CAR SERVICE

handle a very large special car traffic and advertise extensively for this business.

The methods of advertising special-car facilities on the Boston & Northern and Old Colony are worthy of note. In a recent series of aisle cards, Mr. Faulkner advertised the advantages of special car travel in verses deal-



TROLLEY FARMING SPECIAL RUN BY NEW ENGLAND INVESTMENT & SECURITY COMPANY

ing with the adventures of sundry Hottentots, Esquimaux and cannibals. These card advertisements proved no less popular than the original "Pilgrim John" series, which attracted attention from all parts of the country. These companies have made a point of bringing special cars to the attention of fraternal and social organizations, and have developed a substantial traffic in connection with the visiting of U. S. battleships. Members of the crews of battleships on shore leave have found the special-car service most attractive. Last spring the New Hampshire Electric Railways sent a special-car agent to all towns on the system to call upon ministers, secretaries of lodges, Sunday school officers, and others having to do with making picnic arrangements, and secured considerable business in a two weeks' canvass. At a recent educational convention in Boston arrangements were made to handle a party of 310 teachers in six special cars, which were run to the birthplace of the poet Whittier and thence to the beach resorts. The Boston & Worcester Street Railway's regular rate for special-car service is the regular tariff rate for a full car (seating limit only), with about 10 per cent reduction on the round trip. This company has handled a large amount of special-car business in connection with the movement of regiments of the Massachusetts militia and the coast artillery, emergency movement of supplies as in the Chelsea fire, pleasure and educational trips, fraternal conventions and field days, fishing trips outside of Boston Harbor, church and school picnics. The company has handled over 25 tons of tentage and other military supplies in a day between the coast forts and the South Framingham Arsenal, and has transferred a brigade of troops in 26 cars on 1½ minute headway from Boston to the South Framingham muster field. The company frequently runs from 15 to 20 special cars per day on its lines. The Atlantic Shore Line Railway operates special cars on a mileage charge. In general the Boston Elevated Railway's special-car charges are somewhat greater than the full tariff on regular cars, although a reduction from double the one-way charge is made on the round trip. For cars leaving a terminus later than midnight a higher rate is charged. The company has two parlor cars seating 20 persons each which it rents to parties. Several special cars are rented each week on the Atlantic Shore Railway. On the Boston & Northern and Old Colony lines special-car rates vary with local conditions, and rentals are arranged both at the offices of the passenger department and at division offices. The Middlesex & Boston lines charge approximately the one-way rate for special cars for a large party. Recently 68 special cars were arranged for one event.

SAVE

TIME

AND

MONEY

ON

EXPRESS TRANSPORTATION

For further information call or write

C. V. WOOD,
Vice-President and General Manager,
THE ELECTRIC EXPRESS COMPANY
Room 804 Massachusetts Mutual Building
Telephone 4680. SPRINGFIELD, MASS.

WHAT IT COSTS YOU

Rates are based on Official Classification and apply on all kinds of Merchandise and Produce.

Cost in cents per hundred pounds between SPRINGFIELD and the following points:

	CLASSES					
	1	2	3	4	5	6
Westfield	8	7	6	5	4	4
Russell	9	9	7	7	5	5
Huntington	10	10	7	7	5	5
Palmer	9	9	7	7	6	6
Monson	18	16	14	11	9	7
Ware	12	12	9	9	7	7
Brimfield	15	15	12	12	9	9
Southbridge	15	15	12	12	9	9

MINIMUM SMALL-PACKAGE RATE

When 1st-class rate is 7c. or less per 100 lbs., minimum charge is 10c.

When 1st-class rate is over 7c. and not over 25c. per 100 lbs., minimum charge is 15c.

RATE ON MILK

No Cans Daily.	19 Miles or Less.	20 to 49 Miles.
1 to 19 inclusive	5 cts. per can	6 cts. per can
20 to 29 "	4¾ " " "	5¾ " " "
30 to 39 "	4½ " " "	5½ " " "
40 to 49 "	4¼ " " "	5¼ " " "
50 to 74 "	4 " " "	5 " " "
75 to 99 "	3¾ " " "	4¾ " " "
100 and over	3 " " "	4 " " "

Empty cans returned free.

MERCHANDISE OR COMMODITY CLASSES

Agricultural Implements, Double 1st class "set up"	
Agricultural Implements, 1st-class "knocked down"	
Apples in bbls and bags	3rd class
Boards, ceiling	2nd "
Boards, common	4th "
Books, N. O. S.	1st "
Brick, common, loose	2nd "
Butter in baskets	Double 1st "
Butter in tubs	2nd "
Cement in boxes	3rd "
Cement in bags and barrels	4th "
Cheese in crates	1st "
Cheese in boxes	3rd "
Coffee in cans	3rd "
Eggs in baskets	Double 1st "
Eggs in carriers	2nd "
Fertilizer	4th "
Flour	5th "
Fruit, Berries	1¾ "
Furniture, crated	Double 1st "
H. H. Goods	1¾ "
Grain, Corn, in bulk	5th "
Grain, Oats, in bulk	5th "
Grain, Wheat, in bulk	5th "
Hides, dry	1¼ "
Hides, green	4th "
Lime in boxes or kegs	3rd "
Meats, smoked	3rd "
Meats, fresh	1st "
Nails	4th "
Paint in buckets	1st "
Pipe, drain	4th "
Poultry, alive	Double 1st "
Poultry, dressed, boxed	1st "
Seeds, N. O. S.	1st "
Vegetables, Beans	1st "
Vegetables, Beets	1st "
Vegetables, Corn, green	1st "
Vegetables, Melons	1¼ "
Vegetables, Onions	1st "
Vegetables, Potatoes	4th "

COVER AND SAMPLE PAGES OF FOLDER ISSUED TO ADVERTISE EXPRESS SERVICE OF NEW ENGLAND INVESTMENT & SECURITY COMPANY

The Lewiston, Augusta & Waterville Street Railway operates a special parlor and observation car, "Merrymeeting," on its lines between Waterville and Bath, Maine. This car is equipped with double trucks and four motors, with plush and wicker chairs. The car is 41 ft. long over all; has two observation platforms, carries 35 persons comfortably, and is equipped with a refrigerator and outline electric lighting. The company charges $7 per hour for all special car service.

STEAM AND TROLLEY CO-OPERATION

In New England the competition between steam and electric railways is acute for local service where lines parallel one another, and as yet there is but little co-operation between the two, with the exception of cases where the steam lines and electric roads are operated under the same management. Since June 11 a new solid train service has been in operation between Williamstown, Mass., and New York via Greenfield and Springfield, over the lines of the Boston & Maine and the New York, New Haven & Hartford. From Williamstown a 50-minute run is made by the Berkshire Street Railway to Bennington, Vt. The two steam railroads and the electric railway which combine to give this through service co-operate in the publication of a timetable which shows the time of the entire trip. Tickets can be purchased at any point on the steam or electric lines.

EXPRESS SERVICE

Electric express service has as yet attained only an initial development in New England. The Electric Express Company, operated by the New England Investment & Security Company's organization, has a growing traffic in the territory between points in the Springfield-Worcester district, in the Attleboro section of Massachusetts, and to some extent in the Berkshire district. The service is advertised in the regular passenger folders, in the daily papers, and in various Board of Trade publications. The company ships merchandise as far east as Southbridge from Springfield, and has nine general agents, with three men who devote considerable time to soliciting business. Express service is given at approximately freight rates. Steam railroad cars are switched at various points and there are about 16 sub-agencies in towns in the territory. A movement designed indirectly to increase traffic through the improvement of conditions in the company's territory was the running of a "Trolley Farming Special" by these lines over about 300 miles of track in Central Massachusetts for four days in April, 1910. Active co-operation with local Boards of Trade is a fundamental policy with this organization. In a recent article in the "Live Wire," published by the Springfield Board of Trade, C. V. Wood, traffic manager of the company and vice-president of the Electric Express Company, stated that if the territory north and south of the present area served by electric express cars should be developed in this way, the result would mean an increased trade of $1,000,000 yearly to the Springfield district.

Other localities enjoying this class of service are the Bangor district, where agricultural products are handled on a large scale; the Central Maine district, served by the Lewiston, Augusta & Waterville Street Railway; the Atlantic Shore Line territory, served by three electric locomotives which haul all rail-borne traffic into the Sanford district, and which operate from Portsmouth, N. H., to Springvale, Me.; the Old Colony Street Railway Company's territory south of Brockton, and the Buzzards Bay district, centering upon the lines of the Union Street Railway Company, New Bedford, Mass. The New Hampshire Electric Railways are planning a service of this kind for next year. The Maine companies favor the plan of leasing the business to an old-line express company. The tendency is for the electric railways to avoid anything in the nature of collections and deliveries off their lines. In spite of the fact that the trolley express business is in its infancy in New England, with the possible exceptions of Connecticut and Rhode Island, it is proving most welcome to the communities into which it is introduced, even in a limited way, and with the expansion of the service is certain to revolutionize freight-carrying conditions in many localities now handicapped by slow and roundabout steam railroad service.



TRAFFIC PROMOTION IN CENTRAL NEW YORK AND ATLANTIC COAST STATES

THE interurban electric railways in Central New York constitute a group intermediate between the suburban lines serving the thickly populated districts of New England and the network of long-distance interurban lines in the Central Western States. For the most part, they connect prosperous industrial cities of large size and traverse thickly populated country districts. The roads which form an almost continuous route across the State from Hudson to Buffalo have to meet the competition of the New York Central & Hudson River Railroad on long-distance travel. The New York Central owns a controlling interest in several of the interurban lines which parallel it, but there is no active co-operation in traffic matters between the steam and electric managements. The electric railways, owing to their convenient entrances into the cities and their frequent and fast service, handle the bulk of the local traffic and a fair share of the through business between terminal cities. Most of the interurban roads in New York State have well-organized traffic departments, and the heads of these departments are constantly striving to create new business from any source which is profitable. Picnic and long-haul excursion business engages a large share of the attention of the traffic departments during the summer months. Although the electric lines now extend across the State with only one break of 30 miles between Fonda and Little Falls, no through cars are operated.

Freight and express business has not been developed on the lines in New York State to the extent which prevails in the Middle Western States and on the Pacific Coast. The franchises in most of the large cities prohibit the hauling of standard freight cars over tracks laid in the streets and the construction of outside belt lines on private right-of-way has not been undertaken. Most of the companies are doing a package freight and express business on a small scale, with and without wagon collection and delivery. Inadequate terminal facilities and the competition of steam railroads and canals have prevented great extension of freight traffic. One or two companies do a switching business in handling steam railroad cars, but the steam railroads in general have jealously guarded their own freight business by refusing to interchange cars on a switching basis with parallel or competing electric roads. On account of the limitations of space freight and express traffic methods of the New York roads have not been described in this chapter.

The promotion of urban traffic has been given close attention by the managements of the street railway companies in some of the largest cities in the Eastern States. In Newark, Baltimore and elsewhere extensive advertising campaigns have been conducted, and large sums have been expended for folders, timetables, city guides, and other forms of advertising matter intended to inform the public about the service given by the local street railway company.

ORGANIZATION OF TRAFFIC DEPARTMENTS

The interurban railways in New York State, and some of the street railway companies in the principal Eastern cities, maintain separate traffic departments. The title of general passenger agent is given to the head of the passenger traffic department of the Beebe Syndicate lines composing the Rochester, Syracuse & Eastern, the Auburn & Northern, the Auburn & Syracuse, Syracuse, Lake Shore & Northern and Syracuse & South Bay Electric Railroads. This title is also held by the head of the traffic department of the Albany Southern, the Oneida Railway, the Utica & Mohawk Valley Railway and the Fonda, Johnstown & Gloversville Railroad. A general passenger and express agent is in charge of the passenger and freight department of the New York State Railways, Rochester lines. Traffic promotion on the Schenectady Railway is in charge of the superintendent of transportation, and on the United Traction Company of Albany and the Hudson Valley Railway the traffic department is headed by a traffic manager who has as an assistant a general passenger agent in charge of passenger traffic of the Hudson Valley Railway. The general passenger agent of the Albany Southern also has charge of the freight and express business. The Utica & Mohawk Valley Railway and the Oneida Railway have a general express agent who has entire charge of the freight department. The freight and express business of the Schenectady Railway, the United Traction Company of Albany and the Hudson Valley Railway is conducted under a pool agreement under the name of the Electric Express Company, the traffic manager of the United Traction Company and the Hudson Valley Railway having the title of manager of the Electric Express Company.

The chart on page 556 shows the organization of the passenger and express department of the Rochester lines of the New York State Railways. It will be noted that the ticket agents are under the direct supervision of the general passenger agent, as are also the superintendents and employees of the three parks owned and operated by the company. The general passenger agent has charge of the printing and disbursement of tickets and the ticket agent in each town acts as a local representative of the traffic department. The agents keep the general passenger agent informed of any local events which may promote travel on the lines of the electric railway. In some of the smaller towns the agents are paid on a commission basis, but in the larger cities the agents are paid regular salaries. In the same manner the local express agents come under the supervision of the general passenger and express agent. They report to an assistant express agent, who conducts the active work of solicitation for freight and express traffic in Rochester and other large cities reached.

The traffic department organizations of most of the other interurban railways in Central New York are not

so elaborate. The Beebe Syndicate lines have a general passenger agent in Syracuse, who reports directly to the general manager. The ticket agents are responsible to him for cleanliness of the stations, courtesy to the traveling public, and all other matters affecting the relations of the company with the public. Ticket disbursements, however, are made through the ticket department, and the agents are employed or discharged by the superintendents of the several lines composing the system. Special car movements are contracted for by the general passenger agent, who gives the proper instructions to the operating department. The Beebe Syndicate lines handle package freight on the Rochester, Syracuse & Eastern, the Auburn & Syracuse and the Syracuse, Lake Shore & Northern, with a general freight agent in Syracuse in charge. He solicits freight and express in that city.

The general passenger agent of the Albany Southern has one assistant, who acts as an outside solicitor for excursion business. He is employed during the busy summer season, from about April 1 to Sept. 1. The manager of Electric Park, at Kinderhook Lake, reports to the general passenger agent.

The Fonda, Johnstown & Gloversville Railway, which operates a combination electric and steam road connecting Schenectady, Fonda, Amsterdam, Johnstown and Gloversville by electric lines, and reaching Sacandaga Park by a steam road from Gloversville, has a passenger traffic department which is organized on the same lines as the passenger traffic departments of some of the larger steam roads. The general passenger agent, with offices in Gloversville, has general charge of all advertising matter, the booking of special excursions and the handling of general or special passenger business. He has as an assistant a traveling passenger agent, who solicits business throughout the entire territory between Utica, N. Y., on the west and Poughkeepsie on the south. The freight business of this road, which is handled entirely by steam locomotives, is in charge of a general freight agent at the head of an organization similar to the freight traffic departments of steam roads.

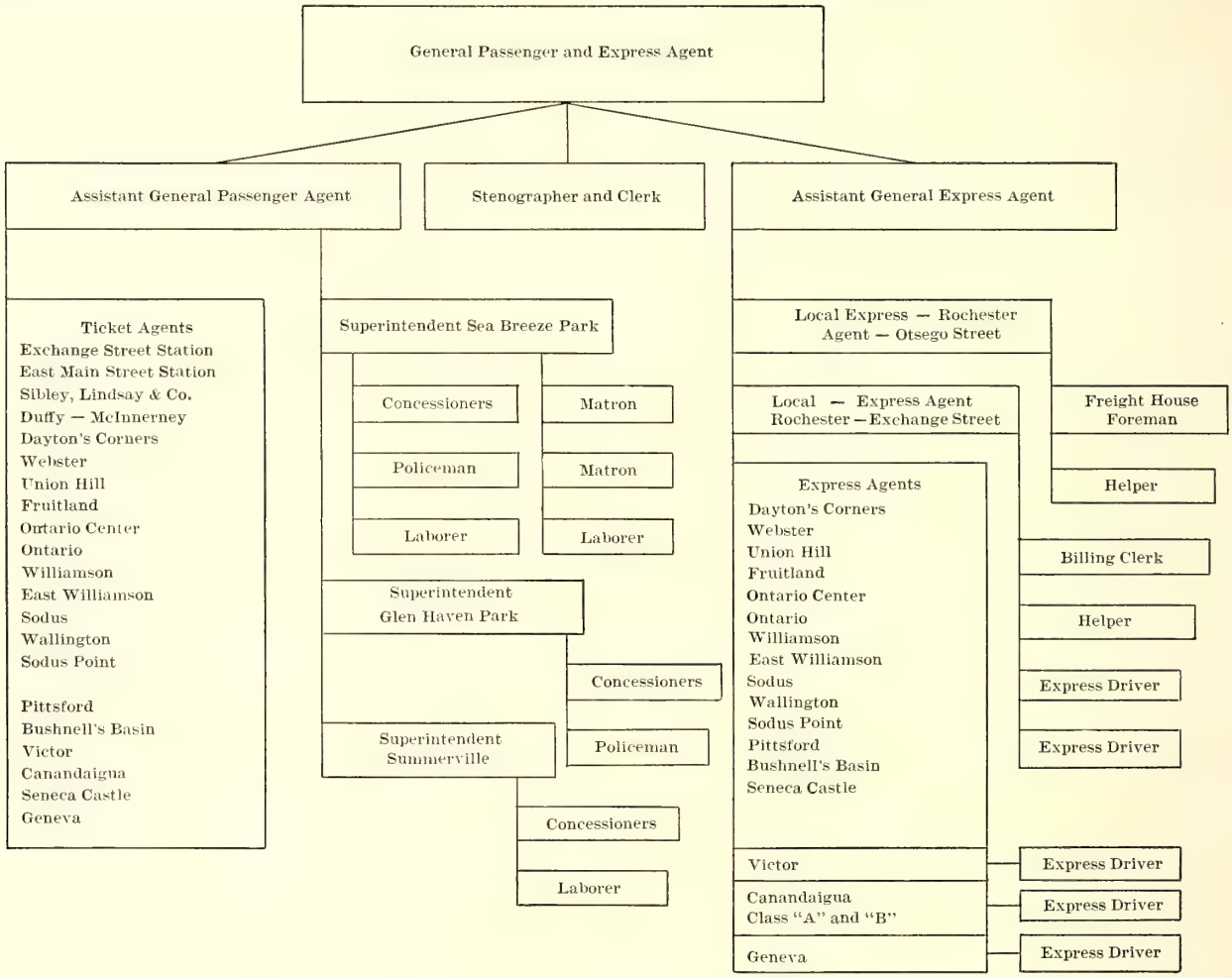


CHART OF ORGANIZATION OF TRAFFIC DEPARTMENT, NEW YORK STATE RAILWAYS, ROCHESTER LINES

The traffic department of the Otsego & Herkimer Railroad is in charge of a general freight and passenger agent, who reports to the general manager. An assistant general freight and passenger agent helps in the soliciting of both freight and passenger traffic. The duties of this department include making up and filing tariffs, preparing and distributing timetables and folders, adjusting freight claims, generally supervising station agents and train crews in their relations with the traveling public, and performing the functions of an industrial agent.

The traffic department of the Washington, Baltimore & Annapolis Electric Railway, under the general freight and passenger agent, has jurisdiction over the freight and passenger business, arrangements and sale of tickets, issuing of tariffs, handling of baggage, receiving and delivering freight, and solicitation of traffic. Freight, ticket,

baggage and soliciting agents report to the general freight and passenger agent, who reports direct to the general manager. Arrangements for special car movements are made through the traffic department, and notice of such special movements is given the operating department. The auditing department is kept advised of all tickets issued to ticket agents, rates on all regular and special business, and any other information necessary for properly auditing the company's business.

The promotion of traffic on the lines of the Public Service Railway in New Jersey is under the direction of the superintendent of transportation, supplemented by the work of the company's publicity department, which handles all advertising. In Baltimore the United Railways & Electric Company conducts a very vigorous campaign for the creation of traffic. This work is in general charge of James R. Pratt, assistant general manager, who also supervises the work of the claim department. The preparation of the numerous folders and newspaper advertisements and the booking of special-car parties is done by B. B. Long, excursion agent, who reports to Mr. Pratt.

TIMETABLES

Early in 1910 all of the interurban railway companies in Central New York formed a pool or association for the purpose of publishing a joint official electric railway guide, containing maps and timetables of all the roads. An agreement, binding for one year, was entered into, and the cost to each company was apportioned according to the amount of space occupied by its timetables and the number of copies of the folder furnished to it each month. The compilation of the official guide is in charge of the secretary to the general manager of the Schenectady Railway. The official guide is issued once a month, and contains correct current timetables of each of the subscribing companies. Several of the companies which subscribe to this guide have discontinued the publication of their own local timetables, and are using the official publication for general distribution. The guide is much sought after by the public and on account of the wide circulation which it has and the fine maps which it contains, showing all the trolley lines in the State, it is considered a cheap advertising medium for the companies interested.

The general timetable of the Beebe Syndicate lines contains the schedules of all lines in the system, including the boat lines, a map of the system and a table of connections with foreign electric and steam railways, and costs $8 per thousand. Small pocket folder timetables, 2¾ in. x 6¼ in., which are printed for each division of the Beebe Syndicate lines, cost only $2 per thousand. A very simple local timetable folder of the Albany Southern Railroad is printed for general distribution at a cost of $4 per thousand. The Schenectady Railway uses the official guide for general distribution, but it also distributes a large folder timetable, 14½ in. x 9¼ in., which is printed from the same type as used for the company's working timetable.

The Oneida Railway and the Utica & Mohawk Valley Railway issue a joint folder timetable, giving the time of all interurban passenger cars on both roads, and also condensed schedules of the city cars in Utica and Syracuse, which are operated by the same management. This folder, which is issued twice a year, is 4¼ in. x 9 in. in size, and costs $11 per thousand. A pocket folder, 2⅝ in. x 6 in. in size, contains all of the information in the large folder and costs $4.50 per thousand. Both folders have covers of the same design, which includes the Indian arrowhead trade mark of the Oneida Railway and reproductions of the block signals used on the electrified division of the West Shore Railroad. These timetables are distributed through the United States Steamship Railway & Hotel Advertising Company to the timetable racks in all hotels in Central New York. About 2500 copies are required each month for this method of distribution.

The Otsego & Herkimer Railroad prints its timetables on large cards, 11 in. x 22 in., and these are distributed by messenger to all the principal hotels, stations and public places on the line, and in nearby cities. Oak frames are furnished to the best hotels for displaying these cards. The station agents also give out these cards to stores, factories and individuals in rural districts. A list of all persons to whom the cards have been given is kept in the office of the general freight and passenger agent, so that each card can be accounted for. Six hundred of the cards are printed twice a year, when the schedule is changed, and the cost is about $40 per year.



COVER OF TIMETABLES OF LEHIGH VALLEY TRANSIT COMPANY

The following electric railways in the Eastern States pay for the insertion of their timetables in the Official Railway Guide:

Albany Southern Railroad.
Buffalo & Lake Erie Traction Company.
Chautauqua Traction Company.
Erie Traction Company.
Fonda, Johnstown & Gloversville Railroad.
Hudson & Manhattan Railroad.
International Railway of Buffalo, N. Y.
Lackawanna & Wyoming Valley Railroad.
Maryland Electric Railways.
Niagara Gorge Railroad.
Otsego & Herkimer Railroad.
Washington, Alexandria & Mount Vernon Railway.
Washington, Baltimore & Annapolis Electric Railway.
Wilkes-Barre & Hazleton Railway.

The Public Service Railway issues no printed timetables, but supplies information about the schedules of night cars for use in local city guides and private advertising matter. The United Railways & Electric Company issues small card timetables for all suburban lines which show on one side the intervals between cars at different periods of the day and on the other side a schedule of leaving times in minutes after the hour from important points on the line during the middle of the day, when the cars run at intervals of from 15 to 30 minutes. These are placed in racks at all waiting stations. The

cards for each line are of different sizes and colors, so that they can be picked out readily.

DESCRIPTIVE PAMPHLETS

A number of the interurban roads in New York State have issued handsome descriptive pamphlets, which are used extensively in advertising the historical places, park attractions and natural scenery along their lines. The covers of a few of these descriptive pamphlets, printed in colors, are reproduced. The pamphlet issued by the Rochester lines of the New York State Railways costs $20 per thousand. It describes all of the city parks and pleasure resorts and steamboat trips on Lake Ontario and other places of interest to the visitor in Rochester. Following each description are brief directions for reaching these places on the company's cars and the rate of fare. In this folder is printed a two-page map of the city of Rochester and its suburbs, showing all of the car lines in red, the principal streets and parks, the summer resorts on Lake Ontario and a key to all of the railroad depots, buildings, institutions, hotels, theaters, etc. These folders are supplied to the timetable racks of all hotels within a radius of 100 miles from Rochester, and large numbers of them are also distributed through the mails.



COVERS OF DESCRIPTIVE FOLDERS OF ELECTRIC RAILWAYS IN CENTRAL NEW YORK

One of the most expensive pieces of advertising matter of this kind is an attractive folder published by the Beebe Syndicate lines. The contents of this folder are purely descriptive, no timetables or general information being included. The folders cost $60 per thousand, and when mailed in an envelope with a 2-cent stamp, they cost the company 8⅝ cents apiece. They have been very widely distributed, both through the mails and occasionally on timetable racks in the company's stations and cars. That they have been read with interest and kept for reference is evidenced by the fact that requests for copies have been received by the general passenger agent of the Beebe Syndicate lines from all parts of the world.

During State Fair week, Sept. 12 to 17, the Syracuse Rapid Transit Railway distributed 13,000 copies of a small folder prepared in the form of a guide book for strangers in the city. Directions for reaching by trolley car 28 places of interest in or near the city were given. The conductors on the city cars distributed 10,000 of these folders; 1000 were placed in racks in the hotels and 2000 were distributed on the cars of the Oneida Railway between Utica and Syracuse. The folders cost but $2.20 per thousand.

The descriptive pamphlet of the Public Service Railway is bound with handsomely lithographed front and back covers suggestive of the city and country districts served. A feature of this folder is the use of elaborate maps. A large-scale map of Central New Jersey shows all of the lines of the company in the northern and southern districts centering in Newark and Camden respectively. Connecting electric lines and all highways are also shown. In addition to this system map street maps of Jersey City and Hoboken, Newark and Camden are also included. Numerous half-tone engravings illustrate the text. This folder has been extensively advertised, but is given out only on application to the publicity department or to any one of the division superintendents' offices. The company regards this as the best method of distribution, because anything which people take the trouble to ask for they are likely to keep, and it is neither difficult nor expensive to stimulate a demand for a really attractive folder of this kind.

The descriptive folder published by the Hudson Valley Railway is entitled "The Warpath of the Nations." This road traverses the historical territory of the Hudson River Valley between Albany and Lake George, which was the route of Burgoyne's march and was marked by the decisive battles of Saratoga and Lake George. The text of this pamphlet was written by a young woman of Glens Falls, who had made a study of the history of this region and submitted the manuscript to the company without solicitation. The accuracy and completeness of the story were recognized at once, and the manuscript

was bought and incorporated into an attractive folder, illustrated with numerous views of the historical places referred to in the text which can be seen from the car windows.

A unique descriptive folder published by the passenger department of the Schenectady Railway is entitled "Forty-four Trips by Trolley to Historical Landmarks." This folder is a guide to many of the interesting places near Schenectady, and any of the trips can be made in half a day with a stop-over at the place described. A short history of the objective places of interest is given, and this is followed by brief directions covering the car to take, the place to alight, and the round-trip fare. Copies of this pamphlet were sent to every school teacher in and around Schenectady, and as a result, many small excursion parties of school children have been carried on the company's cars to the places mentioned in the guide.

The Albany Southern does not publish an elaborate descriptive folder, but in its place it distributes as its official timetable for the summer season a 24-page booklet, containing the complete timetables of the road, list of connections with steam and electric lines and the Hudson River boat lines, a map of the system, information about how to reach Electric Park, several views of Electric Park, and on the last few pages a complete list of the summer hotels and boarding houses along the electric line, as well as a list of farms, cottages and tenting sites for rent and real estate for sale along the road. This list is very complete, and the general passenger agent made a special effort through the local ticket agents to obtain accurate and complete information about all of the places mentioned. These folders have been in great demand by persons who were contemplating finding a place to spend their vacations or to live during the summer months. The company believes that they have promoted a large amount of summer commutation business. This same plan of including in a railway folder a list of boarding houses and real estate sites has been followed, also, by the Pittsburgh & Butler Street Railway in a publication issued this year under the title "Summer Boarding and Tent Life on the Butler Short Line."

One of the most comprehensive railway publications in the East is issued by the Conestoga Traction Company, Lancaster, Pa., under the title of "Seeing Lancaster County from a Trolley Window." This book, which is 7 in. x 10 in. in size, contains 80 pages, and is sold for 10 cents a copy. The introduction contains the following explanatory note:



COVER OF DESCRIPTIVE FOLDER OF LEHIGH VALLEY TRANSIT COMPANY

"The desire to acquire some knowledge of the history, present activities and natural scenery of Lancaster County induced the author to prepare these sketches. The story was woven around the trolley lines because these afford one of the most convenient and most economical methods of travel for the sightseer. The author hopes the perusal of these pages may afford the reader as much pleasure as their preparation afforded the writer, and that a wider knowledge of the county, a deeper love for history and higher life aspirations may thereby be promoted."

The text of this publication has been very carefully prepared from histories and county records, and it is illustrated with numerous engravings from photographs and old prints. A large scale map of Lancaster County is included in the booklet.

"A Little Trip Through History" is the title of a descriptive pamphlet issued this year by the Lehigh Valley Transit Company, now widely known throughout Eastern Pennsylvania as the "Liberty Bell Route," through its

wide use of this catchy nickname in all of its extensive advertising. The interurban line of this company between Chestnut Hill, Philadelphia and Allentown follows the historic Bethlehem Pike over which the Liberty Bell was transported to a safe hiding place in Allentown when the British took possession of Philadelphia in 1777. The booklet, which is printed on very fine paper and is profusely illustrated with half-tone engravings, describes in an interesting manner the principal points of historical interest which can be seen from the cars. It also contains a list of the principal hotels at the Delaware Water Gap, but includes no timetables or display advertising.

The descriptive folder of the Washington, Baltimore & Annapolis Electric Railway has been prepared in the form of a guide book of the three principal cities which it reaches. These cities are full of historical places of interest to the tourist, and one page of the pamphlet is devoted to a list of the chief attractions in each city, with the times during which they are open to visitors and the cost of admission. A special feature is made of excursion trips over the electric line which can be completed in one day or less. Inasmuch as most tourists wish to know in advance what a side trip will cost, the rates of fare are included in the pamphlet, as is also a small map of the road.



COVER DESIGNS OF TIMETABLES AND DESCRIPTIVE FOLDERS

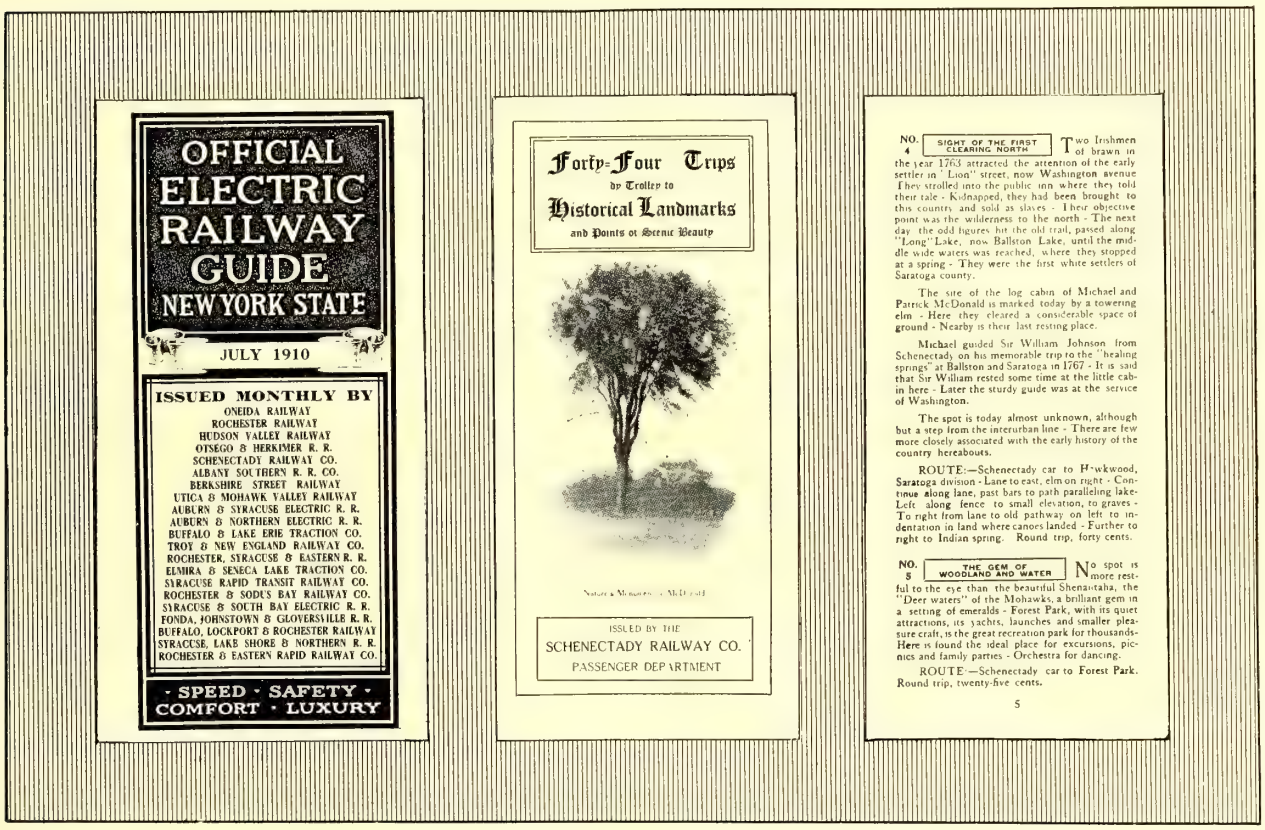
The cover is a drawing in colors of the Liberty Bell being transported at night on a crude wagon, drawn by four powerful horses and guarded by Continental soldiers. This booklet is not sent out promiscuously, but it has been widely advertised by the railway company, and is sent to anyone on receipt of a letter or post card requesting a copy. The management believes that expensive publications of this kind are valuable as advertising matter if they are distributed only to those who take enough interest to write for them. The timetable of the Lehigh Valley Transit Company is a 24-page booklet, with a very artistic front cover. It contains, besides the interurban and local city timetables, a large amount of display advertising of merchants and hotels in the cities and towns reached, and on the back cover is printed a map of the system. The Chestnut Hill terminal of the company is on the outskirts of Philadelphia, and no city ticket office is maintained downtown. Arrangements have been made with a large department store in Philadelphia to supply the store's information bureau with timetables and other advertising literature, and this fact is constantly advertised in the Philadelphia newspapers. The plan has been found to be mutually advantageous to the railway company and the department store.

BILLBOARD ADVERTISING

Two of the electric railway companies in Central New York make extensive use of billboards for advertising their service and park attractions. The Fonda, Johnstown & Gloversville Railroad spends about $600 a year for billboard advertising. It has a contract with a billboard advertising company for 75 large 24-sheet stands in the cities and towns and along the New York Central Railroad between Utica and Albany. These billboards are used to advertise Sacandaga Park. The posters cost about $1.25 per set, and the bill-posting company charges 10 cents per stand per sheet for posting them. R. M. Colt, general passenger agent of the company, believes that this kind of advertising produces excellent returns.

The Albany Southern Railroad advertises Electric

Park with a large number of billboard signs which cost the company about 4 cents per sheet. About 400 of these posters are displayed in Albany and Troy, and as many more are put up in Hudson, Catskill and other river towns. Before the summer season opens large signs advertising the park attractions for the coming season are put up, and these are allowed to remain from two to four weeks. From about the middle of June to the first of August smaller posters are supplied as often as required to keep the signs looking fresh and clean. Billboard advertising is discontinued about the first of August, as the summer season is then well under way. The Albany Southern makes arrangements with local fairs and circuses to have bills printed showing the excursion rates and train service, and these are posted at all prominent places along the road in advance of the fair or circus day.



COVER OF OFFICIAL ELECTRIC RAILWAY GUIDE COVER AND SAMPLE PAGE OF PAMPHLET ISSUED BY SCHENECTADY RAILWAY

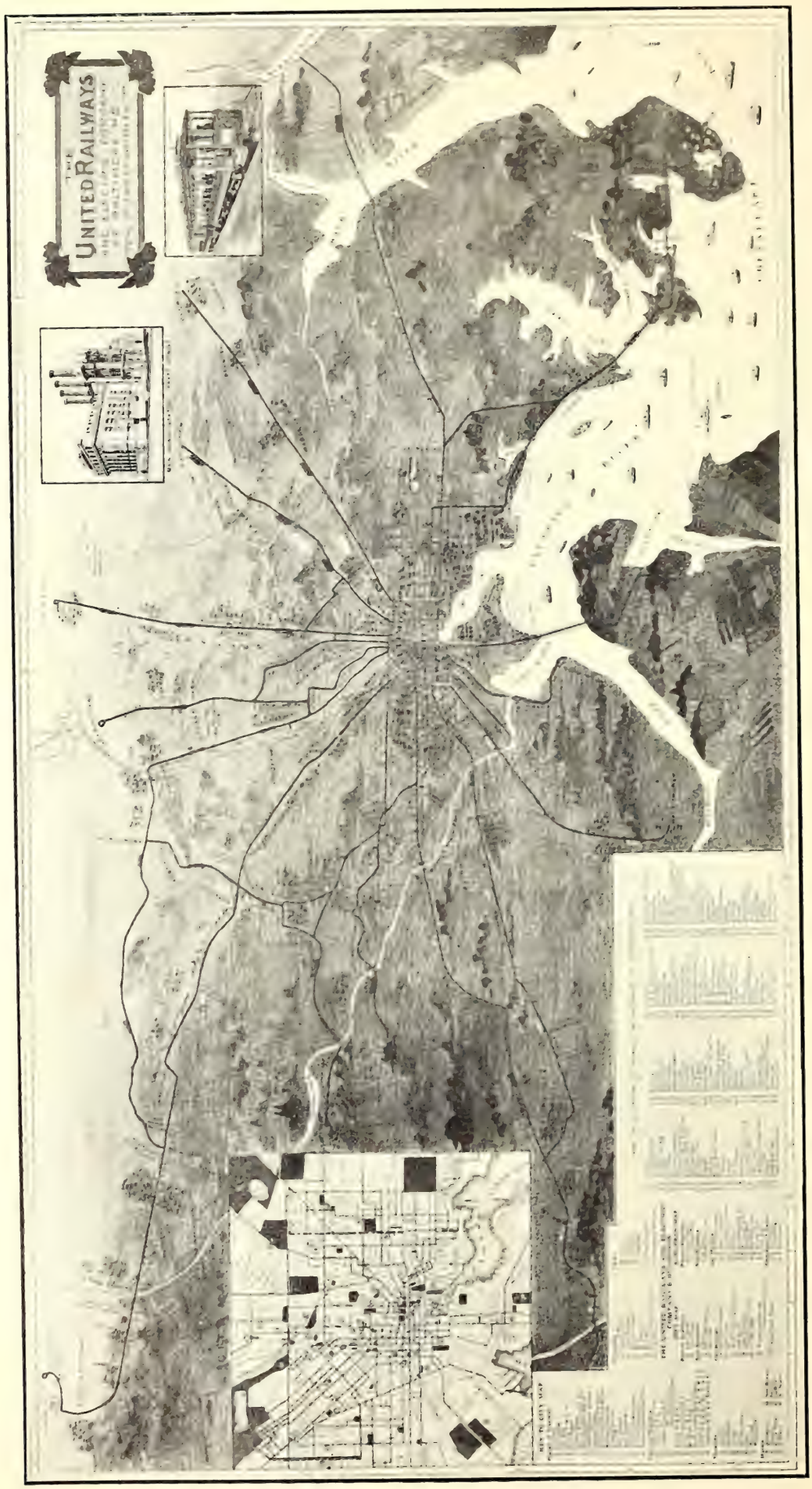
The United Railways & Electric Company of Baltimore uses bill posters for advertising Bay Shore and Gwynn Oak Parks. They are lithographed sheets, 28 in. x 42 in., and are posted on billboards at all of the car houses of the company where waiting rooms are maintained. Occasionally they are posted on billboards in other parts of the city.

COMPANY MAGAZINES

None of the electric railways visited in Central New York publish a company magazine, but several monthly publications are issued by private individuals who receive some direct or indirect revenue from the railway companies in return for advertising which the railway company receives through the general distribution of these publications.

A typical magazine publication of this class is "Trolley Talk," issued by a local printer in Newark, N. Y. This magazine, which is a small folder, 4 in. x 9 in., is issued once a month, and each issue contains complete timetables and small maps of each of the lines composing the Beebe Syndicate system. In addition, a special section, printed on a different colored paper from the main part of the booklet, is devoted to descriptions of special attractions during the current month along the Beebe Syndicate lines. The July, 1910, issue of this publication contains 52 pages of timetables and advertising matter, and 12 pages of descriptive matter. The publishers solicit advertising in the booklet from local merchants in the towns along the railway, and their direct revenue is derived solely from this source. Besides the descriptive matter relating to the railway company, interest is added to the advertising pages by jokes and humorous short stories which are interspersed between the advertisements. "Trolley Talk" is distributed by the railway company in all of its stations and from the timetable racks in its cars. The small cost to the company of this form of advertising, its wide distribution and its frequent publication make it a particularly desirable adjunct to the regular publicity work of the passenger department. The publishers are reliable, and devote their efforts exclusively to the Beebe lines.

A similar publication, containing the timetables of city and interurban electric railways in and around Troy and Albany, is issued in Troy under the name of "Electric Railway Service." The United Traction Company of Albany and the Hudson Valley Railway jointly contribute $15 a month to this publication in payment for the insertion of their local and interurban timetables. A map of the electric railways and their connections centering in Troy and Albany is included.



GUIDE MAP OF BALTIMORE USED IN FOLDER OF UNITED RAILWAYS & ELECTRIC COMPANY

The Fonda, Johnstown & Gloversville Railroad distributes a 40-page timetable folder containing timetables of all of its lines and a considerable amount of advertising of local merchants. The traveling passenger agent of the company publishes this timetable on his own account, and he solicits and receives the entire revenue from the advertising which it contains. He furnishes the railroad company twice a year 5000 copies free of cost. The official connection of the publisher with the company insures correctness of the timetables and the solicitation of the advertising as a side issue requires so little time that the efficiency of the traveling passenger agent's work for the company is not impaired.

The summer timetable of the Albany Southern, containing a list of boarding houses and real estate opportunities, which has been mentioned previously, is published under an agreement with the printer, who solicits and receives all of the revenue from the advertising which the timetable contains, and the railway company makes up the deficit, if any. For an edition of 2000 copies the deficit this year was $15.

The United Railways & Electric Company of Baltimore issues a small 4-page folder, under the title of "Trolley News." An edition of 100,000 of these folders is printed twice a month, and they are distributed from wire racks in the company's cars. They have been well received by the public, and each new number is looked for eagerly. It is of interest to note that they are taken from the racks and read by passengers, and then put in the pocket for future reference. None have been seen torn or thrown on the floors of the cars. Great care is taken to make the folder attractive as well as to furnish information which the general public needs. A large number of requests have been received from people living in Baltimore to have their names placed on the mailing list in order that they may receive these folders regularly. The company states that it has traced a good part of its excursion business to these folders. Each issue is printed in a different-colored ink, so that trolley patrons can tell readily when a new issue is out. Some sample pages of "Trolley News" are reproduced herewith.

In addition to the "Trolley News" series the United Railways & Electric Company has published this year a number of small illustrated folders advertising its two pleasure parks and its chartered-car and funeral-car service. The park and chartered-car folders are sent out to a selected mailing list, composed chiefly of the names of officers of church, Sunday school, fraternal and social organizations, and they are also distributed from racks in the waiting rooms. The folder used to advertise the funeral car "Dolores" is appropriately printed with black borders and contains views of the interior and exterior of the car, together with a schedule of charges. One of these folders is mailed to every undertaker in the city and suburbs on the first of each month, and they are also placed in racks in the funeral car and in waiting rooms. The schedule of charges is from $20 to $25 for a round trip from any point in the city to the cemetery and return. The company reports a steady increase in the revenue derived from this car, which it is believed is due largely to the advertising of its advantages through this folder.

Another folder of this series is a convenient guide to the city of Baltimore and the suburbs, which is printed in a single sheet, 15 in. x 28 in., and folded to pocket size, 7½ in. x 3½ in. On one side of the sheet is printed a bird's-eye view map of Baltimore and surrounding country, in four colors. This map is reproduced as being an excellent example of a city guide. Copies of the map are framed and hung in all waiting rooms and other public places in Baltimore.

CIRCULAR LETTERS

The use of circular letters for soliciting picnic and excursion business is quite general in New York State. Most of the companies have a mailing list composed of the names of the secretaries and other officials of all organizations which have chartered special cars or arranged excursions or picnics over the company's lines in years past, or who have made inquiries for rates. The Hudson Valley Railway keeps a careful record of all of the picnics and excursions which are handled by the other electric railways, steam railroads and boat lines in its territory, and the following season it sends out a circular letter calling the attention of the officers of these organizations to the parks and attractive excursions which it has to offer. The circular letter is an effective form of advertising, but to be entirely successful it must be followed up immediately by personal solicitation while the impression formed by the circular letter is still fresh in the mind of the recipient.

ALBANY SOUTHERN RAILROAD CO.

WE BEG TO CALL YOUR ATTENTION TO THE POSSIBILITIES OF THE TERRITORY TRAVERSED BY THE ALBANY SOUTHERN RAILROAD FOR THE BUILDING OF SUMMER AND PERMANENT HOMES. THERE ARE MANY SITES AVAILABLE WITH FINE VIEWS AND PURE WATER, WITHIN A SHORT DISTANCE FROM THE CITY, AT PRICES THAT SHOULD INTEREST YOU.

THE LONG TALKED OF DOUBLE TRACK IS AT LAST A REALITY, AND WILL BE IN USE FOR THIS SUMMER'S BUSINESS, WITH FREQUENT AND EFFICIENT TRAIN SERVICE. OUR COMMUTATION RATES ARE AMONG THE LOWEST IN THE STATE.

TAKE A TRIP OVER THE ROAD AT YOUR EARLIEST CONVENIENCE AND SEE FOR YOURSLF WHAT A DELIGHTFUL COUNTRY IT IS,—THEN WRITE TO THE UNDERSIGNED CONCERNING LOCATIONS, PRICES, ETC.

FRED BURGER,
Gen'l. Pass. Agent.

ALBANY, N. Y.,

CIRCULAR LETTER USED BY ALBANY SOUTHERN RAILROAD

The Beebe Syndicate lines have used circular letters very extensively in soliciting new business. About two years ago J. Stanley Moore, general passenger agent of these associated companies, made a very thorough canvass of every city and town along the companies' lines for the purpose of preparing a mailing list. He obtained through local directories, telephone directories, interviews with newspaper men and prominent citizens a classified list of names, including the officers of every church, fraternal, social and labor organization in all the cities and towns. This list has been found very useful in sending out circular letters soliciting picnic and excursion business. It is revised at frequent intervals and kept up to date.

For soliciting excursion and picnic business from organizations, a circular letter describing the parks ar resorts reached by the company's lines has been prepared and is sent out in the spring of the year. The text of this letter is as follows:

Dear Sir:

It has come to my attention that your organization is discussing plans for your annual summer picnic. Lying in the very heart of the most beautiful and picturesque lake country in the world,

Syracuse has at its doors a number of delightful resorts, ideal for picnic and outing purposes. Permit me to call your attention to the advantages of several of our picnic grounds:

HISTORIC FRENCHMAN'S ISLAND in Oneida Lake, reached via the Syracuse & South Bay Electric Railroad in connection with a frequent boat service, has recently been developed into one of the finest picnic grounds in the State. A beautiful grove with picnic tables and seats provided, a new dancing pavilion, baseball diamond, etc., are the features of The Island. Having been recently connected with the mainland by means of a submarine cable, brilliant night illumination is now an added attraction. This trip, like all others to Oneida Lake points, includes both a trolley ride and a delightful sail on the lake.

SYLVAN BEACH, also on Oneida Lake, with its wonderful three mile bathing beach, has a widespread reputation as one of the finest general amusement resorts in the State. The forty mile sail on the magnificent new steamer "Sagamore" from South Bay to the Beach and return is in itself a delightful outing.

SKANEATELES LAKE is reached by a picturesque ride through the most beautiful section of Central New York via the Auburn & Syracuse Electric Railroad. The cars stop at the dock at Skaneateles, from which point an excursion may be made by boat to Ten-Mile Point, a charming and completely equipped picnic ground or to Glen Haven at the extreme southern end of the lake.

LAKESIDE PARK on Owasco Lake, near Auburn, is one of the finest picnic grounds within easy riding distance from Syracuse. In the park there is a dancing pavilion where band concerts are given each afternoon and evening. Picnic tables and tents are scattered about under the trees. There is a restaurant on the grounds and adequate arrangements for heating coffee.

LONG BRANCH on Onondaga Lake has long been a popular playground for Syracusans. It is located on the Syracuse, Lake Shore & Northern Railroad.

Special round-trip excursion rates are made to all of the foregoing points for churches, Sunday schools, fraternal, social, civic and labor societies and factory organizations. I will be pleased to furnish you detailed information as to rates, special cars, dates, etc.

Very truly yours,
(Signed) J. Stanley Moore,
General Passenger Agent.

Another circular letter which this company has issued with very good results is one which was sent out early in 1910 to every attorney in Syracuse. This letter was intended to promote through travel from Syracuse to Rochester over the Rochester, Syracuse & Eastern Railroad in direct competition with the express service of the New York Central. The text of the letter is reprinted below:

January 13, 1910.

My dear Sir:

As you are probably aware, the Rochester, Syracuse & Eastern Railroad, popularly known as "The Electric Short Line" is now open and in operation between this city and Rochester. Built on private right-of-way for nearly all of the 86 miles of its length, the double-track construction of this line being equal in every respect to that of any steam railway in the country, we are able to operate our large, comfortably equipped cars at a speed of practically 60 miles an hour with absolute safety.

There are numerous advantages for Syracuse lawyers in the use of the R. S. & E. in their travel between Syracuse, Rochester and intermediate villages. If you will consult the enclosed timetable you will find that we give you a car every hour on the hour, between this city and Rochester, from 6 a. m., until 9 p. m.—the local cars, making all stops, leave on the even hours, while the limited cars, stopping only at important villages, including Port Byron, Clyde, Lyons, Newark, Palmyra and Fairport, leave on the odd hours.

We wish to particularly call your attention to our 7 a. m. limited, which reaches Rochester at 9:50 o'clock—just in time for court. Our cars pass the Monroe County Court House, thus saving you the walk or car ride of a mile heretofore necessary.

Our round trip fare is $2.50, for which we give you 2 hours and 50 minutes of delightful travel each way. Speed, comfort, convenience, no smoke, no dirt and a saving of 70 cents—briefly summed up, these are the advantages of the use of our line.

An opportunity in the near future to try our road will present itself during the convention of the New York State Bar Association to be held in Rochester on the 20th inst. Any further information regarding our road will be promptly furnished upon application at this office, or to ticket agents at the Electric Railway Terminal, Clinton Square.

Very truly yours,
(Signed) J. Stanley Moore,
General Passenger Agent.

The patronage of commercial travelers is appreciated by all railway companies, whether steam or electric. The Beebe Syndicate lines have made a special effort to acquaint traveling men residing in Rochester and Syracuse with the advantage of using the electric lines instead of the steam railroad. The text of a circular letter sent out to the traveling men of all of the large wholesale and manufacturing establishments in Rochester and Syracuse is reproduced below. A special feature of this letter was the use of a large scale map of the company's system printed on the first page of the letter:

January 24, 1910.

My dear Sir:

I take pleasure in calling your attention to the fact that the Rochester, Syracuse & Eastern Railroad, popularly known as "The Electric Short Line," is now in operation between Rochester and Syracuse with direct connections at Port Byron, via the Auburn & Northern Electric Railroad, for Auburn; at Auburn, via the Auburn & Syracuse Electric Railway, for Skaneateles and Marcellus, and at Syracuse, via the Syracuse, Lake Shore & Northern Railroad, for Baldwinsville, Phoenix and Fulton.

The R. S. & E. is double-tracked for its entire length, its roadbed is equal to that of any steam railway in the country and is laid upon private right-of-way except in the villages through which it passes. Thus we are enabled to operate our large, comfortably equipped cars at a speed of 60 miles an hour with absolute safety.

There are numerous advantages to commercial men in the use of our lines in their travel between the points mentioned. Your watch is your timetable—we give you a car every hour on the hour from the Four Corners at Rochester to the Common Center at Syracuse. Our stations in the intermediate villages are located in the business districts, thus saving you the annoyance and expense of 'bus fares. Our schedules provide such frequent service as to enable you to make more towns in one day than has heretofore been possible in three.

In addition to the foregoing, we save you money. Our fares, including Rochester city fare, follow: To Syracuse, one way, $1.50; round trip, $2.50; to Auburn, one way, $1.25; round trip, $2.45.

Speed, safety, comfort, convenience, no smoke, no dirt and money saved—these sum up the features of travel by our lines.

Consult the enclosed map and timetable for details and upon application additional information will be promptly given by ticket agents or at this office.

After you try our roads, tell your traveling friends about the service we give. If you ever have any criticisms or complaints to make, I ask you to write me fully about them. By this means we hope to eventually attain as near a perfect service as possible.

Very truly yours,
(Signed) J. S. Moore,
General Passenger Agent.

NEWSPAPER ADVERTISING

Most of the interurban roads in the State of New York use the advertising columns of newspapers in the cities and towns reached, but the amounts expended and the character of the advertising vary. The Public Service Commissions law permits the exchange of transportation in payment for newspaper advertising, and where this method of payment is acceptable to the newspapers the railway companies, as a rule, use larger space than where the payment is made on a strictly cash basis. The Rochester lines of the New York State Railways spend about 35 cents per 1000 car miles for newspaper advertising each year, and pay for this advertising with exchange transportation. The advertisements of the service are confined to timetables of the suburban and interurban lines printed in all of the daily papers in

Rochester and in the weekly papers in the smaller towns. Any changes in city timetables are advertised for a few days before and after the change is made. The company does very little display advertising of its park attractions. The Albany Southern pays cash for display advertisements of the attractions at Electric Park and the service to and from Albany. The amount paid to one newspaper in Albany for the month of July was $89. The newspapers in the smaller towns on the lines of the Albany Southern will accept transportation in exchange for advertising, and both timetables and display advertisements are run in these papers. This company is a firm believer in the value of news notes and reading notices, and it makes a special effort to get as much as possible of this form of publicity. It employs for a small consideration a reporter on an Albany newspaper, who acts as the company's press agent and writes up special events which take place at the company's park or in the towns reached.

The Schenectady Railway prints its timetable in condensed form in all newspapers in Schenectady and Albany, and Troy, Ballston and Saratoga. It also uses paid reading notices extensively, as it believes that this form of advertising is more profitable than larger display advertising. The United Traction Company of Albany and the Hudson Valley Railway do not do any newspaper advertising.

The Fonda, Johnstown & Gloversville Railroad advertises extensively in all of the newspapers in the towns which it reaches, but it pays for all advertising with exchange transportation. A very careful record is kept of the transportation used and a special form of ticket is issued. The standard form of contract with the newspapers which is used by this company is reproduced. This form of contract is used by the New York Central and has been passed on by the Public Service Commission, Second District. Its validity has not been questioned.

FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD CO.

OFFICE OF GENERAL PASSENGER AGENT, GLOVERSVILLE, N. Y.
ADVERTISING CONTRACT NO. ————.

1. The undersigned, ..., of the ....., ..., published at ..... solicits hereby the advertisement of the FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD COMPANY, to the extent of $....., and agrees to accept non-transferable transportation over said lines, at full first-class tariff rate, in payment for same; and it is further agreed as follows: That there shall be published in the issues of the above publication..... ..... to be paid for in transportation as above.

2. That the size of each page (printing surface) is..... by ..... inches, and the width of each column is..... Day of publication..... Date copy should be furnished.....

3. That in case of sale or misuse of the transportation covered by this or any previous contract, there shall be paid in cash to this company the value of same at full tariff rates, and such action shall annul this contract and any balance due the publication shall be canceled.

4. That there shall be forwarded a copy of said publication free of charge to the General Passenger Agent, Gloversville, N. Y., and also to the following parties.....

5. It is further agreed that the transportation furnished as payment for said advertisement shall be non-transferable; that is, shall be furnished only upon the formal written request of ....., and that each ticket shall be made out in the name of the person or persons who will use it; that said persons shall be either the editor, publisher, manager, or other authorized and active employee of said publication, WHO IS NOT ENGAGED IN ANY OTHER BUSINESS, or a dependent member of the immediate family of one of the above-named parties, and that if said ticket should be sold or presented for passage by anyone other than the person to whom it was issued, the same may be taken up and full fare collected and this contract annulled, and any balance due the publication shall be canceled.

6. In order to prevent errors in the issue and use of press transportation, it is understood and agreed that transportation will not be issued on request by telegraph or telephone, and it is further agreed and understood that each request shall state in what capacity the person who is to use the transportation is employed upon the publication.

7. In the event of the discontinuance of said publication that this contract shall be immediately abrogated, without claim on either side, and all unused transportation shall be returned at once to the General Passenger Agent at Gloversville, N. Y., for cancellation.

8. That the transportation due under this contract shall be ordered and used during the year 1910, and that any transportation not ordered and used within the specified time shall lapse and become void.

9. It is also agreed that either party hereto shall have the right to cancel this contract at any time upon thirty days' notice in writing to the other party.

The foregoing contract is entered into and all its terms and conditions are agreed to by.....
FOR the owners and publishers of the publication named in clause No. 1 of this contract, said person being duly authorized by said owners so to do, and by the General Passenger Agent of the Fonda, Johnstown & Gloversville Railroad Company, this..... day of....., 191 , as witness the signatures hereto appended.

.....

Effective only when countersigned by .....

For the publication named in clause No. 1 of this contract.

.....

General Passenger Agent.

Note 1.—If the conditions of this contract are agreed to, please execute the original and duplicate and return to the General Passenger Agent, Gloversville, N. Y., the original copy, retaining the duplicate for your files. Note especially section 5, and have personal signature inserted.

Note 2.—Ticket scalpers and others who attempt to manipulate press tickets are using every means in their power to secure such transportation, and it has become necessary for the railroads to surround the issue of their transportation with every possible safeguard, and our friends of the press are earnestly requested to aid us as far as it lies in their power to keep transportation issued on account of the press out of the hands of all such persons, in accordance with rule 5 of this contract.

The Beebe Syndicate lines print timetables mostly in the newspapers in small towns. Display advertisements are occasionally used in the newspapers in the larger cities, as the company believes that they are more effective in proportion to their cost than timetable advertisements.

In 1909 the Oneida Railway, the Utica & Mohawk Valley Railway and the Syracuse Rapid Transit Railway spent $5,465 for display and timetable advertising in 28 newspapers.

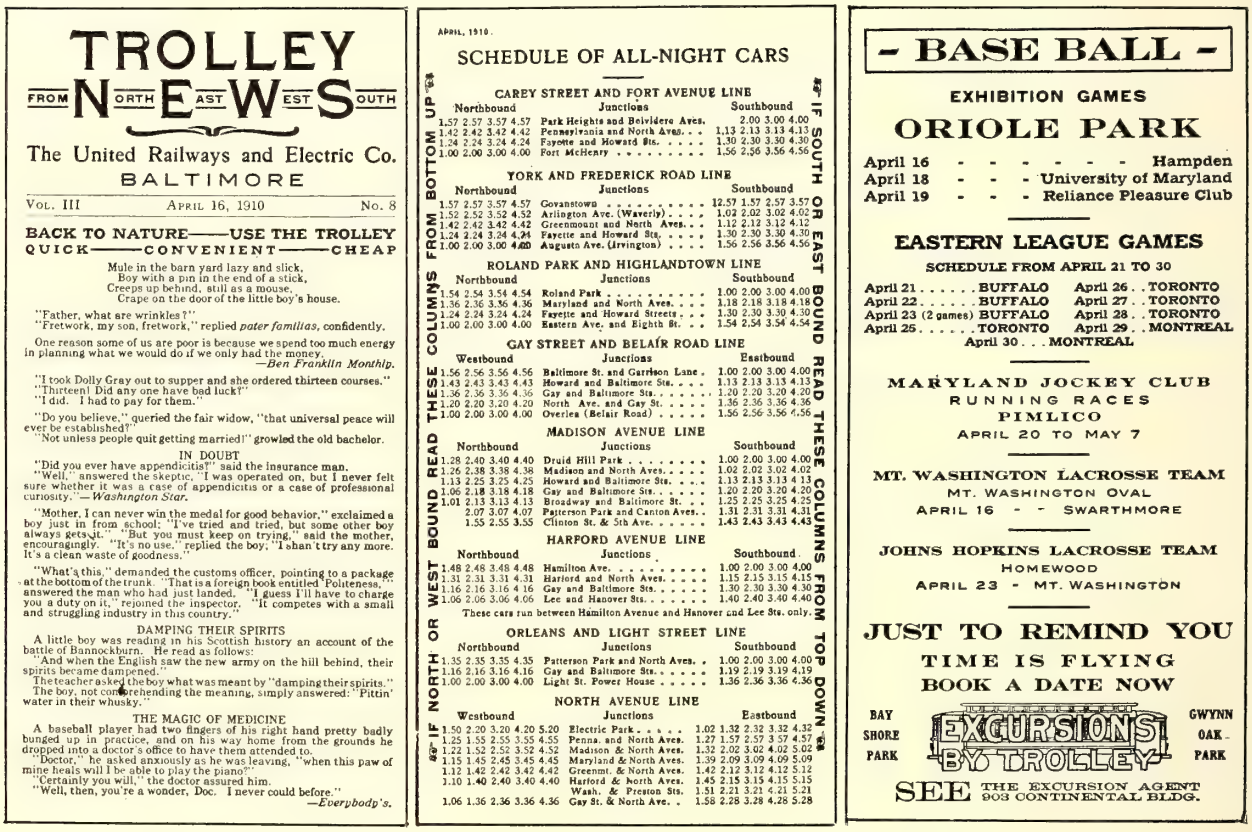
The United Railways & Electric Company of Baltimore is a liberal user of display advertising space in the daily newspapers of that city. It pays cash for this space at the rate of from 20 cents to 37½ cents per nonpareil line per insertion.

The Otsego & Herkimer Railroad contracts with one newspaper in each town along its line to print its time card, with the privilege of using this space for other advertising when desired. This costs the company about $15 a year for each of the weekly papers.

The Washington, Baltimore & Annapolis Electric Railway uses the newspapers to announce special excursions and for advertising any events which will take place in one city which might be of interest to people living in the other cities and towns on its lines. About $3 per 1000 passenger car miles is spent for newspaper advertising.

ADVERTISING ON CARS

Most of the city and interurban railways in the East make good use of their opportunity to display effective advertising on their cars. Dasher signs, fender banners, car-window posters, advertising rack cards, handbills hung in bunches from the strap poles, and the backs of transfers are all used to good purpose. Dasher signs, window posters and advertising rack cards are the most popular forms. The Rochester Railway makes constant use of special designs of dasher signs for advertising baseball games at the league park, band concerts in the summer at the city parks, skating on the park lakes in the winter, and fireworks or other special attractions at the beach resorts. All of these signs are of uniform size, parks. In order to promote travel to the parks by street cars the railway company carries these dasher signs on cars running to all parts of the city during the day. The signs cost about 6⅛ cents apiece when ordered in lots of 300 or more. Owing to the peculiar form of transfers used in Rochester, on which the junction points are printed on the back, no advertisements of any kind are printed on them. The company does not use window cards or handbills on the cars, but its contract with the car advertising company gives it the use of two full-size card spaces in each car, which it utilizes as occasion requires for making announcements to the traveling public about changes of schedules, prevention of accidents and advertising special events.



TROLLEY NEWS
FROM NORTH EAST WEST SOUTH
The United Railways and Electric Co.
BALTIMORE
VOL. III APRIL 16, 1910 No. 8

BACK TO NATURE——USE THE TROLLEY
QUICK——CONVENIENT——CHEAP

Mule in the barn yard lazy and slick,
Boy with a pin in the end of a stick,
Creeps up behind, still as a mouse,
Crape on the door of the little boy's house.

"Father, what are wrinkles?"
"Fretwork, my son, fretwork," replied *pater familias*, confidently.

One reason some of us are poor is because we spend too much energy in planning what we would do if we only had the money.
—*Ben Franklin Monthly.*

"I took Dolly Gray out to supper and she ordered thirteen courses."
"Thirteen! Did any one have bad luck?"
"I did. I had to pay for them."

"Do you believe," queried the fair widow, "that universal peace will ever be established?"
"Not unless people quit getting married!" growled the old bachelor.

IN DOUBT

"Did you ever have appendicitis?" said the insurance man.
"Well," answered the skeptic, "I was operated on, but I never felt sure whether it was a case of appendicitis or a case of professional curiosity."—*Washington Star.*

"Mother, I can never win the medal for good behavior," exclaimed a boy just in from school; "I've tried and tried, but some other boy always gets it." "But you must keep on trying," said the mother, encouragingly. "It's no use," replied the boy; "I shan't try any more. It's a clean waste of goodness."

"What's this," demanded the customs officer, pointing to a package at the bottom of the trunk. "That is a foreign book entitled 'Politeness,'" answered the man who had just landed. "I guess I'll have to charge you a duty on it," rejoined the inspector. "It competes with a small and struggling industry in this country."

DAMPING THEIR SPIRITS

A little boy was reading in his Scottish history an account of the battle of Bannockburn. He read as follows:
"And when the English saw the new army on the hill behind, their spirits became dampened."
The teacher asked the boy what was meant by "damping their spirits." The boy, not comprehending the meaning, simply answered: "Pittin' water in their whusky."

THE MAGIC OF MEDICINE

A baseball player had two fingers of his right hand pretty badly bunged up in practice, and on his way home from the grounds he dropped into a doctor's office to have them attended to.
"Doctor," he asked anxiously as he was leaving, "when this paw of mine heals will I be able to play the piano?"
"Certainly you will," the doctor assured him.
"Well, then, you're a wonder, Doc. I never could before."
—*Everybody's.*

APRIL, 1910.

SCHEDULE OF ALL-NIGHT CARS

READ THESE COLUMNS FROM BOTTOM UP IF NORTH OR WEST BOUND

CAREY STREET AND FORT AVENUE LINE

Northbound				Junctions	Southbound
1.57	2.57	3.57	4.57	Park Heights and Belvidere Aves.	2.00 3.00 4.00
1.42	2.42	3.42	4.42	Pennsylvania and North Aves.	1.13 2.13 3.13 4.13
1.24	2.24	3.24	4.24	Fayette and Howard Sts.	1.30 2.30 3.30 4.30
1.00	2.00	3.00	4.00	Fort McHenry	1.56 2.56 3.56 4.56

YORK AND FREDERICK ROAD LINE

Northbound				Junctions	Southbound
1.57	2.57	3.57	4.57	Govanstown	12.57 1.57 2.57 3.57
1.52	2.52	3.52	4.52	Arlington Ave. (Waverly)	1.02 2.02 3.02 4.02
1.42	2.42	3.42	4.42	Greenmount and North Aves.	1.12 2.12 3.12 4.12
1.24	2.24	3.24	4.24	Fayette and Howard Sts.	1.30 2.30 3.30 4.30
1.00	2.00	3.00	4.00	Augusta Ave. (Irvington)	1.56 2.56 3.56 4.56

ROLAND PARK AND HIGHLANDTOWN LINE

Northbound				Junctions	Southbound
1.54	2.54	3.54	4.54	Roland Park	1.00 2.00 3.00 4.00
1.36	2.36	3.36	4.36	Maryland and North Aves.	1.18 2.18 3.18 4.18
1.24	2.24	3.24	4.24	Fayette and Howard Streets	1.30 2.30 3.30 4.30
1.00	2.00	3.00	4.00	Eastern Ave. and Eighth St.	1.54 2.54 3.54 4.54

GAY STREET AND BELAIR ROAD LINE

Westbound				Junctions	Eastbound
1.56	2.56	3.56	4.56	Baltimore St. and Garrison Lane	1.00 2.00 3.00 4.00
1.43	2.43	3.43	4.43	Howard and Baltimore Sts.	1.13 2.13 3.13 4.13
1.36	2.36	3.36	4.36	Gay and Baltimore Sts.	1.20 2.20 3.20 4.20
1.20	2.20	3.20	4.20	North Ave. and Gay St.	1.36 2.36 3.36 4.36
1.00	2.00	3.00	4.00	Overlea (Belair Road)	1.56 2.56 3.56 4.56

MADISON AVENUE LINE

Northbound				Junctions	Southbound
1.28	2.40	3.40	4.40	Druid Hill Park	1.00 2.00 3.00 4.00
1.22	2.38	3.38	4.38	Madison and North Aves.	1.02 2.02 3.02 4.02
1.13	2.25	3.25	4.25	Howard and Baltimore Sts.	1.13 2.13 3.13 4.13
1.06	2.18	3.18	4.18	Gay and Baltimore Sts.	1.20 2.20 3.20 4.20
1.01	2.13	3.13	4.13	Broadway and Baltimore St.	1.25 2.25 3.25 4.25
	2.07	3.07	4.07	Patterson Park and Canton Aves.	1.31 2.31 3.31 4.31
	1.55	2.55	3.55	Clinton St. & 5th Ave.	1.43 2.43 3.43 4.43

HARFORD AVENUE LINE

Northbound				Junctions	Southbound
1.48	2.48	3.48	4.48	Hamilton Ave.	1.00 2.00 3.00 4.00
1.31	2.31	3.31	4.31	Harford and North Aves.	1.15 2.15 3.15 4.15
1.16	2.16	3.16	4.16	Gay and Baltimore Sts.	1.30 2.30 3.30 4.30
1.06	2.06	3.06	4.06	Lee and Hanover Sts.	1.40 2.40 3.40 4.40

These cars run between Hamilton Avenue and Hanover and Lee Sts. only.

ORLEANS AND LIGHT STREET LINE

Northbound				Junctions	Southbound
1.35	2.35	3.35	4.35	Patterson Park and North Aves.	1.00 2.00 3.00 4.00
1.16	2.16	3.16	4.16	Gay and Baltimore Sts.	1.19 2.19 3.19 4.19
1.00	2.00	3.00	4.00	Light St. Power House	1.36 2.36 3.36 4.36

READ THESE COLUMNS FROM TOP DOWN IF SOUTH OR EAST BOUND

NORTH AVENUE LINE

Westbound				Junctions	Eastbound
1.50	2.20	3.20	4.20 5.20	Electric Park	1.02 1.32 2.32 3.32 4.32
1.25	1.55	2.55	3.55 4.55	Penna. and North Aves.	1.27 1.57 2.57 3.57 4.57
1.22	1.52	2.52	3.52 4.52	Madison & North Aves.	1.32 2.02 3.02 4.02 5.02
1.15	1.45	2.45	3.45 4.45	Maryland & North Aves.	1.39 2.09 3.09 4.09 5.09
1.12	1.42	2.42	3.42 4.42	Greenmt. & North Aves.	1.42 2.12 3.12 4.12 5.12
1.10	1.40	2.40	3.40 4.40	Harford & North Aves.	1.45 2.15 3.15 4.15 5.15
				Wash. & Preston Sts.	1.51 2.21 3.21 4.21 5.21
1.06	1.36	2.36	3.36 4.36	Gay St. & North Ave.	1.58 2.28 3.28 4.28 5.28

- BASE BALL -

EXHIBITION GAMES

ORIOLE PARK

April 16 - - - - - - Hampden
April 18 - - - University of Maryland
April 19 - - - Reliance Pleasure Club

EASTERN LEAGUE GAMES

SCHEDULE FROM APRIL 21 TO 30

April 21 . . . . . BUFFALO April 26 . . TORONTO
April 22 . . . . . BUFFALO April 27 . . TORONTO
April 23 (2 games) BUFFALO April 28 . . TORONTO
April 25 . . . . . TORONTO April 29 . . MONTREAL
April 30 . . . MONTREAL

MARYLAND JOCKEY CLUB
RUNNING RACES
PIMLICO
APRIL 20 TO MAY 7

MT. WASHINGTON LACROSSE TEAM
MT. WASHINGTON OVAL
APRIL 16 - - SWARTHMORE

JOHNS HOPKINS LACROSSE TEAM
HOMEWOOD
APRIL 23 - MT. WASHINGTON

JUST TO REMIND YOU
TIME IS FLYING
BOOK A DATE NOW

BAY SHORE PARK — EXCURSIONS BY TROLLEY — GWYNN OAK PARK

SEE THE EXCURSION AGENT 903 CONTINENTAL BLDG.

SAMPLE PAGES OF "TROLLEY NEWS," ISSUED BY UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

24 in. x 26 in., printed on both sides of a sheet of heavy cardboard, which is afterward coated with paraffine to resist moisture. They are kept in stock in all car houses, and are put on or taken off of the cars on directions from the division dispatchers, who receive the necessary instructions from the office of the general passenger agent. They can be slid in or out of light metal frames permanently attached to the front and rear dashers. The baseball advertisement is a red card, with a white baseball in the center, on which are the words "Baseball To-day," printed in green ink. The skating sign has a dark blue ground, with a large red ball, over which the word "Skating" is shown in white letters with the name of the park below. The band concert sign is also printed with white letters on a dark-blue ground. All other signs are printed with blue letters on a white ground. The railway company contributes liberally to the support of a large band hired by the city to play every pleasant evening during the summer in one of three large public

In Syracuse metal plates, 14 in. x 20 in., are hung on the dashers of cars and signs printed on the cheapest kind of paper are pasted on these plates. Baseball games and the attractions at the company's open-air theater are advertised in the summer, and in the winter the bill at Keith's Theater is advertised. The space is never sold to merchants or others for private advertising.

The Beebe Syndicate lines do not approve of disfiguring their cars either inside or out with advertising signs, except in the regular racks, where cards of all kinds are displayed. The contract made with the car advertising company gives the railway company the use of one space in each car. Special cards, advertising the schedules and park attractions, are used in these spaces, and the same cards are also framed and hung in station waiting rooms, hotel lobbies, drug stores, and other public places.

The Oneida Railway and the Utica & Mohawk Valley Railway do not use dasher signs on interurban cars,

but on the city cars in Utica cloth fender banners are used for advertising park and other special attractions.

The Schenectady Railway favors large window posters which are used in all city and interurban cars for announcing special attractions at its park, racing at Saratoga Springs and similar traffic-producing events. It has the signs printed on one side only, and pastes two together so that they can be read from inside or outside of the car. The sheets are 14 in. x 20 in. in size, and the colors are varied at frequent intervals. These signs cost the company $2.50 for 400, and are purchased from a local printer.

The standard dasher signs of the Hudson Valley Railway and the United Traction Company of Albany are 12 in. x 24 in. in size. No signs are allowed to be pasted on the car windows. The Fonda, Johnstown & Gloversville Railroad advertises special events at Sacandaga Park in all of its cars with large window posters costing from $2 to $3 per hundred. Week-end attractions are specially advertised, and the colors of each bill are changed to call attention to the new advertisement. Each bill bears at the top the season's slogan, "Sacandaga Park. The loveliest spot in the State." Some startling color combinations have been tried with good results. This company sells the privilege of advertising on the backs of transfers to local merchants. Handbills hung in bunches from the strap poles are used to advertise special events. These cost about $1.15 per thousand, and an average of 12,000 a week are distributed in the cars and in all of the towns and villages along the road. The distribution of handbills, billboard sheets and miscellaneous advertising matter of this company is in charge of an advertising agent, who employs four distributers to cover the towns on the system and east of Schenectady. The advertising agent covers the territory west of Fonda as far as Utica, and hires boys in each town to distribute handbills and posters. Fender banners are used by this company on the local cars in Gloversville and Amsterdam for advertising special events. They cost $8 per hundred.

The Public Service Railway of New Jersey uses dash signs, car window signs and the backs of transfers for promoting traffic and making announcements of changes in schedules, means for preventing accidents, and the like. In Baltimore the United Railways & Electric Company uses dash signs 16 in. high by 24 in. wide for advertising any special events at its two parks or elsewhere in the city. Frequent changes are made in the text of these signs, and many of them are prepared to advertise a single day's attractions. The company believes that this is one of the best methods of promoting traffic, as the story to be told is literally pushed up into the face of every person standing on a corner and waiting for an approaching car. The signs are printed on a good quality of paper, and are pasted on metal plates hung on the car dashers. The backs of transfers are also utilized for advertising the parks, special-car service, suburban trips and the prevention of accidents. Some of the most striking of these advertisements are reproduced. More than 60 different advertisements have been run in this series. About 6,000,000 transfers are issued each month, and the company states that this form of advertising has been



CAR WINDOW SIGNS, SCHENECTADY RAILWAY



STANDARD DASHER SIGNS OF ROCHESTER RAILWAY

productive of good results, as shown by numerous letters of inquiry and personal calls at the company's office for further information.

MISCELLANEOUS ADVERTISING

Advertising novelties, such as blotters, souvenir post cards, and seal pasters for company stationery, are used to a limited extent by a few railway companies in New York State. The Rochester Railway Company sends out a small blotter with a celluloid cover to the secretaries of all organizations which in previous years have had picnics at Sea Breeze Park, on Lake Ontario. Reproduced on the cover of this blotter is a view of the terminal station at the park, with a large crowd leaving the cars, and the question, "Have You Secured a Date?" This has been found to be an excellent reminder when sent out in advance of the summer season. The Albany Southern Railroad distributes by messenger to all hotels and business houses in Albany, Troy and Hudson a small blotter, advertising Electric Park and the special limited car which leaves Albany every evening at 7:30 and arrives at the park in time for the theatrical performance. This company also uses on its envelopes a large red paster seal advertising Electric Park. Pasters bearing the company's monogram have also been used on envelopes by the Fonda, Johnstown & Gloversville Railroad.

The Washington, Baltimore & Annapolis Electric Railway distributes from racks in its cars and stations picture postal cards of scenes in Annapolis. On the front of the cards, in small type, are printed the leaving and arriving times of trains between Washington and Baltimore and Annapolis, the rates of fare and the location of the depots in the two terminal cities. At different times the company has distributed buttons bearing the railway monogram among school children for the purpose of interesting them in a trip to Annapolis. One of the best pieces of special advertising which it has given away is a large guide map of Annapolis, printed on a sheet 19 in. x 24 in., and folded between a cover 4½ in. x 9¾ in. Each place of interest in the city is indicated on the map by a number, and on the back of the sheet is a short description of the place, giving all the historical facts about it. The hourly train service and the low excursion rates from Washington and Baltimore are advertised on the back of the cover. A large illuminated sign above the Washington city ticket office advertises the service to Baltimore and Annapolis, and calls the attention of many tourists in the capital to the fast and convenient schedules of the electric line.



SAMPLES OF DASHER SIGNS USED IN BALTIMORE



REPRODUCTIONS OF TYPICAL "TRANSFER TALKS," UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

EXCURSIONS AND CHARTERED CARS

Most of the excursion business of the interurban roads in New York State is confined to picnics and outings of church and social organizations during the summer months. Owing to the fact that the electric lines do not make a practice of running their cars over the tracks of connecting systems but little long-distance excursion traffic is handled. While all of the companies visited have in force regular tariffs for chartered-car movements, most of them prefer to handle large excursions by providing all the necessary extra cars and charging regular tariff or excursion rates.

The Rochester Railway carries a large number of picnic parties from Rochester to its parks on the shore of Lake Ontario, and its usual practice is to ascertain in advance about how many persons will be carried. The passenger department then arranges to have the necessary number of extra cars placed at any convenient point in the city at the time requested by the organization. These cars will be held a reasonable time for loading, and on the outward trip the conductor collects the regular fare from each passenger. As soon as the load is discharged at the park the cars return to the city, picking up any inbound passengers the same as regular cars. The regular service, reinforced with extra cars, if necessary, is used for bringing the party back at any time they wish to return. Chartered cars for the exclusive use of the party



CAR WINDOW SIGN OF FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

hiring them are also furnished on application, both for trips within Rochester and on the two interurban lines operated by the company.

The rate for a chartered car between any two points in Rochester is $4 for the one-way trip and $7 for a round trip. A limit of 60 passengers is placed on a car; ordinary semi-convertible cars, seating 50 passengers, are used. In this service the company reserves the right to charter cars only at its convenience and to run any car into any car house for the lay-over period. No cars are chartered on Saturdays, Sundays or holidays. On the suburban lines the chartered-car rates are computed on the basis of 60 times the regular one-way or round-trip rates.



SEAL PASTER, ALBANY SOUTHERN RAILROAD

Interurban cars may be chartered on the basis of 75 cents per car mile, using round-trip mileage between starting point and destination. The number of passengers to a car is limited to 50, and if additional passengers are carried the regular round-trip rate of 1½ cents per mile is charged. The minimum charge for a chartered interurban car is $20. All chartered car service must be paid for in advance at the office of the company, and the receipt given for this payment is collected by the conductor on the car to turn in as his voucher. When an application for special or chartered car service is made at the office of the passenger department an order is sent to the transportation department to furnish the necessary cars at the time requested.

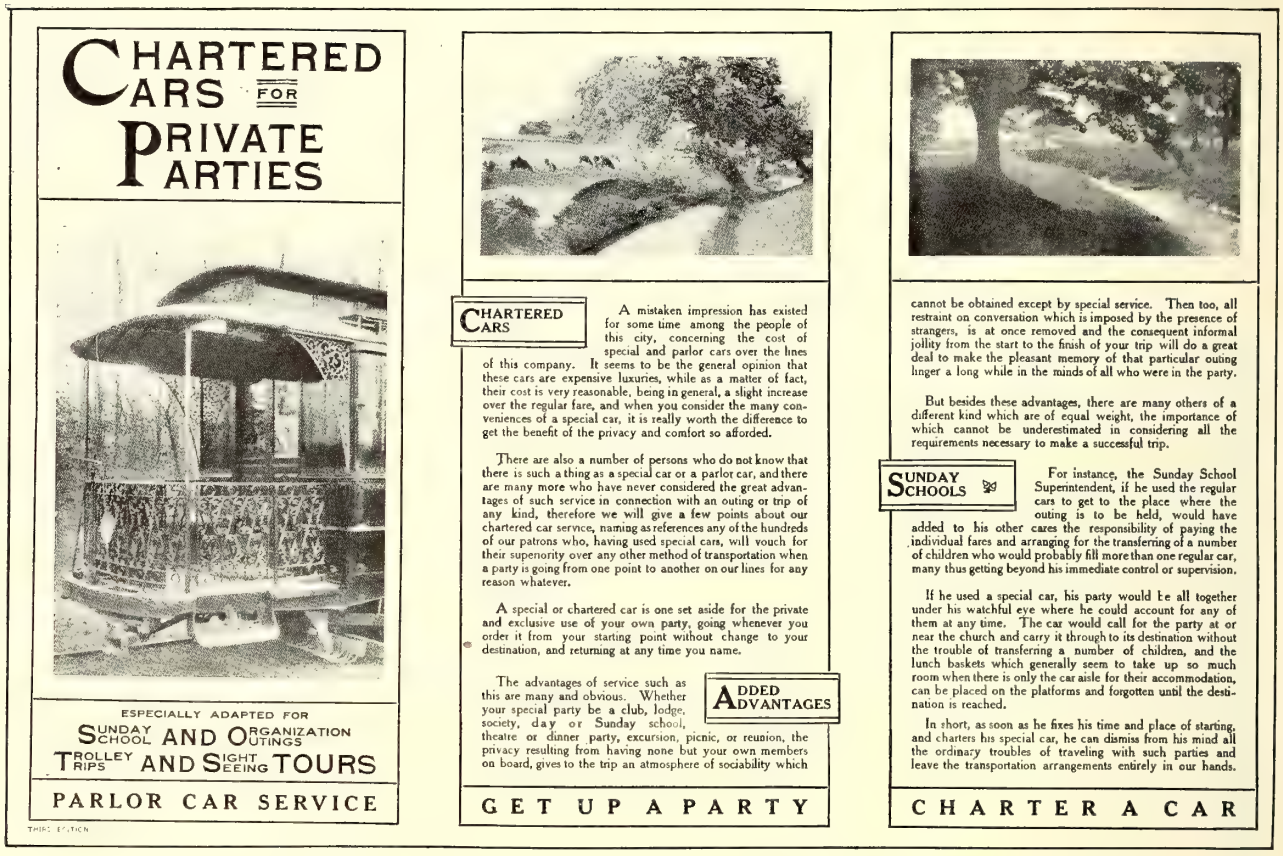
The Beebe Syndicate lines charter a large number of special cars during the winter, as well as in the summer months. The rates considered on a mileage basis vary considerably owing to the fact that they are all figured on the car mileage to and from the division car house. On the Rochester, Syracuse & Eastern the car house is located at Newark, 29 miles from Rochester and 54 miles from Syracuse. The rate between Warners and Syracuse, 10 miles, is $28 for a one-way trip, while the rate from Newark to Palmyra, a distance of 9 miles, is only $15. In general the chartered-car rates are higher than the round-trip rates, multiplied by the seating capacity of the cars, which varies from 48 to 58 passengers. The number of passengers on chartered cars is strictly limited to 75. For each hour after 2 a. m. which a car is delayed in returning to the car house a charge of $10 is made. For large excursions to its lake resorts near Syracuse the Beebe Syndicate lines put in force special party rates, which are proportionately lower for parties of 25, 100, 500 and over 1000. A guarantee must be given in order to obtain these reduced rates.

The Oneida Railway and Utica & Mohawk Valley Railway do not believe in deviating up or down from the regular tariff rates for excursions of any kind. On the Oneida Railway chartered cars, seating 52 passengers, are furnished on the basis of 50 round-trip fares. All over 52 passengers carried are charged the regular ticket rate. If cars are out after 1 a. m. $4 per hour or fraction thereof is charged extra. On the Utica & Mohawk Valley Railway chartered cars are furnished at a price slightly in excess of the regular fare and for cars kept out after 12 midnight $4 per hour is charged extra on the interurban lines and $2 per hour on city lines. During June, July and August of this year 132 chartered cars were handled by these two roads. All chartered cars must be ordered through the office of the general

passenger agent and payment in advance is required unless the person chartering the car is known to be responsible, when a bill is sent after the service is performed. These companies make a reduction of 40 per cent from regular chartered car rates to charitable institutions such as churches, orphan asylums, etc.

The Schenectady Railway has a scale of minimum charges for chartered cars, between any two points within the 5-cent fare limits in Schenectady, and charges a straight 5-cent fare for all passengers in excess of the number required to make up the minimum charge. For large closed cars seating 56 the minimum one-way charge is $5 and the round-trip charge $8. All lay-over or waiting time is charged for at the rate of 50 cents an hour.

Sacandaga Park, and a number of these special days are booked each year. In order to work up interest locally in these excursions a special form of contract is made which provides for paying a fixed compensation to the organization giving the excursion in return for selling a large number of tickets. This contract has been carefully drawn to prevent any conflict with State or national laws covering rebating. The contract specifically states that tickets must be sold at the uniform rate fixed for the excursion, and that the amount paid as compensation shall be placed in the treasury of the organization giving the excursion. It is further provided that no part of the sum so paid shall be given to any person or persons for their own personal benefit or used to pay the fares of any persons. The amount of compensation paid



PAGES REPRODUCED FROM CHARTERED-CAR FOLDER OF UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

The Fonda, Johnstown & Gloversville Railroad makes a special effort to bring large excursions to Sacandaga Park, and while much of the excursion business is handled by steam trains from Fonda to the park, the methods used in arranging for such events may be of interest to other electric railway companies. Sacandaga Park is a combination of a high-class summer resort and popular picnic grounds. The hotels and cottages are entirely separate from the grounds used by excursionists for one-day outings. The general passenger agent of the Fonda, Johnstown & Gloversville Railroad attends all of the conventions which are ordinarily held in Central New York and makes an effort to secure these conventions for Sacandaga Park the following summer. Large organizations having local lodges in all of the nearby towns, such as the Elks and Knights of Pythias, are solicited in person each spring for a big outing and field day at

is fixed solely by the management, which may vary it in any way to suit conditions. It sometimes amounts to as much as 20 per cent of the gross receipts when more than 500 tickets are sold. When an excursion originates on the line of a connecting steam or electric road the same form of contract is used, but the originating road in all cases pays the compensation. For large excursions of this kind special one-day excursion tickets are placed on sale at all ticket offices of the company, and they may be purchased by anyone. As many as 5000 persons have been handled on one of these excursions.

The United Traction Company of Albany and the Hudson Valley Railway solicit picnics and excursions in person during the spring, and a large number are booked to Averill Park, on the Troy & New England Railway, and to Kaydeross Park and Lake George, on the Hudson Valley Railway. Inspectors ride with all large excur-

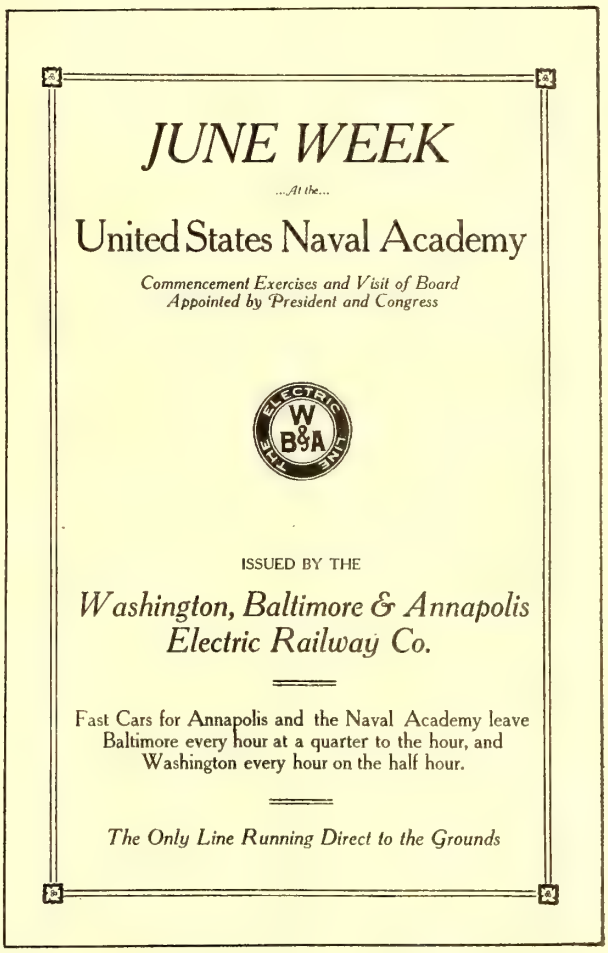
sions and the traffic department makes a point of having assigned to the special cars crews who belong to or know many members of the organization traveling. Thus for a Sunday school picnic motormen and conductors belonging to the church which is having an outing are assigned to the cars whenever possible. For the convenience of responsible organizations these two companies make a practice of printing special excursion coupon tickets, good only on the day specified, and on any regular or special car. These tickets are issued to the organization giving the excursion, which has the privilege of selling them at any price, regardless of the tariff rates. The railway company bills the organization for the number of tickets collected on the cars, multiplied by the regular tariff rate, from which no reduction is allowed, and in addition charges for the cost of printing the tickets, which is about $4 for lots of from 100 to 500. Samples of the special tickets printed for this purpose are sent to the division superintendents' offices, with a memorandum of the extra car service required on the day of the excursion, and these sample tickets are posted on the bulletin boards for the information of the car crews.

Chartered-car rates on the United Traction Company's lines and on the Hudson Valley Railway are slightly higher than the regular tariff rates. No cars are chartered on Sundays and holidays between May 15 and Sept. 15, and the rates on Saturday are made 50 per cent higher than on week days in order to discourage this class of traffic when all the equipment is needed for the regular service. The rates are the same for an open car seating 75 passengers and for a closed car seating 44 passengers; the load on any chartered car is limited strictly to the seating capacity.

The Albany Southern Railroad follows the same practice as the Hudson Valley Railway with regard to printing special tickets for large excursions. Strip tickets composed of several coupons good for the outward and return trip on the cars, admission to Electric Park and also for several of the concessions at the park are sometimes printed for large excursion parties. The organization giving the excursion makes its own arrangements for honoring these coupons with each of the park concessionaires, and pays the railroad 30 cents for each round trip represented by the coupons taken up on the cars. Excursions of this kind are usually handled by putting on enough extra cars to take the party to the park at the time requested, bringing the excursionists home on the regular cars. Large excursions from Troy are often secured during the summer by making arrangements with a local boat line to handle the party by boat from Troy to the railroad company's dock at Rensselaer. The railroad guarantees the boat company $20 for a round trip, and 5 cents is charged each passenger for the one-way trip. The cars for Electric Park are run to the railroad company's boat landing at Rensselaer and the transfer to and from the boat is made without inconvenience.

A special feature is made of one-day combination steamboat and railway excursion trips during the summer months. A car leaves Albany at 1 p. m., arriving at Hudson at 3 p. m., where connection is made with the north-bound Hudson River Day Line steamer arriving in Albany at 6 p. m. The fare is 75 cents, of which the railway gets 35 cents and the steamboat line gets 40 cents for practically equal distances. The same trip can be made starting from Hudson on the boat and stopping off at Electric Park for the evening theatrical performance.

The Washington, Baltimore & Annapolis Railway does a large excursion business in connection with steamship companies in Washington and Baltimore. It has tourist agents as representatives in Boston, Mass.; Worcester, Mass.; Providence, R. I.; New York City and Philadelphia. Through tickets are sold and baggage checked via Washington and Annapolis to Newport News, Va.; Norfolk, Va.; Savannah, Ga.; Boston, Mass., and Providence, R. I., which are reached by



COVER OF SPECIAL FOLDER ISSUED BY WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC COMPANY

steamers of the Merchants and Miners' Transportation Company. Among the most popular shorter excursions for which special round-trip rates are offered are the trips to Washington and thence to Mount Vernon or the Great Falls of the Potomac. Arrangements have been made with a company operating sight-seeing automobiles in Washington for a special auto tour of the national capital, and dinner at a hotel. The expense for the day's trip from Baltimore is $5. From Washington a round-trip rate of $5 is offered for a journey to Atlantic City via the electric line to Baltimore, steamboat to Philadelphia and steam railroad to destination.

The United States Naval Academy and other historic places in Annapolis attract many visitors from Washington and Baltimore. Special excursions are run during

commencement week at the Naval Academy, and these are widely advertised in the newspapers and by special folders. When it is known in advance that a single party of 40 or more persons is going to travel a special car or train is provided. As party tickets for more than 25 persons are sold at a reduction of 20 per cent, notice in advance is usually obtained and arrangements can be made for providing extra cars. Good business is often secured by sending a ticket agent out to accompany any large steamboat or railroad excursion which is run into Baltimore or Annapolis.

The regular excursion rates between terminals are advertised in the company's descriptive folder, and during the summer months a four-page pamphlet, entitled "Places to Go," is published. This contains two lists of short excursions to places on and beyond the company's line. One is intended for those who live in Baltimore or Annapolis, and the other for those who live in Washington or Annapolis. On the back page is a list of summer boarding places along the road.

The Public Service Railway of New Jersey does a large chartered car business, and its tariffs are based on the time the car is out of the car house. It charges $3 an hour with a minimum of $6. A deposit of $3 is required on each order for a special car, and the remainder of the amount due is collected by the conductor on the car.

Small excursions on the Otsego & Herkimer Railroad are contracted for on special party ticket rates based on the chartered-car tariffs of the company. A guarantee of a sufficient number of passengers to fill all the seats in the car is required. For larger parties a sliding scale is used and the rates decrease in proportion as the number of passengers guaranteed increases. The lowest round-trip rate given in this sliding scale is about 10 per cent more than the one-way fare with a minimum of 50 cents. A special blank ticket with going and returning coupons distinctly different from the regular ticket forms and limited for use to the date of sale is used for excursion traffic. A representative of the traffic department usually accompanies excursions and special parties. Special excursion rates are granted on Sunday from all stations to the company's amusement parks, and the tickets sold at these rates are marked with a wide colored bar for easy identification.

The United Railways & Electric Company of Baltimore encourages the chartering of cars by advertising the service in the newspapers, on the backs of transfers and in special folders which are freely distributed. It has a funeral car and four handsomely finished double-truck parlor cars with observation platforms, which it rents, and it also charters standard semi-convertible cars. The charges for the service are reasonable, being only slightly more than the seating capacity multiplied by the regular fare and all classes of patrons are appealed to in the advertisements which are prepared. The special folder which describes the chartered-car service is illustrated with a number of views of the parlor cars and contains paragraphs addressed to Sunday school superintendents, to lodges and societies and to persons desiring to entertain theater or picnic parties. The parlor cars are fitted with refrigerators and tables so that refreshments may be served on them en route. No rates are quoted in the folder, but the back cover page invites inquiries for complete information, which is gladly furnished by the excursion agent.

LIMITED PARLOR CAR SERVICE

Only two interurban railways in New York State operate limited parlor cars on a regular schedule. The Auburn & Syracuse Electric Railroad, one of the Beebe Syndicate lines, began this summer the operation of a luxurious parlor car, "Marcella," between Syracuse and Auburn. Many wealthy people in the two terminal cities have country homes on Lake Skaneateles and in Marcellus, and the service was inaugurated for their benefit.



CAR WINDOW SIGN OF SCHENECTADY RAILWAY ADVERTISING THE "TWILIGHT SPECIAL"

The car makes three round trips a day and the schedule is arranged to suit the convenience of the patrons. On the first trip the car arrives in Syracuse at 8:55 a. m. and on the last trip it leaves Syracuse at 5:25 p. m. The running time is 1½ hours in each direction and only two stops are made, at Marcellus and Skaneateles Lake. The "Marcella" is equipped with two 75-hp. motors. It is handsomely furnished and decorated on the inside and contains 24 upholstered rattan chairs. Smoking is permitted only on the observation rear platform. The regular tariff fare is charged on this car, and in addition a seat charge of 25 cents is made for a ride of any length. Seats are sold by the conductor on the car and when the 24 seats are all sold no more passengers are taken on. This service has proved very popular and the car has been well patronized on all trips.

The Otsego & Herkimer Railroad operates a chair car during the summer months between Herkimer, where connection is made with the New York Central & Hudson River Railroad, and Cooperstown, a distance of 34 miles. This car stops only at the principal stations and makes two round trips daily to connect in both directions with fast trains on the New York Central. An extra



INTERIOR OF PARLOR CAR "MARCELLA"

fare is charged on this car, based on the one-way ticket fares. When the regular ticket fare is 40 cents or less the chair car ticket is 15 cents; from 41 cents to 80 cents the chair car ticket is 25 cents, and above 80 cents the chair car ticket is 30 cents.

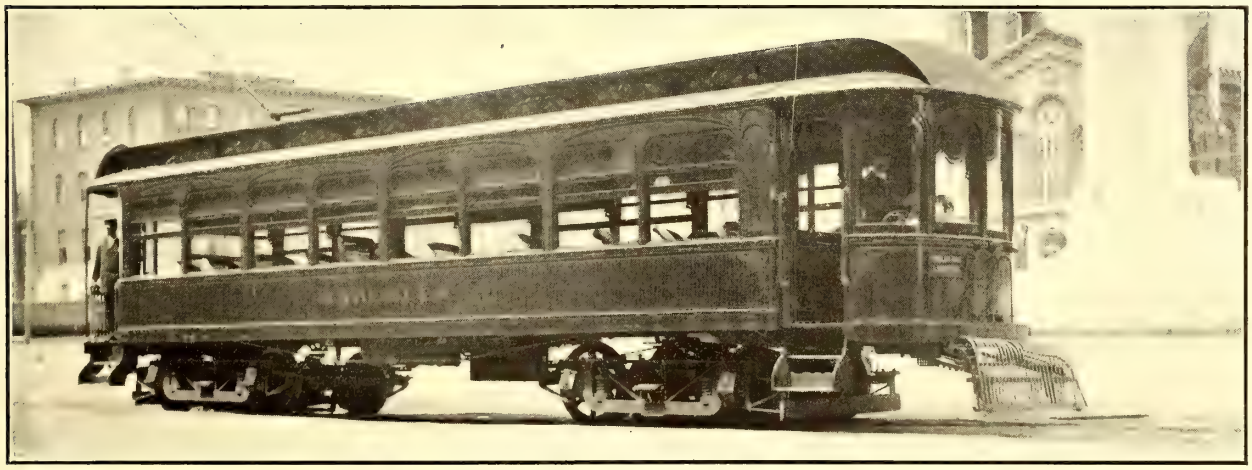
The Lehigh Valley Transit Company operates a "Liberty Bell Limited" between the Chestnut Hill terminal in Philadelphia and Nazareth, Pa. A change of cars at Nazareth enables the passenger to proceed to Portland, where connection is made with a special automobile 'bus running to all the principal hotels in the famous Delaware Water Gap. The limited car has numbered seats which can be reserved in advance by payment of an excess fare of 15 cents which is charged. The car is in charge of a special tourist agent who will answer any questions on points and places of interest along the road. This car runs on a fast schedule and makes but one stop in each of the principal towns. It leaves Chestnut Hill at 9 a. m. and passengers are landed at the Water Gap at 2:30 p. m. Returning the car leaves Nazareth at 12:35 p. m. and arrives in Philadelphia at 5 p. m.

The Schenectady Railway operates during the summer months a special car from Schenectady to Forest Park on the Ballston division. This car is known as the "Twilight Special" and runs on a regular schedule on weekdays and Sundays, weather permitting. A 15-bench open car, which is decorated with festoons of colored electric lights is used, and when there is a special attraction at the park a second or even a third car is put on as a section following the regular car. The car starts from the west side of the city, runs up State Street past the interurban waiting room and then proceeds by a roundabout route through the city and out over the Ballston interurban line to the park. The service is widely advertised by car window posters and handbills which show the leaving times at seven important junction points in Schenectady. The round-trip distance is about 19 miles, the fare is 25 cents, and the time required on the outward journey is one hour. This car has been very popular and the company states that its operation has induced many people to acquire the habit of going to the park in the evening.

The Montreal Street Railway operates two observation cars for about five months during the summer season. These cars start from the corner of Windsor and St. Catherine streets every half hour, commencing at 10 a. m., weather permitting. They make a trip around Mount Royal, which requires one hour, and the fare charged is 25 cents. No lecturer is employed. The number of trips made each season varies according to the weather conditions, but a fair average is 200 trips per month.

The revenue from the operation of these cars for the last three years is as follows:

1908	$6,187.74
1909	5,761.20
1910 (to Aug. 31)	6,336.64



PARLOR CAR "MARCELLA," AUBURN & SYRACUSE ELECTRIC RAILROAD

The service is advertised in a handsome descriptive folder which is issued by the railway company. These folders are distributed from the company's offices and a supply is sent regularly to the timetable racks in all hotels and city ticket offices of steamship and steam railway companies in Montreal.

SPECIAL METHODS OF TRAFFIC PROMOTION

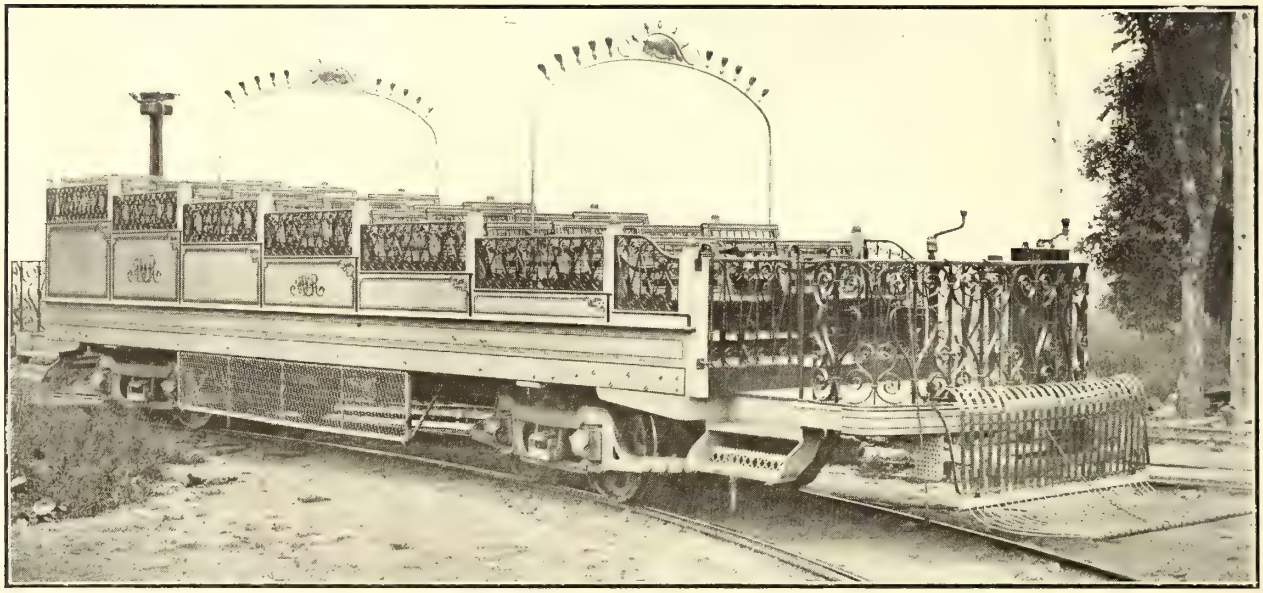
Methods for developing special kinds of traffic are always interesting even to those traffic officers who cannot apply them to the conditions existing on their own properties. Several unique plans have been tried successfully by some of the roads in Central New York which have been referred to in the previous pages of this chapter. The most desirable traffic from the standpoint of net earnings is the regular daily travel of a considerable number of passengers who use the electric railway in going to and from their homes and offices. This commutation business, usually done at but little less than tariff rates, is more easily handled and is more profitable than excursions. The development of summer cottage and camping colonies offers a means of creating a considerable volume of travel during the summer months for a small investment in grounds and buildings. The Rochester Railway, the Fonda, Johnstown & Gloversville Railroad and the Schenectady Railway have tried this plan with good results.

The Rochester Railway owns a large tract of land on the shore of Lake Ontario, about 8 miles north of Rochester, which it has developed as a summer tent colony. Streets have been laid out, sewers laid and water piped into the property. The grounds are laid out in plots about 100 ft. x 100 ft. These are rented for the summer for a nominal sum, which is just sufficient to pay the taxes and cost of upkeep of the property. The use of the ground is granted by a permit issued by the company. Permits are revokable at the pleasure of the railway company and they cannot be transferred by the holder. The company reserves the right to make and enforce regulations concerning the tents erected on its property, the maintenance of the grounds and the deportment of the permit holders. Large tents divided into from two to six rooms and having board floors have been erected on most of the plots. The tents are put up early in the summer and the owners occupy them until late in the fall. Outfits of this kind cost from $400 to $600, but they are cheaper than cottages.

The Fonda, Johnstown & Gloversville Railroad has a large cottage colony at Sacandaga Park. More than 300 handsome and well-built cottages have been erected in the park on land leased from the railroad company. The usual form of term lease is used, the leases running from 10 to 30 years. The rentals are from $20 to $35 a year, which includes taxes and water rents.

The Schenectady Railway leases to cottagers plots of ground 100 ft. x 150 ft. at Forest Park. The rental is $25 a year and the leases run for 10 years. The company reserves the right to cancel any lease at any time on payment to the lease holder of the appraised value of his improvements less depreciation.

The Rochester & Sodus Bay line of the Rochester Railway derives a good income during the summer months from fishermen from Rochester who take occasional holidays and go for a day's fishing on Lake Ontario. The round-trip fare to Sodus Bay on week-days is $1, and as the fishing is uncertain at times the amateur fishermen would not risk a whole day and the expense of the trip if their sport was likely to be spoiled by high wind or the vagaries of the finny inhabitants of the lake. The railway company's agent at Sodus Bay sends in a report by telephone to the office of the passenger agent in Rochester every morning stating the weather at the lake shore, the kind and number of fish caught on the previous day and the best places for fishing. Anglers who wish to know about the fishing before starting out can obtain reliable and complete information by telephoning to the passenger agent's office in Rochester. From 10 to 20 fishermen are carried on the cars every pleasant day during the summer.



SPECIAL OBSERVATION CAR, MONTREAL STREET RAILWAY

Newspaper clipping service is a valuable adjunct to the work of a traffic department. All the newspapers printed in the cities and towns on the Rochester lines of the New York State Railways are read and clipped every morning by a clerk in the office of the passenger agent. Advance notice of coming events from which extra traffic can be expected is obtained in this way and the passenger agent takes steps to get the business.

TRAFFIC METHODS OF ELECTRIC RAILWAYS IN OHIO, INDIANA AND MICHIGAN

IT is but little more than a decade since the first interurban electric railways were built in Ohio and Indiana. The pioneer lines were comparatively short and isolated from each other. Their traffic was purely local and their future growth was dependent on the growth of the limited territory which they served. The rapid construction of new lines has now completed a vast network of electric railways connecting all of the important cities in the Central West and has made possible the development of freight as well as passenger traffic in direct competition with the steam railroads. Long-distance passenger travel and shipments of freight over all-electric routes are growing in volume with remarkable rapidity. In this chapter the traffic promotion methods of about 30 electric railway companies in the three States of Ohio, Indiana and Michigan are briefly described. All of these companies are active members of the Central Electric Railway Association and its affiliated Central Electric Traffic Association, and to the co-operative work done through these two organizations is due much of the success which has been achieved in developing the traffic of all the electric railways in this territory. The Central Electric Traffic Association has a permanent chairman who prepares and files for the member companies joint tariffs, and his office serves as a clearing house for exchanging helpful information and ideas. More than 3600 miles of electric railways are represented by membership in these two associations.

TRAFFIC ORGANIZATION

With the growth of the electric railway industry the value of active solicitation of traffic has become better recognized and the larger roads have found it profitable to establish departments devoted to this work. Usually the traffic staff is headed by a man who has been schooled in the freight or passenger department of a steam railway. Such experience becomes especially valuable in competitive territory. Assisting the "traffic manager" or "general freight and passenger agent" are men who do the active solicitation. These assistants in most instances are put in charge of both passenger and freight traffic on independent sections of a railway, or, as in the case of two roads in the Central States, the Detroit United Railway and the Dayton & Troy Electric Railway, the passenger traffic work for the entire road is handled by one man and the freight by another. On small roads, of course, one man and a clerk are able to supervise all traffic matters, and on some roads, which either have not yet fully recognized the value of traffic solicitation or have neither sufficient mileage nor interline connections to warrant soliciting business, the traffic matters are handled by the general manager or superintendent of transportation.

The traffic officials of the electric railways in the States of Ohio, Indiana and Michigan which have furnished the data published in this chapter include the following:

MICHIGAN

Detroit United Railway: John F. Keys, general passenger agent, Detroit; Geo. A. Parker, general express and freight agent, Detroit; A. D. B. Van Zandt, publicity agent, Detroit.

Michigan United Railways: F. W. Brown, general freight and passenger agent, Jackson.

Grand Rapids, Grand Haven & Muskegon: S. L. Vaughan, traffic manager, Grand Rapids.

Grand Rapids, Holland & Chicago: Chas. A. Floyd, traffic manager, Grand Rapids.

INDIANA

Chicago, Lake Shore & South Bend Railway: W. O. Woodward, traffic manager, Michigan City.

Chicago, South Bend & Northern Indiana Railway: H. S. Dickey, traffic manager, South Bend.

Fort Wayne & Wabash Valley Traction Company: F. Hardy, superintendent of transportation, Fort Wayne.

Indianapolis, Crawfordsville & Western Traction Company: Stephen Ridlen, general passenger and freight agent, Crawfordsville.

Indianapolis & Cincinnati Traction Company: Geo. S. Henry, traffic manager, Indianapolis; C. O. Warfel, general agent, Indianapolis.

Indiana Union Traction Company: F. D. Norviel, general passenger and freight agent, Anderson; J. F. Starkey, district passenger and freight agent, Anderson; A. G. Snell, district passenger and freight agent, Indianapolis.

Terre Haute, Indianapolis & Eastern Traction Company: John H. Crall, general passenger and freight agent, Indianapolis; W. P Bailey, district passenger and freight agent, Indianapolis.

Toledo & Chicago Interurban Railway: G. M. Patterson, claim, purchasing and general freight and passenger agent, Kendallville.

Winona Interurban Railway: C. O. Sullivan, general freight and passenger agent, Warsaw.

OHIO

Cleveland, Southwestern & Columbus Railway: J. O. Wilson, treasurer and traffic manager, Cleveland.

Columbus, Delaware & Marion Railway: W. H. Mathews, general freight agent, Columbus; J. C. Larason, general passenger agent, Columbus.

Dayton & Troy Electric Railway: C. M. Paxton, general manager and traffic manager, Dayton; O. H. Murlin, general passenger agent, Dayton; L. D. Johnson, general freight agent, Dayton.

Lake Shore Electric Railway: F. W. Coen, general manager, Sandusky.

Ohio Electric Railway: W. S. Whitney, general passenger and freight agent, Springfield; A. G. H. Jenseen, district passenger and freight agent, Toledo; F. A. Burkhardt, district passenger and freight agent, Lima; B. B. Bell, district passenger and freight agent, Columbus; Alfred Woch, district passenger and freight agent, Toledo.

Toledo, Bowling Green & Southern Traction Company: C. V. Laney, traffic manager, Findlay.

Toledo, Fostoria & Findlay Railway: R. S. Powley, general passenger agent, Fostoria.

Toledo Railways & Light Company: W. F. Nutt, general freight and passenger agent, Toledo.

Toledo & Western Railroad: C. T. Chapman, traffic manager, Toledo.

Toledo & Indiana Railway: H. C. Warren, general manager, Toledo.

Western Ohio Railway: C. C. Collins, traffic manager, Lima.

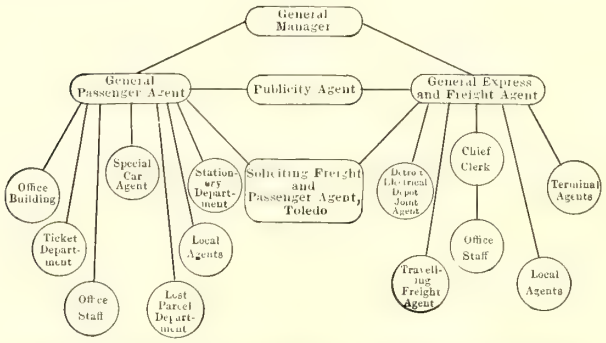
Youngstown & Ohio River Railroad: J. D. Dewees, superintendent and traffic manager, Leetonia.

Youngstown & Southern Railway: E. H. Raupp, general manager, Youngstown.

TRAFFIC DEPARTMENTS OF RAILWAYS OF MICHIGAN

The traffic organization of the Detroit United Railway includes a general passenger agent, a general express and freight agent and a publicity agent. In addition to his duties in charge of the promotion of traffic the general passenger agent has charge of the following depart-

ments: Ticket stock, stationery, lost parcels, special cars, and the upkeep of the company's office building. He has one assistant for each of these departments, and is assisted in all of his work by a special-car agent. A soliciting freight and passenger agent located at Toledo reports to the general passenger agent on matters concerning passenger traffic. The freight department is under the charge of the general express and freight agent, who is assisted by a traveling freight agent, the soliciting agent at Toledo, a joint agent at the electric express depot in Detroit, a tariff clerk and office staff. The agents in charge of the 60 local stations of the Detroit United Railway interurban system report directly to the general superintendent.



TRAFFIC DEPARTMENT ORGANIZATION, DETROIT UNITED RAILWAY

The work of the traffic department of the Michigan United Railways, which is in charge of a general freight and passenger agent, includes not only the solicitation of freight and passenger traffic, but the preparation, storage and distribution of tickets and the disposition of freight claims. Also, the station agents and their clerks and the freight agents are employed by and report to the general freight and passenger agent's office.

The Grand Rapids, Grand Haven & Muskegon Railway and the Grand Rapids, Holland & Chicago Railway offer through service in connection with steamship lines from their western terminals to Chicago and Milwaukee. Both roads have through rates and divisions with all the principal trunk lines operating north, west and south from Chicago, and so their traffic affairs are conducted similarly to those of a steam road in so far as the size of the properties will permit.

The traffic manager of the Grand Rapids, Grand Haven & Muskegon line is assisted by two solicitors in Grand Rapids. One is placed in the territory by the Goodrich Transit Company, and another works in the city ticket office in the morning and on the streets in the afternoon.

The general freight and passenger agent of the Grand Rapids, Holland & Chicago Railway is assisted by a city passenger agent in Grand Rapids, a soliciting freight agent and a freight inspector. All of the station agents work under the direction of the traffic office. The traffic department has charge of the promotion of freight and passenger traffic, the management of the company's park resorts, which are directly under the charge of the park superintendent, the investigation and adjustment of personal, freight and baggage claims, the sale of current for light and power, which is considered as traffic, and the planning and execution of advertising campaigns.

TRAFFIC ORGANIZATIONS ON INDIANA ROADS

The general freight and passenger agent of the Indiana Union Traction Company is assisted by two district passenger and freight agents—one in charge of traffic on all divisions except that extending north from Indianapolis to Kokomo, Logansport and Peru; the other in charge of that division and the office in Indianapolis. The principal traffic office is at the operating headquarters of the company in Anderson. The Indiana Union Traction Company has agents at 56 stations, and these men report direct to the general offices at Anderson, either to the transportation or to the traffic department.

The general passenger and freight agent of the Terre Haute, Indianapolis & Eastern Traction Company reports direct to R. I. Todd, general manager. The headquarters of the traffic department are in the Traction Terminal Building at Indianapolis. The traffic organization includes a district passenger and freight agent, with headquarters at Indianapolis, and from time to time when advertising campaigns are in progress expert services are employed.

The traffic department of the Ft. Wayne & Wabash Valley Traction Company is headed by the superintendent of transportation, who delegates a part of the traffic duties to his chief clerk. The superintendent of interurban lines and the city superintendents at Ft. Wayne, Logansport and Lafayette assist in soliciting traffic. These men hold a conference with the superintendent of transportation and the interurban superintendents every Monday, at which time the possibilities for new business are discussed. The local freight and passenger agents report to the superintendent of transportation.

The general freight and passenger agent of the Toledo & Chicago Interurban Railway not only has charge of traffic, but also acts as claim and purchasing agent. The local agents of this railway report to him, and he is responsible for the company's advertising campaigns and for the solicitation of traffic.

The Indianapolis & Cincinnati Traction Company has a traffic manager, assisted by a general agent, who does the soliciting. The traffic office is at Indianapolis, and four other stations have day and night agents on salaries, who also act as solicitors. The agents at smaller stations are paid commissions on the traffic which they obtain. All agents report to the Indianapolis traffic office.

TRAFFIC ORGANIZATIONS OF OHIO ROADS

The secretary and general manager of the Dayton & Troy Electric Railway also is traffic manager. He is assisted by a general passenger agent and a general freight agent. Both of these men have had steam railroad experience, and they are held responsible for the solicitation of business, the work of the local agents and the treatment of patrons. The local agents are hired by the general superintendent. One of the duties of the general freight agent is to keep a credit list of the customers in each town and make certain that collections for freight charges do not lag. The general manager of the Dayton & Troy has found it advisable to divide the traffic work into separate freight and passenger departments, and even on this road, which has a route less than 40 miles long, it has been shown that the two men can more than pay their own way. The freight and passenger agents do soliciting in the four cities in which

stations are maintained. The smaller towns along the line are prepay points, and freight shipments are not urgently solicited from these districts.

The traffic force of the Western Ohio Railway comprises a traffic manager, a traveling freight and passenger agent and two office clerks, with headquarters at Lima. The traveling freight and passenger agent is, in general, responsible for the way in which passengers and freight are cared for, and also solicits traffic.

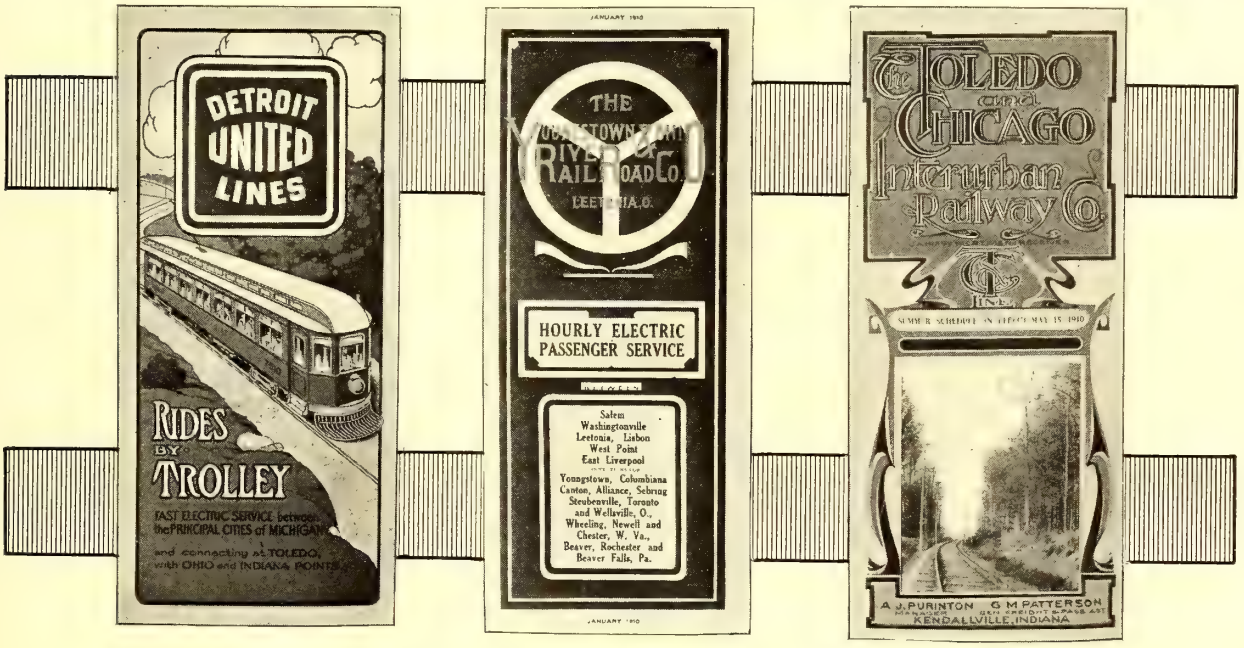
The traffic manager of the Toledo, Bowling Green & Southern is assisted by an agent at the Toledo terminal, who has a sufficient clerical staff so that he has time to do soliciting. Inasmuch as this man is both agent and solicitor he can speak with authority when quoting rates from his terminal. This plan of giving the agent sufficient help so that he can do the soliciting rather than hire a solicitor is said to be economical and to save considerable inter-office correspondence.

The Toledo Railways & Light Company's suburban electric railway system reaches a number of pleasure resorts. The company also owns the freight and express terminal used by several of the interurban lines entering Toledo. The traffic department is headed by a vice-president of the three suburban companies, who also has the title of general freight and passenger agent of these companies and of the Toledo Railways & Light Company. The general freight and passenger agent is assisted by an advertising agent and a park superintendent, and his department has charge of the traffic on the suburban roads, the operation of the parks, the freight station earlier mentioned, and the union passenger station used by the Toledo & Western, Detroit United, Lake Shore Electric, Toledo & Indiana, Toledo, Fostoria & Findlay and Toledo, Bowling Green & Southern Railways.

The traffic department of the Toledo & Western is organized along steam railroad lines, with a traffic manager in charge of advertising, soliciting and freight handling. This officer is assisted by a general agent at Adrian, one of the terminals of the road. The freight claim agent reports direct to the president and the local station agents report to the superintendent. The traffic manager's office is in Toledo and the other operating officials are all located at Sylvania, a small town near the midpoint of the road. This property has friendly relations with practically all of the steam lines which it intersects, and, as a heavy carload business is accepted for Eastern and seaboard cities for fast freight lines, the traffic department found it advisable to adopt steam railway methods.

The Youngstown & Ohio River Railroad has through rates and divisions with connecting steam lines, and does a carload business. The general manager is in charge of traffic and, as he was formerly employed on steam roads, the traffic department of this road is organized along steam railway lines. Assisting the general manager in the promotion and handling of traffic are a general passenger agent, a chief of tariff bureau, a freight solicitor, and the station agents. The general passenger agent also is auditor for the railway company.

The traffic department of the Columbus, Delaware & Marion Railway includes a general freight agent and a general passenger agent, both reporting directly to the general manager. During the winter, when passenger traffic is not being solicited, the general passenger agent works in the Columbus ticket office.



TYPICAL COVER DESIGNS FOR TIMETABLES AND FOLDERS

The general freight and passenger agent of the Ohio Electric Railway is assisted by four district agents located at Columbus, Toledo, Lima and Dayton. Each district agent is in charge of both freight and passenger business for a definite territory and reports to the general traffic office at Springfield. The traffic department is under the jurisdiction of the general manager.

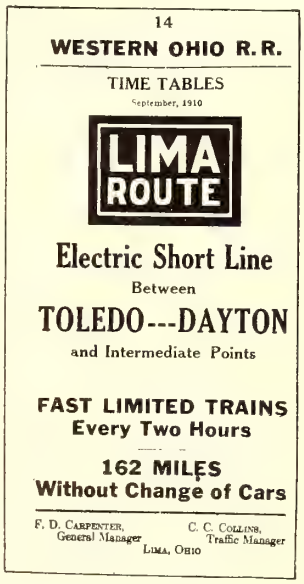
TIMETABLES

One form of advertising used by all roads is the timetable. These are folders, generally of such size as will permit their being placed in standard railway racks with openings 4½ in. x 9 in. Many roads issue vest-pocket folders, with the idea of furnishing regular riders with a small timetable which can be carried continually. The timetable folder publications issued by a number of the roads in the Central States are described.

TIMETABLES OF INDIANA ROADS

A comprehensive folder of all the interurban lines in the State of Indiana is published as an advertising medium by the Electric Railways Publishing Company, of Lafayette, Ind. This folder has 48 pages and a cover, and contains a two-color map of the State of Indiana, 9 in. x 14 in. in size, showing all the interurban lines in the State. Steam lines also are shown, together with the location of the towns of more than 1000 inhabitants. These large folders have a general circulation throughout the State. On the cover is printed the name of each road distributing these folders.

The timetables of the Terre Haute, Indianapolis & Eastern Traction Company are displayed in the official *Indiana Interurban Railway Guide*. The railway contracts for 5000 copies a month of the *Indiana Interurban Railway Guide* with its name printed in red on both covers, and for 4000 copies a month with the words "Connecting Lines" printed on the covers. The latter timetables are distributed from the joint ticket office at the Indianapolis Traction Terminal Building. A smaller folder, containing the timetables of the Terre Haute, Indianapolis & Eastern lines only, is published as a single sheet, 12½ in. square, arranged to fold into six pages about 3 in. x 6¼ in. in size. One double page displays a map of the road. About 2000 copies of this folder are distributed each month. In addition to the timetable of the electric trains, the folder shows the time of all steam passenger trains at terminal cities.



COVER OF TIMETABLE FOLDER

The general timetable of the Indiana Union Traction Company is bound so that when opened it has pages 8½ in. x 8½ in. It contains advertising of merchants and others, which is said to make the publication of the folder self-supporting. Ten thousand copies of the folder as revised and republished each month are distributed by the station agents and by representatives of connecting steam and electric lines. This folder has an attractive cover design, printed in black and bright green, the cover bearing the name and monogram of the company. On the title page are the names and addresses of the executive and operating officers of the company, including the six division superintendents. Following this list are the names of the passenger and freight agents at the principal stations, with the names of the 56 stations alphabetically arranged. Opposite the name of each station is a letter indicating on which division of the railway system the station is located. Following the station list is a page index of the 38 pages included in the timetable, of which 18 are sold as advertising space. Pages 5 and 6, which present general information, are introduced with the following paragraph:

"Particular attention is called to the fact that the schedules of trains over the various divisions of the I. U. T. System are so arranged that direct connections are made at all important junction points. Passengers may be further assured of making connections if they will notify conductor at the time fare is paid. The desire and aim of the company is to get passengers to destination as quickly and comfortably as possible, and it will be considered a favor if any inattention or discourtesy on the part of employees is promptly reported."

In the Indiana Union Traction folder the time cards, corrected to the first of each month, occupy an equivalent of 11 pages, and are grouped according to divisions. The middle pages of the folder carry a map 8 in. x 11 in. in size, showing the Indiana Union Traction and other electric lines in the Central States. The steam roads are shown, except where they parallel the electric railways. Timetables of combination trolley and steam routes to such terminals as St. Louis, Chicago, Toledo and Detroit are shown, and timetables for connections on 13 other traction lines are presented.

The timetables of the Indianapolis, Crawfordsville & Western Traction Company occupy four pages and are printed on cardboard folded to vest-pocket size. These folders include timetables of the steam railway trains at the terminals. This company distributes its folders not only to the stations along the line, but to all business houses in Indianapolis and Crawfordsville. The folders are placed, also, in all small towns within 10 miles of the line. About 2500 folders are distributed each month.

The Toledo & Chicago Interurban Railway issues a 16-page, standard-size folder, with a half-tone cover in two colors. This folder contains the timetable, describes the cities served, advertises the service of the United States Express Company, shows the steam and electric railway connections at terminals, carries a hotel directory and a map of the interurban lines in Ohio, Indiana and Michigan, indicating the local line in red. These folders cost about 1.2 cents each, and are distributed from racks in the cars. The agents at terminals are held responsible for the racks being filled in each departing car, and each agent keeps the hotel racks in his town supplied.

The Indianapolis & Cincinnati Traction Company issues a single-sheet timetable of vest-pocket size, folding into 16 pages, 2⅛ in. x 5½ in. in size. This folder shows a map of Southeastern Indiana, prominently indicating the traction company's line and the lines of the connecting interurban systems. Fifteen thousand of these folders are issued each time the schedules are changed.

The timetables of the "South Shore Route," the Chicago, Lake Shore & South Bend Railway, are published in standard and vest-pocket sizes. The vest-pocket folder is intended for distribution among local travelers. It contains a map of the route and a skeleton map of the business district of Chicago, showing the locations of the Illinois Central Railway suburban stations at which trains may be taken to connect with the electric cars at Pullman and Kensington. The standard-size folder contains only the timetables of week-day and Sunday trains and an advertisement of the resorts reached by these trains. It was first intended to have the *Indiana Interurban Railway Guide* placed in the Chicago racks to show the timetables of the "South Shore Route," but the folder distributing

company made the price for this distribution prohibitive, because other interurban roads in Indiana were shown in this publication. Therefore, the "South Shore Route" publishes a simple standard-size folder, principally for Chicago distribution.

The Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway issue a single-sheet timetable which folds into 10 pages, each 3½ in. x 7½ in. The freight schedules for both roads appear, together with an announcement that "All freight must be delivered at our freight house 30 minutes prior to departure of cars as scheduled." This folder presents a list of the steam and electric connections at each of the seven important towns reached, announces that chartered-car and excursion rates are available, advertises the mileage and coupon books and through ticketing to points on the connecting traction lines in Indiana, Ohio, Kentucky and Illinois. One page of the folder is devoted to schedules of the lake steamers operated between St. Joseph and Chicago by the Graham & Morton line and between Michigan City and Chicago by the Indiana Transportation Company. Interspersed among the sections of the timetable are such statements as "The electric railroad permits you to do in one hour what formerly required a day."

TIMETABLES OF MICHIGAN ROADS

The advertising literature of the Michigan United Railways includes timetables issued in two forms. A standard-sized folder, bound so that the pages are 8 in. x 9 in. when unfolded, contains a map of the system and timetables of all interurban trains. These folders are distributed only from racks in the passenger cars. A smaller folder with eight pages, each 2½ in. x 5 in. in size, printed in red on heavy manila stock, is used for general distribution. This folder gives the time of all trains, but does not show a map of the system. The traffic manager does not approve of putting timetables in advertising folders, or other schemes formulated principally for the purpose of selling advertising space. The timetables of the Michigan United Railways are placed in all standard steam railway guides so that they will be available readily for the use of commercial travelers and steam railway ticket agents.

The Detroit United Railway issues single-sheet folders of pocket size for each division, and these single-sheet folders have one page devoted to the schedules of limited cars of the other divisions. On the folder for the Jackson division the time of the trains of the Michigan United Railways is also shown. In addition to these division folders an "all limited" folder of the same form is published, giving the time of the fast limited electric service connecting Detroit, Toledo, Port Huron, Flint and Saginaw. The leaving time of the local cars from each terminal on each division is also given in this folder, which is intended as a ready reference for people who are not regular riders. The other small folders, one for each division, are intended for the use of people living on the line and regular riders. These patrons ordinarily use but one division, and therefore timetables of the other divisions, except for the leaving time of the limited cars from Detroit, would be encumbrances. The circulation of these small folders is chiefly at terminal points, where they are placed in hotels, clubs and in the Baltimore lunch rooms. Special holders have been made for displaying these folders where they may attract the attention of the greatest number of possible passengers. The patrons of the Baltimore lunch rooms use the folders to a surprising extent, and the demand in such places is almost as great as it is in the hotels. From 15,000 to 20,000 of the small folders are distributed each month, one hotel taking about 1000. Particular care is taken to place these folders and other advertising matter of the Port Huron-Detroit limited service in the hotels of the towns north of Port Huron, because the steam service from these towns into Port Huron does not operate through to Detroit, and through travelers change there to the limited electric cars for Detroit. An advertising folder which also contains the timetables for the Michigan United Railways and the Lake Shore Electric Railway is used. This publication, which is promoted by an advertising concern, is issued monthly, and proofs are submitted to the railway companies for approval. These folders are furnished to the railway companies free of charge in lots of 9000 per month.

The Grand Rapids, Grand Haven & Muskegon Railway issues two timetable folders, both of pocket-size, and an excursion folder. The pocket folders are in the single-sheet form, one with 12 pages, 2¾ in. x 5¾ in., and the other with four pages of approximately the same size. The larger folder presents the time of all trains, shows a map of the railway line, carries an advertisement of the freight service, including a list of the steam trunk lines out of Chicago over which shipments may be routed, an advertisement of the American Express Company, and a timetable of the Goodrich boats between Chicago and Grand Haven.

TIMETABLES OF OHIO ROADS

The official timetable of the Ohio Electric Railway is a single sheet folding into 24 pages. This is devoted entirely to showing the schedules on the 620 miles of track operated by this company. The folder carries a map and a few small advertisements of the freight service and pleasure resorts, together with a list of the connections made with other traction lines and steam railways at each important city. These timetables are distributed at the ticket offices, from racks in passenger cars and by the Central Railway & Hotel Distributing Company.

The Dayton & Troy Electric Railway issues two folders, both of standard size. One folder contains the timetable of the local road and the through schedules over the Lima route of the Dayton and Toledo limiteds. The middle pages of the folder show a map of the Lima route and the steamer connections from Toledo. The timetables of the Western Ohio Railway also are shown. This folder includes a map of the terminal loop in the heart of the city of Toledo, showing the principal streets traversed by the limited trains of the Dayton-Toledo service. Below the map is a table of the distances, rates of fare and connections by trolley from Dayton. A double-page advertisement of excursions by interurban roads from Dayton to Toledo, and thence by steamer to Detroit, Cleveland and other lake points, appears on the back cover of this folder. About 10,000 of these folders are issued each month, being circulated by a folder distributing company. Another folder of the Dayton & Troy advertises the through Dayton-Toledo limited sched-

ule only. During the three summer months about 30,000 of these folders are distributed from the cars and from racks in the stations and in hotels.

The "Lima Route," Western Ohio Railway, issues its timetables in a 12-page folder, 3 in. x 6 in. in size. This folder contains the running time of the Toledo-Dayton limiteds, a map of the route, and the electric line connections at Findlay, Lima and Piqua. In the timetable of this company the population of each city served is shown. This, it is stated, is done by request. All the steam connections are shown, even though the trains may be competitive. These folders are revised every month, and the color of the stock is changed. The cost of the folder is 0.4 cent each, and 12,000 a month are distributed. One-third of the distribution is handled by a hotel distributing company, which places them in its racks in Indiana and Ohio. The traffic department circulates the other 8000 by placing them at stations and mailing them to all interline connections.

The Toledo & Western Railroad issues a six-page folder describing its train service. This folder does not carry any advertising. This company also displays its timetables in the *Toledo Official Interurban Trolley Guide*, which is an advertising folder containing the timetables of the steam and electric lines entering Toledo. The railroad company receives 1000 copies of this folder each month in return for the purchase of a one-half-page advertisement. The timetables of the Toledo Railways & Light Company carry advertising of the Toledo & Western interurban system. The Toledo, Fostoria & Findlay also uses the Toledo *Guide*, at a cost of $7.50 per month for 1000 folders for station distribution. This company also issues eight-page, two-color folders which cost $1.70 per thousand and show a two-page map of the interurban lines in Northwestern Ohio.

The Lake Shore Electric Railway folder is a single sheet, folding into eight pages, 3¾ in. x 8¼ in. The information contained in the folder is printed in purple and red ink, making a striking combination with which to attract attention in the folder racks. In addition to the timetables this folder gives short descriptions of the 10 resorts served and presents a schedule of the ticket fare rates.

The Cleveland, Southwestern & Columbus Railway issues timetables in two forms, both printed on single sheets. One form folds into 12 pages of standard size, and the other into 10 pages of vest-pocket size. The larger folder is printed in red and green, and carries a number of half-tones to illustrate lake and other resorts served. The large folder also has a map showing the interurban lines in Northern Ohio. The company owns the half-tone map and cover plates used in publishing this folder, and the cost for printing and paper is about 0.525 cent each for lots of 25,000. The vest-pocket timetable of the Southwestern lines is printed on white paper, and is devoted exclusively to showing the schedules of the local and limited trains of all divisions of the road. The color of the stock on which the vest-pocket timetables are printed is changed when the folders are revised so that attention is thus called to changes in schedule.

The Mahoning & Shenango Railway & Light Company issues one of the largest single-sheet folders found in the Central States. This folder is 4¼ in. x 9 in., printed in red and black. An attractive feature of this folder is a map 16 in. x 8½ in. The large folder shows the timetables of the different divisions, describes and illustrates Idora and Cascade Parks, at Youngstown and New Castle respectively, and gives the schedules of the Electric Package Agency express cars which operate over three interurban divisions of the Mahoning & Shenango system.

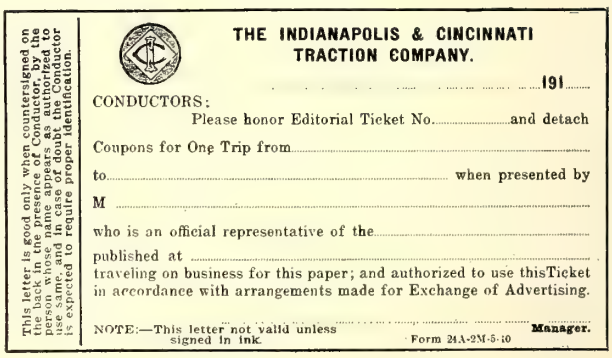
The Youngstown & Ohio River Railroad issues a standard-size railway folder of 16 pages, printed in red and green on coated white stock. This describes the route and its attractions, shows a map of the interurban lines in Ohio, indicating the local line in red; gives the steam railroad connections at the important towns reached, the rates of fares, the points on connecting interurban lines; describes Rock Spring Park at Chester, W. Va., near the southern terminus of the road, and shows usual forms of timetables and general information. The folder is illustrated with 10 half-tone views and contains an advertisement of the Wells, Fargo & Company express service.

NEWSPAPER ADVERTISING

Few interurban companies in the Central States regularly use newspaper advertising space other than to display timetables. Some companies advertise to encourage excursion travel and to promote freight traffic, but unless a road has some special feature to advertise it is not thought advisable by most managers to use more than a small card in the daily papers.

NEWSPAPER ADVERTISING IN INDIANA

The Indiana Union Traction Company is one of the largest users of newspaper space in the Central States. Timetables and display advertisements announcing excursions are published in nearly all the important papers. Also, special articles are written for insertion in the news columns. The usual advertisement is two columns wide and from 1 in. to 3 in. high. Advertising is paid for by



This letter is good only when countersigned on the back in the presence of Conductor by the person whose name appears as authorized to use same, and in case of doubt the Conductor is expected to require proper identification.

THE INDIANAPOLIS & CINCINNATI TRACTION COMPANY.

....., 191....

CONDUCTORS:

Please honor Editorial Ticket No..... and detach

Coupons for One Trip from.....

to..... when presented by

M .....

who is an official representative of the.....

published at .....

traveling on business for this paper; and authorized to use thisTicket in accordance with arrangements made for Exchange of Advertising.

NOTE:—This letter not valid unless signed in ink

Manager.

Form 24A-2M-5-10

NEWSPAPER MILEAGE CREDENTIAL

issuing books of 5-cent coupons. The timetables of the Terre Haute, Indianapolis & Eastern Traction Company are run in all of the more important papers along the line three days a week and the space in the other issues is used for advertising the freight service.

The Indianapolis & Cincinnati Traction Company, which regularly displays its timetables in all the papers along its route and purchases additional display space for excursions, exchanges transportation in payment for the newspaper space. To provide against the promiscuous use of the coupon books they are issued in the name



FIRST OF SEASON

GREAT LAKE EXCURSIONS

Rail and Steamer via

Dayton & Troy ELECTRIC RAILWAY

D&T DAYTON TOLEDO

in connection with the

White Star Line

D. & C. and C. & T. Lines from Toledo.

AUGUST 1st and 2d

$5.25 to Detroit and Return
$6.00 to Algonac and Cleveland and Return
$6.50 to Port Huron and St. Clair and Return

Equally Low Round-Trip Rates to Put-in-Bay, Sarnia, Saginaw, Bay City, Cheboygan and Mackinac Island.

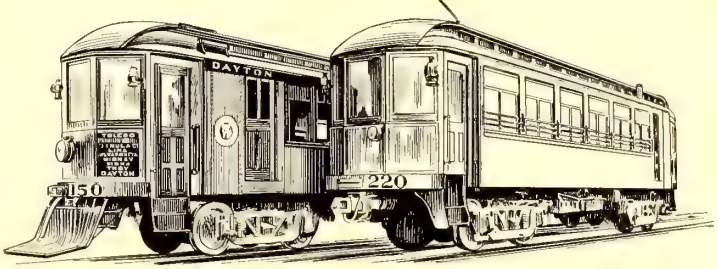
Stop-Over Privileges at Toledo and Detroit in Either Direction.

Fast Limited Trains Every Two Hours

162 Miles by Electric Without Change of Cars

City Ticket Office and Station 7 and 11 N. Jefferson St.

Bell 508 —— Home 2508



Excursion Trains Going and Coming on Double Track.

Next Excursion August 8 and 9

Dayton — Electric Short Line — Toledo

FULL-PAGE NEWSPAPER DISPLAY ADVERTISEMENT OF THE DAYTON & TROY ELECTRIC RAILWAY

of the manager of the newspaper. He is furnished with blanks of the form illustrated on page 580, one of which, when properly made out, entitles the person designated to use the advertising mileage. If the manager of a paper desires to permit some member of the staff to use the coupon book, he makes out one of these blanks, signing it in ink. The user of the coupon book signs his name on the back of the blank in the presence of the conductor, who



DISPLAY CUT USED BY GRAND RAPIDS, HOLLAND & CHICAGO

turns in the blank and the coupons pulled with his other collections. The blanks thus received by the ticket auditor are given to the traffic department for inspection in order to detect possible misuse.

The Winona Interurban Railway uses newspapers in its territory and also advertises the through interline service between Indianapolis, Goshen and South Bend in the Indianapolis papers. The Toledo & Chicago Interurban not only runs timecards in the papers located along the line but also in newspapers located on connecting steam lines within a reasonable distance. The Ft. Wayne & Wabash Valley Traction Company regularly presents its train schedules in 36 newspapers. The amount of space purchased is 2½ in., except in the Ft. Wayne papers, where larger advertisements are run.

The Chicago, South Bend & Northern Indiana and Southern Michigan lines carry timetables in the important daily papers along the routes and purchase newspaper space for display advertising, for which payment is made on a transportation basis. A form of contract between the railway and the newspaper provides for the purchase of a certain amount of display and reading space in each



PART OF ADVERTISEMENT OF GRAND RAPIDS, GRAND HAVEN & MUSKEGON

issue in exchange for a definite amount of non-transferable transportation. Permission is given either party to terminate the agreement on 30 days' notice. This renders the transportation void. The contract requires a representative of the publisher to make formal application for the transportation.

NEWSPAPER ADVERTISING IN MICHIGAN

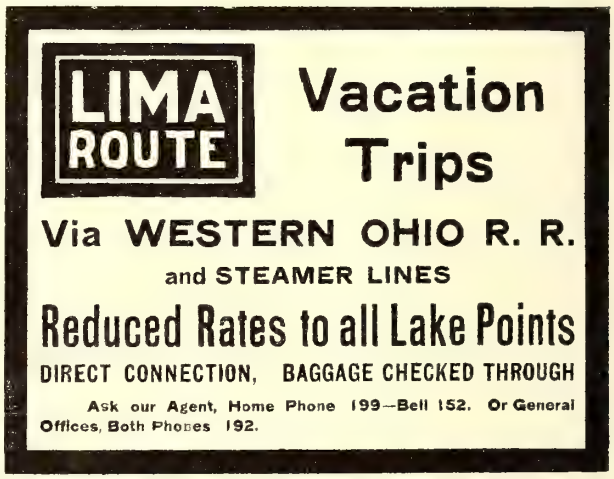
A characteristic advertisement run by the Grand Rapids, Grand Haven & Muskegon road to encourage through travel via the Goodrich Line boats from Grand Haven or Muskegon to Chicago is shown. This company uses a considerable amount of display space for calling attention to combination rail and boat trips. The traffic manager has a set of record cards, one for each newspaper used. These cards show by months and years the expenditure for advertising with each paper and thus he is able to gage the amount of space used according to the yearly appropriation.

The Grand Rapids, Holland & Chicago Railway advertises in all the newspapers on its line, spending about $3,000 during the summer months. No timetables are run except in the weekly papers and the display advertising is devoted largely to featuring the fast service over the double-track line from Grand Rapids to Macatawa Park, Holland and Ottawa Beach on Lake Michigan.

The Detroit United Railway makes use of nearly all the newspapers along its several lines, running its timetables therein. Advertisements also are run in the papers located off from the lines but tributary to them by way of connecting steam roads. Such advertising has been found satisfactory.

NEWSPAPER ADVERTISING IN OHIO

The Dayton & Troy Electric Railway regularly carries timetables in the daily papers. For all special events



ADVERTISEMENT OF "LIMA ROUTE"

a space 10 in. high and three columns wide is used to display a catchy advertisement. During the summer full pages are used for advertising such excursions as may bring sufficient revenue to make the advertising profitable. The copy used in one full-page advertisement soliciting traffic for an excursion over the "Lima Route" from Dayton to Toledo and thence by boat to Great Lake points is reproduced.

The Toledo, Fostoria & Findlay runs advertisements in three daily papers in Findlay and changes the copy daily.

The Cleveland, Southwestern & Columbus and the Toledo & Western roads do not favor running their timetables in the papers in the larger cities, but do run them in the country papers. The Western Ohio Railroad does not exchange transportation, but purchases space on a cash basis and presents display advertising to encourage both passenger and freight traffic.

The Mahoning & Shenango Valley lines advertise in the Pittsburgh papers for excursions over the steam roads to the electric railway company's Cascade Park at New Castle. On the arrival of excursion trains the electric railway company runs through trains of summer cars from the steam railroad depot to the parks.

The Ohio Electric Railway carries display advertisements in a large number of daily and weekly newspapers. Contracts in triplicate form are made with such papers, the railway company agreeing to furnish a definite amount of transportation in return for the advertising space. The transportation so issued is charged against the account



CAR HANGER OF THE TOLEDO & WESTERN

when delivered and has no redemption value according to the contract on account of non-use or expiration of the time limit.

DISPLAY CARDS

The electric railways in the Central States make wide use of advertising cards in dimensions ranging from calling-card size to poster size, 22 in. x 28 in. These cards present general advertisements of the railway service and also advertisements of particular details, such as freight schedules, weekly excursions, interline passenger service, baseball games and other traffic announcements.

CARD ADVERTISING IN OHIO

Probably the most expensive cards displayed are those of the Toledo, Bowling Green & Southern and the Western Ohio Railroad. The Toledo, Bowling Green & Southern card is 22 in. x 28 in. in size, printed in three colors, on heavy white board. These cards are framed and displayed at the offices of connecting roads and at traffic centers in terminals. The principal feature of the poster design is a skeleton map of Central Ohio, in which the route of the Toledo-Dayton limiteds is shown as passing through the heart of the State. The design was drawn by one of the company's motormen, and is shown in one of the engravings. Grouped around the map displaying these features are statements regarding the passenger and freight service. The central design of this large poster also is reproduced in post-card size, with a general advertisement of the service on the back, for presenting the baseball schedules and in connection with routing orders. These cards are inserted in all outgoing company correspondence, and have brought good results.

The card of the Western Ohio Railroad is 19 in. x 26 in. in size, printed in red and black. The central feature of the card is a large map, showing all the interurban lines in Ohio, Indiana and Michigan, with the "Lima Route" indicated in red. A timetable of the limited trains over the "Lima Route" is shown, together with an announcement of through fast freight service.

Several forms of cards are used by the Dayton & Troy. One is 9½ in. x 28 in. in size, and carries a map of the interurban routes between Cincinnati, Dayton, Lima, Toledo, Detroit, Ft. Wayne, Springfield and Columbus. Below the map is a timetable of the freight trains from Dayton to these cities. Several strong arguments for using the electric freight service are presented at the bottom of this advertising card. Some of these are as follows: "Rates to all points same as competing steam roads." "Shipments ready for delivery upon arrival of trains." "No delay on account of switching." "This frequent service gives your out-of-town trade the advantage of city deliveries." "Freight trains are manned by



ADVERTISING CARD OF THE TOLEDO, BOWLING GREEN & SOUTHERN

three competent trainmen, who accompany shipments, assuring careful handling and prompt delivery at destination." "All equipment thoroughly clean and free from leaky roofs." "Shipments protected at all stations by modern freight depots." Other cards displayed by the Dayton & Troy advertise the passenger service, telling of 56 daily trains in and out of Dayton, the six fast limited trains from Dayton to Toledo and hourly local service. The Dayton-Troy service is also advertised by the use of cards placed in the racks in the Dayton city cars and by handbills hung from the strap rail. One hundred timetables of the Dayton & Troy service, enclosed in neat wooden frames, have been placed throughout the

Central States. Special cards are prepared for advertising the freight service out of each terminal.

The Toledo & Western Railroad has two standard forms of card signs. One is a card 10½ in. square, arranged for hanging from one corner by a string attached to a parcel rack. This form of card advertises the number of trains between Toledo and the western termini. The other standard form of card of the Toledo & Western is 17½ in. x 12 in. in size, and is placed in advertising racks of the city and interurban cars for announcing excursions.

The Cleveland, Southwestern & Columbus Railway advertises attractions along the line by displaying posters on the car bulkhead glass; also for special events, when reduced rates are in effect, handbills are hung inside the cars.

CARD ADVERTISING IN INDIANA

The Indiana Union Traction Company displays pasteboard advertisements, 20 in. x 28 in. in size, tacked on a wooden board, carried on the front dash of its city cars. These advertisements call attention to any special features in other cities and towns on the system which may attract people using the city lines toward riding on the interurban cars.

Display cards, 21 in. x 11 in., announce the through fast service of the "Marion Flyer," between Marion and Indianapolis, and the "Muncie Meteor" trains, between Muncie and Indianapolis. On this card, set off by a special border, is the request, "Ask any I. U. T. agent for timetables." Such cards as these are used to advertise all events which may be the means of bringing about heavy travel for several days, and thus make the card advertising worth while. A form of window card used effectively by the Indiana Union Traction Company in advertising limited service and excursions is 14 in. x 11 in. in size. These cards are displayed in all station windows and on the walls of company buildings. They are also placed wherever possible in store windows along the routes.

The timetable card of the Indianapolis, Crawfordsville & Western is 11 in. x 14 in. in size, is printed in black on white cardboard, and shows the time of all passenger trains, a halftone engraving of a passenger car and an announcement of the baggage and freight service. These cards also are displayed in the station windows so that they may be read by passengers standing on the platforms or sitting in a car on the nearby track. The freight service is advertised by cards 4½ in. x 7½ in. in size, printed in several colors and circulated in all the towns served. These cards announce the number of trains and the leaving time at Indianapolis, and present the names of the important points along the road.

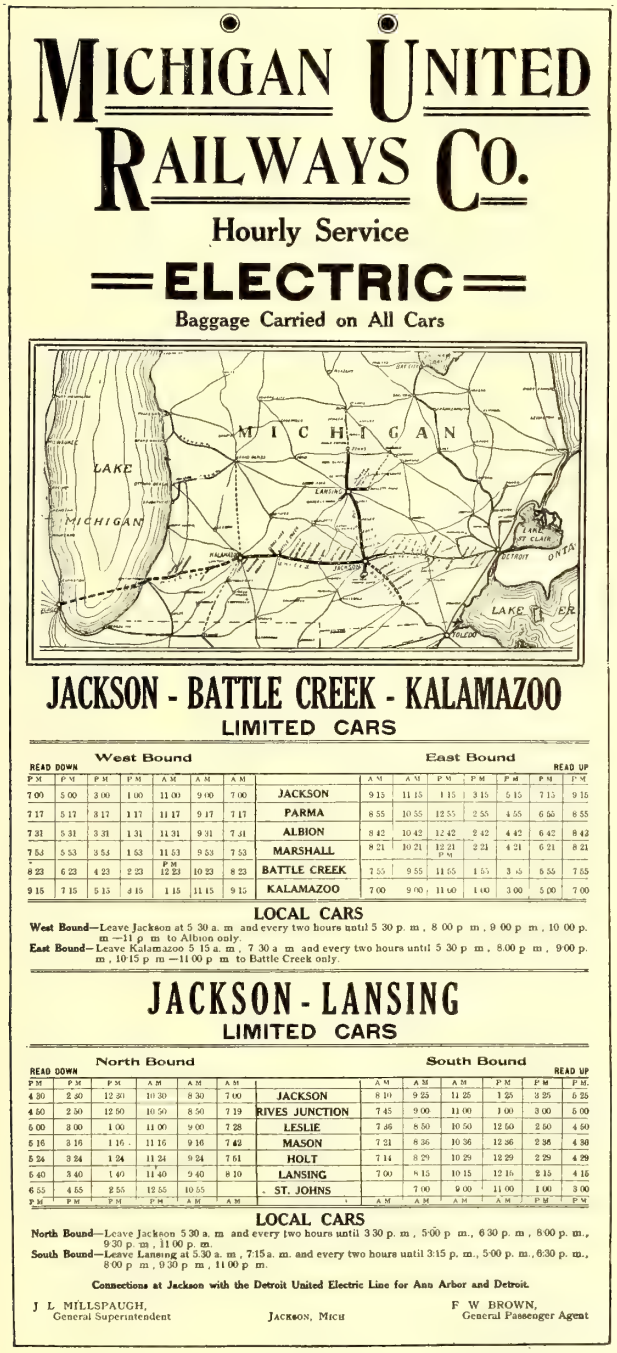


DISPLAY CARD OF INDIANAPOLIS-FORT WAYNE SERVICE



DISPLAY CARD OF TERRE HAUTE, INDIANAPOLIS & EASTERN

The Terre Haute, Indianapolis & Eastern Traction Company uses card hangers, 14 in. x 11 in., printed in red and black. These display a large halftone engraving of a passenger car and announce the local and limited service between important division points on the system. Excursions are largely advertised by the use of cards



CARD SCHEDULE HANGER, MICHIGAN UNITED RAILWAYS

placed in store windows and by the use of smaller cards for general distribution from ticket windows.

The line of the Toledo & Chicago Interurban Railway has its southern terminus at Ft. Wayne, which, like many other cities, enthusiastically supports an association baseball team. The patrons along the interurban line are encouraged to attend the league baseball games by the use of card advertising. Each interurban car is fitted with a rack inside of one of the front windows. These racks are just large enough to hold a card sign, 27½ in. long by 8 in. wide, announcing, "Baseball to-day at Ft. Wayne. Ft. Wayne vs. ———." The blank space has a vertical slit at either end, into which cards bearing the names of the visiting baseball team are inserted each day. This arrangement provides for easily announcing the proper names of the teams and for making the changes in the cards at a low cost.

The Northern Indiana and Southern Michigan lines distribute timetable hangers, 11 in. x 34 in. in size, showing views of the South Bend freight station and interurban freight motor cars, and exhibiting the time of weekday trains and the freight schedules. These hangers are printed on heavy white stock and have red borders.

CARDS USED BY MICHIGAN ROADS

The Detroit United system makes very general use of advertisements displayed on the dashers of its cars. These advertisements are 21 in. x 28 in. in size for both city and suburban use, and when not devoted to special events carry notices of the interurban service. In Flint and Port Huron the local cars carry signs advertising the limited service from those cities in and out of Detroit. The colors of dash signs are changed frequently to make them more attractive. During the winter season dash advertisements of the high-class theater attrac-

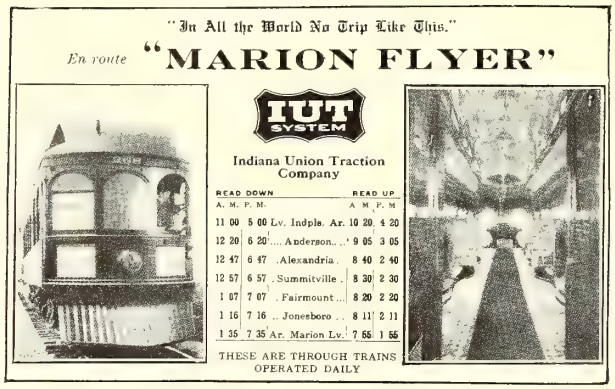


EXCURSION WINDOW CARD

tions are carried on the interurban cars with good results. The Detroit United Railway favors dasher advertising for all special events. The advertisements used are carefully worded and just enough matter is used to cover the subject fully, so that the type may be large and thus be read easily at a distance. Other display advertisements of the Detroit United system include posters hung in the Detroit waiting rooms at the company's station and framed timecards of the limited trains, which are fur-

nished to all hotels. A record of the location of these timecards is kept so that replacements may be made without loss of time or waste of publicity matter.

Some of the special advertising of the Michigan United Railways includes cardboard hangers, 10 in. wide by 22



POST CARD ADVERTISING FAST TRAIN

in. long, printed in red and black and arranged to be hung in public places. These hangers show a map of the lower part of Michigan, 8½ in. x 4¾ in. in size, indicating the interurban routes and all intersecting steam railway lines. Below the map are full station timetables of the limited cars on both main divisions and skeleton timetables of the local cars. Another form of wall advertising is a public timecard mounted under glass and displayed in hotels and other public meeting places. Another card of the same size, but showing only the time of the limited trains and printed with large type so that it

BILLBOARD ADVERTISING AND SIGNS

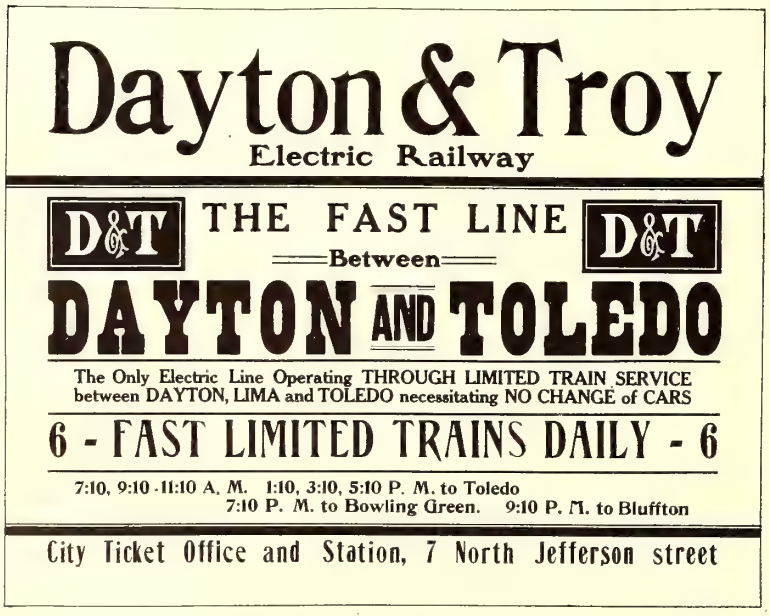
Billboard advertising is not favorably looked upon by most of the interurban roads in Ohio, Indiana and Michigan. The practice of several roads which use billboard space is said to bring fairly good results, but it is noted that these properties have large terminal cities from which to draw traffic. The use of billboards by interurban roads is usually restricted to the announcement of excursions.

The Toledo & Western Railroad displays single sheets, 18 in. x 24 in., announcing its Sunday and week-end excursions between Toledo, Adrian and intermediate points. These billboard displays are supplemented by handbills. This company has succeeded several times in arranging with circuses for announcing the rates over its interurban lines on the advertising which is placed by the circuses for exhibitions to be made on the interurban route.

The Indiana Union Traction Company advertises excursions and special attractions on billboards and uses a large cut showing a baseball player, printed in red and blue, on a sheet 21 in. x 28 in., for announcing the Sunday baseball excursions to Indianapolis. These bills show the fare and the leaving time from each of 38 important stations.

Billboard space in the seven cities which they serve is used by the Northern Indiana and Southern Michigan lines, principally for advertising excursions and important special attractions.

The Grand Rapids, Holland & Chicago road has a billboard at each station, arranged to carry a three-sheet



DISPLAY CARD OF DAYTON & TOLEDO SERVICE



ADVERTISEMENT OF FREIGHT SERVICE

can be read from a distance, is posted in all city cars. Posters are used only to advertise special events. These posters are 24 in. x 28 in. in size and are attached to boards hung from the dash of the cars.

A great many of the interurban lines in the Central States designate the cities reached by each car by carrying on the front dash a neatly painted sign listing the names of the stations.

bill on which advertisements of local attractions are posted. Several times during the summer season expert bill posters are sent out into the country within five or six miles of the road to display large bills calling attention to the service which the road offers to the resorts on Lake Michigan.

The Toledo & Chicago uses quarter and half sheets to advertise excursions. This company has obtained good

returns from billboard advertising in contrast with other roads of practically the same size, which have not thought this method of advertising successful on account of their limited mileage.

The Chicago, Lake Shore & South Bend Railway, which transfers its Chicago passengers to the Illinois Central suburban service at Pullman and Kensington, displays bills 36 in. x 52 in. in size on the platforms of the stations of the connecting steam road. These bills advertise the fast limited service between Chicago and South Bend and also the attractions at Hudson Lake, a summer resort about midway between the two terminals. A billboard, 12 ft. x 50 ft., at Kensington carries advertisements of the interurban service to South Bend. It can be read by passengers on the Illinois Central, "Big Four," Michigan Central, Chicago, Cincinnati & Louisville and the interurban railway cars. Through the winter the "South Shore Route" plans to advertise its general service along the suburban stations of the Illinois Central, at the electric terminal at Pullman and the downtown terminal. The fast through connection over these two roads from Chicago to South Bend also is advertised in the card racks in the suburban coaches. The traffic department of the interurban road has obtained good results by the use of this space, for which it pays the regular rates charged other advertisers.

A number of companies have erected illuminated signs at their terminal stations. The Chicago, Lake Shore & South Bend Railway has such a sign at its station in Pullman, Ill., where connection is made with the Illinois Central trains. This sign reads: "The Electric Way." It also shows the monogram of the road and the names of the principal towns reached. At the terminal station in South Bend this company has a large electric sign reading, "The Electric Way South Shore Lines to Chicago."

The Lake Shore Electric Company has erected at its Sandusky ticket office an illuminated sign 3 ft. 6 in. by 10 ft. in size with letters 14 in. high reading "Interurban Station Lake Shore Electric Railway." Illuminated signs showing the name of the Michigan United Railways Company and the words "Interurban Station" are hung in front of each ticket office in the towns served. These signs are prominent and can be read easily both by day and by night.

SPECIAL ADVERTISING PUBLICATIONS

In addition to the regular forms of advertising here described practically all roads issue special advertising calling attention to various features of the service. More



ILLUMINATED SIGN, LAKE SHORE ELECTRIC RAILWAY

or less money is spent for such advertising, according to the results that can be expected. The advertising matter ranges from expensive illustrated booklets to small card announcements of the service. Several of the roads which deliver passengers to boat lines have their advertising carried in the steamship folders. Attention is called to several of the forms of special advertising issued by the roads in the Central Electric Railway Association territory.



LARGE SIGN ON GRAND RAPIDS FREIGHT HOUSE

SPECIAL ADVERTISING IN INDIANA

The limited and long-distance passenger service of the Terre Haute, Indianapolis & Eastern lines is advertised by an eight-page folder showing a halftone engraving of

a large car, listing the 20 limiteds which leave Indianapolis daily, announcing special or chartered-car service, presenting an alphabetical list of all the important electric railway stations in Ohio and Indiana, steam railroad connections at terminals, and a map of the traction lines in Central Indiana. About 5000 copies of this booklet, which is 5¾ in. x 8½ in. in size and printed on heavy yellow stock, bearing the red monogram of the company, have been distributed to important traffic-producing centers. A similar folder advertises the freight service and is distributed to shippers.

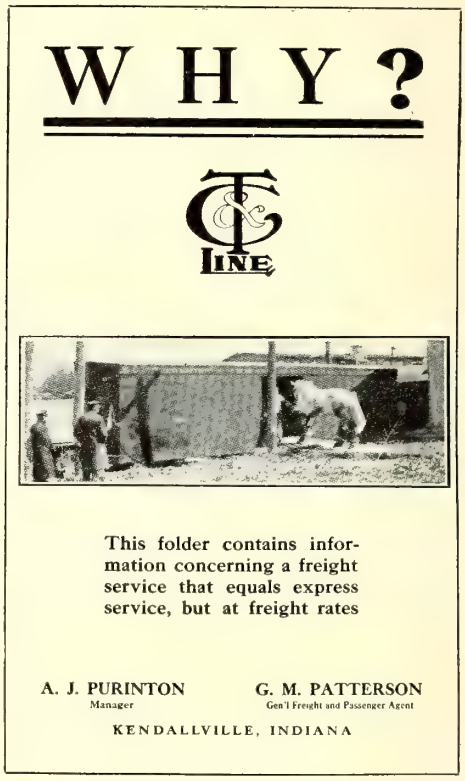
Recently this company published a booklet describing and illustrating the scenic features of the Martinsville division of its road, and next year it plans to publish a folder exhibiting fine engravings of attractive scenic features of the entire system. The interurban express service is advertised by a special four-page folder, 3¾ in. x 7 in. in size, which shows the rates between important cities. Engraved maps, showing the names of each town on the interurban lines in Central Indiana and Western Ohio, also are distributed and the stationery of the traffic department has an imprint of one of these maps on the back of each sheet.

A special four-page bulletin on freight traffic is issued. This bulletin is 8½ in. x 11 in. in size, and shows a list of the stations and towns at which consignments are received, the freight train schedules, and a map of the traction lines in Indiana and as far into Ohio as Dayton and Lima.

The Indiana Union Traction Company, among other special advertising methods, issues and distributes a four-page folder describing the "Marion Flyer," a twice-a-day train which makes a run of 72 miles in 2 hours and 35 minutes. This folder shows views of the special car used, and gives the history of the service. Another four-page folder is entitled, "New Way to New York via Indiana Union Traction System." By this combination of the electric railway line from Indianapolis to Ft. Wayne, connecting there with the "Pennsylvania Special," 20-hour service from Indianapolis to New York is offered. The folder announces that baggage will be transferred free at Ft. Wayne, and that this is the only "noon service" out of Indianapolis to New York. This special New York folder also contains a timetable and announcement regarding through steam connections from Indianapolis to Chicago by way of Peru. A special folder was published in the spring at the time a four-car excursion party was organized for a trip from Central Indiana to the Elks' convention in Detroit.

Another novel advertising scheme is the use of posters carrying the company's monogram and the words, "Go via Indiana Union Traction Company." These posters are 8 in. x 4 in. in size and are attached to foreign card or billboard advertising of events that can be reached by the interurban lines. Picture postal cards describing and illustrating special limited service and features of interest along the line are placed in the hands of the agents for general distribution and patrons may obtain them on request. An artistic panoramic view of Fort Benjamin Harrison, showing the barracks, post buildings, parade grounds, etc., is distributed in Indianapolis, from which point an excursion rate of 25 cents for the round trip to the fort is made.

A monthly magazine, known as the "I. U. T. System Magazine," is issued in the interest of the railway system under the direction of the general passenger and freight agent of the Indiana Union Traction Company. This magazine has 48 pages, 6 in. x 9¼ in. in size, printed on high-grade stock. The covers for each issue are of original design. The magazine contains profusely illustrated descriptions of various cities along the line, each issue being devoted to one of the more important cities. In addition to such descriptive matter, signed articles pertinent to traction service are published. The timetables for the Indiana Union Traction lines only, together with a map of the electric railways in Indiana, are published



COVER DESIGN OF FREIGHT FOLDER

in each issue. Sufficient paid advertising of merchants and others is carried to make the magazine self-supporting. About 5000 copies of the magazine are distributed each month.

In September the Chicago, South Bend & Northern Indiana and the Southern Michigan Railways issued a 24-page folder describing their lines and those of the Graham & Morton Transportation Company. The Chicago, Lake Shore & South Bend Railway has distributed several thousand picture postal cards showing an 11-car excursion train handled from Pullman to Hudson Lake, Ind., on July 10.

The Toledo & Chicago Interurban Railway has circulated two folders advertising its freight service. One of these is an attractive single-sheet folder of five pages, 5½ in. x 8½ in., printed in red and black. Reasons for the use of electric freight service are presented, as are the schedules between points on the Toledo & Chicago line and Indianapolis and Toledo, and a short illustrated article encourages the dairy industry. Two pages of the folder are used to display a map of the interurban lines

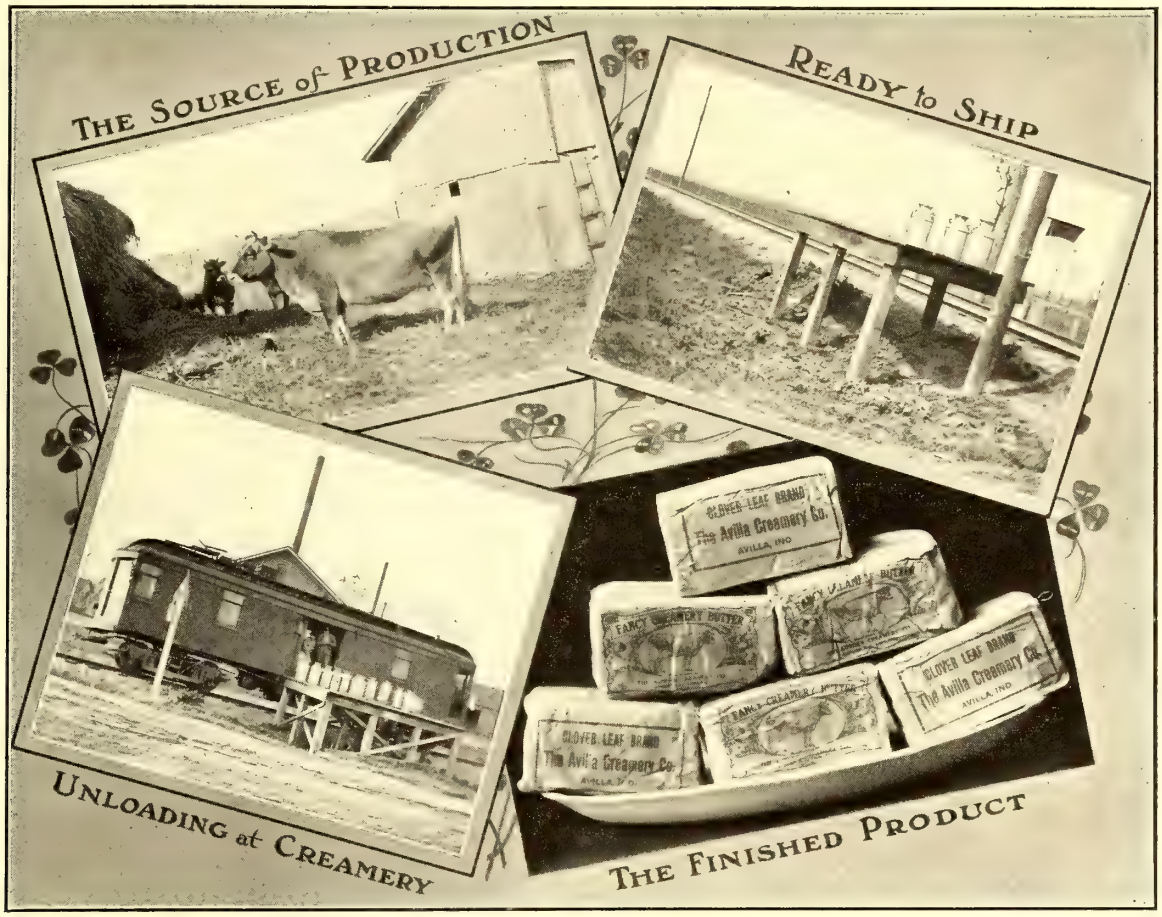
in the Central States with the local line indicated in red, and two other pages present a list of the foreign line stations to which freight may be shipped via the Toledo & Chicago Interurban Railway.

SPECIAL ADVERTISING OF MICHIGAN LINES

The Detroit United Railway has a standard form of illustrated folder on which it prints covers of suitable design for circulation at the time of large gatherings in Detroit. These folders have 16 pages, 4 in. x 8 in. in size, and display on one side of the full sheet a picture map of Eastern Michigan, 30 in. x 7½ in. in size. The folders contain suggestions for outings and trips on the city lines, a schedule of the fares and the Detroit terminal leaving

The passenger department of the Michigan United Railways recently had taken 60 views of attractive scenery along the lines and has had halftone engravings, 4 in. x 5 in. in size, made of these scenes. These views will be used in an especially high-class illustrated folder which will contain no advertising and will be in the nature of a souvenir to be distributed to special-car parties and other patrons.

Special advertising is done by the Grand Rapids, Holland & Chicago road by issuing a great number of picture postal cards showing lake scenes and views at the resorts served. A mailing list of 5000 names in Grand Rapids is used for circulating announcements regarding special



GROUP OF VIEWS SHOWN IN TOLEDO & CHICAGO FREIGHT FOLDER

time for limiteds on each of the four divisions. A similar folder with a more comprehensive map is published for the Detroit, Monroe & Toledo Short Line division.

These two folders are distributed from information booths and hotels during convention time and are also sent out for distribution on incoming excursion trains. This distribution is made in addition to a distribution of standard folders and maps made throughout the North Central States from May to August of each year, and an intermittent distribution made by sending out supplies of folders with committees from the commercial organization which solicit conventions for Detroit. The Detroit United Railway advertises its funeral-car service with a four-page booklet, which includes a halftone view of the car, a schedule of rates to the towns on the interurban system and a description of the car.

service and many of these announcements are made on the picture postal cards. This company also subscribed to a souvenir folder of Grand Rapids which was published for the benefit of 22 business houses. Five thousand copies were distributed by each business house. The folder shows three-color views of the bathing beach at Macatawa Park and the hotel and steamer dock at the terminus of the interurban road near by. Other special advertising of this road is included in the folders of the Graham & Morton Steamship Company.

The Grand Rapids, Grand Haven & Muskegon Railway this spring distributed in Grand Rapids 10,000 folders having 32 pages 4 in. x 8 in. in size. The folder is devoted to a description of the several lake resorts reached by the two divisions of the road terminating at Muskegon and Grand Haven. It is illustrated by a large

number of halftone engravings and an 8-in. x 11-in. map showing all of the stations on the line and the location of the docks on the several lakes reached. A list of seven short outing trips ranging from 32 to 90 miles in length and costing from 50 cents to $1.40 is given. Picnic party rates are given as well as the hotel and boarding-house rates at the lake resorts. The folder also includes a reprint of the Michigan game laws and gives the location of a number of fishing resorts. The service offered for picnics to and from the parks at Grand Rapids is advertised, with a schedule of the rates, and several halftone views of the parks are presented. The freight service between Grand Rapids and Chicago by way of the electric line and steamers is noted in a two-page advertisement, which includes a halftone view of a 40,000-lb. capacity motor car. Similarly, the combination passenger route by rail and boat between Grand Rapids and Chicago is advertised by presenting the schedules, rates and halftone views of a passenger car and a steamer.

SPECIAL ADVERTISING IN OHIO

The special advertising of the Lake Shore Electric includes four small two-color four-page folders describing attractive resorts located on the line between Toledo and Cleveland. The Cleveland-Sandusky limited service is advertised by the distribution of small blotters on which are printed the leaving times of the trains from both terminals. These blotters were distributed in Sandusky by mailing one to each person whose name appeared in the telephone book. Additional service between Cleveland and Beach Park was announced this spring by handing a small card with the leaving and arriving time of the trains to every person who rode on a car in or out of Beach Park.

In addition to its regular timetables the Western Ohio Railroad purchases space in three steam railway travelers' guides at a cost of $160 a year, which is considered to be money well spent. The traffic department of this company also supplies all telephone users in Lima with small cards to hang on the telephone mouthpiece, designating whether the instrument is connected with the "home" lines or the "Bell" lines. These cards carry brief announcements of the Dayton-Toledo limited service.

"Toledo Trolley Trips" is the title of an illustrated folder issued by the Toledo Railways & Light Company, which describes many routes to points of scenic interest in and about Toledo and presents numerous halftone engravings of places reached by the city and suburban lines of that company. The Cleveland, Southwestern & Columbus Railway issues a yearly schedule of the baseball games of the American League team in Cleveland. This schedule is printed in two colors in four-page form and also contains the timetable of the limited trains in and out of Cleveland over this company's lines.

HANDBILLS

Handbills are used by practically all interurban lines for announcing excursions and special attractions along the routes. Quite frequently it is possible for the interurban road to get an announcement of its service as a part of the wording of the handbills distributed by the organization promoting a special attraction.

In June this year the Indiana Union Traction Company distributed more than 200,000 handbills advertising special features that encourage travel. The company employs an expert distributer for placing its advertising material.



ATTRACTIVE COVER DESIGNS FOR FOLDER AND COMPANY MAGAZINE

In addition to the very thorough distribution given the handbills in the towns served, they are also sent to section foremen and station agents. The bills for distribution by section foremen are tied in bunches with a piece of twine so arranged that the bunch may be hung on a nail. Attached to each bunch is the following notice: "Section Foreman, Section No. ——. Please post these at all crossroads in your territory, whether there are shelter sheds or not. Any place so the farmers may see them."

The Terre Haute, Indianapolis & Eastern prints and distributes handbills announcing all special traffic-producing events. Bills are printed on good, heavy paper and the type used is planned so that the bills will be attractive. Ordinarily these bills are not hung in the interurban passenger cars, but are distributed under contract by a bill-posting agency in Indianapolis.

The Dayton & Troy Electric Railway favors the use of handbills and for some excursions has distributed as

many as 20,000 in Dayton alone. While such advertising is expensive, it is considered good policy. The handbills are got up in attractive form and are circulated by a licensed distributing agency.

The Indianapolis & Cincinnati Traction Company this year distributed along its lines handbills announcing the locations and dates of all the county fairs reached by its interurban service.

CIRCULAR LETTERS

Practically all of the interurban roads have selected lists of names to which at some time during the year they address form letters announcing special party service.

Every spring each station agent on the Indiana Union Traction lines furnishes the office of the general passenger and freight agent with a list of the officers of each fraternal and social organization in his territory, and a circular letter calling attention to the attractiveness of the picnic resorts on different divisions and the service given thereto is written to the secretary of each organization.

The passenger department of the Dayton & Troy Electric Railway has a list of about 1000 names in Dayton alone. This list has been built up by watching the society columns of the Detroit, Toledo and Dayton papers and thus learning the names of the Dayton people who go North in the summer. Personal letters and calls upon the people whose names appear in this list have resulted in a large number of special through parties from Dayton to Toledo and Detroit. The traffic manager of the Toledo & Chicago Interurban Railway states that the very considerable number of acknowledgments to circular letters clearly indicates their value as a means of encouraging organizations to work up special party trips and annual excursions.

The Cleveland, Southwestern & Columbus Railway Company has used circular letters very successfully in building up traffic on a section of new road which has opened up a territory heretofore not favored with steam or electric railway service. The traffic department obtained a good mailing list of names by inspection of the tax lists for the communities served. A letter of the form here reproduced was written each taxpayer in the district:

Cleveland, Southwestern & Columbus Railway Company
Ashland, Ohio, Feb. 8, 1910.

Dear Sir: Have you been over our Cleveland, Southwestern & Columbus Railway lines? If not, come with your family, or send them to the cities. Through cars to Cleveland, and but one change on the Square at Bucyrus for Columbus. The time is fast and the service good.

I enclose you circular giving description and timetable. If interested drop me a line and I will put your name on our mailing list so you will get a new one each change.

I know you appreciate my efforts in securing this convenience, and I want you to use our road and recommend it to your neighbors and urge them to patronize one of the best and fastest lines in the State.

When in Ashland make your headquarters at our ticket office on Main Street. You all know Joe Swartz, our agent here, who will welcome you and see that you are comfortable, and will look after express packages and baggage and will furnish tickets at the lowest rates. We are doing a big business and will take care of your trunks and packages to your entire satisfaction.

The service of our limited cars is better, faster and cheaper than on steam roads; and even during this stormy weather, when trains are very late, we are substantially on time, which verifies that we have the power and can be depended upon.

You can telephone our ticket office for particulars up to 10 o'clock at night every day.

We carried over 6,000,000 people last year, and hope this will interest you.

It will be noted that this letter asks for acknowledgment, and if such is made promises to put the name of the addressee on the company's mailing list for copies of timetables to be issued later by the company. Several hundred replies were received to this form letter and thus a very responsive mailing list was obtained. Owing to this means of soliciting traffic and the natural growth of the territory, the traffic on the Cleveland-Mansfield division of the road increased 24 per cent last year. The lines of the Cleveland, Southwestern & Columbus road reach several college towns, and the traffic department sends circular letters to the college students. These letters, which are mailed during the summer vacation, call attention to the connections which the interurban road makes with the east and west trunk lines, and tell the students of the facilities which the interurban road has for handling baggage. The baggage arrangements provide for advance checking and the delivery of the baggage into the students' rooms before their arrival, thus avoiding the two or three days' delay usually occurring before the arrival at a college town of baggage handled over a steam line.

Each spring every agent on the Michigan United Railways sends the general freight and passenger agent a list showing the name of the secretary of each organization within his territory. Then a personal letter is written to each secretary, suggesting excursion trips and outlining the service that can be given. The traffic agent also offers to call and explain rates and details. It has been found advisable to address these letters to the secretaries of the associations because they will then be read in open meeting; and in the past it has been found that the reading of such a letter of solicitation before a large body of people, while it may not be successful in getting that body to contract for an excursion, will call the service to the attention of some member of the organization where the letter is read who may be in charge of the annual excursion of another organization. A sample letter follows:

Michigan United Railways Company
Jackson, Mich., Feb. 7, 1910.

Dear Sir: The Michigan United Railways Company is now fully equipped and prepared to handle special parties on short notice, and, as you no doubt are aware, the convenience of using the electric line for these outings is very much in advance of any other means of transportation, as a special car can be obtained for a much smaller party while at the same time a large party can be handled just as promptly and on any schedule that will suit your convenience.

This coming season a special effort will be made to interest all societies in the different resorts located on our line for picnics and other pleasure trips that your society may contemplate, and I wish to say that arrangements can be made to handle any size party direct to the following resorts:

At Lansing, Pine Lake and Waverly Park.

At Jackson, Vandercooks Lake and Wolf Lake, and if a longer ride is desired, we can take you to the popular and most beautiful lake of all, Gull Lake.

Arrangements can be made to run these cars direct to such resorts, and therefore avoid any change or inconvenience.

I would be pleased to meet your society or committee at any time to make such arrangements, quote you rates or consider the matter in any way that may be of interest to you, and I would appreciate it very much if you would see that this letter is brought to the attention of your society with this end in view.

I wish to say further that special arrangements to fit any special condition can easily be made.

Thanking you for the courtesy in the matter and hoping to hear from you in the near future, I remain,

Yours truly,
(Signed) F. W. Brown,
General Freight and Passenger Agent.

EXCURSIONS AND SPECIAL PARTIES

The electric railways in the Central States are well situated for encouraging special traffic. Practically all of the larger systems have such interline connections that long trips can be offered for excursions in competition with steam railroads. During the summer months nearly all of the roads devote considerable attention to encouraging excursion traffic on those days when regular travel is not expected to be above normal. In the section of this chapter devoted to advertising methods attention was called to the various ways in which the different roads solicit excursion travel by the use of newspaper space, handbills, billboards and cards displayed in windows and on cars. Attention now is directed to the excursion practice of some of the individual and joint lines.

EXCURSIONS ON OHIO ROADS

The traffic department of the Dayton & Troy Electric Railway Company keeps in close touch with the employees of the large factories in Dayton, nearly all of which make a practice of shutting down for about two weeks during the summer so that the employees may have vacations. As these vacation dates are announced the traffic department actively solicits the employees for excursion and special-party business by having a representative stand at the factory gate to distribute advertising matter and answer questions regarding excursions. The large excursions promoted by this road are widely advertised with handbills and have been very successful. Parties of from 50 to 100 frequently are ticketed from Dayton to Toledo over the 162-mile electric route and thence by boat to Detroit and Lake Erie points. A standard excursion ticket form is used. A special coupon is inserted in each ticket announcing in large type, "To the Purchaser: Please take notice that the returning portion of this ticket must be used to destination before midnight of the date canceled by punch mark in the contract." The excursion rates are never less than one and one-half times the regular one-way fare on the electric lines, plus the round-trip boat fare from and to the Toledo docks.

The Western Ohio Railroad makes a party round-trip rate of 1½ cents per mile (short-line distance), adding sufficient to make the rate end in "0" or "5" for parties of 50 or more traveling together on a going trip, and having a return limit of three days from the date of sale. The minimum round-trip fare for such an excursion is 50 cents.

The Toledo & Western Railroad Company regularly advertises, by means of handbills and posters, low-rate excursions every Sunday during the summer months. Week-end excursion tickets good going Saturday and Sunday and good returning Monday are sold for one and one-third times the one-way fare. Sunday one-day excursion tickets are sold at about 1 cent a mile. The regular fare is 2 cents a mile in Ohio and 1½ cents in Michigan, but the company obtains 2 cents per mile for interstate business. When a large excursion is to be solicited the railway company makes a contract with some member of the organization planning the excursion, and this person undertakes to solicit business at a certain compensation for each excursion ticket sold. A contract is executed with the solicitor. Permission to run excursions is obtained from the State Commissions and tariffs are filed with the Interstate Commerce Commission. In Michigan it is necessary to have a guarantee of 150 or more full fares before a low excursion rate tariff can be filed.

The Cleveland, Southwestern & Columbus Railway encourages special-party travel from one division of its road to another by advertising and solicitation and by offering a rate of 1 cent per mile each way on days of light travel. This company has been successful in organizing excursions for the farmers to visit the State Experimental Farm Station at Wooster. One party of 250 recently was carried 80 miles on such an excursion. This road co-operates with the Lake Shore Electric Railway in encouraging travel from the center of the State of Ohio to the lake resorts reached by the Lake Shore Electric. Interline ticket forms are used for this joint traffic.

EXCURSIONS IN INDIANA

The Indiana Union Traction Company offers a great many excursion rates. Cheap rates are offered Sundays with a view to encouraging working people to make trips to Indianapolis. Some excursions on this road to Fort Benjamin Harrison at the time of the army maneuvers have required handling as many as 50,000 people. Wherever the one-way fare is less than 50 cents no excursion rates are offered. The proportionate reductions for excursion fares are greater according to the length of the ride, this plan being followed in order to encourage long-distance travel. Excursion tickets are sold good going on a certain train and returning any time during the day. For some excursions, such as church picnics, special tickets are prepared and sold by the organization having the excursion; then the railroad traffic department puts a man on each excursion car. He exchanges regular transportation for the tickets sold by the organization, collecting sufficient money from the treasurer of the organization to pay for transportation according to the number of tickets exchanged. At other times the organizations holding the excursions buy the tickets outright.

Each year the Indiana Union Traction Company also runs about ten excursions to Chicago, St. Louis and Toledo in connection with steam railroads. These excursions have been very successful. As many as 100 tickets for one excursion to St. Louis have been sold and 325 tickets have been sold for one Chicago excursion. The steam railroads make an excursion rate from the junction point with the electric line. The interurban rate is added thereto and passengers are ticketed through to destination and return. These interline excursions are an effective means of advertising the possibilities of the combination steam and electric routes, over which tickets at regular fares are always on sale.

Excursion travel on the Terre Haute, Indianapolis & Eastern is solicited principally by the use of handbills and advertising cards placed in store and depot windows. On Sundays, on the Northwestern division, extending from Indianapolis to Lafayette, 69 miles, an excursion rate of $1 for the round trip is made to encourage people to use the electric cars into Indianapolis. The company runs a number of combination steam and electric excursions similar to those described for the Indiana Union Traction Company. The traffic department of the Terre Haute, Indianapolis & Eastern Traction Company subscribes to Russell's *Convention Dates*, a bi-weekly publication which gives the names of the officers of all societies about

to hold conventions and the dates and locations of the meeting places.

The Indianapolis, Crawfordsville & Western Traction Company advertises Sunday excursions with a round-trip fare of $1 between any two points on the road. The highest regular round-trip fare is $1.40. This company has found it profitable to run excursions to Chicago and Cincinnati via the Monon and Cincinnati, Hamilton & Dayton steam lines. For special parties of 50 passengers traveling together on the going trip this company offers a round-trip rate of 1 cent per mile, adding enough to make the fare end in "0" or "5" plus 10 cents per passenger per round trip for those going into or out of Indianapolis. The return limit for these party rates does not exceed three days from the date of sale. Baggage is checked on these tickets.

The traffic department of the Indianapolis & Cincinnati Traction Company subscribes for 25 daily papers and has these carefully read with a view to obtaining tips regarding excursions or chartered-car business. This company offers an excursion rate in both directions every Sunday. The excursion rates average about one-third cent per mile and are in competition with Sunday excursions on steam lines. At Christmas time the connecting interurban lines in Indiana make holiday round-trip rates of one and one-half times the one-way fares. These excursions originate a considerable amount of interline travel and are thought to have greatly encouraged through business.

The Toledo & Chicago Interurban and the Ft. Wayne & Wabash Valley Traction Company sell interline excursion tickets with the revenue prorated according to mileage. The general passenger agent of the Toledo & Chicago Interurban personally solicits excursion business and keeps a careful record of the addresses of all parties handled, so that business may be solicited for the following year. This company obtains a guarantee before it makes a low rate for an excursion.

The Winona Interurban Railway serves a territory in which nearly 20 attractive lakes are located within one mile of the line. This company makes excursion rates to these lake points and to Winona Lake, at one terminus of the line, for a round-trip rate of one and one-half times the full one-way fare. Sunday excursions are announced to points on the connecting interurban lines at both ends of this road.

The Chicago, Lake Shore & South Bend Railway, along the southern end of Lake Michigan, has held several large excursions during the summer. At one time a train of 11 cars carrying 900 people was taken nearly 60 miles at a round-trip rate of 75 cents per passenger. This company offers a special-party rate based on a minimum of 50 people with a per capita charge for all over the minimum. Special parties are given the advantage of an extra car usually attached to a regular train. If the car is to be run as a special train the company requires a guarantee of 60 fares. Party rates are based on 1 cent per mile, adding enough to make the round-trip fare end in "0" or "5." Whenever a big excursion is to be held the organization is urged to sell its own card tickets, which call for an exchange at the loading station.



TYPE OF COMBINATION STATION AND RESIDENCE, CLEVELAND, SOUTHWESTERN & COLUMBUS

Excursions to points on the Northern Indiana and Southern Michigan lines are advertised by the use of dash signs, 18 in. x 32 in. in size, and by displaying cards in the windows of stores and ticket offices along the route. When an excursion is to be held by any large organization the railway company makes a contract with an authorized agent of the organization and this contract provides for handling the excursion traffic at one fare for the round trip plus an arbitrary charge of about 10 cents per ticket, which is paid to the contracting party for his services in working up the excursion and in selling tickets.

Special tickets, if needed, are printed for large excursions. These tickets are put in the hands of a committee of the organization and frequently the committees offer prizes to the persons selling the most tickets. It is arranged

that the prizes shall be distributed on the day preceding the excursion date, and thus the company can get a very close approximation of the number of people that will have to be handled. The tickets sold by the organization are honored on the cars and the organization which sold the tickets then pays the railway company the round-trip fare as designated in the contract, less the predetermined amount which the representatives of the organization are allowed for selling the ticket. This method of selling tickets for large excursions has brought very satisfactory results to the railway company in the way of increased revenue.

EXCURSIONS IN MICHIGAN

A list showing all the excursion parties handled during the year is kept in the passenger traffic office of the Michigan United Railways and each spring the general freight



STATION ON FLINT DIVISION, DETROIT UNITED RAILWAY

and passenger agent visits the officers of each party handled the previous summer. Suitable dates and excursion points are proposed. The station agents are expected to keep in close touch with local organizations and are required to forward promptly to the general office the names of those who make inquiries regarding excursions or special car service.

Excursion rates are based on the number of people and the length of haul with a minimum fare of 25 cents. When a car is rented at a flat rate no limit is placed on the number of passengers that can be handled. If the car is not rented outright special tickets are sold. When the excursion party is to be carried for more than 15 or 20 miles and it is expected that the party will exceed 500 in number, a rate of 1 cent per mile, with tickets limited to one day, is given. When steam roads name a competitive rate the interurban company tries to meet it except when all the business that can be handled is obtainable at the 1-cent-a-mile rate. No reduced rates are made on national holidays, for county fairs or for similar gatherings.

For special summer excursions, such as those of Sunday schools and fraternal organizations, a flat rate per car is made with the earnings based on a minimum of 65 cents per mile. The railway company collects the rental from the organization promoting the excursion and does not sell tickets except in rare instances. Then it is arranged to have the excursionists purchase tickets from their local organization and exchange these tickets at the ticket offices for regular transportation. A representative of the traffic department is on hand at the loading of every excursion party and keeps in close touch with the program of the excursion so that the patrons of the road may have every consistent favor extended to them. The railway company has an arrangement with a circuit of 25-cent vaudeville theaters in the larger cities whereby the company's agents at all stations sell round-trip tickets which include coupons good for admission to the theaters at a slight reduction under the regular round-trip rate. This reduction is absorbed by the members of the theater syndicate, so the railway company receives as its share a full round-trip fare.

The Grand Rapids, Grand Haven & Muskegon Railway makes a party rate of about 1 cent a mile for 25 passengers. Individual tickets are sold. As described in the section of this issue devoted to special folders, this company publishes an illustrated pamphlet presenting a number of attractive one-day trips, which include interurban rides and boat trips. The fares for these outing trips, however, are in general based on the regular ticket rates.

The Grand Rapids, Holland & Chicago line actively solicits and widely advertises excursions to its Lake Michigan resorts and connecting boat lines. More than one-half of the excursion traffic is said to come to the road by reason of the service given on previous occasions. During the winter months the traffic department makes records of all organizations which might hold excursions, and beginning in March a traffic representative calls on the entertainment committee of each organization in Grand



INTERIOR, MUNCIE PASSENGER STATION, INDIANA UNION TRACTION COMPANY

Rapids and offers to escort it to the company's picnic resorts and make plans for an excursion. Three times each year so-called "missionary" picnics are held by religious bodies which meet at a resort near the middle of the line.

The company gives three large dancing parties each week at its $50,000 pavilion in Jennison Park and obtains a revenue of $500 to $600 a night from the dance floor alone. The revenue obtained from excursion parties is about five-sixths of a cent per mile, and according to the ruling of the Michigan State Railroad Commission no excursion rate can be offered for a party of less than 150 adults.

CHARTERED-CAR SERVICE

The interurban railways in the Central States derive considerable passenger revenue from chartering special cars. The practice, with regard to the negotiations and agreements between the railway company and the passengers, is rather uniform on the interurban roads and a presentation of the methods followed by a few properties will serve to illustrate the general practice of renting and handling special cars.

CHARTERED CARS IN OHIO

The Cleveland, Southwestern & Columbus Railway has a finely built interurban car called the "Alvesta," which is chartered for special parties. The interior of the car, which has a standard interurban body, is provided with chairs in the front half and cross seats in the rear. Tariffs of the special-car rates are displayed in each office and the traffic department encourages the use of this car, both from the revenue standpoint and because of the advertising which it gives the railway system. The chartered-car service is based on a minimum of 50 people. Party rates are made for more than 20, but the special car is not rented for less than a revenue of 50 cents per car-mile. This company has a working arrangement with the Lake Shore Electric Railway so that chartered cars may be through-routed over both roads at a charge of 30 cents per car-mile. The traffic department endeavors to have a representative accompany all chartered-car parties so that the wishes of the party may be met and the possibilities of improving the service be noted.

The Dayton & Troy Electric Railway makes a practice of handling all special-party business on a per capita charge, refusing to rent cars for a pre-arranged flat rate, because it is believed that if a special party has paid a flat rate for a car there is considerable possibility of this car being overloaded and people not entitled to ride with a special party may be carried free. All special-party tickets are limited to three days. By charging for each passenger the transportation department learns in advance how many cars will be required and thus can provide against overloading. Special-car service will be furnished a party of 41 or more without extra charge when party tickets amount to $25 or more. The per capita rates for parties of 15 to 40 and 41 to 80 and over 81 are quoted in the company's local passenger tariff. Insofar as possible special parties are handled on the regular cars or by the addition of trailers.

The Columbus, Delaware & Marion Railway charters regular equipment for a round-trip fare of one cent per mile per passenger each way, with a minimum of 40 fares for 50-ft. cars, and a minimum of 60 fares for 67-ft. cars. The one-way rate is 75 per cent of the round-trip rate. An additional charge of $10 per hour or fraction thereof is made whenever it is necessary to operate a power house on account of special-car movement. The minimum charge for a chartered car is $15.

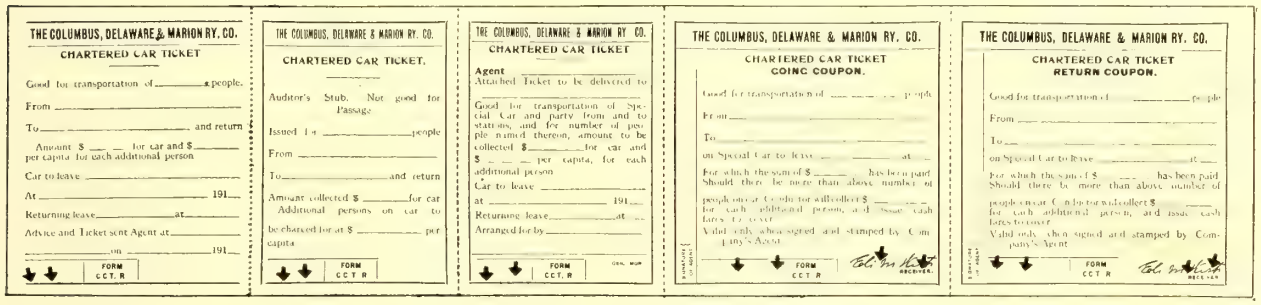
The accompanying form of ticket is used for chartered-car transportation. The original size of this ticket is 15 in. by 3½ in. and it is printed on safety stock. These tickets are sold at the main office of the company in Columbus and are delivered by the station agent at the loading point.

CHARTERED CARS IN MICHIGAN

The Detroit United Railway has a very complete special-car tariff which includes the rules and regulations of the service and the rates over each division. A part of the rules and regulations follows:

RULES FOR CHARTERED CARS

(1) (a) If the round-trip rate is less than $15, cars will be allowed three hours in which to complete the service. For all time over three hours, an additional charge of $1 per hour or fractional part thereof will be made.



CHARTERED-CAR TICKET, COLUMBUS, DELAWARE & MARION

(b) If the round trip rate is $15 or $16, cars will be allowed four hours in which to complete the service. For all time over four hours, an additional charge of $1 per hour or fractional part thereof will be made.

(2) (a) Where the one-way or round-trip rate is $20 or more, and less than $25, a reduction of $2 will be made on each car after the first.

(b) Where the one-way or round-trip rate is $25 or more, a reduction of $5 will be made on each car after the first.

(c) (Intrastate only) If six or more cars are chartered by any one party, a further reduction of 5 per cent will be allowed for advertising expense.

(3) Rates marked ($5 per hour) indicate that charge will be made at the rate of $5 per hour for either one-way or round-trip service, charge to be computed from the time the car leaves car house until it returns to car house.

(4) Should it be necessary to keep the power house open between 1 a. m., and 5 a. m., an additional charge of $5 per hour will be made. This additional charge is per hour, not per car.

(5) All special cars will be limited to 60 passengers.

(6) The through rate from any point on one division to any point on another division, for either one-way or round-trip service, will be the sum of the two local rates.

(7) Advertising streamers must not be fastened on the outside of chartered cars.

(8) Rates on the funeral cars No. 1027 and No. 7006, from Detroit to any point on lines mentioned, will be the same as regular chartered-car rates with a minimum charge of $25. To Detroit from any point on lines mentioned these rates will also apply with an additional charge of $10 from any point within a radius of from 15 to 30 miles from Detroit; $15 from any point within a radius of from 30 to 50 miles from Detroit and $20 from any point over 50 miles. This additional charge will also be made when chartering the parlor car "Yolande."

(9) A charge of 30 cents per car-mile will be made for handling special passenger cars of foreign roads to any station and return, minimum charge of $15 per car, foreign roads to furnish conductor and motorman, and line over which car is operated to furnish pilot.

The Detroit United Railway will not charter cars on Saturdays, Sundays and holidays.

A blank form regarding special-car movements is addressed to the division superintendent and to the car house foreman. These blanks carry full instructions for the loading and movement of the special-car parties, tell the conductor the amount of rental to collect before leaving

Ft. Wayne & Wabash Valley Traction Co.

TICKET ORDER NO.....

Good for ONE ROUND TRIP ticket from .....to .....

if 50 of these orders are sold. If less than 50 orders are sold money will be returned by

.....

TICKET ORDER FOR EXCURSIONIST

and advise the trainmaster where to have pilots. The blanks are signed by the general superintendent and are forwarded to the division headquarters and to the car house foreman in an envelope labeled "Important—Special Car Order."

This company operates two funeral cars, as will be noted from the above regulations, and these are in use practically all the time. They are advertised by a four-page folder carrying an engraving of the car and information as to its use.

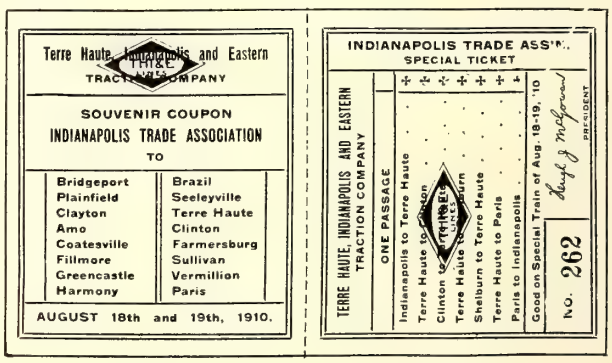
CHARTERED-CAR SERVICE IN INDIANA

The traffic department of the Chicago, South Bend & Northern Indiana and the Southern Michigan Railways keeps an accurate list of the excursion and chartered-car parties handled so that in the following year the same people may be solicited both by letter and by calls from the passenger department. Cars are chartered for a minimum of 60 people and the fare is based on 1 cent a mile each way, all passengers paying the same fare. Not more than 125 people are allowed in one car. If the car is held after 1:00 a. m. a charge of $10 per hour is made. The types of chartered cars used seat either 65 or 55 people. A regular form of chartered-car ticket is issued for transportation of the party. Individual tickets also are issued and are required for collection by the conductors on the cars. A report similar to that described for the Detroit lines is made for chartered-car movements. Care is taken that all the services promised are listed on the chartered-car report so that there may be no arguments between the party and the crew. The revenue from chartered cars is credited to the station in the town from which the party travels.

The Indianapolis, Crawfordsville & Western Traction Company furnishes special cars for a guarantee of $25 for any movement except in and out of Indianapolis, when the minimum is $30. The rate for special cars used one way only is 75 per cent of the round-trip rate and if special cars are to be run between the hours of 1:30 and 5:00 a. m. an additional charge of $10 per hour or fraction thereof is made.

The traffic department of the Ft. Wayne & Wabash Valley makes special winter rates for dancing parties with a minimum of 60 passengers per car. The special chartered-car rates ordinarily charged are one and one-half times the one-way rate, with a minimum of $25 and with no rate for less than 50 passengers per car. A temporary ticket of the form illustrated is used by those who plan to charter cars for excursions. The organizer of the excursion sells these ticket orders, noting on each the stations from and to which the car will be run. After 50 or more tickets have been sold, so that it is known that a chartered car can be had, the organizer of the party buys railroad tickets from the company with which to redeem the temporary ticket orders. This plan relieves the company from refunding tickets, should the full party not be made up.

Special-party and chartered-car service is advertised by the Terre Haute, Indianapolis & Eastern and the business is solicited by the local agents. The tariff for chartered cars calls for a fare of 1 cent a mile per person and a guarantee of 50 or 60 people according to the size of the cars. When there are more than 100 people in the party and conditions warrant, a tariff is filed for a special rate which is governed by the number of people that it is expected will make the trip. At the time of the Indianapolis Trade Association excursion a special-party ticket was printed, one-half of the ticket serving as transportation and the other half as a souvenir. The minimum charge for a chartered car is $25, except when it is moved in and out of Indianapolis, and then the charge is $30, the additional $5 being required to cover the terminal expense. A representative of the traffic department nearly always accompanies a large special party or a chartered-car party. This personal attention on the part of the



SPECIAL TICKET FOR LARGE EXCURSION

traffic department is considered a good advertisement of the general service which the railroad has to offer.

For special parties the Indiana Union Traction Company makes a rate of a fare and a half for the round trip on a guarantee of 50 people, with a minimum charge of $25. No form of contract is executed for a special-party car, but in its place special-party tickets or individual tickets sufficient to cover the guarantee are sold in advance. Whenever a special party makes an interline trip the traffic department invariably sends a representative with the party to make certain that the original plans are carried out and to be of service to the special party.

A novel special-car trip held in Indiana each year is the journey of the "boosters" of the Indianapolis Commercial Association. This year four cars were used for three days in carrying this party all over the State of Indiana.

INTERLINE PASSENGER SERVICE

Interline passenger service is now run north, south and east from Indianapolis to Goshen, Ft. Wayne, Louisville and Dayton, north from Dayton to Toledo and between Detroit and Saginaw. Negotiations also have been made for through service from Cleveland to Columbus, and when the construction of the new link between Fostoria and Fremont is completed fast service no doubt will be operated between Lima and Cleveland over a direct route.

THE LIMA ROUTE

The interline service between Dayton and Toledo is probably the longest regularly operated electric run. There are six trains a day each way, making the run of 162 miles between terminals in six hours. Only one train on a parallel steam line makes this run in less than 5 hours and 50 minutes. The Dayton & Troy, Western Ohio and Toledo, Bowling Green & Southern lines make up this route and furnish and operate the cars. Nine cars are required and two of these are furnished by the Dayton & Troy, four by the Western Ohio and three by the Toledo, Bowling Green & Southern. It is arranged that each car shall end its run on its own line. The train crews of one road do not operate on the tracks of a connecting road, unless the schedule has been interfered with and then a pilot is taken on. The three companies have joint car equipment inspectors at Piqua and Findlay. This through service is stated to be productive of considerable riding that would not be done if it were necessary for



NOBLESVILLE STATION, INDIANA UNION TRACTION COMPANY

passengers to change cars at junction points. Ordinarily 25 tickets a day are sold at Dayton for the through trip to Toledo. Each station on the entire route is prepared to sell different forms of transportation to points on the railroads making up the route and to interline points represented by the Central Electric Traffic Association. The revenue from the through trains between Dayton, Lima and Toledo is prorated on a mileage basis.

The Ohio Electric Railway operates through limited service between Dayton and Indianapolis in connection with the Terre Haute, Indianapolis & Eastern Traction Company, a distance of 108 miles; between Lima and Columbus, and between Ft. Wayne, Ind., and Dayton, O. The Ft. Wayne-Dayton run of 158 miles is made in 5 hours and 20 minutes. The Lima-Columbus run of 111 miles is made in 3 hours and 30 minutes. On these through runs especially fine equipment is used, but no extra fares are colletced.

INTERLINE SERVICE IN INDIANA

The Indiana Union Traction Company and the Ft. Wayne & Wabash Valley Traction Company operate



DELTA STATION, TOLEDO & INDIANA

10 limited trains daily each way between Indianapolis and Ft. Wayne. These trains make the 136-mile run in 4 hours and 45 minutes. Six of the trains run via Bluffton and four via Peru. The running time is the same by either route. Over the Bluffton route the Ft. Wayne & Wabash Valley handles the cars for 25 miles, and over the Peru route it handles them for 55 miles. The round-trip rate for the ride between Ft. Wayne and Indianapolis is $4.25. Through tickets are sold for any point on either route. Each company furnishes equipment in proportion to the mileage of its part of the through route.

The Indiana Union Traction Company and the Winona Interurban Railway operate two through limiteds daily in each direction between Indianapolis and Goshen. At Goshen connection is made with cars of the Chicago, South Bend & Northern Indiana Railway so that patrons may continue with limited service to Elkhart, South Bend, Michigan City and Chicago. Each road furnishes one car for the "Winona Flyer" which makes one round trip daily between Goshen and Indianapolis. The route length is 145 miles and the electric cars make the run in 15 minutes faster time than the only competing steam road. The through-car service operated out of Indianapolis to Ft. Wayne and to Goshen is found to be profitable and it is also a strong feature in promoting long-distance interline electric railway travel.

Six limited trains are operated daily between Indianapolis and Louisville over the lines of the Indianapolis, Columbus & Southern, Indianapolis & Louisville and Louisville & Northern Railway lines. This is a run of 117 miles, which is made in 4 hours. An extra fare of 10 cents is charged on these trains for any point between Indianapolis and Seymour, 62 miles south of

Indianapolis. Each train southbound is called a "Dixie Flyer," and northbound a "Hoosier Flyer."

The Terre Haute, Indianapolis & Eastern Traction Company, in conjunction with the Ohio Electric Railway, operates three through limiteds daily between Indianapolis and Dayton, Ohio, a distance of 108 miles, which is covered in 4 hours and 10 minutes. On limited cars an excess fare of 5 cents for each 20 miles or fraction thereof is charged, and is justified because of the extra speed and extra fine equipment used. The timetable showing this company's limited service indicates the through connections from Indianapolis to Richmond on the Terre Haute, Indianapolis & Eastern, and from Richmond to Toledo, Cincinnati, Columbus, Newark and Zanesville on the Ohio Electric Railway. The distance from Indianapolis to Zanesville is 248 miles and the running time, including the connection at Richmond, is 9 hours and 35 minutes.



ARLINGTON STATION, INDIANAPOLIS & CINCINNATI

The Detroit United and the Saginaw & Flint Railways operate three through cars each way daily between Detroit and Saginaw. Interline tickets are not sold because as yet no terminal station has been established in Saginaw. This run, a distance of 100 miles, is made in 3 hours and 35 minutes.

FREIGHT SERVICE AND EQUIPMENT

Nearly all of the interurban roads in the Central States handle freight, although comparatively few of them have been so fortunate as to get prorating arrangements with steam lines, thus making possible extensive carload business. The greater part of the freight is merchandise matter carried in motor express cars. Electric interline traffic is developing rapidly. Some connecting roads run through freight trailers nearly 200 miles and are thus increasing the radius of their fields of operation. Practically all roads carry old-line express matter. With few exceptions the roads mentioned in this chapter are not built to handle standard steam railroad cars; the principal obstructions are the sharp curves in city streets. Those roads which handle trains of standard freight cars have found it advisable to adopt the traffic methods of steam roads; first, because these methods provide for completely checking and tracing all freight, and second, because those steam roads which interchange with electric lines desire uniformity in the handling of through shipments. On the following pages are presented accounts of the freight service offered by typical electric railways and the methods used in soliciting and supervising the traffic.



COLUMBUS TERMINAL, COLUMBUS, DELAWARE & MARION



RAIL AND BOAT TERMINAL, GRAND RAPIDS, HOLLAND & CHICAGO

The Terre Haute, Indianapolis & Eastern Traction Company has two fast freight trains each way daily on each of the five interurban divisions centering at In-

dianapolis. These trains connect at junction points and service over the entire system is given twice a day. The principal shippers are the merchants and jobbers in the terminal cities. The company accepts all classes of traffic except live stock and grain, although horses are handled to and from county fairs. The equipment available for freight service includes 25 interurban motor cars. Freight tariffs are filed with the Interstate Commerce Commission, and whenever a tariff is issued to the agents it is accompanied by a return card addressed to the general passenger and freight agent. This card, which is to be signed by the agent, acknowledges receipt of the tariff or circular and designates the number of the new publication and the number of the old one which it supersedes.

The Indiana Union Traction Company operates 20 freight trains. The traffic is practically all l.c.l. merchandise. The heavy carload business is largely confined to the handling of tile, wood, lumber, crushed rock, gravel and other road-making materials. Twenty-five motor and trail cars equipped for operating on high-speed passenger schedules are used.

Stock shipments are not solicited for delivery to other lines, but a considerable number of horses for county fairs and races are shipped each summer and fall. Portable loading chutes are used and the stock is unloaded with permanent chutes built alongside the tracks at the fair grounds. Until four years ago practically no milk was shipped over the Indiana Union Traction lines, but by systematic advertising and co-operation with the creameries a large milk traffic has been built up. Creameries have been established at Indianapolis and Muncie with branch houses and milk depots at various points along the lines. In soliciting this traffic the creameries already established were visited first by the solicitors and the facilities of the railway company for handling dairy products were described in detail and rates quoted. The representatives next visited the rural districts and canvassed the situation thoroughly, setting forth the advantages of the facilities offered by the electric railway as against the older methods of handling milk. This service also is advertised by the use of cards, 21 in. x 28 in. in size, posted at all crossroads and at the railway stations. Some advertising of the service is also done in country newspapers and a considerable amount in the *Indiana Union Traction Magazine.* As this magazine is distributed to a large mailing list composed of shippers, farmers and possible shippers, a direct means of reaching these people is afforded. In practically all of its other advertising matter attention is called to the milk traffic.

TERRE HAUTE, INDIANAPOLIS AND EASTERN TRACTION CO.

..... Station

..... 19

I have this day received:

Passenger Tariff No. ..... Sup. No. .....

Freight Tariff No. ..... Sup. No. .....

Excursion Circular No. ..... Sup. No. .....

Traffic Dept. Circular No. ..... Sup. No. .....

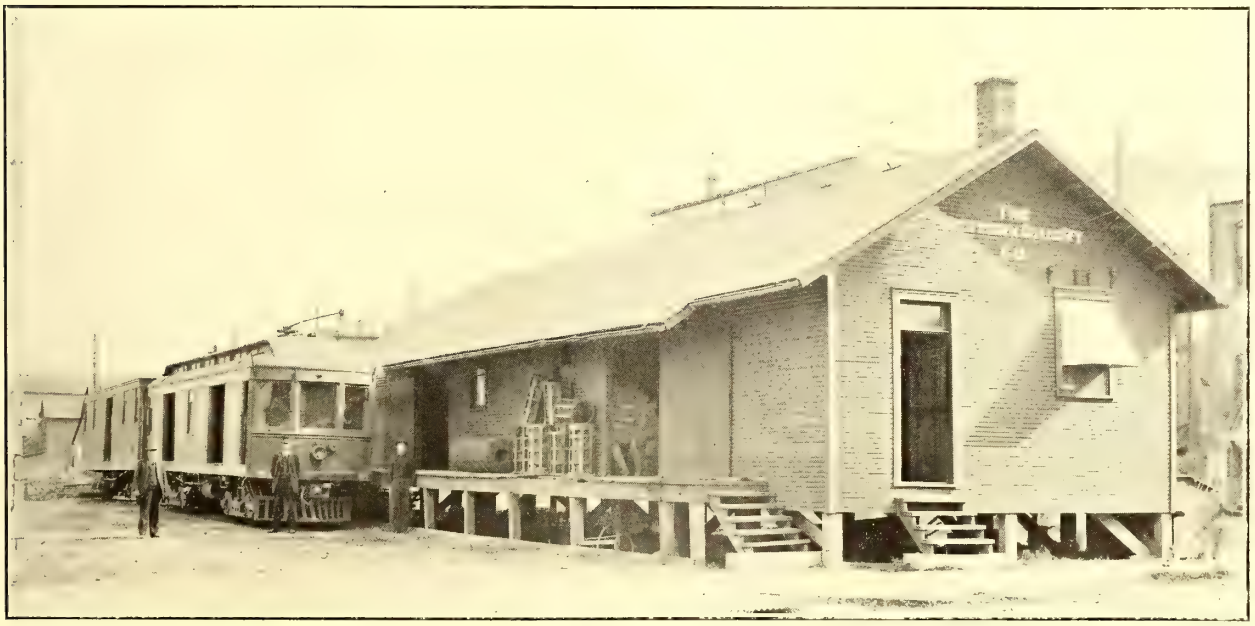
Percentage Sheet No. ..... Sup. No. .....

..... AGENT

Agent will sign this card, filling in name of Station and Date, and send to General Passenger and Freight Agent's office immediately.

POST CARD RECEIPT FOR TARIFF

The Indiana Union Traction Company and the Ft. Wayne & Wabash Valley Traction Company operate a through freight service daily except Sunday, leaving Indianapolis at 7 p. m. and arriving at Ft. Wayne at 11 p. m. Local deliveries are made early in the morning and freight also is transferred at Ft. Wayne for interurban shipment over the Toledo & Chicago Interurban Railway to Waterloo and Kendallville, Ind., and over the Ohio Electric Railway to Lima, Defiance and Toledo, Ohio, reaching Toledo at 4.30 a. m. on the second day. The schedule is arranged to be handled both ways with one motor car, which is dispatched out of Indianapolis ahead of a limited passenger train.



WAPAKONETA STATION, WESTERN OHIO RAILWAY

The Indianapolis & Cincinnati Traction Company operates four freight trains in and out of Indianapolis daily, two being run over each division. This company handles part of the output of 13 furniture factories, and a considerable amount of supplies for carriage, wagon and automobile manufacturing plants. The traffic department issues an "Indianapolis Shippers' Guide," containing information about its freight and express service, showing a map of Southeastern Indiana, a schedule of the freight trains and a list of the class rates. In several instances special sidings have been installed for a guaranteed amount of traffic. The cost of these sidings has been divided equally between the shippers and the road. For one man a siding was placed for the shipment of 100 cars of logs. After this shipment had been made another man cut the limb wood trimmed from the logs first shipped into suitable shape for use in smoking meats and shipped it. Since the logs and wood have been shipped other people have found the siding a handy place to load and unload freight, and so the cost of the original installation of the siding has been more than earned.

The Indianapolis, Crawfordsville & Western Traction Company obtains 12 per cent of its gross receipts from freight traffic, largely made up of merchandise. The first-class rate for 41 miles is 21 cents. Two cars equipped with Westinghouse No. 304 motors are used in the service. Each car makes a round trip daily. This company uses the large Indianapolis terminal and arranges the schedule of its freight cars so that one crew, which arrives at Indianapolis in the morning, "lays over" there to load its own car. This morning car is scheduled out again by the time the afternoon car arrives. The crew of the afternoon car loads until supper time, when the night man comes on duty. Thus the time of all the freight employees is fully occupied and some economy is effected by not hiring warehousemen, although the trainmen who do the loading receive higher wages than would be paid to warehousemen.

The Ft. Wayne & Wabash Valley Traction Company furnishes the freight and passenger terminal for the following roads entering Ft. Wayne: Ohio Electric Railway, Toledo & Chicago Interurban Railway, Ft. Wayne & Springfield Railway. Twelve freight trains are scheduled out of this station daily. The Ft. Wayne & Wabash Valley Traction Company at present does not actively solicit freight traffic because of the limited capacity of its freight station at Ft. Wayne; however, a larger station here is under consideration and others are being built at Huntington, Logansport and Bluffton. To overcome the congestion at the Ft. Wayne station trailers are set in the yards during the daytime so that they may be loaded directly from wagons. Cars are loaded during the night and sent out between 5 a. m. and 8 a. m. The freight cars from Toledo to Ft. Wayne leave Toledo at 9 p. m. and arrive at Ft. Wayne at 5 a. m., in time for transferring through shipments to a car bound for Indianapolis, which arrives there at 11 a. m.

FREIGHT SERVICE IN NORTHERN INDIANA

The Toledo & Chicago Interurban Railway operating north from Ft. Wayne makes three freight deliveries daily to all points on its line. A fast through freight service has recently been inaugurated between Toledo and points on the Toledo & Chicago Interurban. Freight trains leave Toledo daily, except Sunday, at 6 p. m. and reach Ft. Wayne via the Ohio Electric Railway early in the morning so that morning deliveries can be made north to Garrett, Kendallville and Waterloo. Reference has been made to the fast freight service between Ft. Wayne and Indianapolis. The tariffs of the Toledo & Chicago Interurban Railway cover points on the connecting lines out of Ft. Wayne. The tariffs of this company are printed on high-grade paper with heavy covers so that they do not need to be replaced frequently.

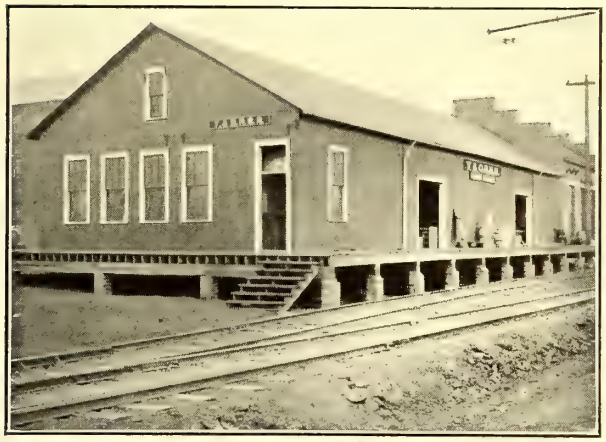
The Winona Interurban Railway, with the completion of its Peru extension early in the present year, was placed in a position where it could profitably undertake to build up an interline and a carload business. A part of this road serves a territory heretofore without transportation facilities and the company has recently purchased a number of box and stock cars with the idea of encouraging heavy freight traffic. Two merchandise freight trains are operated daily from Warsaw to Goshen, where connection is made with the cars of the Chicago, South Bend & Northern Indiana Railway. One car is operated from Warsaw to Peru, where connection is made with the Indiana Union Traction Company and with the Chicago, Cincinnati & Louisville steam line. The freight motor cars used by this road are 60 ft. long and are equipped with four 100-hp motors.



STANDARD STATION, TERRE HAUTE, INDIANAPOLIS & EASTERN

Since active solicitation work has been done the freight service of the Chicago, South Bend & Northern Indiana and Southern Michigan lines has grown very rapidly. Eight freight trains daily are run out of South Bend. A traffic arrangement has been made with the Graham &

Morton Steamship Company operating between St. Joseph and Chicago, and shipments are accepted in Chicago until 11 p. m. for delivery on the following day in South Bend at 6:50 a. m.; Goshen, 9:30 a. m.; Warsaw, 11:30 a. m., and Peru at 1:30 p. m. The last two towns are reached over the Winona Interurban Railway connection. The westbound shipments leave South Bend at 6 p. m., are loaded into the boat about 11:30 p. m., and reach Chicago at 3 a. m., in time for early



FREIGHT STATION AT SALEM ON YOUNGSTOWN & OHIO RIVER ROAD

morning delivery. Shipments are solicited in Indianapolis over the electric connections and 12-hour delivery is promised in contrast with the four-day delivery of the steam railroad way-freight trains.

FREIGHT SERVICE IN MICHIGAN

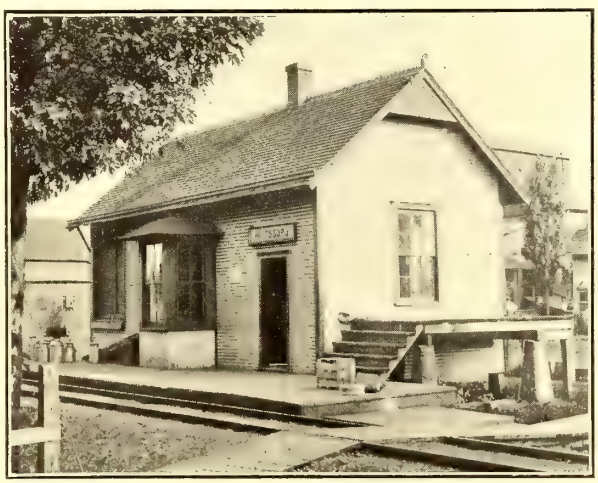
The Southern Michigan Railway handles large quantities of orchard and farm products into St. Joseph for boat transfer to Chicago. Last year the through traffic amounted to 400 cars. The dispatch with which shipments are delivered to the Chicago market renders easy the successful solicitation of this traffic. Fruit picked in the afternoon is hauled to highway intersections, where loading platforms protected from the weather have been built by the interurban company. The farmers leave the fruit on these platforms with memoranda showing the names of the consignor and consignee and the number of cases. On the arrival of the freight train the conductor checks the shipments into the car and makes out an interline waybill which accompanies the shipment to the Graham & Morton dock in Chicago. By this arrangement the farmers between stations have the same advantage as those located at towns. As an index to the carrying capacity of the steamers engaged in this fruit traffic it is stated that on one trip one of the connecting boats carried 27,500 crates of strawberries from St. Joseph to Chicago. The fruit buyers say that fruit handled by the interurban and boat route sells for from 20 to 25 cents per crate more than that handled by the steam roads. The doors of the electric cars can be left open so the fruit will cool. Fruit carried in tightly closed cars becomes heated and discolors before reaching the market.

The Southern Michigan Railway handles wheat in carload lots from stations north of South Bend into St. Joseph, where it is delivered to the flour mills. A 57-ft. combination locomotive and snowplow is used for hauling standard freight cars for carload traffic.

The two interurban roads from Grand Rapids to the Lake Michigan ports both have through rates and divisions with trunk lines, to which deliveries are made through boat connections between Holland, Grand Haven and Muskegon, the termini of the roads, and Chicago.

The Grand Rapids, Grand Haven & Muskegon Railway operates nine freight motor cars, often loading them out of Grand Rapids three times a day. Connection is made at Grand Haven with the Goodrich Line steamers. When a boat arrives from Chicago two or three cars are "spotted" on the steamer dock so that shipments may be transferred quickly and dispatched to Grand Rapids. The westbound business from Grand Rapids to the boat averages three or four cars daily. The last connecting freight car leaves Grand Rapids at 6:15 p. m., and the boat reaches Chicago at 6 a. m., in time for transfer to the steam railroad freight stations in Chicago for outbound shipment on the day of arrival. The published schedules for the southbound routing out of Chicago over the Chicago & Eastern Illinois state that shipments leaving Grand Rapids at 6 p. m. will arrive in Nashville, Tenn., on the third day and in Jacksonville, Fla., on the sixth day. The Grand Rapids, Grand Haven & Muskegon handles a considerable number of shipments of furniture, brass goods, carpet sweepers and other manufactured products billed through to the Pacific Coast. The freight trains regularly scheduled are, one car leaving Grand Rapids at 3:30 a. m., which handles United States mail and American express and some merchandise into Muskegon, and another freight car run to Muskegon at 11 a. m. The other freight trains are run as extras.

The Grand Rapids, Holland & Chicago has a double-track line from Grand Rapids to Holland and Macatawa Park. This company also has through rates and divisions with practically all the steam lines out of Chicago. About one-third of the total freight revenue is obtained from



STANDARD FREIGHT AND PASSENGER STATION, BEN-HUR ROUTE

these shipments billed to Chicago and points west. The total freight revenue is 27 per cent of the gross revenue of the road. The freight business is handled by five 50,000-lb. motor cars and a number of box-car trailers, which are run as many as four in a train. Five freight trains are scheduled daily between Grand Rapids and the lake terminal, each of these trains ordinarily being made up of from one to three cars. The local ship-

ments largely include jobbers' supplies and merchandise outbound from Grand Rapids and market products inbound. Coal, gravel, wheat and lumber also are handled. The freight received by boat from Chicago is mostly merchandise and perishable commodities shipped by wholesalers to jobbers in Grand Rapids. The outbound interline freight consists of machinery, refrigerators, furniture, embalming fluid, knitted goods, paper box stock, plaster, alabastine and canned goods destined for Chicago and points beyond. The company has two joint terminals with the Graham & Morton Transportation Company, one at Holland for freight and the other at Macatawa Park on Lake Michigan for passengers. In April when the lake traffic began the Grand Rapids, Holland & Chicago delivered 500 tons of freight to the boats for points beyond Chicago and on this business earned 9 cents gross per ton-mile.

The freight revenue of the Detroit United Railway for the first half of this year approximated $100,000. This company operates 29 freight motor cars, two trailers and four box cars. The freight loaded in and out of Detroit and the interchange of l.c.l. shipments from one division to the other are handled at the electric terminal depot. The schedules of the freight trains are arranged to make connections at Detroit with outbound freight trains of the steam roads and the boats to the lake ports. Through rates and percentages are in effect with these boat lines. Shipments are transferred by wagon from the electric terminal depot in Detroit to the boat docks. The expense of transfer is absorbed in the through rates. The division agreement provides 2 cents per 100 lb. as a charge for this wagon transfer from the electric depot to the docks. Where a transfer is made to a steam railroad freight warehouse the charge is added to the rate and is shown as an advance on the transfer slip. This company's freight trains are operated into joint terminals used by connecting lines at Jackson and Toledo.

A number of side tracks have been built for loading sugar beets and for facilitating shipment of farm products. In constructing these sidings the electric railway builds to the property line and the shipper, if the track is installed for one industry only, builds the remaining part of the siding. The railroad reserves the right to use all of the track at any time for switching and loading purposes.

The freight equipment of the Michigan United Railways includes five motor cars, three trailers and 25 flat and gondola cars. The Lansing-St. Johns division of this road serves a territory without other transportation facilities and originates considerable carload business which is delivered to the Pere Marquette Railroad at North Lansing. No prorating arrangement has been made and so cars are borrowed from the steam railway on a per diem basis. The inbound carload freight exceeds the outbound. At DeWitt, located midway between Lansing and St. Johns, two grain elevators have been built on the interurban line. The company which operates these elevators has its own grain cars and loads them here for shipment to Lansing. Whenever steam railroad cars are required for this grain or any other carload shipment the Michigan United Railways Company adds the per diem charge to the regular freight charge. The Lansing-St. Johns division originates about 125 cars of sugar beets per year, which are delivered to the Pere Marquette.

The regularly scheduled freights of the Michigan United Railways and the Detroit United Railway make two deliveries a day each way between Kalamazoo and Detroit, a distance of 145 miles. Shipments are billed through and the rates approximate those of the parallel steam line. Two freight deliveries a day also are made between Lansing and all points on the Kalamazoo and Battle Creek divisions of the Michigan United.

FREIGHT SERVICE IN OHIO

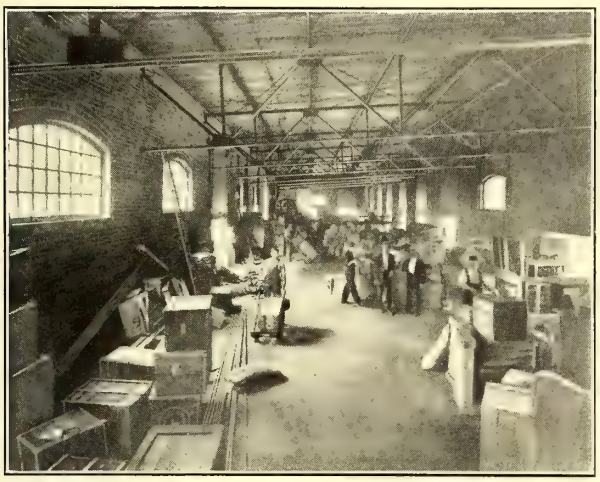
The Toledo & Western Railway has direct connections with the Wabash at Franklin, Ohio, and Adrian, Mich.; with the Detroit, Toledo & Ironton at Denison, and with other routes through the Toledo Terminal Railway, a belt line in that city. The company is a member of the American Railway Association, Master Car Builders' Association, the Freight Claims Association and the Association of Railway Accountants. Its freight equipment conforms to the standards of the Master Car Builders' Association. Carload shipments are delivered to the Toledo Terminal Railway, which makes delivery to any industry located on any railway line in Toledo. The l.c.l. shipments are delivered to the joint interurban freight terminal in Toledo, owned by the Toledo Railways & Light Company and described on page 608. Traffic arrangements have been made with most of the Eastern roads as well as with the roads in the Central Freight Association and the Western trunk line territory. Shipments for the East and to seaboard cities are handled by the various "fast freight" lines. In addition to a heavy carload business originated on the line the company handles about 350 cans of milk each day. Every possible argument is used to encourage the use of the company's service for long-distance shipments. Industrial and special sidings are installed at the expense of the user, who is allowed a certain sum per car in settlement for the cost of construction. A number of elevators located along the line each furnish annual shipments of about 50 cars of grain. A detailed account of the traffic methods of this road appeared in the Electric Railway Journal for Sept. 18, 1909.

The Toledo & Indiana Railway uses the two joint stations at Toledo as the eastern terminals for its 52-mile road. This company is equipped to handle all classes of freight and has connections and prorating agreements with the Detroit, Toledo & Ironton Railway. Also it has a connection with the Toledo Terminal Railway. The motive power equipment includes four motor express cars used for package freight and as locomotives, and 15 standard box and flat cars. One market garden located on the line furnishes daily shipments during the season of from 100 to 120 bbl. of cucumbers and muskmelons.

The Electric Package Agency of Cleveland handles the major part of the freight business for the Lake Shore Electric Railway, Cleveland, Southwestern & Columbus Railway, Northern Ohio Traction & Light Company and the Cleveland, Painesville & Eastern Railway Company.

The Youngstown & Southern and the Youngstown & Ohio River roads offer a through route from Youngstown to East Liverpool on the Ohio River. The freight traffic totals about 30 carloads a day and carload shipments are switched and handled by electric motor cars. The carload business is composed largely of stone, coal, lumber,

live stock and foundry supplies and products. The route lies through a territory otherwise unoccupied by transportation lines and a great variety of traffic is handled. Sidings are provided for coal yards, packing houses, bakeries and foundries. These sidings have been installed by the company and paid for by the shippers, who are rebated 20 per cent. of the freight charges until the cost of the siding is equaled. Recently when



INBOUND WAREHOUSE AT DETROIT

a township macadamized six miles of road the railway company handled the material and built an elevated track so that the contractor might conveniently load his wagons. At Leetonia the Youngstown & Southern and the Youngstown & Ohio River Railroads use a terminal owned by the latter company. Proportional tariffs are in effect between the two companies, but all interline shipments in less than carload lots are rehandled at Leetonia. The station expense is prorated according to the traffic. The Youngstown & Southern receives cars from the Pennsylvania Lines and pays for them on the basis of an industrial switching road. The steam railroads at Youngstown will not furnish cars to the electric road for shipments originating in or destined to Youngstown.

The Youngstown & Southern Railroad is organized as a steam railroad and belongs to the American Railway Association and its affiliated associations. This line has direct connection with the Erie Railroad at Washingtonville and has a prorating agreement. About 80 cars a day are interchanged. The Youngstown & Southern runs 10 freight trains a day, all of which are hauled by steam locomotives. The steam roads in the Central Freight Association refused to prorate with the electric line unless the freight was handled with steam locomotives. The rolling-stock equipment includes four Baldwin locomotives, weighing 85 tons, and 22 standard flat and box cars. Additional cars are obtained from the steam roads at a cost of 35 cents a day during the summer and 30 cents a day during the winter months, according to the regular per diem agreements. This company is a member of the Central Passenger Association and sells through tickets. Attractive freight and passenger stations are built at all towns served. In the 37 miles of line the company has 35 freight sidings.

THE "LIMA ROUTE" FREIGHT SERVICE

The three roads which make up the "Lima Route" from Dayton to Toledo have built up a substantial interline traffic over this run of 162 miles. These roads are the Toledo, Bowling Green & Southern, the Western Ohio and the Dayton & Troy. Each road handles the through freight trains between Dayton and Toledo over its own line. The revenue is divided according to the mileage in groups. An arbitrary charge is made for the use of the equipment of one company over the lines of connecting roads.

The Toledo, Bowling Green & Southern operates two local freights each way, in addition to the joint through freight trains. The freight equipment of this road comprises five motor express cars, three express trailers, 11 box, flat and gondola cars, and a heavy electric locomotive. The company has a new freight station in Toledo and local stations with agents at five other cities.

Last year the Western Ohio Railway handled 37,000 tons of freight. About 35 per cent of this tonnage was carload business, yet the revenue from the carload business was only 12½ per cent of the gross freight revenue.



MUNCIE STATION, INDIANA UNION TRACTION COMPANY

The freight equipment includes 7 motor cars, 4 merchandise trailers and 30 cars purchased from steam railways. The flanges on the wheels of these cars have been ground down to fit city special track work. Two local freight trains are operated each day over all divisions of the road, in addition to the through Toledo and Dayton freight trains, which frequently leave Toledo with three or four trailers. The company has prorating arrangements with the White Star Line at Toledo for shipments to points on the Great Lakes. Freight stations are maintained at the larger towns. The station at Wapakoneta employs two day and two night men. Joint stations are maintained at Piqua with the Dayton & Troy, at Lima with the Ohio Electric and at Findlay with the Toledo, Bowling Green & Southern Traction Company.

The local and interline freight of the Dayton & Troy Electric Railway averages about 14 per cent of the gross revenue of the road. About seven cars a day are loaded out of Dayton for local and interline points. The interline shipments are handled in trailers attached to the regular freight trains. This traffic just about equals the local freight traffic, and the revenues are about equal. The freight equipment used by this road includes two motor express cars, one electric locomotive, two box trailers, and a number of steam railroad flat and gondola cars. The company is now planning to build or purchase additional freight equipment. Dump cars are used for hauling stone. One stone-handling contract amounted to 2000 carloads. These were handled in 10-car trains drawn by an electric locomotive. A joint station is maintained at Troy with the Springfield, Troy & Piqua Railway.



NEW FREIGHT STATION AT SOUTH BEND

The Ohio Electric Railway operates fast freight trains between all points on its system. These freight runs include through cars between Columbus and Toledo, Dayton and Toledo and Toledo and Ft. Wayne. Freight is exchanged with most of the steam railroad connections, but is handled as local business.

SOLICITING FREIGHT

The freight solicitation methods of the roads in the Central States are patterned largely after steam railroad practice. A few companies regularly employ solicitors, and state that the traffic thus gained more than warrants the cost for solicitation. The practice of a number of roads will be given.



JACKSON STATION OF MICHIGAN UNITED RAILWAYS

FREIGHT SOLICITING METHODS IN INDIANA

All employees of the traffic department of the Indiana Union Traction Company serve as freight solicitors, but the active part of the work is carried on by the two district passenger and freight agents, who regularly solicit business from shippers in all the larger towns. The agents in some of the smaller offices are paid commissions of from 3 to 5 per cent on the freight business originating in their territories. In soliciting freight routing orders are used effectively.

When the district traffic men are soliciting freight they make certain that each possible shipper is furnished with a list of all the stations to which he can make shipment by electric line. Also his attention is called to the quick deliveries which can be made and he is shown that there is scarcely an important town in Indiana or Ohio to which freight deliveries cannot be made on following day over the electric lines. Each agent keeps a list of his regular shippers and takes particular care to prevent anyone from discontinuing the use of the service.

An argument effectively used by the solicitors is that the cars in which shipments are handled over electric roads, as compared with steam railroad cars, are warmer in winter because they may be heated, and are cooler in summer because the doors can be left open. Thus the liability of damage on account of temperature conditions is reduced.

Whenever new rates are put into effect the traffic department issues announcements in the form of mimeograph sheets. Traffic bulletins and circulars are prepared in regulation typewritten form by the use of either an Underwood revolving duplicator or a Neostyle machine.

On the Terre Haute, Indianapolis & Eastern Traction Company's lines freight is solicited mostly by means of advertising matter distributed to the shippers. The company now has almost as much outbound business as can be handled in the present freight terminal at Indianapolis.

The freight solicitation for the Indianapolis, Crawfordsville & Western Traction Company is in charge of the general passenger and freight agent, who is assisted by a local agent and freight assistant at Crawfordsville, and by agents at 10 different stations. The traffic department endeavors to find out where the local merchants do their jobbing and to obtain routing orders. Some representative of the department calls on every shipper once every two weeks and asks for complaints and suggestions regarding the service. A memorandum of the results of these calls is kept on file and records are made of all the routing orders obtained. These records are checked up frequently to find out whether the routing orders are being followed.

On the Indianapolis & Cincinnati Traction lines the general agent does the soliciting, but during the summer devotes most of his attention to passenger business. In October calls are made on all jobbers in Indianapolis and other terminal cities. Routing orders have not been found very satisfactory, especially with the country merchants, because these men have a natural hesitancy about signing any order. The agents at the way stations are paid commissions with a view to encouraging them to be active in soliciting local shipments.

SOLICITING FREIGHT IN MICHIGAN

The local and interline traffic of the Grand Rapids, Holland & Chicago Railway and its boat connections is solicited by a freight agent in Grand Rapids, who calls on all shippers once every two weeks. All of the local freight agents assist in the solicitation of freight at points along the line and the company has a freight inspector who audits the daily freight reports before they are turned over to the cashier, inspects the tariffs, investigates claims and traces losses. The traffic department keeps complete statistics of ton-miles and car-miles to and from the different stations. The soliciting freight agent at Grand Rapids makes a daily report to the traffic manager of the heavier shipments and the total daily shipments. This statement also includes a report of the tonnage billed to each steam railroad out of Chicago.

The shippers of perishable goods are called on in Grand Rapids every two or three days. Some of the arguments used in soliciting freight traffic in Grand Rapids are the excellence of the service, on account of the careful handling shipments receive, and the prompt adjustment of claims. All of the local agents are also agents for an old-line express company and work on salary.

The solicitation of freight traffic for the Detroit United Railway is done by a traveling freight agent with headquarters at Detroit, and a soliciting freight agent at Toledo. Local solicitors are also employed at the terminals in Jackson, Flint, Port Huron, Northville and Pontiac. Each terminal solicitor is, in a way, responsible for solicitation on his division, extending from one of the terminals named to Detroit. In asking for traffic the solicitor explains the details of the fast and frequent service, pointing out the care with which goods are handled and the thoroughness with which claims are adjusted. No carload shipments are solicited for Detroit on account of a prohibitory clause in the company's ordinance in that city. The solicitors send weekly reports to the general express and traffic agent, telling of the results of their work.

The traffic headquarters of the Michigan United Railways are at Jackson, the operating center of the system. Merchandise freight is solicited from the jobbers and merchants by personal calls from the general freight and passenger agent, who places the printed schedules of the freight rates in the hands of the possible patrons of the road and calls attention to the merits of the service. As yet little solicitation has been done among the farmers, although the local agents solicit the merchants in their territories. Carload business is solicited for only one division of the road—that between Lansing and St. Johns—where the tracks are entirely on private right-of-way and are built for handling standard freight cars. Some representative of the traffic department is a member and takes active part in the work of all the commercial associations in the cities served.



GRAND RAPIDS FREIGHT STATION OF THE MUSKEGON LINE

METHODS OF SOLICITING FREIGHT IN OHIO

In addition to the traffic manager of the Toledo & Western Railway located at Toledo, the company has a general agent at Adrian, Mich. Both of these men solicit freight and passenger business. The local agents also call on shippers in their towns. The station agents receive salaries of from $40 to $75 per month, and those in charge of substations have helpers so that they may have time for soliciting freight traffic. Inasmuch as the Toledo & Western has close traffic relations with all the steam lines the traffic manager is enabled to learn

from the representatives of steam roads of any business which is expected to be routed into the local territory. Similar information regarding the outbound shipments from the local territory is sent out to steam roads. When the traffic department learns of any shipment coming into its territory it immediately takes up the situation with the steam railroad representative at the point of shipment, asking him to secure a routing via the respective lines. Routing orders are not ordinarily used in dealing with jobbers. All shippers that might be interested are furnished with copies of the company's freight tariffs. Special attention is paid to cultivating the friendly acquaintance of stock buyers and shippers, and stock pens are provided for the use of shippers at the principal stations. Little solicitation is done among the farmers because, as a rule, their products are shipped by the commission men. There are five elevators located on the line of the Toledo & Western, each of which ships annually about 2500 bushels of grain. The traffic manager keeps himself advised regarding the comparative solicitation work at each station by inspecting the tissue copies of the freight bills sent in each day. At the end of each week a statement of the carload shipments from each station on the road is prepared and from these reports the traffic office makes up a statement of the total inbound and outbound carload business from each station.

The traffic department of the Dayton & Troy Electric Railway regularly solicits freight shipments by describing the excellence of the service and encouraging the signing of permanent routing orders. The soliciting is done by the general freight agent and by the local agents. A tariff with 590 points reached by the electric lines in the Central States has been prepared to meet the steam railroad joint tariffs to all points. The traffic office keeps a list showing the location of every copy of its tariffs and delivers supplements in person, so that an opportunity for a personal interview may be had. The freight department keeps an up-to-date record of the tonnage of the big shippers so that a close approximation may be had of how the business is being routed. On all interline shipments tissue copies of the way-bills are sent to the auditor of each of these interline roads.

The Western Ohio Railway has helpers at each of its larger stations and this gives the agents time to do considerable soliciting. The traveling passenger and freight agent visits all the cities served and assists the local agent in his work of calling on the merchants and jobbers. A monthly comparison of the business done at each station is kept in the traffic manager's office so that the increases and decreases may be observed and the reasons for variation ascertained. The routing orders used by the solicitors of the Western Ohio Railway read, "Please mark and ship our freight via Western Ohio Railway regardless of previous instructions." On the backs of these orders is a map of the interurban system connecting Lima with Toledo, Dayton, Springfield, Celina and Ft. Wayne.

The Youngstown & Ohio River Railroad uses a routing order stating, "Ship our freight via Erie-Youngstown & Ohio River fast freight until further notice." The traffic representative of the Youngstown & Ohio River Railroad solicits signatures to routing orders of the Erie Railroad for interline shipments.

In addition to four district freight agents who solicit traffic, the Ohio Electric Railway Company pays some of its agents on a percentage basis of the business handled and thus encourages active solicitation. The secretary of the company states that careful solicitation has brought satisfactory results. The volume of freight traffic of the Ohio Electric Railway has increased since 1907 as follows: 1908 over 1907, 11 per cent; 1909 over 1908, 37 per cent; first six months of 1910 over first six months of 1909, 42 per cent.

PASSENGER AND FREIGHT STATIONS

The steady growth of traffic on interurban lines has necessitated improved terminals for handling passengers and freight. These are being erected from year to year at all of the more important traction centers. Mention of these stations has been made in this paper at the time of their construction, but reference here to some of the more important stations should be of interest in connection with the traffic which is handled. Several stations are illustrated.

INDIANAPOLIS TERMINAL

The most important terminal in the Central States is that at Indianapolis. This is owned and operated by the Indianapolis Traction & Terminal Company and is used by all the traction lines entering Indianapolis. The incoming lines pay for the use of the city trackage and the terminal at a flat rate per passenger and per piece of baggage or express matter carried on passenger cars, and an additional charge for the use of the freight buildings, which is based on a rate per car-mile for mileage inside the city and an arbitrary charge per round trip. A joint ticket office is maintained in which eight ticket sellers are employed; from three to five are always on duty.

The passenger terminal includes a nine-story office building with a frontage one-half block long; a concourse which encloses the waiting rooms, ticket offices, etc., parallel with the ground floor of the office building, and a connecting train shed with nine through tracks one block long enclosed for half that length.

The Indianapolis freight station property includes three large brick warehouses, two of which are two stories high. Nine tracks serve these warehouses. The freight property adjoins the passenger terminal property. The following roads use the freight warehouses: Warehouse 1—Terre Haute, Indianapolis & Eastern; Indianapolis, New Castle & Toledo. Warehouse 2—Indiana Union Traction Company. Warehouse 3—Indianapolis & Cincinnati Traction Company, Indianapolis, Crawfordsville & Western. At the time these warehouses were built, about five years ago, it was thought the capacity of these buildings would be ample for many years to come, but now the traffic is becoming so congested that special means have to be used to load cars direct from wagons and thus relieve the storage capacity of the warehouse floors as much as possible.

The following figures will indicate the extent of traffic to and from the Indianapolis Terminal:

TRAFFIC TO AND FROM INDIANAPOLIS TERMINAL.

	July, 1909.	July, 1910.	Jan.-July. Incl. 1909.	Jan.-July, Incl. 1910.
Passenger trains in and out	17,853	20,498	108,882	114,540
Passengers carried in and out	467,816	574,154	2,770,652	3,115,061
Freight trains in and out	1,815	1,983	11,415	13,293
Baggage handled (pieces)	8,884	11,734	52,110	67,934

The Indiana Union Traction Company has a number of attractive stations in the larger cities, notably at Anderson, Marion, Kokomo, Tipton, Noblesville and Hartford City. Illustrations of some of these are printed. A new station is being built at Elwood.

MICHIGAN STATIONS

The Detroit United Railway a few years ago made arrangements for the use of a large building near the center of the city, the lower floors of which were re-



BUILDINGS OF THE DETROIT ELECTRIC DEPOT COMPANY

arranged into a passenger station. All of the interurban cars are routed by this station. This company also has a freight terminal owned by a subsidiary company known as the Detroit Electric Depot Company. The latter company is local agent for all of the Detroit United Railway lines. No wagon deliveries are made, but an arrangement has been made with a cartage company to act as agent for the Electric Depot Company and the Detroit United Railway. The expense of cartage is added to the freight rate and service is furnished to those who do not care to make their own freight deliveries. The police department of Detroit has stationed two mounted policemen at this depot so that all of the team traffic may be handled with the least possible congestion. At the request of the police department the Electric Depot Company issued a bulletin to teamsters, giving directions for approaching and leaving the depot.

The Detroit United Railway, by ordinance, must pay a tax to the city of Detroit of 50 cents per car per trip for hauling empty or loaded freight cars over city lines. The ordinance also states that cars must be similar in appearance to a passenger car and that cars cannot be operated in the same direction over one street less than two hours apart. They also must be operated as single units and be manned by two men.

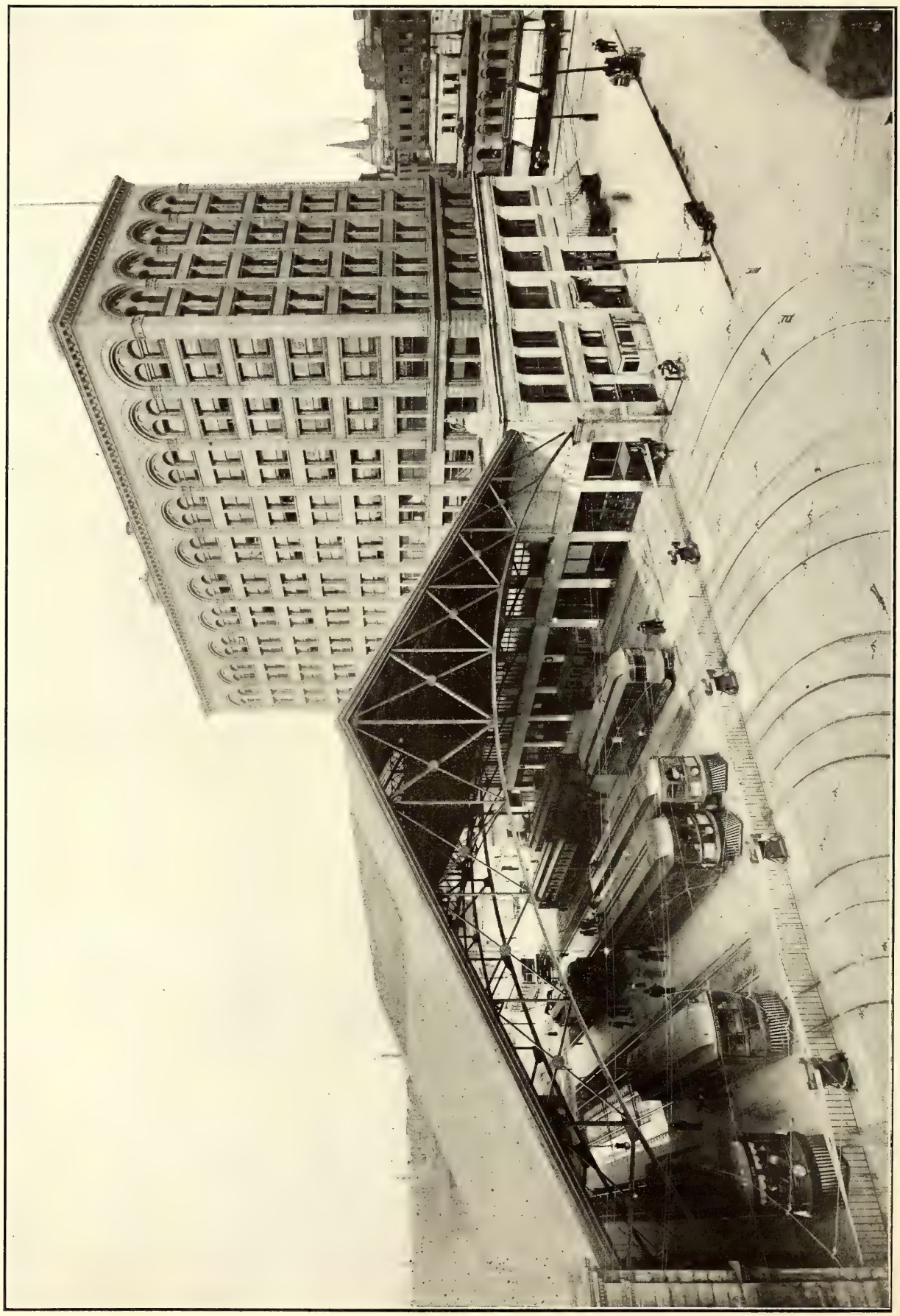
The new freight station at Jackson, which is owned by the Michigan United Railways, also is used by the Detroit, Jackson & Chicago line of the Detroit United Railway. The expense of operation is divided on a tonnage basis and all through merchandise is reloaded at this point. The new Jackson freight warehouse is a fireproof structure with a driveway on one side and several loading tracks on the other. Already the capacity of this station has been exceeded and plans are under way for doubling its size.



FREIGHT BUILDINGS OF THE INDIANAPOLIS TERMINAL

JOINT TERMINALS AT TOLEDO

The Toledo Railways & Light Company owns terminal passenger and freight stations near the heart of the city of Toledo, the privilege for the use of which is leased to seven of the electric railways entering the city. The Ohio Electric Railway has its own terminals and the Toledo, Bowling Green & Southern, having its own freight station, uses only the joint passenger station. A



INDIANAPOLIS TRACTION TERMINAL BUILDING AND TRAIN SHED

stock company has been formed to operate the freight and passenger stations. The general managers of the different roads using the terminals control the management, each road sharing in the expense of operation and paying an arbitrary charge per year to the Toledo Railways & Light Company for the privilege of using the stations. In addition to this arbitrary charge each interurban road pays a fixed sum for each passenger carried into or out of the city over the tracks of the local company.

In June of the present year 4500 tons of freight were handled through the joint station in Toledo. The warehouse force includes 20 freight handlers in the outbound house, four men in the inbound house and 10 clerks. There is no night force in the office, but two men are on hand in the warehouses to accept or deliver freight. The cost of handling the freight through the freight houses is about 15 cents a ton, exclusive of the charges for the use of the tracks. It is interesting to note that eight years ago when this station was built one man handled all the freight. At the present time the traffic is restricted on account of lack of room for storage.

The Toledo station of the Toledo, Bowling Green & Southern road is located in the wholesale district. It is a brick and concrete building 30 ft. x 200 ft. in dimensions.

Each of the two roads in Grand Rapids has an independent freight station. The Grand Rapids, Grand Haven & Muskegon has two warehouses, the inbound building being about 60 ft. x 100 ft. and the outbound building 40 ft. x 100 ft. The structures have concrete foundations and basement, brick walls and a mill-type roof. Six tracks serve the two houses and provide room for 12 cars. The Grand Rapids, Holland & Chicago freight station in Grand Rapids is a brick structure which cost $10,000, and is located on land which cost $20,000. The terminal provides three loading tracks and six doors open on the team side of the building. A cold-storage room is enclosed on the first floor with the office supported above it. This company also has a freight station at Holland which cost $3,000.

The Chicago, South Bend & Northern Indiana Railway has recently completed a two-story and basement freight station in South Bend with floor dimensions of 30 ft. x 165 ft. The traffic is growing so rapidly that another building of like size will be erected this fall. An illustration of the South Bend freight house appears on page 604. The building is constructed with concrete basement walls and a red brick superstructure trimmed with cut stone. It is heated by steam. The doors leading to the team tracks on one side and to the car tracks on the other are protected by rolling steel shutters. An elevator serves for handling freight between the basement and the two upper stories. This freight house is provided with a hot and cold room for the storage of perishable shipments.

The Ohio Electric Railway has about completed two large new passenger stations at Springfield and Lima. The Springfield station is a three-story brick building of triangular form. The two street sides are each 100 ft. long. The diagonal side faces two pairs of loading tracks protected by platform coverings. The ground floor of the station building will be subdivided into a restaurant, women's rest room and toilet, men's room, baggage room, parcel room, ticket office and a general waiting room 88 ft. x 56 ft. The second floor will provide 13 offices for the operating department.

The Lima station is a two-story rectangular shaped building of brick and cut stone, 99 ft. x 71 ft. in ground dimensions. This building is located on a terminal property of half a city block. The face of the building is set back 75 ft. from the street line. Four tracks pass at the rear of the station, extending across the width of the block on private property. The full trackage for the length of the block is covered with a train shed.



WAITING ROOM OF INDIANAPOLIS TERMINAL

TRAFFIC WORK ON ELECTRIC RAILWAYS IN THE MISSISSIPPI VALLEY

THE larger electric railways serving the Mississippi Valley States offer a wide variety of service and therefore form an interesting subject for study. These roads are notable chiefly for the growth of their freight traffic. It is said that the interurban railways of Iowa could not be operated successfully without the revenue derived from the freight traffic. The Illinois Traction System has been especially successful in building up its freight business and the work of its traffic organization is of interest because of the wide territory served.

Three of the roads treated in this section—the Twin City Rapid Transit Company, the Aurora, Elgin & Chicago Railroad and the Chicago & Milwaukee Electric Railroad—serve densely populated communities. The latter two lines are interurban roads with metropolitan terminals, while the Twin City property is a street railway system operating high-speed suburban service. This company does not handle freight, as do all the others considered in this chapter, but its advertising methods have been so fruitful that particular attention is called to them.

The interurban railways treated in this chapter differ from those in Indiana, Ohio and Michigan in that with few exceptions they are operated more nearly along steam railroad lines. The roads of Illinois and Iowa are favored with friendly relations with their steam connections and thus have been able to build up a carload interchange business that can profitably be hauled in trains.

An account of the traffic methods of the Ft. Dodge, Des Moines & Southern Railway, a property which is operated very closely along steam railway lines, was presented on page 1094 of the issue of this paper for June 25, 1910. The article described in detail the traffic organization of this company and its work, so that the information previously presented is not repeated here.

ORGANIZATION OF TRAFFIC DEPARTMENTS

The traffic organizations of the roads in the Mississippi Valley States which are engaged in freight handling do not differ materially from those of small competing steam roads, except as to size. The Illinois Traction System has the largest traffic organization of any road visited. It is headed by George Quackenbush, who has the title of traffic manager and reports to H. E. Chubbuck, vice-president. Assisting the traffic manager are a passenger agent and five general agents, each having jurisdiction over both freight and passenger traffic on their respective sections of the system. Two of the five general agents of the Illinois Traction System have assistants, and a general agent at St. Louis is assisted by a commercial agent and a city passenger agent. During the past year the Illinois Traction System organized a department of publicity, which is in charge of Fred Buffe, an experienced daily newspaper man. This department prepares and supervises the distribution of advertising matter and is responsible for the relations with the daily press throughout the entire territory served.

The traffic department of the Aurora, Elgin & Chicago Railroad Company is in charge of R. Breckinridge, traffic agent, who reports to E. C. Faber, general manager. Mr. Breckinridge has his office at the Fifth Avenue terminal in the business district of Chicago. The work of this department includes the solicitation of excursions, the supervision of newspaper and other advertising and the operation of Glenwood Park on the Fox River at Batavia.

The traffic department of the Chicago & Milwaukee Electric Railroad is headed by E. H. Vivian, general traffic manager, who reports to E. E. Downs, general manager. Mr. Vivian also is claim agent of the company.

The traffic promotion work of the Twin City Rapid Transit Company is carried on by Arthur W. Warnock, general passenger agent, who reports to the general manager on matters of operation and to the president on public relations. Mr. Warnock's earlier training as advertising agent of the Chicago, St. Paul, Minneapolis & Omaha lines of the Chicago & Northwestern System and his general editorial and business experience on several large daily papers especially fit him for his present position. The office of the general passenger agent of the Twin City lines has full responsibility for all publicity, including advertising and the general relations with the press; it also plans and executes all regular and special campaigns in the promotion of regular and excursion traffic and supervises the sale of car advertising space. The walls of Mr. Warnock's office are decorated with more than 100 different samples of the many series of advertising cards which lately have been used in promoting passenger travel on the Twin City lines.

The Inter-Urban Railway of Des Moines, Ia., has a traffic department of which F. S. Cummins is manager. Mr. Cummins is also chief engineer of this interurban system. He is assisted in the traffic work by a traveling freight agent and the station agents in all of the towns report to him.

The traffic department of the Cedar Rapids & Iowa City Railway is headed by Isaac B. Smith, traffic manager, who also is secretary and treasurer of the company. This road is a member of the American Railway Association and keeps its accounts and handles its traffic work according to steam railway methods. The traffic and operating departments are entirely separate, each reporting to the president. The traffic manager is assisted in his work by a freight and passenger solicitor and two office men.

P. P. Crafts, general manager of the Iowa & Illinois Railway Company, acts as traffic manager and is assisted in that work by a freight and passenger solicitor who also investigates claims.

TIMETABLES AND FOLDERS

Two general forms are used for presenting the timetables of the Twin City Rapid Transit Company's service. Each carries a large map and shows schedules for a different section of the system. One 20-page folder gives the time for cars running between Minneapolis and Lake Minnetonka and also shows the schedules of the express steamers which are operated on the lake and make connection with all cars. The other timetable shows the schedules of the St. Paul and Stillwater lines. The folders cost one cent each. They are distributed at the ticket offices and transfer points and from all information bureaus in the Twin Cities. Formerly the color of the paper stock on which these timetables were printed was changed with the publication of each new schedule. This practice has been discontinued because of an apparent waste of circulation.

Two picture folders are published, one entitled "How to See the Twin Cities," and the other "Beautiful Lake Minnetonka." Both folders fit a No. 10 envelope and are rewritten every spring. Sixty thousand copies of the two folders are issued annually. The picture folder, "How to See the Twin Cities," has been described in this paper. Briefly, this publication comprises 48 pages, 8 in. x 9 in., printed in two colors and profusely illustrated with half-tone views. The middle pages of the folder carry a bird's-eye view map in three colors. This map is 30 in. long. It represents a territory 16 miles by 48 miles in extent. The cover pages of this folder are especially attractive. They are printed in five colors. The front cover shows a bird's-eye view of the Twin Cities and the back cover shows two figures typifying St. Paul and Minneapolis greeting visitors.

The Lake Minnetonka folder is a single sheet 18 in. x 16 in., carrying a large map of the lake district served by the two interurban divisions, and showing views of the company's interurban cars, excursion steamers and park resorts.

Miscellaneous folders of the Twin City Company include bulletins on the handling of baggage on the interurban lines, a synopsis of the navigation laws of Minnesota for boat owners and a large four-color map of the Twin City territory.

The folders of the Twin City Rapid Transit Company, when issued in the spring, are widely advertised in the daily papers. The advertisements announce that copies will be mailed on receipt of 6 cents in stamps. At the time of this advertising campaign it is stated that from 25 to 150 requests for copies are received daily from surrounding towns. The picture folders are also distributed by the ticket agents and by a local distributing agency which supplies the hotels and information bureaus. Formerly these folders were kept in the railroad racks,



COVER DESIGN OF TWIN CITY FOLDER

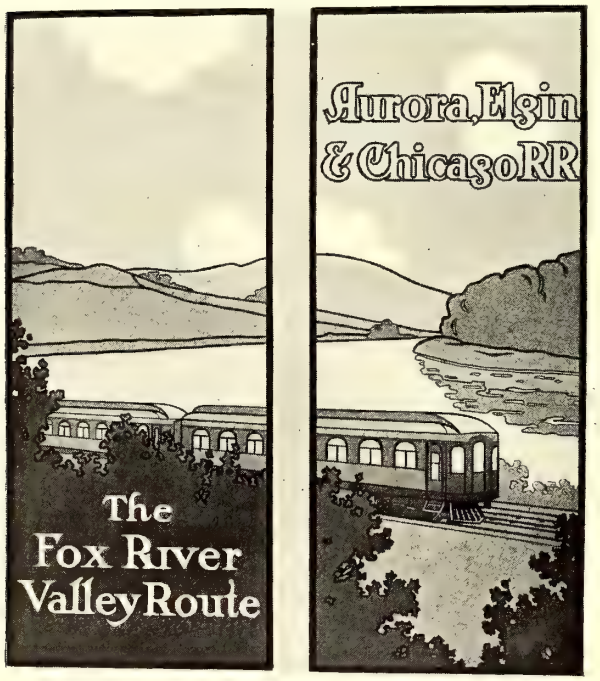
but it has been found better practice to follow the method of distribution described.

FOLDERS OF ILLINOIS ROADS

The Chicago & Milwaukee Electric Railroad publishes its timetables in three forms and also has them inserted in the trolley guides for Chicago and Milwaukee. The official timetable is a four-page folder printed on colored stock and showing in red the time of the four limited parlor-car trains between Evanston and Milwaukee. Smaller timecards, the cost of which is defrayed by local advertising printed on them, show the leaving time of the trains at one station only. These cards are published for all important stations. A pictorial folder with three-color covers also is issued. This folder is a complete guide to the thickly populated lake shore territory lying between Chicago and Milwaukee. In addition to its timetable publications this company displays timecards mounted in frames. These cards are 44 in. long by 14 in. wide and are printed in two colors. This company operates three classes of trains leaving the terminals at the same time: (1) Milwaukee-Evanston limited, (2) Milwaukee-Evanston local and (3) Evanston-Waukegan local. The limited trains make five pas-

senger stops in 73 miles and complete the run from Evanston to the city limits of Milwaukee in two hours. Fifteen minutes are required for entering the city. The Evanston-Milwaukee locals make only the main depot stops in each town.

The standard timetable folders of the Aurora, Elgin & Chicago Railroad are published as eight-page single sheets; four of the pages show the weekday and Sunday time of all trains of the third-rail division. Four other pages are devoted to the schedules of the Fox River trolley division and a condensed schedule of the connections from Elgin to Freeport via the Elgin-Belvidere Electric Company and the Rockford & Interurban Railway. This standard folder shows the rates of fares to all points mentioned in the timetables and carries an advertisement of the "Panhandle" trip of 110 miles over the company's lines. The timetables are published with covers of several colors and cost $13 a thousand in lots



COVERS OF AURORA, ELGIN & CHICAGO SCENIC FOLDER

of 10,000. They are distributed at all stations and also by the Railway & Steamship Advertising Company, which has racks throughout the Chicago territory. In addition to the standard folder a timecard of four pages is published for each important station on the road. The inside pages show the leaving time of trains between one station and Chicago. These timecards are published by a banking association which uses the outside pages for advertising. Twenty-five thousand are furnished the railroad company free of charge each month. The cost of these four-page cards is about $4 a thousand. They are printed on high-grade coated stock.

Recent publicity matter of the Aurora, Elgin & Chicago Railroad also includes two pictorial folders devoted largely to points of interest in the Fox River Valley. The latest issue of these folders is a single sheet, 23 in. x 18 in., containing a seven-color lithograph map showing the territory between Chicago and the Fox River Valley, which is reached by three branches of the road and also is served by an interurban division which parallels the river for 40 miles. The other 12 pages of this folder carry half-tone views of attractive scenes and descriptions of the company's parks. These picture folders are distributed in the same way as the timetables and also are mentioned in newspaper and other advertising. The folders cost about 3 cents each. Several smaller folders are devoted to descriptions of one-day outings which the company has to offer at parks and resorts at its western termini.

The Illinois Traction System issues two timetables; one shows the schedules of all trains and the other is devoted entirely to the sleeping-car service between St. Louis, Springfield and Peoria. The general timetable is a single sheet folding into 20 pages 3¼ in. x 6 in. in size. With the exception of the two cover pages and a double-page advertisement of the "High Ball" fast freight from St. Louis to Peoria and the daily through package express from Chicago to Illinois Traction towns via the Chicago & Eastern Illinois Railway, the entire space is devoted to schedules. The front cover of the folder carries a two-color map of the Illinois Traction lines, showing all the cities and towns reached.

The folder devoted to the sleeping-car service is made up of 16 pages, 3 in. x 6 in., printed in two colors. The cover page shows a half-tone view of one of the company's sleeping cars, which were described in the Electric Railway Journal for March 19, 1910, page 476. Four other half-tone illustrations of the cars and a reading article on the service are given. In addition to its timetable folders the Illinois Traction System displays large timecards, which are hung in stations along the route.

FOLDERS OF IOWA ROADS

The Inter-Urban Railway of Des Moines, Ia., publishes an eight-page standard-size timetable displaying a two-color map of the territory served and showing the schedules of the two daily freight deliveries on all its divisions. This folder carries advertisements encouraging suburban homeseekers and manufacturers desiring locations to investigate the territory reached by the interurban railway. The freight service is advertised by timecards displayed in all the shipping rooms in Des Moines and mailed to representatives in all lines of business that ship freight to and from the surrounding cities. A small vest-pocket folder of six pages, 1¾ in. x 3½ in. in size, printed in red and blue on white stock, is issued each summer for the convenience of the suburban and pleasure-riding patrons of the road. A 36-page pictorial folder is devoted to descriptions of the scenic features of the entire road. In addition this folder includes short announcements of the service offered and presents a schedule of the special events and attractions for the year. The pictorial folder is illustrated by 45 half-tone engravings of attractive scenes.

The Iowa & Illinois Railway Company publishes a six-page timetable folder showing the connections with steam railway lines at Clinton and Davenport; also a timetable hanger, 17½ in. x 23 in., printed in three colors and carrying a 15-in. x 7-in. half-tone engraving of a passenger car, is given general distribution. These hangers are edged at the top with brass and are provided with an eye so that they may be hung conveniently

on a wall. The large timetables are placed in all the more important hotels in cities on the trunk lines between Chicago and Omaha. They are distributed by a representative of the company and are furnished in a flexible form for hanging or on bristol board for tacking up on a wall.

"Trolley to Leavenworth" is the title of an illustrated

NEWSPAPER AND MISCELLANEOUS ADVERTISING

In the opinion of the general passenger agent of the Twin City Rapid Transit Company the various advertising mediums used rank in value as follows: (1) Daily newspaper space, which is placed first because of the possibilities for obtaining quick results; (2) cards displayed



DISPLAY HANGER AND TIMETABLE OF IOWA & ILLINOIS RAILWAY

pamphlet issued for general distribution by the Kansas City-Western Railway. In addition to timetables it contains a picture map of the road, an illustration of one of its standard passenger cars, attractive views along the route, and descriptions of the service offered, power stations, equipment, etc., of the line. The prices of tickets and special-car rates also are included in tabular form in the folder.

in local cars, and (3) company publications, including folders, maps and timetables. The Twin City lines purchase display space in equal amounts in all the daily papers in the territory. The contracts for this space have averaged about $17,000 a year for five years. A sample of one of the general advertisements, which has brought the best results, is reproduced on page 614. This advertisement, it will be noted, shows the fares for a great

number of pleasure trips over the Twin City lines. The passenger department uses a special blank form in ordering the insertion of newspaper advertisements and thus keeps a check on the expense. Newspapers are carried on local cars at ¼ cent per pound and on interurban cars at ½ cent per pound. The revenue from newspaper handling is credited to the advertising account.



THE WOODS ARE CALLING YOU

FOR A DAY OUT OF THE HEAT.

The beautiful cool country is yours for the day—river and woods and green fields. A rest from the rush, noise and heat of the city is only a short trolley ride away. Our New Outing Folder tells all about it.

TAKE YOUR FISHING TACKLE AND LUNCH BASKET

Trains from Fifth Avenue Terminal Station every few minutes. Parlor and Buffet Car Service and limited trains at convenient hours to Aurora and Elgin and intermediate points.

AURORA, ELGIN & CHICAGO R. R.

THE FOX RIVER VALLEY ROUTE.

All Trains Leave FIFTH AVENUE TERMINAL, Near Jackson Boulevard.
(In center of business district adjacent to Union Loop.)

Information—Phone Harrison 5388.

NEWSPAPER ADVERTISEMENT OF AURORA, ELGIN & CHICAGO

A great many display cards have been used effectively by the passenger department of the Twin City lines. The most successful of these were the "Hi Jinks" cards, which bore short verses regarding the interesting and attractive features of the service and resorts as they appealed to "Hi Jinks."

The advertising privilege in the cars is sublet, but the company retains the use of eight side window spaces for accommodating cards 13½ in. x 24 in. in size. Clips support the cards so that they can be read from both sides. Six-ply cards printed on both sides in several colors are used. This method of displaying advertisements is regarded as unusually good, and from May 15 to October 15 the passenger department advertises the special features of its service in the eight side windows on 800 cars. The cards are changed every Friday night. Through the winter the side-window space is leased for advertising high-class entertainments. The passenger department advises the mechanical department regarding the placing of the cards by designating the location of each kind of card to be used in the cars on a special form which shows a numbered diagram of the car window spaces.

SPECIAL ADVERTISING IN ILLINOIS

The miscellaneous advertising of the Chicago & Milwaukee Electric Railroad includes several forms of two-color display cards describing features of the service and presenting timetables. These cards are placed on bulletin boards at the company's stations. Dash signs, 14 in. x 22 in., are carried on cars to announce special events along the line. Handbills also are distributed in the tributary towns and are hung in the cars to announce events and changes in schedule. Picture postal cards showing the exterior and interior views of one of the parlor-car trains run between Evanston and Milwaukee are enclosed in correspondence sent out from the traffic office. Two card spaces are used in each local car and in the cars of the Chicago Railways Company which connect with the interurban road. Advertising space is purchased in the Milwaukee daily papers for featuring the fast trains to Chicago. The menu cards of the cafe cars carry advertisements of the 46 trains daily between Chicago and Milwaukee.

The Chicago & Milwaukee Electric and the Aurora, Elgin & Chicago Railroads have used double-page display advertisements in connection with real estate enterprises along the route. The cost of this display advertising has been borne largely by the real estate firms.

The Aurora, Elgin & Chicago Railroad is probably as large a user of metropolitan billboard space as any electric railway company in the Central or Mississippi Valley States. Each summer attractive 24-sheet posters are carried on 150 or more billboards under the control of the American Posting Service. These boards are located throughout Chicago and its suburbs. The poster used this year is a lithographic view of a train of cars on a double-track roadway set in a rural background.

TWIN CITY LINES

VISITORS CAN SEE

The Twin Cities

THEIR BEAUTIFUL LAKES, PARKS, FALLS, MOUNDS, AS WELL AS THEIR DESIRABLE RESIDENCE SECTIONS.

Most Quickly, Comfortably and Inexpensively

On Electric Cars

TRAVELING back and forth between Minneapolis and St. Paul the visitor may obtain a good idea of the geography of the Twin Cities, as well as enjoy much interesting sightseeing. There are four Interurban lines connecting the Twin Cities, and each line has its own special scenic attractions. Cars on each line are marked "Minneapolis & St. Paul," on another "Como-Harriet," or "Como-Hopkins," on another "Selby-Lake," on another "Snelling-Minnehaha." The fare from city to city is 10 cents, collected in two fares of 5 cents in each city, entitling the passenger to transfer at either end to any local line desired.

All places of interest can be reached from either St. Paul or Minneapolis as starting point. For instance, if you start from St. Paul to Lake Minnetonka, go to Minneapolis by any Interurban line and ask conductor for transfer to Lake Minnetonka. On return trip, ask conductor on Lake Minnetonka Car for transfer to any Interurban line to St. Paul.

PLACES OF INTEREST YOU SHOULD VISIT	CARS YOU SHOULD TAKE—FROM MINNEAPOLIS.	FARE	CARS YOU SHOULD TAKE—FROM ST. PAUL.	FARE
Lake Minnetonka "Minnesota's Famous Resort." 5 FAMOUS BOAT TRIPS TO MAKE. WAYZATA EXPRESS. Round Trip—14 Miles—2 Hours....20c MINNETONKA BEACH EXPRESS. Round Trip—6 Miles—1 Hour....20c ZUMBRA HEIGHTS EXPRESS. Round Trip—10 Miles—1 Hour....20c SPRING PARK EXPRESS. Round Trip—7 Miles—1 Hour....20c BIG ISLAND PARK FERRY. Round Trip—4 Miles—45 Min....10c	"Lake Minnetonka" "Excelsior Limited" "Excelsior Excursion" "Deephaven"	25c	Take any Interurban Car and Transfer in Minneapolis.	30c
LAKE MINNETONKA RESORTS—BIG ISLAND PARK, TONKA BAY HOTEL, EXCELSIOR, DEEPHAVEN.		25c	" "	30c
STILLWATER—MINNESOTA STATE PRISON.	Take any Interurban Car and Transfer in St. Paul.	35c	"St. Paul & Stillwater"	30c
WILDWOOD—"THE BEAUTIFUL" ON WHITE BEAR LAKE.	" "	20c	"St. Paul & Stillwater" "St. Paul & Wildwood"	15c
WHITE BEAR TOWN.	" "	25c	" "	20c
MINNEHAHA FALLS AND PARK MINNESOTA SOLDIERS' HOME LONGFELLOW GARDENS	"Minnehaha Falls" "Snelling-Minnehaha"	5c	"Snelling-Minnehaha"	10c
HISTORIC FORT SNELLING	"Snelling-Minnehaha"	5c	" "	5c
LAKE CALHOUN LAKE HARRIET	"Como-Harriet-Hopkins" "Lake Harriet" "Oak & Harriet"	5c	"Como-Harriet-Hopkins"	10c
FLOUR MILLS AND ST. ANTHONY FALLS	"Como-Harriet-Hopkins" "Oak & Harriet"	5c	" "	10c
UNIVERSITY OF MINNESOTA	" "	5c	" "	10c
STATE FARM AND AGRICULTURAL SCHOOL	"Como-Harriet-Hopkins"	5c	" "	5c
MINNESOTA STATE FAIR GROUNDS	"Como-Harriet-Hopkins" "Fair Grounds"	5c	"Como-Harriet-Hopkins" "Fair Grounds"	5c
COMO PARK AND LAKE	"Como-Harriet-Hopkins"	10c	"Como-Harriet-Hopkins" "Como Park"	5c
MINNESOTA STATE CAPITOL	"Como-Harriet-Hopkins" "Minneapolis & St. Paul"	10c	Take any Car Going North on Wabasha Street to Capitol	5c
INDIAN MOUNDS AND STATE FISH HATCHERY	Take any Interurban Car and Transfer in St. Paul.	10c	"Rondo & Mounds Park"	5c
PHALEN PARK AND LAKE	" "	10c	"Phalen Park"	5c
HARRIET ISLAND AND PUBLIC BATHS—ST. PAUL	" "	10c	"Mississippi & W. St. Paul" "Jackson & Stryker"	5c
GEBBER BATHS ON HALL'S ISLAND—MINNEAPOLIS	Take any Car going North on Washington Ave. to Plymouth.	5c	Take any Interurban Car and Transfer in Minneapolis.	10c
CAMDEN BATHS AT SHINGLE CREEK—MINNEAPOLIS	"Cedar and Camden."	5c	" "	10c

For any further information please telephone, call on or write to
A. W. Warnock, General Passenger Agent "Twin City Lines," Hennepin Ave. and 11th St., Minneapolis.
Telephones—Minneapolis, N. W. 4580 M.—T. S. 3134. St. Paul, N. W. 2616 Cedar.

MOST SUCCESSFUL NEWSPAPER ADVERTISEMENT USED BY TWIN CITY LINES

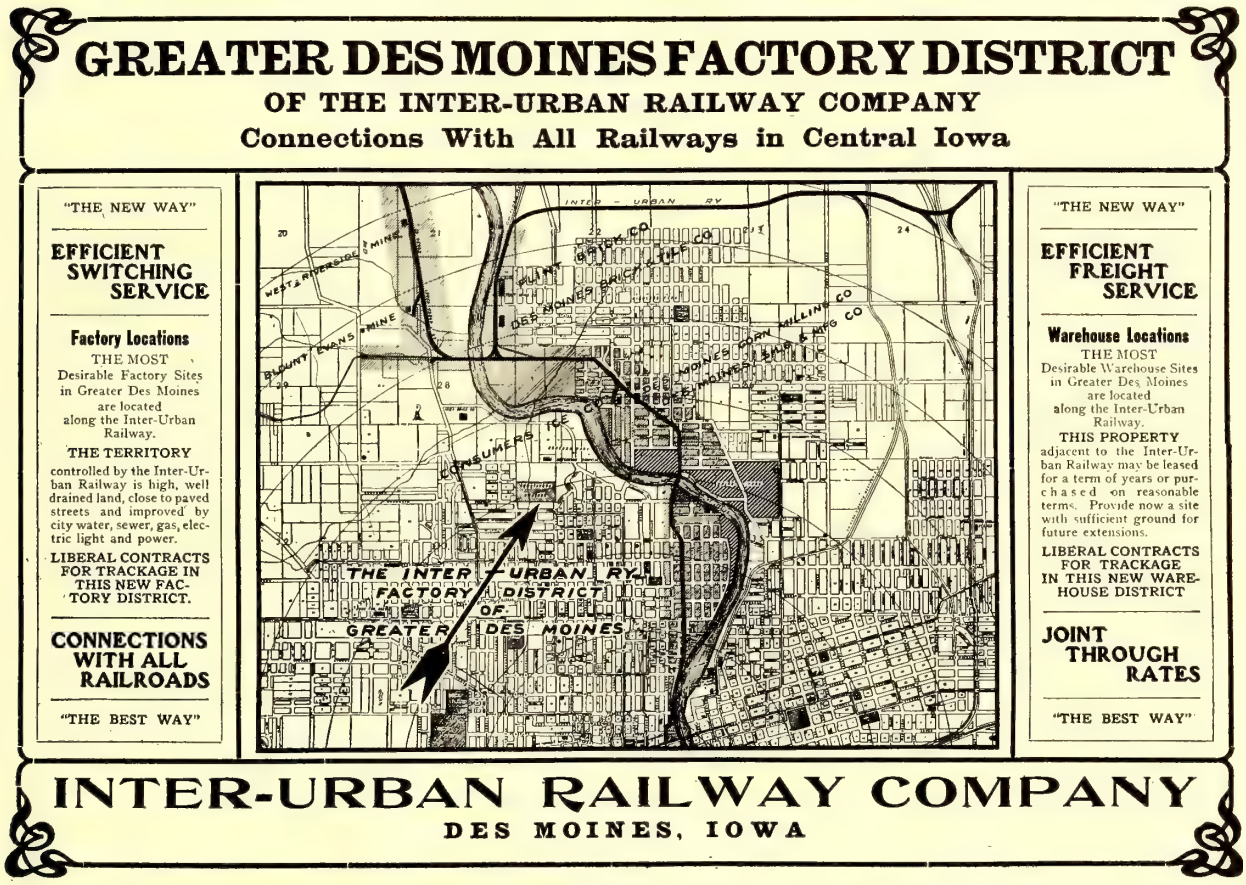
The Aurora, Elgin & Chicago Railroad also is a large user of newspaper space, carrying advertisements up to a double-page size in the Chicago daily papers. The copy used in the daily newspapers varies according to the season, and one of the chief reasons for the use of daily

newspaper advertising is that it enables the traffic department to reach a great many people quickly when the weather is right for excursions or pleasure riding. Interurban travel is encouraged by cloth signs carried on the company's local cars in Elgin and Aurora.

The display advertisements of the Illinois Traction System include handbills for special events, half-sheets posted on billboards for advertising the parks and combination excursions with river steamers at Peoria, and special cards and car hangers for announcing important events. In some instances the advertising department of the company arranges with the promoters of the special events to include in their advertising matter mention of the electric service, on condition that the railroad will distribute the advertisements. The copy run in the newspapers as a part of their regular issues. In this way 152,000 eight-page descriptions of the road were circulated throughout the State at a cost of only $1500.

SPECIAL ADVERTISING IN IOWA

The advertising of the Inter-Urban Railway of Des Moines is confined largely to company publications. The traffic department holds that the steam railroads have shown the advisability of making a road popular through the passenger service and thus gaining the freight traffic. Therefore, "on time" service is held to be the best kind of advertising. The company distributes hanger timecards showing a map of the road, a half-tone view of a car and advertisements of the freight service. No advertising is carried in the cars nor is foreign advertising allowed at the stations or station yards. Thus, offence to



NEWSPAPER ADVERTISEMENT SHOWING FACTORY DISTRICT SERVED BY DES MOINES INTER-URBAN RAILWAY

papers is largely in the form of reading notices for which transportation is exchanged. This year approximately $10,000 is being spent in newspaper advertising in addition to the exchange contracts for the regularly run timetable copy. Early in the year the publicity department prepared an eight-page newspaper article which, with the proper head and date line added, was supplied for one edition of the largest paper in each of the more important towns in Central and Northern Illinois. This long article described and illustrated the interesting features of the various McKinley properties in Illinois and included more than 50 illustrations. The printing of the eight-page forms was all done by the publicity department; then a sufficient number for one edition of each of the papers was shipped and a release date fixed, so that on that date the more important papers of the State inserted the eight-page description of the McKinley property as a part of their regular issues. In this way 152,000 eight-page descriptions of the road were circulated throughout the State at a cost of only $1500.

The local merchants who regularly patronize the interurban road is avoided. The only special advertising displayed on the company's property is that announcing general holiday excursions. Publicity is given the road by the activity of the officers and representatives in commercial and social affairs. The keynote of the newspaper advertisements used is that the Inter-Urban Railway furnishes fast and through freight service from any point on its lines to all steam railway territory. The factory district of Des Moines is almost entirely available by the interurban line, and half-page newspaper advertisements are used to influence the location of warehouses and manufacturing establishments along the tracks.

The Iowa & Illinois Railway Company displays dash signs on its interurban cars, and 30-in. x 30-in. posters are placed on steel waste-paper receptacles at the street corners in Davenport. Special events are featured in

the newspapers and general advertisements of the service are carried on four theater curtains and in the programs of two theaters. No advertising is carried in the cars. The average yearly expense for advertising the service of this company is $4000, which includes a loss of about $900 at a park which the company operates on its interurban line. When the road was first started the company obtained considerable publicity from a contest for the best four-line limericks using the names of the two terminal cities, Clinton and Davenport, and the name of the road. Two 500-mile books were given as prizes. In the opinion of the management the best results from advertising are obtained by the use of dash signs, circular letters, timetables and posters, in the order named.

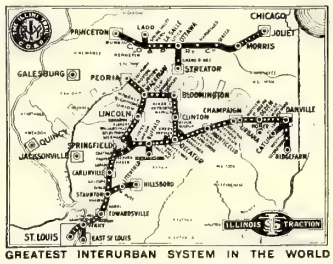
EXCURSION AND SPECIAL PARTIES

The Aurora, Elgin & Chicago Railroad Company handles a great many large excursions. The special-party and excursion business is encouraged by personal solicitation by the traffic agent. Two forms of contracts are made for handling excursions, one basing the rate according to the number of cars used, and the other furnishing the service on a per capita basis. Contracts are drawn for either kind of service. In the special-car contract the number of passengers carried is limited to 70 and the signer of the contract agrees to appoint two men for each car to act under the direction of the railway conductor in assisting in every way to prevent accidents. The per capita form of contract states that the tickets sold shall

THE ILLINOIS TRACTION SYSTEM

(THE McKINLEY LINES)

First Days Freight Delivery to All Points from Chicago and Saint Louis



Hourly Passenger Trains to E. St. Louis, Decatur, Champaign, Danville, Peoria, Bloomington and All Intermediate Points

GREATEST INTERURBAN SYSTEM IN THE WORLD

Electric Travel Does Away with Dust, Dirt, Smoke and Cinders

SPRINGFIELD TERMINAL TIME CARD

ALL TRAINS DAILY (SUBJECT TO CHANGE WITHOUT NOTICE) EFFECTIVE APRIL 1, 1910

READ DOWN BOTH SIDES

EAST BOUND

Limited	Local	Limited	Local	Limited	Local	Limited	Local	Local		Local	Limited	Local	Limited	Local	Limited	Local	Local	Local
A M	Noon	A M	A M	A M	A M.	A M	A M	A M		P M	P M	P M.	P M.	P M.	P M	P M	P M.	P M.
1:00	12:00	11:00	10:00	9:00	8:00	7:00	6:00	5:00	Lv. Springfield Lv	2:00	3:00	4:00	5:00	6:00	7:00	8:40	10:00	11:15
2:27	1:50	12:27	11:50	10:27	9:50	8:27	7:45	6:35	Ar. Decatur Ar	3:50	4:27	5:50	6:27	7:50	8:27	10:20	11:35	12:45
4:25		2:25		12:25		10:25		8:50	" Champaign "	6:35	6:25		8:25		11:00		1:30	
5:55		3:55		1:55		11:55		10:50	" Danville "		7:55		9:55		12:30			
P M	P M	P M	A M	P M	A M.	A M	A M	A M		P M	P M	P M	P M	P M	A M	P M	A M	A M.

SOUTH BOUND

Local	Limited	Local	Limited	Local	Limited	Local	Limited	Limited Peoria Sleeper		Limited	Local	Limited	Local	Limited	Local	Limited	Local	E. St. L. Sleeper
A M	A M	A M	A M	A M	A M.	A M.	A M.	A M.		P M.	P M.	P M.	P M.	P M.	P M.	P M.	P M.	P M
11:30	11:00	9:30	9:00	7:30	7:00	6:00	5:00	2:15*	Lv. Springfield Lv	1:00	1:30	3:00	3:30	5:00	6:00	7:00	9:00	11:59†
1:30	12:30	11:30	10:30	9:30	8:30	7:55	6:30	3:55	Ar. Carlinville Ar	2:30	3:30	4:30	5:30	6:30	7:48	8:30	10:50	2:05
2:25	1:10	12:25	11:10	10:25	9:10	8:55	7:10	4:45	" Staunton "	3:10	4:25	5:10	6:25	7:10	8:35	9:10	11:40	3:00
3:17	2:17	1:17	12:17	11:17	10:17		8:17	5:17	" Litchfield "		5:03	6:14	7:27		9:29	11:25		
3:47	2:47	1:47	12:47	11:47	10:47		8:47	5:47	" Hillsboro "		5:35	6:47	8:00		10:00	11:57		
2:25	1:10	12:25	11:10	10:25	9:10	8:55	7:10	4:45	Lv. Staunton Lv	3:10	4:25	5:10	6:25	7:10	8:35	9:10		3:00
4:10	2:40	2:10	12:40	12:10	10:40	11:00	8:40	6:30	Ar. E. St. Louis Ar	4:40	6:10	6:40	8:10	8:40	10:15	10:40		5:00
P M.	P M	P M	P M	P M	A M	A M	A M.	A M.		P M.	P M.	P M.	P M.	P M.	P M.	P M.		A M.

NORTH BOUND

		Local	Limited	Limited	Local	Limited	Local	Peoria Sleeper		Limited	Limited	Local	Limited	Local	Limited	Local	Limited	
		A M	A M	A M	A M	A M	A M	A M		A M.	A M.	P M.	P M.	P M.	P M.	P M.		
		11:30	10:55	8:55	7:35	6:50	4:55	4:15*	Lv. Springfield Lv	12:55	2:55	3:30	4:55	6:00	6:55	9:00	11:15	
		12:50	11:54	9:54	8:50	7:49	5:56	5:20	Ar. Lincoln Ar	1:54	3:54	4:50	5:54	7:20	7:54	10:02	12:30	
		3:00	1:40	11:40	11:00	9:40		7:00	" Peoria "	3:40	5:40	7:00	7:40		9:40	11:45		
		3:00	1:40	11:40	11:00	9:40	7:40	7:05	" Bloomington "	3:40	5:40	7:00	7:40		11:05	1:00		
		P M.	P M.	A M	A M	A M	A M	A M		P M.	P M.	P M.	P M.	P M.	P M.	A M.	A M.	

‡ All Limited Trains except 7:00 P M leaving Springfield East Bound make direct connections at Decatur for Clinton and points north of Bloomington.
* Peoria-E. St. Louis Sleeper attached to Combination Smoker and Passenger Coach for seat passengers. Berths south from Springfield, $1.00; north to Peoria, $1.50. Direct connections each way at Mackinaw Junction for Bloomington passengers.
† Springfield-E. St. Louis Sleeper open for occupancy at 9:00 P.M. Berths, $1.00.

The Only Interurban in the World to Operate Sleeping Cars — Peoria to E. St. Louis — Springfield to E. St. Louis

ILLINOIS TRACTION

"THE ROAD OF GOOD SERVICE"

H. E. CHUBBUCK, Vice Pres. Executive, Peoria, Ill. C. F. HANDSHY, Gen. Supt., Springfield, Ill. G. W. QUACKENBUSH, Traffic Mgr., Springfield, Ill.

ILLINOIS TRACTION

TYPICAL TERMINAL TIME CARD OF ILLINOIS TRACTION SYSTEM

Electric signs are displayed on the stations at terminals.

The Kansas City-Western Railway uses billboard advertising to a considerable extent in Kansas City and through the country within a radius of 100 miles of the Kansas City terminal. Pictures of the Soldiers' Home, Lansing State Prison, a guard mount at Fort Leavenworth and a picture of one of its large cars are shown on a 16-sheet billboard. The management believes that this form of publicity gives much better returns than any other method of advertising its attractions. The company also issues folders containing timetables and illustrations of various points of interest on the line. Advertising space is used in the Kansas City and Leavenworth newspapers, including socialist, German and negro publications.

be good only on the special trains mentioned in the contract. Both forms of special-car contracts provide for postponing the use of the service on account of inclement weather. The going and returning leaving times and the stops to be made en route are stated in the contracts.

The charges for chartered cars from Chicago to the three Fox River terminals 40 miles west of Chicago are graduated according to the number of cars required, 10 or more cars being sufficient to obtain the minimum rate. When special parties are carried at the per capita rate the organizers of the special party are required to guarantee a certain number of fares. The rates are made according to traffic conditions and are graduated according to the size of the party. A party of 1000 people obtains the minimum rate. During the present season the

company has handled a number of 40-car excursions from Chicago to Glenwood Park, 40 miles distant.

Special one-day tickets are sold for excursions and these tickets sometimes are printed to include park attractions. It is thought good policy to print special tickets for all excursions because the name of the association on the ticket pleases its members. These special tickets are easy to audit and check. The Aurora, Elgin & Chicago Railroad makes combination excursion rates with all of its electric connections.

The revenue from excursion parties out of the Fifth Avenue terminal, Chicago, only, during the months of May, June, July and August, 1910, has been as follows: 1906, $6313; 1907, $9458; 1908, $14,497; 1909, $14,562.

The Illinois Traction System has obtained excellent results by the use of circular letters for soliciting excursion travel. These letters also are used effectively in announcing changes in the service. Whenever an organization is to hold a convention or large meeting along the route the railroad company prints a circular letter announcing the dates, rates and attractive features. This letter specifies the Illinois Traction System as the official route and appeals to the members of the organization to use the electric service on account of the reduced rates. The letters are given to the secretary of the organization which is to hold the convention, who signs and mails them at a cost of 1 cent each. Usually at the time of the meeting it is possible to get the association to pass resolutions approving the service given by the railroad, and copies of these resolutions are filed for use in future solicitation of such business. When an excursion party will total 300 people a fare of one and one-third times the one-way rate is given. The regular round-trip fares are approximately 180 per cent of the one-way rates, which are based on 2 cents a mile.

The Chicago & Milwaukee Electric Railroad carries a large number of excursion and special parties between its two terminal cities. The traffic department has built up a mailing list which originally was obtained from Sunday school publishing houses, club and other directories. Each spring about 500 circular letters are sent out calling attention to the special points of interest along the line and to the service thereto. This excursion solicitation matter also includes return addressed postal cards which can be used in asking the traffic department of the railroad to have a representative call for the purpose of planning an outing or excursion. In this way the traffic agent obtains definite appointments at which preliminary arrangements for holding excursions can be made. All excursions on this road are personally conducted, with the idea that the presence of a representative of the company is appreciated and that he may be able to improve the service and assist in preventing accidents.

EXCURSIONS IN IOWA

The Cedar Rapids & Iowa City Railway Company uses circular letters for encouraging special-party business. Each year a number of excursions to college athletic meetings are organized by the steam railroads, which turn over their trains to the electric road at Cedar Rapids. The trains of steam coaches are then hauled over the interurban road by an electric freight locomotive to the State University at Iowa City.

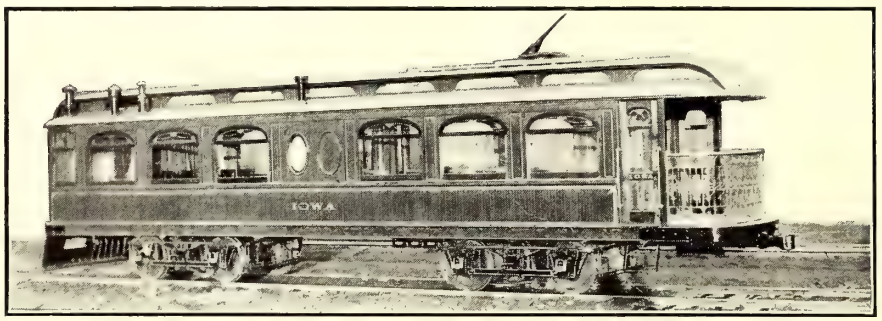


CAR CARD OF SUCCESSFUL TWIN CITY SERIES

The Iowa & Illinois Railway Company uses mimeograph circular letters for advertising its park and excursions. These are mailed for 1-cent postage to a list of about 1000 women. It has been found that circular letters addressed to women receive better attention than when mailed to men. Whenever a change of schedule is to be made form letters are addressed to all the business houses in the cities reached and to the jobbing houses in the Mississippi Valley and in Chicago. These letters have found a receptive audience, as indicated by calls from 40 or 50 traveling men whose firms

had sent them to the office of the railway company to inquire about the freight service mentioned in the circular letters.

The Iowa & Illinois Railway Company sells excursion tickets in connection with the "Diamond Jo" steamer line and the Tri-City Railway of Rock Island, Moline and Davenport. The steamers coming up the Mississippi River reach Davenport about 8 o'clock in the morning and tickets good for a ride in an observation car over the Tri-City lines, and thence to Clinton over the Iowa & Illinois Railway line, are sold to passengers. The steamer trip from Davenport to Clinton requires six hours and thus there is time for passengers to spend two hours in the tri-cities, take the interurban ride to Clinton and have dinner there, before the boat arrives. As many as 100 of these combination tickets have been sold in a day. The excursion steamers on the Mississippi River make combination rates with the interurban road for round trips, one way by boat and one way by interurban. The special excursion traffic is handled in trailers attached to the regular passenger cars.



PARLOR CAR BUILT AND OPERATED BY DES MOINES INTER-URBAN RAILWAY

The Kansas City-Western Railway sells one-way tickets from Leavenworth to Kansas City for 50 cents; a round-trip ticket between Kansas City and Leavenworth with a five-day limit for 75 cents; and a round-trip unlimited ticket for 80 cents between the same points. The Twin City Rapid Transit Company makes a round-trip excursion rate to Minnetonka for parties of 50 or more of 35 cents. The regular fare is 50 cents. These tickets are good only on the date of sale. The Inter-Urban Railway Company of Des Moines makes but few excursion rates. However, it assists organizations to advertise excursions and encourages the use of the interurban lines for this service.

PARLOR, DINING, SLEEPING, FUNERAL AND CHARTERED CARS

The Aurora, Elgin & Chicago Railroad and the Chicago & Milwaukee Electric Railroad operate combination dining and parlor cars in regular service. The scheduled runs of the former road call for a dining car out of Chicago at intervals of 2½ hours. These cars, of which the company has two, are trailers fitted with train control. Each includes a complete kitchen and pantry and equipment for serving a car full of people. The crew of one car includes only four men and a parlor-car conductor. The service privilege in these cars is handled by a contractor under the careful supervision of the railroad management.

A parlor-car fare of 15 cents is collected from each passenger. The receipt for this fare is accepted as 15 cents in part payment for any purchases made on the diner. This method of charging for the superior service rendered has been very acceptable to the passengers and to the railroad. It popularizes the service and brings additional revenue to the cafe department. Illustrations of the parlor and dining cars used in this service were presented in the Electric Railway Journal for Oct. 10, 1908, page 840.

The Chicago & Milwaukee Electric Railroad operates combination parlor and cafe cars on all of its limited trains between Evanston and Milwaukee. These trains, which were described in detail in the Electric Railway Journal for Feb. 13, 1909, page 293, and May 15, 1909, page 907, are made up of two passenger coaches and the cafe car. On Sundays a combination baggage and smoking car is added to make a four-car train. The cafe service is handled by contract, the railway company retaining the supervision of the service and furnishing the menu cards. The contractor assumes the loss and receives the profit. The railroad company furnishes the buffet contractor with complete table service and kitchen equipment. A complete commissary is maintained to furnish supplies for the dining cars and to handle the linen. The crew on the buffet car regularly includes a cook and two waiters. On the noon trains an average of about 20 people are served with dinner.

The fare on a limited train between Milwaukee and Evanston is $1.35. This includes 25 cents excess fare. The regular fare on the parallel steam line is $1.46. The excess fare charged on the limited trains is graduated from 5 cents to 25 cents, according to distance. Tickets are sold with the excess coupons attached. The excess fare is collected for a ride on any car in the train and entitles all passengers to the use of the parlor buffet cars.

During the month of July the limited parlor-car trains operated between Milwaukee and Evanston carried an average of 125 passengers per day, or a total of 30,964 revenue passengers for the month on trains with cafe cars attached. In the two seasons in which these trains have been running there has not been a single claim for damages to clothing by reason of the buffet service.

SLEEPING-CAR SERVICE

The sleeping-car service operated by the Illinois Traction System was described in the Electric Railway Journal for March 19, 1910, page 476. This service is furnished with three sleeping cars and two others are being built. Each car has 20 berths, 6 ft. 4 in. long. The special features of the cars are the two windows in each upper berth, reading lamps and fireproof safety deposit boxes in the upper and lower berths, "tipless" porters and free breakfasts of coffee and rolls.

The cars are operated daily in each direction between Peoria and St. Louis, leaving one terminal at about midnight and arriving at the other terminal at 6:30 in the morning. The sleeping cars are hauled by motor cars. As earlier described, these sleeping cars contain a number

of special features of design and construction originated by H. E. Chubbuck, vice-president executive, and J. M. Bosenbury, superintendent of motive power and equipment of the Illinois Traction System.

The sleeping-car fares for the 175-mile trip between Peoria and St. Louis are $1.50 for the lower and $1.25 for the upper berth. Baggage is carried on the night trains and every attention is shown, with a view to keeping this service superior to that furnished by the steam roads. In addition to the Peoria-St. Louis sleeping-car service another sleeping car is run between Springfield and St. Louis. Electric sleeping-car service has proven to be popular and in addition to earning operating revenue it has been a most efficient means of advertising the other service which this road has to offer. The table on page 620 shows the earnings of the sleeping cars and the motor-passenger cars which haul them. These figures are for August, 1910, and include neither "deadhead" passengers nor express revenue obtained from the motor cars.



INTERIOR OF DINING CAR ON CHICAGO & MILWAUKEE LIMITED TRAIN

FUNERAL TRAINS

The Aurora, Elgin & Chicago Railroad and the Metropolitan West Side Elevated Railway jointly operate funeral trains over their entire trackage. The operation of the funeral-car service is under the joint charge of the general managers of the two roads, but the direct handling of the service is done by the traffic agent of the Aurora, Elgin & Chicago Railroad, who keeps in touch with the undertakers, supervises the use of the trains and collects the revenue therefor. The equipment used was described in the Electric Railway Review for Oct. 12, 1907, page 441. Two specially built funeral cars are operated in and out of Chicago, and in addition the Metropolitan West Side Elevated has four passenger cars that can be converted quickly for funeral use. No funerals are handled on regular trains, but only by the use of chartered cars. The companies announce that they stand ready to furnish any number of cars at any time for funerals to be held at any station on either of the two roads. As an index of the extent of the funeral business it is stated that in July, 1910, 63 funeral parties were carried by these two roads. The parties required 75 cars, including the special funeral equipments. The total revenue from these parties was $1,143, which included the rental of the funeral equipment and the chartered-car service.

CHARTERED CARS

Previous to Aug. 1 of the present year the Chicago & Milwaukee Electric Railway had handled 100 special-car parties between Evanston and Milwaukee, 73 miles. Special-car parties are solicited with circular letters, which are followed by personal calls. Ravinia Park, 30 miles north of Chicago, is an important terminal for special-car parties. In 1909 this park collected 25 cents admission from each of 250,000 patrons of the Chicago & Milwaukee Electric Railroad. Chartered cars are rented for a flat rate based on the regular ticket rates and a minimum of 60 people. Where the single-ticket rate is $1 and the return-ticket rate $1.90, the one-way chartered-car rate is $46 and the round-trip char-

tered-car rate is $80. These are the rates between Evanston and Milwaukee, the termini of the line. An addition of 25 cents per passenger is made to the regular rate of 25 cents in each direction if cafe or parlor cars are chartered.

The Twin City Rapid Transit Company bases its chartered-car rates on 60 round-trip fares to destination. The cars seat 50 and the load is limited to 75 adults or 100 children. A single-way chartered-car movement costs three-fourths of the round-trip rate and these rates apply to movements over all of the system, except between Minneapolis and St. Paul, where an arbitrary charge of $15 for the round trip and $10 for the one-way movement is made. Cars chartered for use on a city line earn $10 for the round trip or $7.50 for a one-way trip. Ordinarily a chartered-car trip on a local line in connection with any other trip costs $2.50. This company owns eight steamers on Lake Minnetonka which are chartered for excursion parties.

The Inter-Urban Railway Company of Des Moines has a chartered-car tariff based on mileage. This company built at its shops a large interurban parlor car named "Iowa," which is used for chartered-car service. The "Iowa" has complete equipment for cooking and serving meals. Parties chartering this car are limited to 20 in number and the service, including a porter, is furnished at a flat rate per trip.

Sunday school and picnic parties are handled by the Kansas City-Western Railway from Kansas City to Lansing State Prison, Soldiers' Home, Leavenworth and Ft. Leavenworth and return to Kansas City, a round-trip distance of 64 miles. A charge of $25 is made for this service with a car seating 60 passengers.

ILLINOIS TRACTION SYSTEM—STATEMENT OF EARNINGS OF SLEEPING CAR TRAIN, AUGUST, 1910.

	Sleeping Car						Motor Car		
	Rev.	Berths		Seats &	Traff.		Rev.	Traff.	
Train Nos.	Pass.	Upper	Lower	Pillows	Earn.	Total	Pass.	Earn.	Total
Train 91, Peoria to East St. Louis	267	$43.25	$322.00		$672.24	$1,037.49	729	$584.21	$1,621.70
Train 24, East St. Louis to Springfield	277	49.75	310.50	$0.25	606.18	966.68	966	525.76	1,492.44
Train 92, Springfield to Peoria Train 23, Springfield to East St. Louis	310	30.00	166.00	30.00	327.39	553.39			553.39
Totals	854	$123.00	$798.50	$30.25	$1,605.81	$2,557.56	1,695	$1,109.97	$3,667.53

exceed $600,000 for 1910. The normal coal traffic is 2000 tons a day and this spring one mine shipped 12,000 tons over this road in one month. During the last two years the physical condition of the 550 miles of track included in the Illinois Traction System has been so improved that long trains may be operated without undue interference with passenger traffic. In addition to the lengthening of all sidings and the construction of belt lines around three cities, the power situation has been improved by the addition of 105 miles of No. 000000 feeder and 100 miles of No. 0000 feeder to supplement the existing trolley and No. 0000 feeder.



TYPE OF SLEEPING CAR OPERATED BY ILLINOIS TRACTION SYSTEM

FREIGHT SERVICE

The Illinois Traction System undoubtedly handles as large a freight tonnage as any electric railway. Based on the earnings for the first eight months of the present year it is estimated that the gross revenue of this company from freight, not including express and mail matter, will

The freight equipment of the Illinois Traction System includes the following: Eleven 40-ton electric locomotives, sloping-cab type, 12,000-lb. drawbar pull; six 60-ton locomotives, steel box bodies, 30,000-lb. drawbar pull; 25 motor express cars with four 75-hp motors each; 62 express trailers; 50 box cars and 500 gondola and hopper-bottom coal cars.

The Illinois Traction System handles practically all of the output of nine coal mines, two of which have connections with no other roads. Commercial coal is handled over the entire system in the electric railway company's cars and on the 100-mile division between Springfield and St. Louis in foreign cars. The new direct line into the wholesale and retail business districts of St. Louis is expected to handle a large coal traffic from Illinois

mines. Facilities for unloading coal by gravity from the cars directly into wagons are being provided at the St. Louis terminal.

The Illinois Traction System competes with steam roads in handling sand, gravel, brick and cement. During the present year 500 tons of gravel have been taken out of one pit and 625 carloads from different sources have been delivered for municipal work in Springfield, Clinton, Carlinville and Lincoln. The Chicago & Alton Railroad in August delivered to the electric road a shipment of 175 cars of stone for municipal construction work. The cars for this shipment were furnished by the Illinois Traction System.

The milk traffic averages about 300 cans a day, one-half of which are taken into St. Louis. The minimum revenue per can is 12½ cents for handling a distance of 20 miles or under. This rate is graded up to 20 cents for a distance of 25 miles or over.

In addition to the commercial coal traffic the company handles about 700 tons of coal a day to its own power plants. During the past summer it has been necessary to haul the larger part of this coal from the Danville district to Riverton, 125 miles, and to Bloomington, 133 miles. Coal for the large power plant at Peoria is hauled from Worden, a distance of 150 miles. Coal storing and submerging pits to hold between 10,000 and 12,000 tons each are being built at Riverton and Mackinaw Junction. The pit at the Riverton power plant will be served by a conveyor handling coal direct to the bunkers. The Mackinaw Junction coal-storage plant is located at the intersection of lines leading to Peoria, Bloomington and Springfield. A locomotive crane will be used to reload the coal stored here.

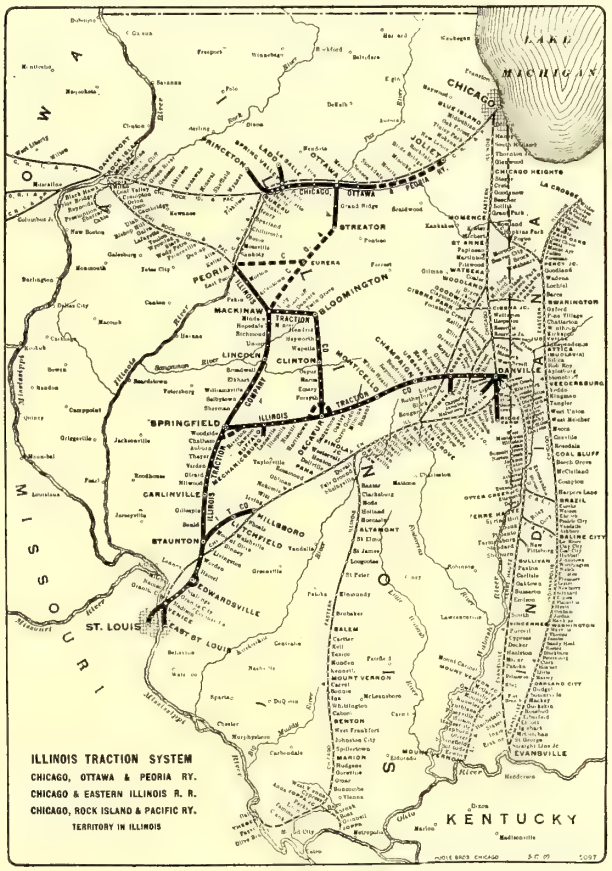
GENERAL FREIGHT SERVICE OF ILLINOIS TRACTION SYSTEM

The grain-handling business of the Illinois Traction System is growing rapidly. In addition to the seven 50,000-bu. capacity elevators located on the lines and elsewhere described, a 150,000-bu. capacity transfer elevator is to be built at Glover, Ill., the junction point of the electric line with the Chicago & Eastern Illinois Railway.

Based on a guarantee of 5000 lb. of traffic the Illinois Traction System operates tri-weekly a refrigerator car from East St. Louis to Springfield. This car is loaded back with merchandise. During the past summer the car has handled an average of 9000 lb. on each trip for this 100-mile run.

The belt lines which have just been built to facilitate fast through freight service are located at Decatur, Springfield and Edwardsville. The Decatur belt line, partly double-tracked, is 4 miles long and furnishes an unobstructed route around the city, connecting the Decatur-Danville, Decatur-Bloomington and Decatur-Springfield divisions. This belt line will enable the company to handle long freight trains without taking them on city tracks and will afford a steam connection with the Illinois Central Railroad and possibly with the Wabash Railroad. At Springfield a belt line 6 miles long skirts the southeast side of the city, intersecting four steam roads with two grade crossings and one under- and one over-crossing. This belt will give the Illinois Traction System access to two coal mines, an automobile factory, a brick-yard, several smaller industries, and to the site of a proposed zinc smelter. The Edwardsville belt line is 4 miles long, and in addition to furnishing a low-grade fast route around the town, it affords connections with the Litchfield & Madison, Clover Leaf and Illinois Terminal Railways.

The Illinois Traction System has physical connection with the Chicago & Eastern Illinois Railroad at Glover, Ill. A daily through car operated over this route between Chicago and points on the traction lines carries diversified shipments and leaves Chicago at 9 p. m., making



MAP SHOWING ILLINOIS TRACTION SYSTEM AND STEAM RAILROAD CONNECTIONS

morning delivery to the Illinois Traction System. The average through load is 7500 lb. Ten express trailers now being built for this service are designed so that they will be acceptable to the steam roads. These cars will have radial drawbars provided with locking devices for use when the cars are to be operated in steam railroad trains.

The Illinois Traction System has through rates and divisions with the following interstate carriers: Chicago & Eastern Illinois Railroad; Chicago, Rock Island & Pacific Railway; Chicago, Peoria & St. Louis Railroad; Litchfield & Madison Railroad and the Goodrich Transportation Company, which operates steamship lines out of Chicago. For joint business with the Chicago & Eastern Illinois Railroad the revenue is prorated according to mileage. The accompanying map of Illinois indicates the physical relation of the Illinois Traction System to the lines of the Chicago, Rock Island & Pacific Railway, the Chicago & Eastern Illinois Railroad and other steam railroads in the State.

AURORA, ELGIN & CHICAGO RAILROAD

The freight service of the Aurora, Elgin & Chicago Railroad is confined largely to the handling of milk, newspapers and carloads of stone and coal. The company has physical connections with several steam railroads, including belt lines connecting with all the trunk lines in and out of Chicago. The milk traffic has doubled in the last four years. In an average month for 1906 9545 cans were handled, while in June of this year 18,554 cans were carried to Chicago, an average of 618½ cans of milk per day. Two milk trains are started from the western terminals early each morning. These trains are then combined at Wheaton Junction and pick up cans until within 5 miles of the joint terminal with the Metropolitan West Side Elevated at 52d Avenue, where the milk is unloaded at any one of three platforms within the Chicago limits. The railway company gets a revenue of 15 cents per can between any two stations. This business requires the use of two motor cars and two box cars during the early morning hours.

NEWSPAPER TRAINS

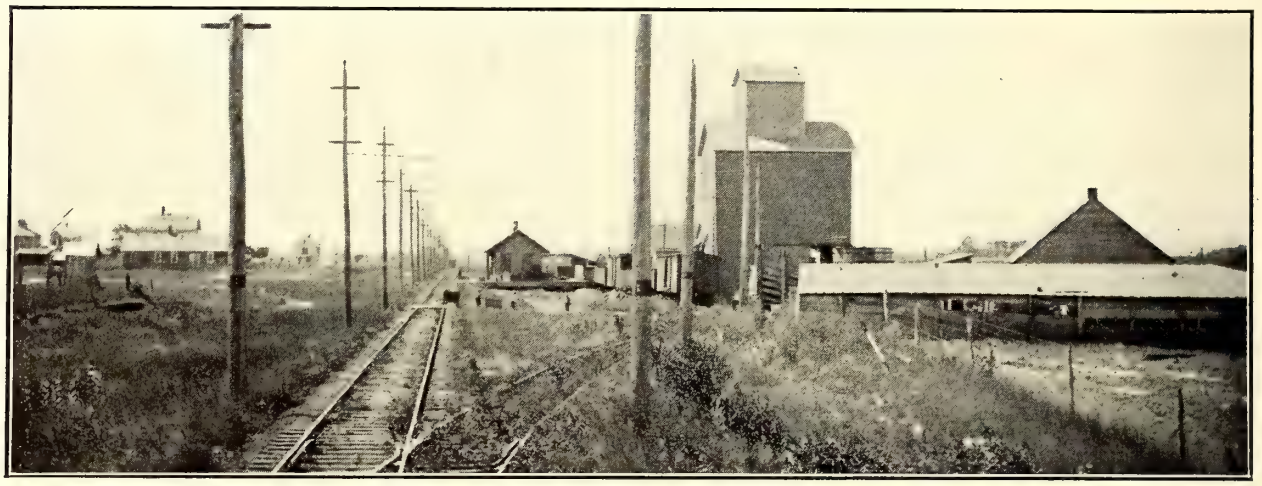
The Aurora, Elgin & Chicago Railroad obtains a substantial revenue from newspaper trains which operate out of Chicago at 3:30 each morning. The city editions of the Chicago daily papers are off the press about 3 a. m. and can be loaded on the electric cars for departure at 3:30. Were it not for this service the people in the towns reached by the Aurora, Elgin & Chicago Railroad would be furnished with the "fast mail" edition of the morning papers, which is loaded on the steam trains at 3 a. m. The use of the electric road for quick delivery of the latest edition of the morning papers is valuable to the metropolitan newspaper publishers as a means of competition with the local papers.

The newspapers are loaded on the cars at the Fifth Avenue terminal of the line, being raised from the wagons at the street surface to the car doors by either of two electric hoists.

The newspaper cars make the run of 40 miles to Aurora or Elgin, including stops at all towns, in one hour and 10 minutes. On Sundays two cars are required. Payment for the handling of the newspapers is made according to the weight. The newspaper offices render the traffic office of the railroad company weight statements each month. These are checked by the traffic office and bills are rendered for service at practically express rates. During the month of July, 1910, the railway company carried newspapers aggregating 242,000 lb. in weight.

IOWA FREIGHT SERVICE

The Inter-Urban Railway of Des Moines has direct connection in Des Moines with the following railroads: Chicago & Northwestern, Chicago Great Western, St. Paul & Des Moines and Des Moines Western and reaches other trunk lines over these with switching charges. At Perry a connection is made with the Minneapolis & St. Louis; at Altoona with the Chicago, Rock Island & Pacific, and at Colfax with the Colfax Northern, Ft. Dodge, Des Moines & Southern and the Chicago, Rock Island & Pacific. The Inter-Urban Railway is a party to numerous trunk-line tariffs and does a considerable interstate business with its steam connections. The local and interline tariffs of the Inter-Urban Railway Company carry full-page maps showing the position of the electric line and its relation to the several trunk lines which cross the State of Iowa.



A COUNTRY STATION WITH STOCKYARDS AND ELEVATOR ON THE CEDAR RAPIDS & IOWA CITY RAILWAY

Freight rates in Iowa are prescribed by the State. For Iowa business all roads are on an equal basis, having a through rate amounting to 80 per cent of the sum of the locals, as provided by the classification and tariff. For interstate business joint through rates are made on a competitive basis established to and from the Des Moines territory by the roads with which the Inter-Urban Railway connects. The company is a member of the steam railroad Freight Claim Association, and it is stated that the average freight claim is passed through the office in three weeks.

The Inter-Urban Railway divides its freight trains into four classes: Merchandise freight, local or way freight, stock freight and extra freight, which may be local or fast.

CEDAR RAPIDS & IOWA CITY RAILWAY

The Cedar Rapids & Iowa City Railway Company has friendly relations with its steam connections, is a member of the American Railway Association and has a roadbed over which any traffic acceptable by connecting steam lines can be handled. A new terminal track in Cedar Rapids provides for handling M. C. B. standard cars by electric locomotives direct to the Union Station of the several steam roads. The interurban road has

signed the per diem agreement for car service charges. Physical connection is had with the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, and by payment of an intermediate switching charge cars are also exchanged with the Chicago, Rock Island & Pacific and the Illinois Central Railroads. The electric line connects with the Chicago, Rock Island & Pacific Railway at Iowa City. Carload business is interchanged with the Chicago, Milwaukee & St. Paul Railroad according to through rates and divisions. The electric and steam roads use the same warehouse in Cedar Rapids. Merchandise cars are loaded at this warehouse and delivered to the electric line with a switch engine. Similarly, inbound carload business is turned over to the electric road for local delivery.

The Cedar Rapids & Iowa City line was built to care for all of the interests of the community and has substantial stations, stockyards and grain elevators at terminals and intermediate towns. Between the terminal cities the line serves a rich farming territory not provided with other means of transportation. Freight traffic is made up largely of farm products and stock outbound and merchandise inbound. Practically all the freight is handled in standard cars which are hauled by electric locomotives.



A COUNTRY STATION ON THE DES MOINES INTER-URBAN RAILWAY

One important source of traffic is the stock shipped in from the West to be fed and reshipped to Chicago. A shipment of 300 cars of construction materials for a public building in Iowa City, largely composed of stone from Bedford, Ind., was handled during the past summer over the full length of the line, having been delivered to the electric railway company at Cedar Rapids. The freight equipment includes a Baldwin-Westinghouse electric locomotive weighing 52,500 lb., mounted on 33-in. wheels and having an 18-ft. truck center distance. The locomotive is 23 ft. long and has a maximum drawbar pull of 9200 lb. at 10 m.p.h.

The accompanying traffic statement of the Cedar Rapids & Iowa City Railroad is of interest because it shows the substantial growth of freight traffic on a 27.5-mile road having friendly steam connections and serving a sparsely populated territory. The table in the next column shows the ton-miles of revenue freight for the past six years.

TONS AND TON-MILES OF REVENUE FREIGHT

	Tons.	Ton-Miles.
1904	3,006	62,462
1905	10,792	202,141
1906	16,295	348,901
1907	15,209	278,335
1908	18,710	310,333
1909	25,420	455,141

The number of freight cars handled, loaded and empty, and the total tonnage for the past three years were as follows:

	1907	1908	1909
Loaded	1,111	1,851	6,594
Empty	1,034	1,314	3,283
Tons	57,550	93,527	327,729

When the Cedar Rapids & Iowa City Railway began operating in 1904 passenger service was given on an hour and a half headway. In 1906 the headway was cut to 1 hour and since then 38 daily passenger trains in addition to the freight business above stated have been handled. The following table shows the motor-car miles, the substation output and the kw-hours per car-mile for each year:

	Motor-Car Miles.	Power in Kw-Hours at Substation.	Kw-Hours Per Motor-Car Mile.
1904	128,578	638,500	4.96
1905	343,075	1,679,100	4.89
1906	433,626	1,879,000	4.33
1907	527,980	1,975,600	3.74
1908	525,915	1,936,334	3.67
1909	533,282	2,152,800	4.03

In the above table the electric locomotive which hauls the freight trains is counted as one motor car. The reduction in power per motor car noted in 1907 is accounted for by a change in the running time of the passenger trains. Previously the run between terminals was made in 1 hour and 8 minutes, but early in 1907 the time was lengthened to 1 hour and 20 minutes. The increase in power consumption noted for 1909 resulted from the growth in the freight traffic earlier noted.

CHICAGO & MILWAUKEE ELECTRIC RAILROAD

The Chicago & Milwaukee Electric Railroad has connections with the Elgin, Joliet & Eastern and the Chicago, Milwaukee & St. Paul at Rondout, and with the Canadian Pacific "Soo" line at Rockefeller, Ill. Through billing and interchange of equipment are carried on with the first-named steam road, which encircles Chicago and connects all trunk lines. The carload business amounts

to 5000 cars per year and this traffic has been obtained with very little solicitation. The shipments are made up largely of stone and gravel for road building and other construction materials. No merchandise freight business is done as this traffic is handled by the express company. The rolling stock equipment includes 100 standard freight cars, four electric locomotives and four new motor express cars. Two of the express cars recently received from the McGuire-Cummings Manufacturing Company are 9 ft. wide and 55 ft. long, with truck centers 31 ft. 6 in. apart. These cars are mounted on McGuire-Cummings trucks with 35-in. wheels and carry four G.E. 73 motors. The gross weight of one car is 61,600 lb.

IOWA & ILLINOIS RAILWAY

The Iowa & Illinois Railway does a merchandise freight business between Davenport and Clinton, Ia. The freight runs are scheduled to make close connections at Clinton with the east-bound and west-bound trains of the Chicago & Northwestern Railway. In addition to this interline freight, which is hauled in trailers attached to passenger trains, the Iowa & Illinois Railway has regular way freight trains which handle local business on merchandise and commodity rates. The first-class rate for merchandise hauled 35 miles is 18.2 cents.

FREIGHT SOLICITATION

The Inter-Urban Railway Company of Des Moines is very aggressive in soliciting freight traffic and is alive to serving the needs of its patrons. One solicitor calls once a year on every farmer within five miles of the line to inquire regarding possible business, but not to interfere with the business of commission buyers. It has been found good policy to ascertain the probable amount of traffic in this way and then turn over the information to the live stock and grain buyers, who, having had favors shown them, will see that the interurban road gets its haul. Merchants and jobbers are solicited in the ordinary way and the solicitors advise the traffic manager of their success by written reports. All agents are expected to take active part in the commercial organizations in their towns and the traffic manager is a member of such organizations in Des Moines. The company pays the membership fees of its agents. These memberships have been of considerable value because, through the acquaintances formed at the meetings of the organizations, the company has been enabled to locate several important industries along its lines.

FREIGHT FORWARDED FROM ..... STATION.

19	Agl. Imp. Mchy. Vehicles	Brick	Canned Goods	Cement, Lime, Plaster	Coal Anthracite	Coal Bituminous	Dairy Products	Drain Tile, Clay Products	Emigrant Mov. & H. H. Goods	Fruits and Vegetables	Furniture	GRAIN & GRAIN PRODUCTS: Wheat	Corn	Oats	Rye	Other Grain	Flour	Millstuffs	Hay and Straw	Iron and Steel Articles	Lumber
January																					
February																					
March																					

FREIGHT FORWARDED FROM ..... STATION.

19	LIVE STOCK: Cattle	Hogs	Sheep	Horses & Mules	Mine Props	Mineral Water Glassware	Sand	Stone	Misc.	TOTAL	L. C. L. Merchandise (Lbs.)	Cars Switched
January												
February												

MONTHLY RECORD OF CLASSES OF FREIGHT HANDLED FROM ONE STATION ON INTER-URBAN RAILWAY

TRAFFIC RECORDS OF THE INTER-URBAN RAILWAY COMPANY

Special records have been found valuable in the traffic office for keeping close watch of the quantity of shipments in and out of all stations. In addition to these records the traffic manager has a "reminder" box indexed by the days of the month. The chief clerk inserts memoranda in the proper section of this box so that on certain days the traffic manager is reminded that particular agents should be prompted to look after certain solicitation or other work. With the exception of personalities, probably the largest factor responsible for the successful growth of the freight traffic of the Inter-Urban Railway is the system of records of business handled in and out of each station and business handled to and from each shipper. These records show the weak points in the soliciting organization and afford the manager of the department timely data which can be used to urge more active work by the solicitors before business from any one source has fallen off greatly and competing steam roads have had an opportunity to establish firmly their hold on the shippers.

The traffic manager is advised regarding the progress of the traffic growth at each station by means of monthly statements made out by the agents. These statements are of two forms: one for carloads received and the other for carloads forwarded. The headings of the forms read: "Monthly report of all carload shipments (except those received from connecting line at the station, or company freight)." The report blanks, which are 8½ in. x 11 in. in size, are ruled into six columns headed as follows: Number of cars; commodity; weight of contents; point of destination; name of shipper; junction at which received (delivered) from (to) connecting line. In addition to showing a complete statement of the carload business from each station, these monthly reports show the total l.c.l. business in pounds received and delivered at each station.

As more definite information is desired regarding the shipments made or received by some of the more important patrons the traffic office furnishes each agent a list of the shippers whose freight business it is desired to watch. These names are entered on either of two blank forms, one for freight forwarded and the other for freight received. The blanks are 20 in. x 8¼ in. in size and are ruled to show the names of the shippers in a column at the left-hand edge and provide one space opposite each name for every day of the month in which to indicate the pounds of l.c.l. freight shipped or forwarded by the individual shippers. These blank forms carry the following instructions to the agents:

NOTE TO AGENT

The purpose of this report is to ascertain, from day to day, whether we are obtaining our proportion of the shipments at your station. Agents carefully keeping up this report and comparing this report by days and months will find same a great help in soliciting business. This report must not be shown to any one except an official or employee of the traffic department of this company.

INSTRUCTIONS TO AGENTS

The names of the principal shippers at your station are to be entered on this report and a daily record made of all l. c. l. shipments received for such shippers. The names of shippers will be carried forward from month to month and new names added and old names dropped, with the approval of the traffic manager. Suggestions as to revising list of shippers are requested in order that this report may be at all times up to date. Forward this report to the traffic manager not later than the fifth day of the following month and retain a carbon copy for your files.

NAME ADDRESS

19	L. C. L. Rec'd	L. C. L. Fow'd	C. L. Rec'd	C. L. Fow'd
JANUARY				
FEBRUARY				
MARCH				

NAME ADDRESS

19	CARLOADS RECEIVED			CARLOADS FORWARDED		
JANUARY						
FEBRUARY						
MARCH						

MONTHLY RECORD OF FREIGHT TO AND FROM ONE SHIPPER OF INTER-URBAN RAILWAY



STANDARD PASSENGER AND FREIGHT DEPOT, ILLINOIS TRACTION SYSTEM

With these progressive records of the pounds of l.c.l. freight shipped and received daily by the important shippers it is easily possible to ascertain whenever a shipper is cutting down his business on account of a grievance. The records also are an incentive for the agents to urge more business from the local shippers.

The efficiency of the station and traveling agents in soliciting separate classes of traffic is indicated by a set of record cards for each station. The cards are ruled to show for one station the total amount of traffic, total pounds of merchandise handled, total number of cars switched and a segregation of the traffic for that station under 35 subheads. Of the four cards with these headings kept for each station, one shows the items for inbound traffic by months, another the outbound traffic by months, another the inbound traffic by years and another the outbound traffic by years. The headings on the two sides of one of these cards, which are similar in general form and are 8½ in. x 5 in. in size, are reproduced. By means of these cards, particularly those showing the amount of the different kinds of freight out of each station per month, it is possible for the traffic office to observe closely the work of solicitors and thus be able to give compliments or criticisms as the case may be, and offer suggestions that will bring definite results in increasing business.

The traffic office also keeps an individual record of the business done by each of the large shippers. These records are in card form, 5 in. x 3 in., printed on both sides and filed alphabetically according to the names of shippers. They present statements of the carload and less than carload business received and forwarded by each shipper during each month, thus furnishing ready information which is very useful in soliciting. The knowledge that these different records are kept is also an incentive to the agents to be aggressive in soliciting traffic. In addition to these very complete records the traffic department of the Inter-Urban Railway Company periodically determines the exact cost of handling its freight. These records are compiled on the basis of ton-miles and also car-miles for cars handled on a switching charge.



LAKE FOREST STATION, CHICAGO & MILWAUKEE ELECTRIC RAILROAD

ILLINOIS TRACTION SYSTEM

The solicitation of traffic for the Illinois Traction System is carried on by six general agents with assistants, each handling a definite territory. These agents have jurisdiction over both freight and passenger business and all report to the traffic manager and keep in close touch with local agents at the stations. Weekly reports are forwarded to the central traffic office. These reports show the number and location of the calls made, outline the possibilities for additional business, state grievances heard and fully summarize the week's work of each solicitor.

Routing orders carrying the names of the Illinois Traction System, Chicago, Rock Island & Pacific and Chicago & Eastern Illinois Railroads are used by the solicitors. The traffic office keeps a record of all routing orders signed by merchants and takes particular care to see that the traffic is received. The local agents furnish a daily report of the tonnage shipped by each important manufacturer so that if this falls off the reason may be ascertained. The jobbers and shippers of merchandise are solicited by personal visits. When a solicitor learns where a merchant purchases his goods, if that merchant controls the routing, the solicitor tries to get him to specify the Illinois Traction System, and in addition to put his signature to a routing order. These routing orders are then sent to the local solicitors, who use them in endeavoring to get the shipper to specify shipment over the Illinois Traction System and its friendly connections. Not a great deal of solicitation has been done among the farmers, because they do not originate many shipments except grain and stock, which are handled by commission buyers or representatives of elevator companies who control the routing.

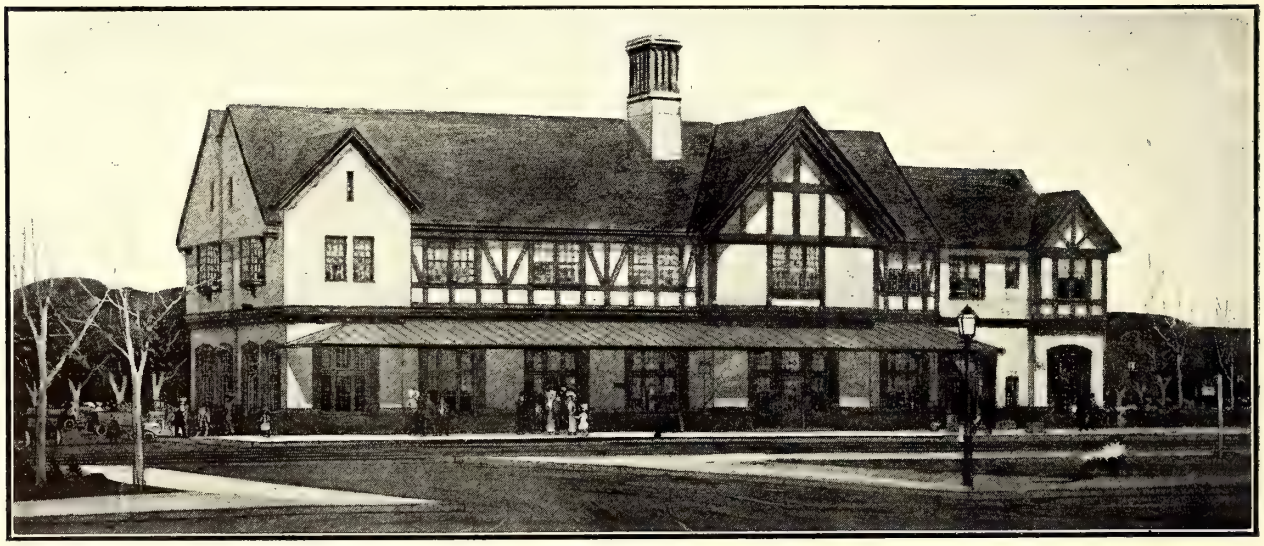
During the spring the traffic department contracted for handling a circus over the lines of the Illinois Traction System. Eight freight and two passenger cars were required and all the revenue, according to legal ruling, was credited as passenger business. This circus traffic required a special contract covering liability and a special tariff, but the business was appreciated because of its novelty. The circus train was handled for a distance of about 250 miles.

CEDAR RAPIDS & IOWA CITY

The Cedar Rapids & Iowa City Railway Company has one freight solicitor. The traffic office keeps a complete list of the merchants and farmers who have anything to ship. This list includes all the shippers within 5 miles of the intermediate towns and within 10 or 12 miles of either terminal. Whenever there is any special announcement to be made, such as a change in the differential against the rate on cattle to Chicago, circular letters are forwarded, together with blank routing orders. The solicitor canvasses the farming communities in company with stock buyers and commission men with a view to getting all outbound interline traffic routed over the electric line. Routing orders are also obtained and forwarded to friendly steam connecting lines with a view to getting inbound traffic specified.

IOWA & ILLINOIS RAILWAY

The Iowa & Illinois Railway Company traverses a sparsely settled territory and does not have through rates with terminal connecting lines. Its freight business therefore is confined largely to merchandise. One solicitor looks after the freight and passenger business and investigates and adjusts the freight claims. The general manager also solicits traffic from the big shippers. A card catalog of all the large shippers, classified according to location and products or commodities handled, is kept to assist in building up the freight traffic. The agents in the country towns do some soliciting and arrange with merchants to handle over the company telephone orders from the country stores to the city jobbers, with the understanding that the freight will be shipped over the electric line, which assumes no responsibility for error in transmitting the orders. The farmers are not solicited except for market-garden products. Some owners of land along the line where it lies in the river bottoms have been induced to raise onions, cucumbers and strawberries for shipment into the terminal cities, but it is not advisable to solicit from the farmers generally because the company is not prepared to handle carload business.



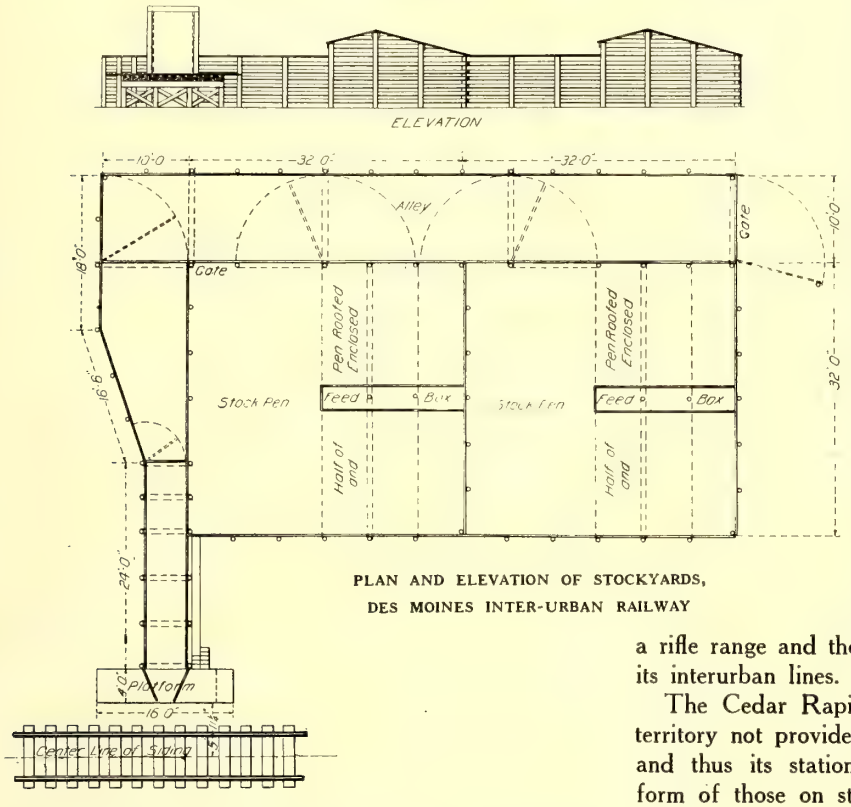
PROPOSED NEW AURORA, ELGIN & CHICAGO STATION AND OFFICE BUILDING AT WHEATON

LOCAL DEVELOPMENT WORK

The Inter-Urban Railway of Des Moines has been especially successful in its work of developing the communities which it serves. The traffic department urges

real estate operators to sell suburban property along the line. As a means of encouraging this development the traffic department has plats drawn up to show how property might be subdivided and the attractive features of this property are clearly set forth.

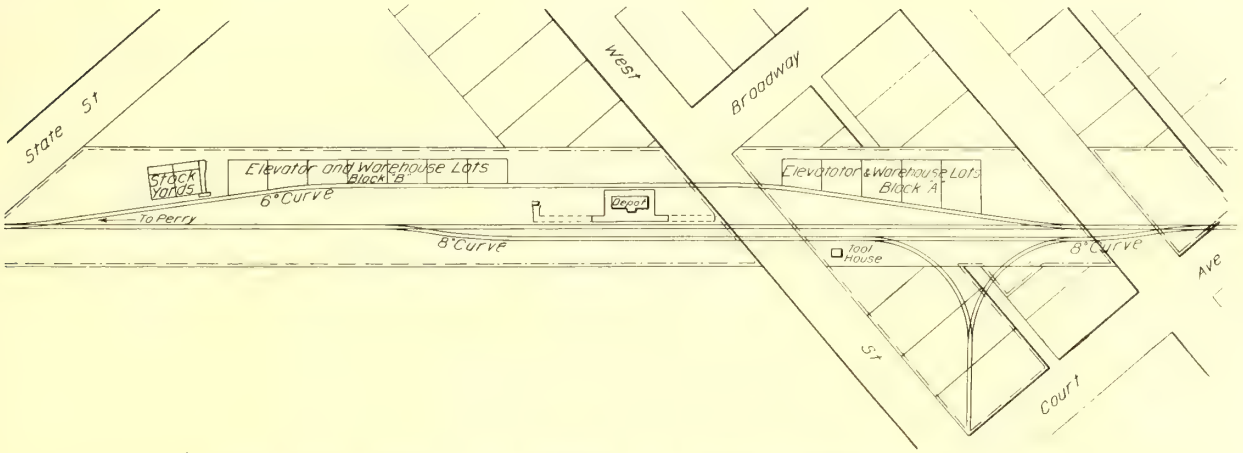
The following account is typical of several new towns that the road has assisted. At the beginning of the development work the Inter-Urban Railway built a freight and passenger station and installed an agent at a point on the line 5 miles from the nearest town. The company reserved a wide right-of-way for side tracks, elevators and industrial lots and assisted the local people in establishing streets and lot lines. Settlers were attracted largely on account of the service and the character of the soil and now a thriving village at this point furnishes a substantial passenger and freight traffic. The accompanying engraving was made from a plat of the property as it originally was laid out and developed. It is noted that the right of way, 150 ft. wide, extends through the plat and that the depot is located near the center. A turning "Y" and two long sidings have been built to permit switching and handling of freight trains. Elevator and warehouse plots of ample size, together with a stock pen, were provided.



PLAN AND ELEVATION OF STOCKYARDS, DES MOINES INTER-URBAN RAILWAY

The Inter-Urban Railway has a few intermediate sidings, but urges the use of the sidings at stations so that the farmers will purchase their supplies from the merchants located where freight is handled. At each country station a stockyard with a well and scales is built for the accommodation of stock buyers. A two-pen yard of the form illustrated is said to cost about $750. These stockyards are provided with loading chutes and enclosed pens with feed boxes. The engineering department has complete assembly and detail drawings for the erection of stockyards, including fixed and portable loading chutes, scale racks and feed troughs. Independently owned elevators at country stations each furnish about 100 carloads of grain a year. In addition to the local country development work the traffic department of this road has been successful in locating several clubs, a rifle range and the winter headquarters of a circus on its interurban lines.

The Cedar Rapids & Iowa City Railway serves a territory not provided with other transportation facilities and thus its station grounds and equipment take the form of those on steam roads. In the 27½ miles of line are six grain elevators, one of which furnishes 1500 carloads of outbound grain each year for delivery by connecting steam lines. The elevators are owned by grain-handling companies and to them the railway company sells power at 5 cents per kw-hour. At industrial locations the railway company installs sidings and charges the cost to construction. It has been found that the receipts during the first year will just about pay for the construction.



PLAN OF TRACK LAYOUT AT SMALL STATIONS, DES MOINES INTER-URBAN RAILWAY

Stockyards are located at all important centers along

the line. The stockyard at North Liberty has concrete floors and cost $600. Another more recently built and larger stockyard at Iowa City cost $2,000. This stockyard has concrete floors, permanent sheds and scale houses. The traffic department of this road is especially active in advertising and promoting the growth of the intermediate towns. Booklets are published describing the attractive features and including a description of the passenger and freight service that is provided.

ILLINOIS TRACTION SYSTEM

The Illinois Traction System co-operates with real estate firms and has been successful in having several active real estate developments located on its lines. The company puts in sidetracks and solicits the use of its services for handling construction materials.

The Illinois Traction System has leased ground on its private right-of-way for elevators, manufacturing plants and stores. The cost of the lease is based on the value of the ground. Industrial and rural sidetracks are installed on the same basis. If the industrial sidetracks are for public team use the cost is borne by the company.

The method of charging for industrial sidings is as follows: The engineering department makes a construction estimate of the cost and the user of the siding reimburses the company for the total amount. Where a revenue haul is obtained the railway company refunds the shipper at an arbitrary rate of $2 or $3 a car, exclusive of switching business. This rebating is limited to a period of from three to five years. In the contract for the installation of industrial sidings the railroad company receives a guarantee of the traffic. These contracts are filed with the Interstate Commerce Commission. On private tracks within switching limits the law designates the switching rates to be from $2.50 to $5 per car, and as a distance tariff rate, based on the commodity, is allowed for handling from a team track in excess of a distance of 3 miles, team tracks thus are more profitable when located outside of the switching limits.

The Illinois Traction System now is serving seven modern, electrically operated grain elevators, each with a capacity of 50,000 bu. An illustration of one of these elevators at a town just being built is presented. The elevators are privately owned and the company expects that seven or more will be erected during the coming season. It is expected that the present elevators will originate 700 or 800 carloads at an average revenue for the Illinois Traction System of $15 per car. Most of the grain is shipped to Chicago, St. Louis, Nashville and Louisville. The Illinois Traction System encourages farmers to form associations and ship their own grain, thus saving the middleman's profit. In such associations the farmers agree to ship through a certain elevator or be penalized at 1 cent a bushel.



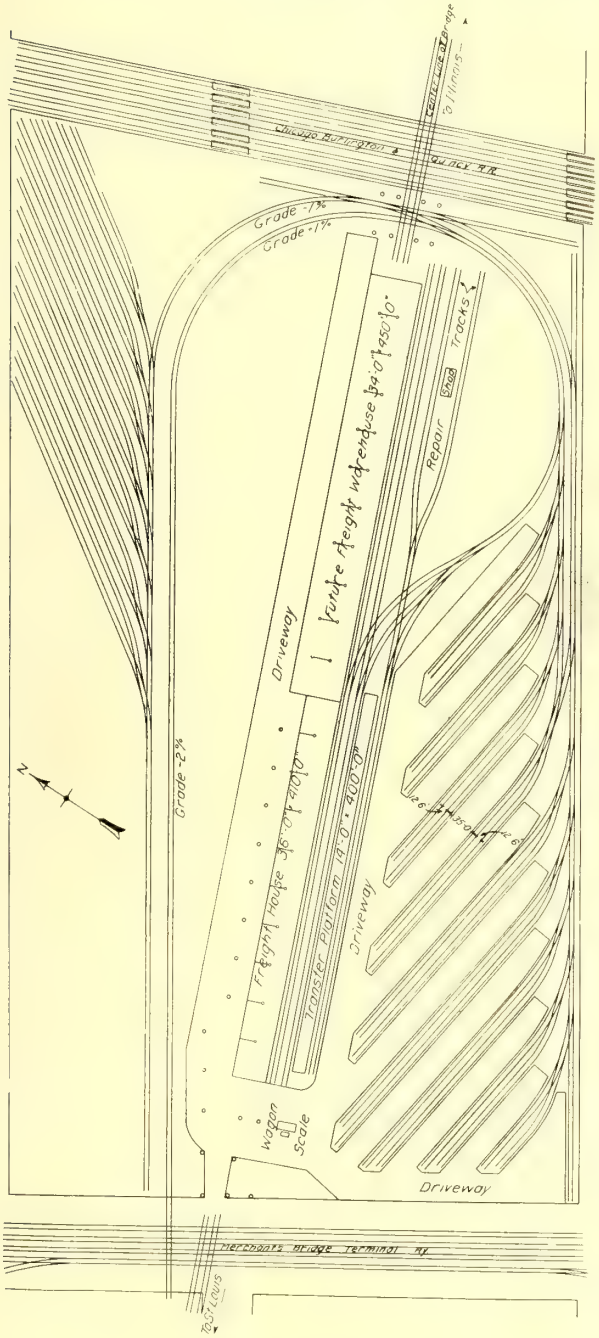
TYPICAL ELEVATOR ON ILLINOIS TRACTION SYSTEM

STATIONS AND TERMINALS

With the completion of its entrance into St. Louis the Illinois Traction System will have more extensive terminal facilities than any other interurban railway. The St. Louis project was described in detail in the Electric Railway Journal for Jan. 22, 1910, page 138. The McKinley property is building a double-track bridge over the Mississippi River which, with its completed approaches, will be nearly 2 miles long; a double-track line 2½ miles from the St. Louis end of the bridge to a passenger and express terminal in the heart of the retail and wholesale districts; a 12-story office and station building; a package freight and ex-

press terminal 88 ft. x 268 ft., a two-story bridge terminal station 50 ft. x 150 ft., and a freight warehouse 860 ft. long, and is improving 24 acres of team, yard and coal tracks. The construction work on this great project, with the exception of one of the passenger stations, will be completed within the next four months.

The Illinois Traction System contemplates handling local and through passenger trains, express and sleeping



PLAN OF ILLINOIS TRACTION FREIGHT TERMINAL AT ST. LOUIS

car trains to the heart of St. Louis. Car-load freight will be handled from Central and Northern Illinois into the terminal located under the Missouri approach to the Mississippi River bridge. The track layout of this terminal is illustrated herewith. This includes an incline leading from the Missouri approach to the McKinley bridge to a loop track, with which connect 18 team tracks with a capacity for 94 cars. The freight warehouse will be served by two tracks on one side and a driveway on the other. In addition, a transfer platform 14 ft x 400 ft. will be built parallel to the freight house and will be served by a track with a capacity for 10 cars. Two freight-car repair tracks and a small shop will be built on the terminal freight property and storage tracks to hold 85 cars will be served by a loop ladder track connecting with all parts of the yard. This freight property lies between the right-of-way of the Merchants' Bridge Terminal Railway and the right-of-way of the Chicago, Burlington & Quincy Railway, and it is close to the main line of the Wabash Railroad.

In addition to the important St. Louis development, new freight houses are being built at Peoria and Bloomington, and an appropriation has been made for a large new freight terminal in Springfield. Existing stations at Urbana and Danville are to be enlarged. The station program for 1910 and 1911 includes new combination passenger and freight depots at 13 small cities.

The Des Moines Inter-Urban Railway has large freight yards with team tracks and a freight house located about four blocks from the heart of the city of Des Moines. This terminal is entirely on private property. In the smaller towns frame combination stations 63 ft. x 16 ft., including a waiting room, ticket office and a freight room, are provided.

The Cedar Rapids & Iowa City Railway has a passenger station in the business district of each of its terminals and separate freight terminals. The freight terminal at Cedar Rapids is owned by the Chicago, Milwaukee & St. Paul Railway.

The Iowa & Illinois Railway reaches the center of the business district of Davenport over the tracks of the Tri-City Railway Company, paying a fixed amount per passenger carried for the use of the 4 miles of track and the power supply. A percentage of the gross earnings is paid for freight traffic handled. The track rights to the Clinton passenger station are obtained from the local street railway company by paying one-half the interest charge on the cost of the local company's tracks, over which the interurban cars are operated under their own power. The Iowa & Illinois Railway has freight warehouses at both terminals and at three intermediate towns. The freight terminal in Davenport was built and first occupied by a steam railroad and has a very desirable location close to the commercial center of the city.

The passenger trains of the Aurora, Elgin & Chicago reach the business district of Chicago over the tracks of the Metropolitan West Side Elevated Railway and use the Fifth Avenue terminal of that company. In this terminal the interurban company has a ticket office and headquarters for the traffic department. It is now constructing new fireproof station buildings at all of the more important towns. These structures are made of brick of various textures and with characteristic bonds so that no two of the stations will appear similar, although the general design of all is nearly the same and conforms to the Spanish style of architecture. Each station includes an enclosed waiting room and two open waiting rooms protected by heavy arches and pillars. A new general office building and station has been planned for the headquarters at Wheaton. This building will be two and a half stories high and 40 ft. x 130 ft. in area.

TRAFFIC FEATURES OF SOME OF THE PACIFIC COAST ROADS

THE Pacific Coast roads which have furnished data for this issue are notable for their individuality. Each road has developed with its own community and the types of construction, operating methods and services rendered have been designed to fit particular needs. The Pacific Coast States have no interurban networks comparable with those of Ohio and Indiana, but a wonderful growth in the agricultural districts, combined with the annual influx of tourists, has brought about an enviable density of freight and passenger traffic.

The freight departments of the steam railways on the Pacific Coast are interested chiefly in obtaining transcontinental traffic and, compared with the territorial area, their mileage is small in contrast with the amount of trackage in the States east of the Missouri River. The inertia of the steam railways and their inability fully to meet the needs of new communities have resulted in the electric railway systems of the Pacific Coast being constructed to care for the entire interests of the population served, furnishing passenger, freight, mail and express services comparable with those of steam roads. The Pacific Coast roads are enthusiastic advertisers, principally because they have an ever-changing transient population to reach.

The interurban roads and a number of the larger city systems have well-organized freight traffic departments. In addition to the interurban service connecting Seattle with Tacoma, the local properties in these cities have considerable freight and merchandise equipment constantly in use transporting traffic within the city limits.

Each of the Pacific Coast roads has been developed along individual lines, and because of the great distance from manufacturing centers in the East the operators of the roads must be resourceful men; and, as pioneers in furnishing the electric transportation service for a fast-growing section of the country, they must devise methods and means for furnishing service which fundamentally is not unlike the service of the Eastern roads, but in reality varies greatly according to the needs of local communities.

TRAFFIC DEPARTMENT ORGANIZATIONS

The environs of Los Angeles are served by three interurban and suburban electric railway systems. The Pacific Electric Railway Company, with 562 miles of track, is one of the largest electric railway properties in the country. The second largest in Southern California is the Los Angeles Pacific Company, with 260 miles of track. A third interurban line, the Los Angeles & Redondo Railway, has 85 miles of track.



SAN PEDRO HARBOR, RAIL AND STEAMSHIP TERMINAL ON THE PACIFIC ELECTRIC RAILWAY

The passenger department of the Pacific Electric Railway is headed by a general agent, D. A. Munger, who is assisted by a Los Angeles city passenger agent and two traveling passenger agents. The general agent of the freight department, W. F. Towne, at present has no assistant solicitors, although plans are being made for their employment. The two general agents report to J. McMillan, general manager, who states that the reason the Pacific Electric Railway heretofore has not employed freight solicitors has been that the existing organization has secured business faster than equipment could be built to meet the needs of the traffic. The traffic department of the Pacific Electric Railway is represented throughout the East by a general Eastern agent, C. E. Graham, located in New York City.

The traffic department of the Los Angeles Pacific Company is entirely separate from the other departments

of the road and gives its time wholly to the proper handling of traffic and to increasing business from tributary territory. The department is in charge of a traffic manager, D. W. Pontius, who is assisted by a chief clerk, traveling freight and passenger agent, freight solicitor, excursion manager, two clerks in the excursion office, six excursion solicitors, three excursion guides and a stenographer. The traveling agent solicits business from both sources of traffic and checks the service of the line as given by the operating department.

The traffic department of the Oregon Electric Railway, a 75-mile interurban road with headquarters at Portland, Ore., is now under the charge of A. L. Ruff, assistant general freight and passenger agent, who is assisted by a traveling freight and passenger agent, a chief clerk and an office staff. Under the jurisdiction of this department come the making of freight and passenger tariffs and other matters pertaining directly to the service, such as getting out publicity matter, soliciting freight and passenger business, fostering industrial propositions, etc.



BALLOON ROUTE EXCURSION PARTY, LOS ANGELES PACIFIC RAILWAY

The Puget Sound Electric Railway, operating 44 miles of main and branch track between Seattle and Tacoma, Wash., has a traffic organization headed by A. H. MacKay, general traffic agent. Mr. MacKay holds the same position with the Tacoma Railway & Power Company, a 90-mile city and suburban system, and is general traffic manager of the Pacific Traction Company, a 17-mile suburban system with headquarters in Tacoma. These three roads are Stone & Webster properties under the local management of L. H. Bean. The traffic department of the three roads has jurisdiction over freight and passenger tariffs, special rates, freight claims, advertising, chartered cars and industrial development.

The traffic department of the Spokane & Inland Empire Railroad Company, which operates 248 miles of track, is in charge of Waldo G. Paine, traffic manager and second vice-president, who reports to the general manager on matters pertaining only to traffic, and to the president on matters coming under his jurisdiction as vice-president. One man with the title of traveling freight and passenger agent solicits both passenger and freight business. In addition, the agents at different points on the line look after traffic solicitation in their vicinities. Some of this work also is done through the local office in Spokane. The publicity work of the Spokane & Inland Empire Railroad and its affiliated properties in Eastern Washington is handled by Charles E. Flagg.

TIMETABLES AND FOLDERS

The Pacific Electric Railway distributes about 40,000 timetables a month, the cost of which is defrayed by the advertising privileges. Folders are distributed by the Railroad Folder Advertising Agency; by the city passenger agent, to 432 apartment houses and hotels in Los Angeles, and by the regularly appointed agents of the company, who pass them out over the ticket counters and distribute them to the local hotels. The official railway folder is a 48-page publication of standard size with covers printed in two colors. Each month the color of the cover is changed. This folder contains an equivalent of 21 pages of timetables and includes a map showing all suburban lines. Timecards, the printing privilege for which is leased, are given general distribution through a free information bureau which the company maintains at its Sixth and Main Streets terminal.

Good results are obtained from the general distribution of pamphlets illustrating scenery along the line of the Pacific Electric Railway. These are issued in large quantities and are distributed freely to the general passenger and traffic agents of the steam roads in the Eastern States, who, it is stated, appreciate their value for distribution to prospective California passengers. In addition, all hotels and information bureaus on the Pacific Coast are furnished with these pamphlets. The company also distributes from its free information bureau in Los Angeles literature issued by various commercial associations and general literature on features of interest located in Southern California.

Special events and trips are advertised with leaflets and flyers printed by the company. This class of advertising, as issued by the passenger department of the Pacific Electric Railway, displays considerable originality. Some of the publications have the following titles: "Los Angeles' Welcome to the Fleet," six pages,

three colors, standard size; "The Hot Sands of Los Angeles," six pages, four colors, standard size; "Educational Association Convention," six pages, standard size, three colors; "Mt. Lowe," three different folders describing scenic trips; "Santa Catalina Island," four pages; "Valley and Mountain Trolley Lines," 12 pages and cover, 10½ in. x 6 in., two colors, with full-page engravings.

The official timetable of the Los Angeles Pacific Company is a 24-page publication, 3 in. x 9 in. in size, which costs $8 per thousand in lots of 10,000. Besides the regular schedules this folder contains half-tone engravings of many scenic features. A map of the "Balloon Route" excursion trip is shown. There are also advertisements of express and freight service and announcements regarding parlor and chartered-car parties, special tickets and lost articles. The different information bureaus throughout the country are supplied with these folders, and timetables also are carried in the folder racks of the different hotels in Southern California and as far north as San Francisco.

A standard-size folder circulated by the Los Angeles Pacific Company gives information about the "Balloon Route" excursions with fares, leaving time, etc., and in addition has advertisements of trips through other parts of California. Another pamphlet issued is called "Balloon Route Excursion Souvenir." This has 28 pages, 5¼ in. x 7¾ in. in size, illustrating and describing interesting trips.

"The Crescent Bay Cities—Their Residential and Commercial Advantages" is the title of an attractive pamphlet issued by the traffic department of the Los Angeles Pacific Company. This 32-page pamphlet is 7¾ in. x 9 ¾ in. in size and contains extended descriptions of business houses, residences, resorts and public buildings of the Pacific Coast towns on the electric railway, illustrated with 73 half-tone engravings. On the first page is a map of the 100-mile "Balloon Route," which reaches coast and interior cities and towns.

The Oregon Electric Railway issues two folders for general distribution. One is of standard size with covers printed in several colors, giving a bird's-eye view of the Willamette Valley, which the lines of the company serve. One-half of the inside pages of this folder contain descriptions of points of interest and a large number of half-tone illustrations. A picture map of the Willamette Valley, 14 in. x 28 in. in size, printed in colors, occupies the entire inside half of the folder.

The second and smaller folder, 3¼ in. x 6½ in. in size, is printed in black on light blue heavy paper, and is devoted entirely to train schedules on the electric road and on connecting steam lines. On the back cover are announcements of the company's interline ticket arrangements with steam roads, its resorts and picnic grounds. These folders cost about 1 cent each, and are distributed from all stations on the company's line and through the ticket offices of connecting steam roads, as well as through the usual channels of leading hotels, publicity bureaus, etc. Folder boxes are provided at distributing points.

The Spokane & Inland Empire Railway issues a large timecard showing the time of all trains in and out of Spokane. These are distributed by messengers to all places where people congregate in Spokane and other towns served by the line. An arrangement also is made with two Spokane business men who get out official timecards whereby the timetables of the Spokane & Inland are included therein without cost to the railway company, the railway agreeing not to furnish any other timecard in this form to the public. These cards are distributed by the publishers in quantities of 10,000 a month through the racks in hotels in Spokane and the surrounding territory.

A great many attractive folders and leaflets are issued by the publicity department of the Inland Empire System. Numerous leaflets describe the lakes and other resorts reached by the Inland Empire lines and the advertising of a connecting line of steamers serving the Cœur d'Alene mining district is used to influence travel over



TYPICAL ADVERTISEMENT, PACIFIC ELECTRIC RAILWAY

the double-track, 40-mile division between Spokane and Cœur d'Alene. One of these publications, "Through the Pines to Spokane's Lake Resorts," is a single-sheet folder of 16 standard-size pages, containing seven full-page half-tones and a four-color map 15 in. x 17½ in. in size. Another standard-size folder illustrates and describes the attractive features of Liberty Lake, a bathing resort which has been developed by this electric railway. The "Liberty Lake" folder has 12 pages, several of them carrying full-page half-tone engravings. An especially attractive booklet on Hayden Lake, the terminus of one of the Inland Empire lines, contains 20 pages, 5¼ in. x 9¼ in. in size, and two embossed covers carrying half-tone engravings of woodland scenes. The interior pages are illustrated with numerous half-tone engravings of forest and lake scenes printed in black and green ink. Interspersed among the pages are small half-tone views of wood berries, ferns and flowers.

MISCELLANEOUS ADVERTISING METHODS

The Pacific Electric Railway spends approximately $825 per month for advertising space in the daily newspapers in the cities and towns served. Yearly contracts

are made for space in suburban newspapers. A typical 2-column newspaper advertisement pointing out many attractive trips is reproduced.

This company has gained considerable publicity by advertising liberally through what is known as the "Hot Belt," a section embracing the territory bounded by Salt Lake City, Albuquerque, N. M., Houston and El Paso, Tex., and San Diego, Cal. During the summer months many residents of this territory spend much time on the Pacific Coast and are encouraged by the advertising to take the scenic trips offered by the Pacific Electric Railway.

Circular letters calling attention to "Ye Alpine Tavern," on Mt. Lowe, which is an all-the-year-round hotel resort owned by the Pacific Electric Railway, are mailed to people within a radius of 800 miles of Los Angeles. The mailing list for this purpose is compiled by the various newspapers and the Dake Advertising Agency, of Los Angeles, and is furnished free to the railway company. The Mt. Lowe excursion trips are advertised by means of bright-colored stickers 3½ in. square, which are placed on the baggage of all visitors to the Alpine Tavern. A daily newspaper also is published at the Mt. Lowe tavern. The outside sheets of this newspaper are printed in advance and kept in stock. Inside sheets carrying the names of the daily visitors are printed each afternoon for insertion in the stock covers. The sale of papers to tourists pays for the cost of printing. Almost every tourist whose name appears purchases a copy of this paper and carries it home; thus the mountain trip, which is fully described in the paper, is well advertised.

The Pacific Electric Railway uses billboards only in the event of national conventions, etc., which have a program covering three or four days to advertise. Automatic illuminated display machines, showing views along the routes and such other advertising as the company desires to display, have been installed in the Los Angeles terminal of the Pacific Electric Railway. Each machine carries 86 ordinary colored stereopticon slides, which are changed every 10 seconds. This method of advertising, it is stated, has been productive of especially good results. Framed, glass-covered signs advertising the service of the Wells-Fargo express and features of interest along the electric lines are carried in the suburban cars of the Pacific Electric Railway. Revenue is also derived from the sale of space on the backs of transfers to commercial institutions.

The Los Angeles Pacific Company contracts for space with all Los Angeles daily newspapers and spends from $800 to $1,200 a month for this class of advertising. Billboard and bulletin board advertising is used for featuring the "Balloon Route Excursion." The boards are 10 ft. high and 40 ft. long and are repainted frequently to keep them in good condition. The average cost of one of the boards, as illustrated, is $75. Illuminated signs are used at the different resorts, but these are erected at the expense of the resort amusement companies, although the railway company occasionally supplies the electric current for operating the signs. Ban-



LARGE BILLBOARD ADVERTISEMENT OF EXCURSIONS OVER LOS ANGELES PACIFIC RAILWAY

ners and window cards are used on the local cars of the Los Angeles Pacific Company to a limited extent in advertising special events.

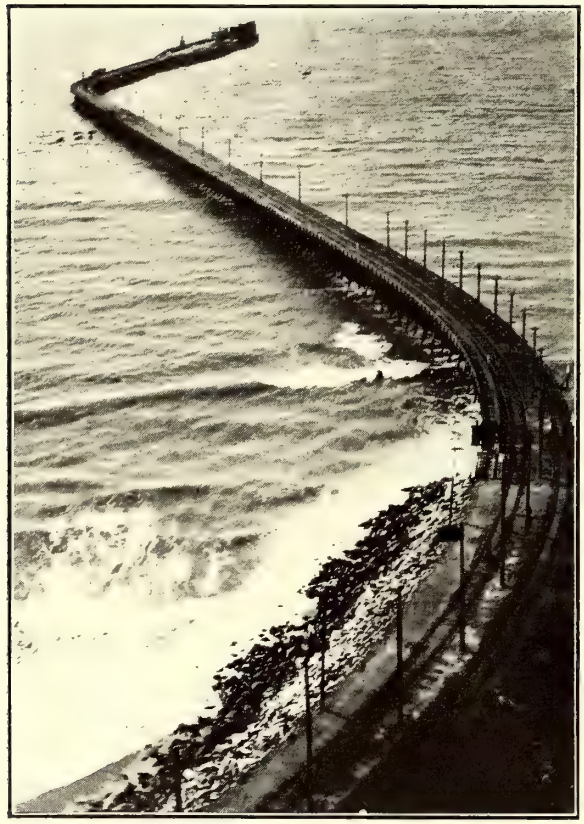
The Oregon Electric Railway carries only timecard notices in the newspapers of Portland. Larger space is carried in the local newspapers of the principal towns along the route, advertising special events such as excursions, conventions and the company's through ticketing arrangements with steam lines for Eastern and Canadian points, these arrangements having only recently been put into effect.

A large electric sign placed on the top of a building occupying a prominent corner in Portland calls attention to the service of the Oregon Electric Railway. A facsimile of one of its standard passenger coaches with scenery typical of the country through which the line passes and an invitation to the public to make a daylight trip over the road are shown by this illuminated sign. No advertising whatever is carried in passenger coaches of this road.

The Spokane & Inland Empire Railway contracts for display and reader advertising in most of the Spokane papers, while small 2-in. or 3-in. single-column advertisements are used in the country papers. The space on the backs of transfers also is used for advertising features of the system. This company favors the use of billboard advertising, believing that it brings quick and direct results. In the summer 30 prominent boards throughout

Spokane are utilized to advertise week-end and Sunday excursions, while during the winter season seven or eight such boards covering practically every avenue of ingress and egress to the city are used to advertise connections beyond terminals for through traffic. The advertisements displayed on some of these boards are reproduced herewith.

Dash signs are carried on city cars only of the Spokane & Inland Railway Company. These advertise special revenue-producing events anywhere on its system and such space is not sold to advertise foreign business. Window cards are also displayed, one on each side, in the center of the car in the upper sash. These are printed on both sides so they may be read from the inside and outside and are used principally for advertising baseball games. At other times this space is used to advertise summer



JOINT RAIL AND BOAT TERMINAL AT PORT LOS ANGELES

resorts on the line, while in winter announcement is made through them of through traffic connections with the steam roads.

The Washington Water Power Company, which operates 97 miles of city and suburban lines in and about Spokane, owns a park within the city limits. A description of the large natatorium at this park was presented in the Electric Railway Journal for Oct. 2, 1909, page 525. Park attractions are advertised in four daily papers and by means of an advertising car carrying a 24-sheet billboard on each side with electric lamps along the top rails. Also oilcloth signs 3 ft. wide and the full length of the sprinkler cars carry park advertising. During the park season the Washington Water Power Company also uses 24-sheet standard park lithographs on a large number of billboards in and about Spokane.

EXCURSIONS AND SPECIAL PARTIES

The traffic department of the Pacific Electric Railway has so many attractive rides to offer as compared with Eastern railways and has such fast service that this department has built up an enormous special business. The capacity of the system for handling dense traffic over its interurban lines to the ocean beaches, from 20 to 70 miles distant from Los Angeles, is learned when it



BILLBOARD ADVERTISEMENT OF THE SPOKANE & INLAND

is stated that at the time of large excursions 80 interurban cars, carrying an average of 145 people per car, are regularly dispatched out of the Los Angeles terminal each hour.

Excursion and other special traffic, including the Mount Lowe and Catalina Island scenic trips, is solicited by traveling passenger agents and is contracted for through the general passenger office. On account of the varied amusements which are offered to excursionists at the different beach resorts and the competition which exists, the proper handling of the summer excursion traffic entails a considerable amount of work in the passenger department. Probably no other electric railway uses such far-reaching means to solicit special parties and chartered-car rides. The passenger traffic department through its general agent in New York and through the courtesy of its friendly steam connections keeps in touch with all special trains leaving Eastern cities bound



BILLBOARD ADVERTISEMENT OF THE SPOKANE & INLAND

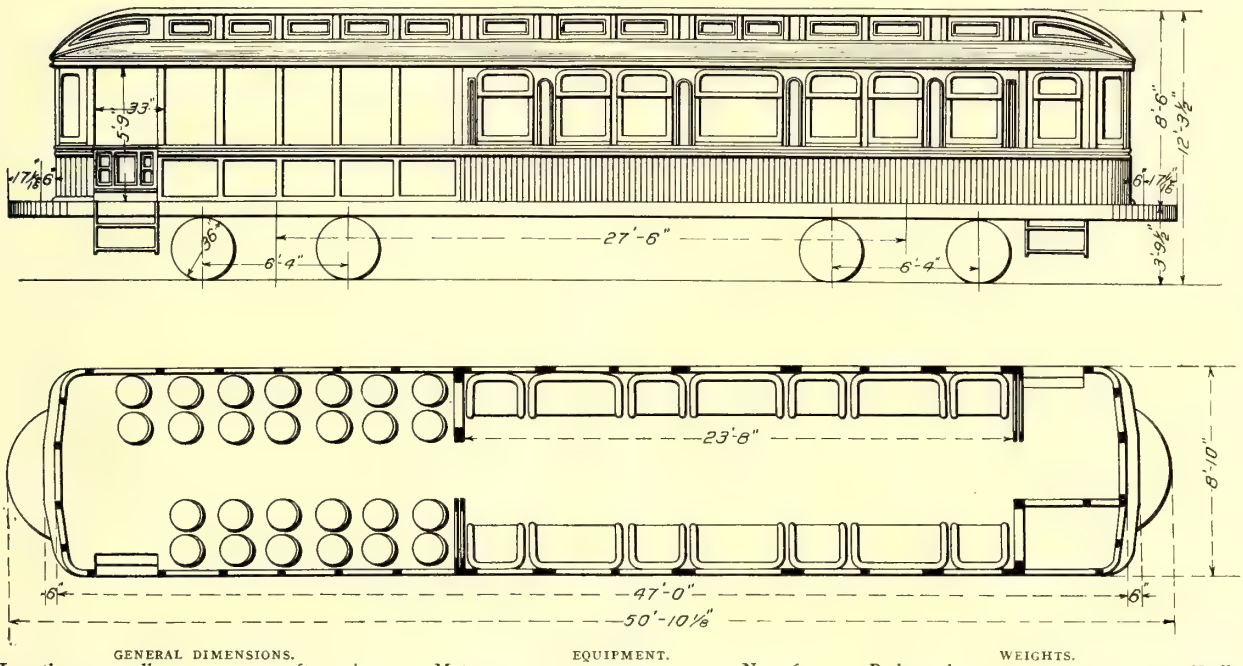
for points near Los Angeles. The traveling passenger agents of the Pacific Electric Railway meet these trains at points as far east as Salt Lake City and Albuquerque and distribute publicity matter and make definite arrangements for handling parties over the Pacific Electric lines. A personal canvass of each train is made and the traveling passenger agent is prepared to contract for chartered cars and sell tickets for any of the many scenic rides

which the Huntington system has to offer. At the time of large conventions in Los Angeles the Pacific Electric Railway Company keeps passenger department representatives in the Rocky Mountain cities so that these men may meet westbound excursion trains and sell special-party tickets for the Pacific Electric tours. Excursion traffic also is encouraged by furnishing the Eastern agents of the New York Central and Pennsylvania Railroads with Pacific Electric coupons, which can be used in building up tourist tickets. In combination with other companies the Pacific Electric Railway receives its full local rate.

Traveling passenger agents work with the various beach resort organizations, secure reduced rates on amusements, provide band concerts and programs of sports, etc. Special excursion tickets are furnished in lots of any number and in many instances thousands of tickets are issued for one excursion, the excursion committee arranging to sell tickets in advance. Excursion rates are based on parties of 60 or more people traveling together at a given time. Special parlor cars are chartered on a basis of 40 or more people, the maximum limit being the seating capacity of the cars. The regular one-way or round-trip fare plus $5 for the exclusive use of a car and plus the dead-head mileage at a rate of 20 cents per mile where necessary to deadhead equipment is charged for this service. The seating plan of one of the six observation cars which the company has built for handling chartered-car traffic is shown in the engraving above.

Excursion traffic for the Los Angeles Pacific Company is obtained by personal solicitation. Such service is covered by a contract which specifies the attractions offered at the different beach resorts and any special arrangements that the railway company may care to make in conjunction with the resorts. Excursion tickets are limited to one day and special tickets are issued for such occasions. With but one exception rates for such service are based on 80 per cent of the regular tariff. This exception is the "Balloon Route Excursion," a 101-mile round trip for which the fare is $1. On this trip an experienced guide is sent with each car. He explains the points of interest as they are passed. The "Long Wharf," which is visited on this ride, is illustrated herewith. A number of free attractions at beach cities are given on this trip, including admission to a "camera obscura," admission to the $20,000 aquarium at Venice and a ride on a scenic railway. This is the most extensively advertised of all of the excursion trips run by the Los Angeles Pacific Railway and is, perhaps, the most popular one of its kind on the Coast. Between 60,000 and 75,000 tourists take the trip each year.

Special-party and chartered-car rates on the Los Angeles Pacific Company lines are based on 40 fares plus $5 for the extra service and 20 cents per mile for dead-heading the equipment. A representative of the traffic department accompanies all special-party trips to insure the comfort of the passengers.



GENERAL DIMENSIONS.		EQUIPMENT.		WEIGHTS.	
Length over all	50 ft. 10 in.	Motors	4-No. 76	Body only	31,680 lb.
Width over sills	8 ft. 10 in.	Control	L-4.	Trucks, each	9,280
Height to roof	12 ft. 3 in.	Brakes	West. Air.	Electrical equipment	17,738
Bolster centers	27 ft. 6 in.	Trolley base	Pneumatic	Air brakes	1,822
Seating capacity	46	Gear ratio	28:54	Total	59,800

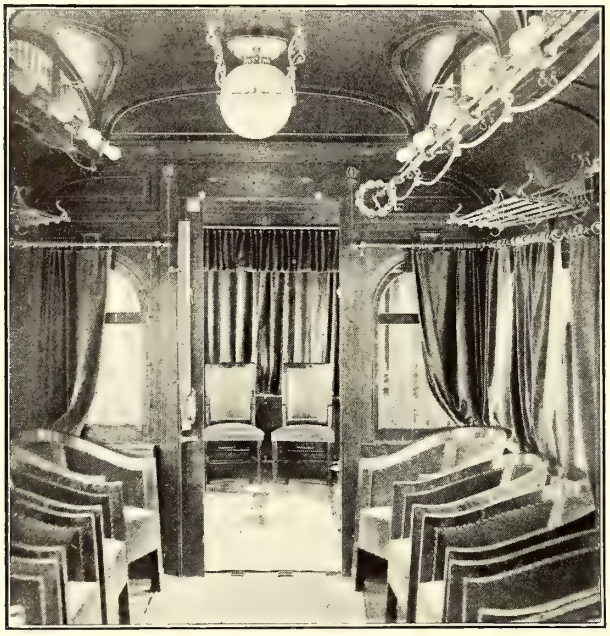
PLAN AND ELEVATION OF TYPICAL OBSERVATION PARLOR CAR OF PACIFIC ELECTRIC RAILWAY

On the Oregon Electric Railway the solicitation of passenger traffic is confined principally to the movement of special parties, picnics, lodge conventions, etc., and includes local traffic as well as through business to points on connecting lines. Many attractive parks and picnic grounds on the route offer inducements for travel which constitutes a large part of the summer passenger business. The park at Wilsonville, 11 acres in extent and situated on the Willamette River, is owned by the company. It is 21 miles from Portland and 28 miles from Salem, the principal termini of the road.

Excursion fares generally are based on one and one-third of the first-class fare for the round trip. Passen-

gers are carried on special round-trip forms of tickets issued for the purpose. Solicitation of excursion business usually is left to the secretaries of the organizations holding the excursions.

The charge for special-party or chartered-car service is made on the basis of $1.50 per revenue train-mile for one way, and $1 per revenue train-mile for the round trip, with minima of $25 and $35 respectively. Unless requested to do so or unless some occasion demands, this



INTERICR OF PARLOR OBSERVATION CAR, PUGET SOUND ELECTRIC RAILWAY

company does not send a representative of the traffic department to accompany special parties.

The Oregon Electric Railway operates two parlor-chair cars 61 ft. long over all. These cars embody many attractive features of modern construction and are equipped with large observation platforms, containing 24 seats in the parlor and observation end. They also contain a smoking room, with a seating capacity for nine persons, and they are equipped for buffet service. They are operated on the "Capital City Flyer" and the "Rose City Limited," which give limited service between Portland and Salem. The parlor-car fare between these two points is 35 cents.

PUGET SOUND LINES

The Puget Sound Electric Railway does not make reduced rates for excursions. Special cars and trains, however, are rented on an arbitrary basis. For the one-way 36-mile trip between Seattle and Tacoma the special train fares are as follows: Motor car only, $30; motor car and trailer, $50; motor car and two trailers, $70. For the round trip, motor car only, $50; motor car and one trailer, $85; motor car and two trailers, $120. When the chartered car may be attached to a regular train the one-way rate is $20 and the round-trip rate $35. The number of passengers allowed in a chartered car is limited to its seating capacity.

Parlor observation cars are attached to all trains of the Puget Sound Electric Railway. A charge of 25 cents per seat is made in addition to the regular fare. The interior of one of these observation trailer cars as regularly operated on hourly headway is shown in an accompanying engraving. Several other views of these especially fine parlor cars were presented in the Electric Railway Journal for Oct. 2, 1909, on Plate XXX. The observation platforms of these cars are so designed that during the winter they may be enclosed with glass.

INLAND EMPIRE SYSTEM

Excursions and all kinds of special traffic are solicited by the Inland Empire System. Most of the contracts for excursions are made by the traffic manager and some are solicited by the passenger agent. Special tickets are provided for excursions and in some instances are printed especially for and furnished to the organization holding the excursion, the representatives of which sell them. They are also sold by the local ticket agents. Excursion rates are based on fare-and-a-third for the round trip, and no rates are made for parties of less than 100 people. Through joint ticket rates with connecting lines are made on the usual pro rata basis, although the full local rates usually obtain by reason of the electric road furnishing a short, direct route to destination.

Special-train service is furnished when desired with a minimum charge of from $15 to $20, according to the distance. This is on the basis of $1 per train-mile and



INTERIOR OF SPOKANE & INLAND PARLOR CAR

full fare for each passenger on the train. A representative of the traffic department accompanies special-car parties when requested.

The Spokane & Inland Railway operates two chair cars on its Cœur d'Alene division, making four trips in each direction daily, for which a special charge of 25 cents is made. On the Inland division the rear coach of every train has a chair-car compartment seating 16 peo-

ple, for which a charge of from 25 to 50 cents, according to the distance, is made. Illustrations of the parlor-car equipment of this road were shown in the ELECTRIC RAILWAY REVIEW for Dec. 28, 1907, page 977.

FREIGHT SERVICE AND EQUIPMENT

Regular freight trains are operated morning and evening daily except Sunday over the lines of the Pacific Electric Railway, except on the Mt. Lowe division. Additional daily trains for newspaper, milk and perishable freight are run as required. Twice each week the electric freight trains connect at San Pedro with steamers from San Diego, once each week with a steamer from Seattle, and twice a day with boats running to Catalina Island. Freight is transferred directly between the electric cars and the boats and it is billed through.

The principal sources of freight traffic of this large property are the industries of the cities and towns along the routes, lumber yards, rock crushers, fruit orchards, sugar-beet farms and sugar-beet factories. Many products of the soil together with fertilizers for the various crops are handled. Crude oil and oil-well supplies also are shipped. A beet-sugar factory at New Delhi on the Huntington Beach line is served exclusively by the Pacific Electric Railway. The daily capacity of this factory is 600 tons of sugar beets sliced and worked into sugar. All of the output is shipped over the electric road.

The freight equipment available for handling this traffic includes the following: 125 box cars of 80,000 lb. capacity; 138 flat cars, two of 60,000 lb. capacity, 78 of 80,000 lb. capacity, and 58 of 100,000 lb. capacity; 200 side-dump cars of 60,000 lb. capacity and 20 of 80,000 lb. capacity; 15 gondola cars of 60,000 lb. capacity and 37 of 80,000 lb. capacity; 19 oil tank cars with a capacity of 6500 gal. each, and eight narrow-gage flat cars of 30,000 lb. capacity; a total freight equipment of 562 cars. The motive power equipment for freight trains includes 11 express motor cars of 60,000 lb. capacity each; 9 express motor cars of 90,000 lb. capacity; 4 electric locomotives and 17 freight motors. The average power used per car-mile (both passenger and freight) is 4.4 kw-hours and per ton-mile is 0.165 kw-hour. The average cost of the power is 3.1 cents per car-mile and 0.115 cent per ton-mile.

The Pacific Electric Railway has physical connections with all steam railroads entering Los Angeles, Long Beach and San Pedro and, at tidewater, with San Pedro harbor. Arrangements for interchange and switching are the same as those ordinarily in force between steam railroads or railroads and water carriers. Industrial side tracks are installed wherever the traffic will warrant the expenditure, the railroad furnishing the permanent portion of materials and the industry paying for the perishable portion. The freight station buildings of the Pacific Electric Railway are designed after modern plans in use by steam railroads. A half-tone engraving of the Los Angeles station is shown on page 639.

LOS ANGELES PACIFIC COMPANY

The Los Angeles Pacific Company operates two freight trains from Los Angeles to Playa del Rey and Redondo and return; four freight trains from Los Angeles to Santa Monica, Ocean Park, Venice, Colegrove and Sherman and return; two freight trains from Los Angeles to Hollywood and return, all service being daily except Sunday and operated at night, if possible, to improve the load factor and not to interfere with passenger trains. The principal sources of freight revenue are merchandise, crude oil, crushed rock, cereals and cereal products and machinery.



GRAIN WAREHOUSE AND FREIGHT TRAIN OF THE SPOKANE & INLAND

The Los Angeles Pacific Company's freight equipment consists of 130 standard flat cars and 15 standard box cars with capacities ranging from 50,000 lb. to 100,000 lb. In addition, 10 electric locomotives handle commodities brought into Los Angeles by the different steam roads. Freight equipment is exchanged with the Southern Pacific Company at Sentous and with the Atchison, Topeka & Santa Fe at Inglewood. The railway also exchanges freight with the ocean vessels at Redondo Beach and Port Los Angeles. Interchange tracks are established at all these points and where a joint agency is not maintained the agents of the electric railway transact the business with the agents of the connecting lines. A joint station is maintained at Inglewood by the Los Angeles Pacific Company and the Atchison, Topeka & Santa Fe, the expense being divided equally between the two companies. The switching and interchange arrangements with steam or other connecting lines are the same as those in effect between steam lines. Freight sta-

tions are maintained at Los Angeles and seven smaller cities. These are of conventional design.

OREGON ELECTRIC RAILWAY

A fast service is maintained by the Oregon Electric Railway for handling the freight traffic between Portland, Salem and intermediate points. The loading schedules at the large stations are so arranged as to permit separate cars to be loaded for the principal shipping points, and these cars are set out at sidings. This ensures prompt delivery of freight at destination on the morning following the date of shipment, and also ensures quick dispatch of through freight, interchanged with other lines at Portland, moving to and from the East, consisting of merchandise, machinery, farm implements, etc., westbound, and hops, prunes, fruits and farm products eastbound. The larger portion of the freight business of the Oregon Electric Railway consists of shipments of farm products and the usual merchandise traffic, originating largely from the jobbers in Portland.



WAY FREIGHT STATION OF THE LOS ANGELES PACIFIC COMPANY

The principal shipping points are at Portland, Woodburn, Salem, Forest Grove and Hillsboro, at each of which cities, with the exception of Portland, combination freight and passenger station buildings are maintained. The freight station at Portland is operated jointly with the United Railways Company. This building recently has been enlarged and now has trackage facilities for loading nine cars of freight at one time. A separate depot for handling passenger traffic, with a large waiting room, baggage and express room and other accommodations, is maintained at Portland.

The Oregon Electric Railway line does not reach the water front at Portland and so has no direct interchange arrangements with the boat lines. Business with these companies is handled, however, through switching connections with other lines serving the docks and wharves.



LOS ANGELES FREIGHT STATION OF THE LOS ANGELES PACIFIC COMPANY

The freight equipment of the Oregon Electric Railway includes three freight locomotives; 57 box cars, the majority of which are of 60,000 lb. capacity; 49 flat cars of 60,000 lb. capacity; 15 flat cars of 50,000 lb. capacity; 17 flat cars of 40,000 lb. capacity; two stock and four Hart convertible cars, besides miscellaneous equipment consisting of cabooses, line repair cars, equipment cars, etc.

PUGET SOUND PROPERTIES

The Puget Sound Electric Railway derives most of its freight revenue from handling crushed rock, coal, lumber, wood, brick, hay, mill stuff, vegetables, packing-house products, fresh meat, general merchandise and milk. About 5000 gal. of milk are handled each day. Because the interurban line has direct competition from several boats operating between Seattle and Tacoma, a large commodity tariff is published and the traffic department aggressively solicits new business. Statistics of the freight traffic of this road, showing the revenue and expense accounts and a description of the traffic, were presented in the Electric Railway Journal for Oct. 2, 1909, page 544. As power is purchased and a penalty is charged for peak loads, freight trains are operated principally at night and at hours when the passenger train load is lightest.

The Puget Sound Electric Railway has transfer tracks connecting with the Northern Pacific Railway, Tacoma & Eastern Railway, Great Northern Railway, Chicago, Milwaukee & Puget Sound Railway and the Union Pacific Railway. Steam railroad cars are handled direct to destination over the electric line and the local carload rate is charged for this switching service. The electric railway company's cars are not interchanged with the steam roads. The rolling-stock equipment includes the following freight cars equipped with automatic air brakes and couplers and built under Master Car Builders' specifications so as to be perfectly interchangeable with steam railroad cars.

89 flat cars 36 ft. long, capacity 50,000 lb.
11 flat cars 41 ft. long, capacity 50,000 lb.
32 box cars 34 ft. long, capacity 50,000 lb.
25 coal hoppers 30 ft. long, capacity 70,000 lb.
30 coal gondolas 34 ft. long, capacity 50,000 lb.

Additional equipment includes eight refrigerator cars 34 ft. long, 10 ft. high and 9 ft. 4 in. wide and of 50,000 lb. capacity. These cars are used exclusively on the Puget Sound Electric Railway for handling fresh

meat. This traffic includes two carloads southbound daily and three carloads northbound daily between terminals. The motive-power equipment includes two express motor cars 45 ft. 4 in. long, equipped with four GE-66 motors and automatic air brakes. These motor cars weigh 72,000 lb. each. Three 36-ft. cab-type locomotives with similar electrical and air-brake equipment rates being quoted according to the combination of the regular tariffs of each line.

The Tacoma Railway & Power Company has the following equipment for handling its freight traffic. All cars are built according to M.C.B. standards and are equipped with automatic air brakes and couplers for train operation.



FREIGHT DEPOT OF PACIFIC ELECTRIC RAILWAY IN LOS ANGELES

and weighing 86,000 lb. each are used to haul freight trains.

The warehouse accommodations of the Puget Sound Electric Railway include the following:

Tacoma freight warehouse; corrugated iron building 200 ft. x 30 ft.
Seattle freight warehouse; wooden building 200 ft x 30 ft.
Kent combination passenger and freight; frame building 94 ft. x 30 ft.
Auburn combination passenger and freight; frame building 70 ft. x 24 ft.
At 16 other points, freight warehouses 16 ft. x 20 ft.
At 28 country road crossings, open platforms 8 ft. x 29 ft.

Loading tracks are provided on the right-of-way at all principal stations. When spurs are built into private yards or industrial plants all the labor and material, except rails, are paid for by the owners of the property on which the tracks are laid.

85 flat cars 36 ft. long, capacity 50,000 lb.
5 box cars 34 ft. long, capacity 50,000 lb.
2 cab motors 36 ft. long, four GE-57 motors, weight 57,000 lb.
2 cab motors 36 ft. long, four GE-90 motors, weight 60,000 lb.
2 express box cars 34 ft. long, four GE-90 motors, weight 60,000 lb.
2 express box motor cars 34 ft. long, four GE-67 motors, weight 60,000 lb.

The Seattle Electric Company has industrial connections with many plants in the city, acts as local distributor for freight brought into Seattle by the Puget Sound Electric Railway and makes local deliveries for steam roads and boats. The freight traffic in Seattle includes the collection of lumber, shingles and wood from the mills and delivery to steam railways. More than 50 carloads of this class of freight are handled daily, for which a charge of $5 per car is made. The company has 19



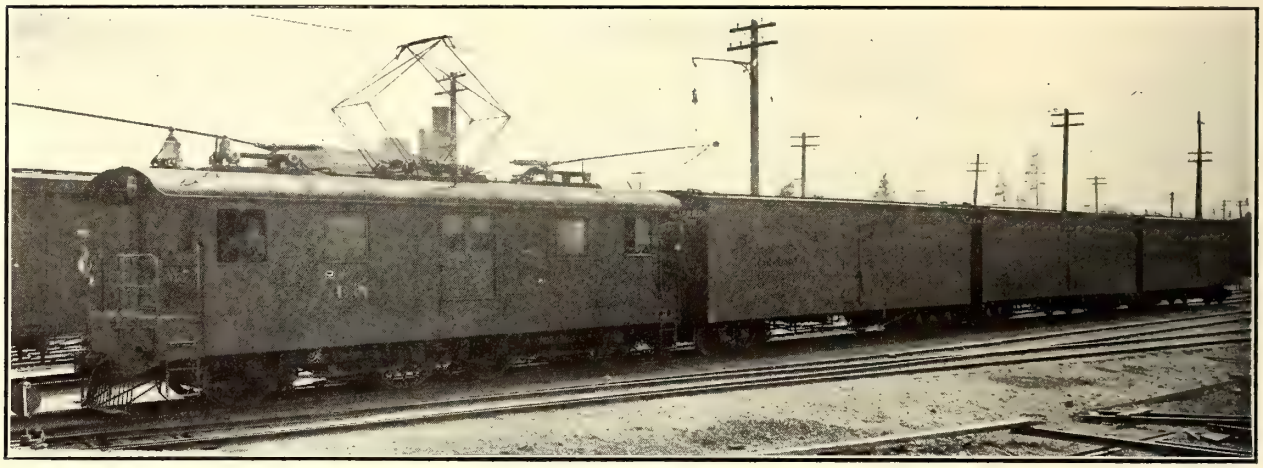
TYPE OF SPOKANE & INLAND PASSENGER AND FREIGHT STATION AT LARGER TOWNS

The Tacoma Railway & Power Company and the Pacific Traction Company at Tacoma operate merchandise and freight cars over 110 miles of city and suburban track. This traffic is supervised jointly with that of the Puget Sound Electric Railway. The freight cars of the three roads are interchanged and shipments originating on one line destined to points on another line take the regular tariff rate over each system, through freight motor cars and 44 miscellaneous freight cars. Business is interchanged between this company and the Puget Sound and Tacoma companies, the rates charged being equal to the sum of the local tariffs.

INLAND EMPIRE SYSTEM

Freight trains are run on the Cœur d'Alene division of the Spokane & Inland Railway twice each way daily except Sunday, leaving the Spokane terminal at 11 a. m.

and at 4:35 a. m. On the Inland division trains are run daily, leaving the Spokane terminal at 4 a. m. and arriving at other terminals so that all freight may be delivered at 8 a. m. over the entire system, returning to the Spokane terminal about 5 p. m. Special freight trains with full



REFRIGERATOR TRAIN OPERATED DAILY OVER THE INLAND EMPIRE SYSTEM

carloads are dispatched whenever necessary. Grain, lumber and lumber products form the principal sources of freight revenue. The freight traffic is handled in trains of standard cars drawn by electric locomotives, of which the company has nine. The freight equipment includes 450 M.C.B. standard cars and five steam locomotives.

The Spokane & Inland Railway has connections with all the steam lines entering Spokane and with two lines of steamboats at Cœur d'Alene. Arrangements for interchange are similar to those existing between steam roads. Through tariffs are published in both directions and full interchange of freight is made between all lines. Divisions of through rates according to conditions are made between the electric railway and its steam connections, although, by reason of being the originating and delivering line, the Spokane & Inland Railway usually obtains its local rates.

No terminal track arrangements are maintained by the Spokane & Inland Railway Company with its connecting steam lines, separate transfer tracks of each road affording the necessary switching facilities for interchange of freight. Industrial sidings are installed by the Spokane & Inland Railway whenever business warrants, the location being governed entirely by prospects of future revenue from this source. The cost for building such sidings when installed under contract is borne by the shipper, the railway company allowing the shipper 25 per cent of all freight charges on inbound and outbound shipments, excluding switching charges, for a period of two years. The company also has installed these sidings at its own expense in some instances where a large volume of traffic was anticipated.

The Inland Empire System has a valuable terminal property located close to the business center of Spokane. This property connects the large freight station with the repair and car shops and private right of way. A tunnel which will connect the terminal yard with the large passenger terminal building located in the heart of the retail district is now under construction. The stations and grounds in the smaller towns served are planned according to steam railroad practice. An engraving of the passenger station at one of the larger towns is shown and a view of a grain warehouse also is presented.



SPOKANE & INLAND FREIGHT DEPOT AT SPOKANE

The grain warehouses are of three sizes, 50 ft. x 100 ft., 50 ft. x 150 ft. and 50 ft. x 200 ft., and cost from $2,000 to $6,000 each. Grain elevators are but

little used throughout the West, the grain being handled in sacks. Stockyards are maintained at all of the principal freight stations of the Spokane & Inland Railway. These vary in size from one pen and chute to larger ones with two and three pens. They are provided with water, scales and other facilities for this service. Their cost ranges from $100 to $1,000 each.



FREIGHT MOTOR AND TRAIN PASSING INTERLOCKING TOWER ON FOUR-TRACK DIVISION OF PACIFIC ELECTRIC RAILWAY

FREIGHT SOLICITATION

The traveling freight and passenger agent of the Spokane & Inland Railway does most of the freight soliciting for this road, although the local agents in small towns are expected to spend an hour or two a day with their customers in an endeavor to induce them to ship via the electric route. The local freight agent in Spokane also makes it a point to call in person every day or two on the jobbers in that city. The growth of the freight business on the lines of the Spokane & Inland is believed to be due in great measure to the close watch which is kept by the traffic department on possible new business.

The traffic manager of the Spokane & Inland requires the outside agents to make daily reports to the traffic office of the freight inbound and outbound from their stations, and necessary special information is wired in to the traffic manager. The traveling freight and passenger agent reports daily by letter to the home office and the company keeps in constant touch by telephone with all outside agents.

The record of new business is shown in the daily and monthly records of all business as kept by the traffic department.

PUGET SOUND ELECTRIC RAILWAY

The general traffic agent of the Puget Sound Electric Railway calls on merchants and possible shippers. After business has been secured the traffic department does all it can to hold the good will of its customers by giving good service, prompt settlement of claims, careful handling of shipments, and generally showing patrons that their interests and those of the railway company are identical. While no solicitors are employed other than the head of the department and the local agents, the growth of traffic has been steady, as is shown by the statement that the freight earnings have been as follows: 1903, $41,433; 1904, $66,401; 1905, $87,277; 1906, $108,133; 1907, $143,686; 1908, $129,560; 1909, $143,851, and for the first seven months of 1910, $80,123. The increase over last year for the same period is $4,204.

OREGON ELECTRIC RAILWAY

Freight solicitation from merchants and jobbers in Portland and the district surrounding it is done by the traveling freight and passenger agent of the Oregon Electric Railway, whose time is so divided as to permit of regular trips over the road and periodical calls upon the company's patrons in Portland. The local agent at each shipping point on the line solicits the business from his territory and reports to the general office by letter re-



TYPE OF COMBINATION PASSENGER AND FREIGHT STATION, PACIFIC ELECTRIC RAILWAY

garding the result of his work. He also reports on conditions that may effect an increase or decrease in the tonnage from his territory, such as the probable success or failure of the crops in the farming districts.

Regular monthly statements covering revenue and tonnage reports of freight and passenger traffic are compiled and sent in to the traffic department promptly at the close of each month by the local agents of the road. These are checked carefully and investigation made of any apparent decrease or loss of business, particularly with respect to such loss at competitive points.

LOS ANGELES PACIFIC COMPANY

One man, who reports to the traffic manager, does the freight soliciting for the Los Angeles Pacific Company. He calls on jobbers, merchants, farmers and buyers. As the company operates in a district in which there is considerable team competition, every effort is made to give immediate service to shippers. A record is kept of all new business and a close check on the district served is maintained for the purpose of developing new business. The Los Angeles Pacific Company is an advocate of the liberal expenditure of money for freight and passenger solicitation and maintains a fully equipped staff for soliciting this business, both from its offices and through liberal newspaper and other advertising. Its traffic has increased heavily for the past five years in both the passenger and freight departments. While part of this increase may be traced to the growth of Los Angeles and the surrounding districts served by the lines of the company, a considerable portion of it is due to the effort of the railway company to furnish adequate equipment for its handling.

PACIFIC ELECTRIC RAILWAY

The records of the Pacific Electric Railway show that the 12 months from July 1, 1909, to June 30, 1910, when compared with the same 12 months in 1908 and 1909, show an average increase in freight earnings of 77 per cent for each month. The freight soliciting work on the Pacific Electric Railway at present is done through the general freight office and by the local agents in the usual way. No regular freight solicitors are employed at present, but it is expected they will be in future. They will report daily direct to the general freight agent. While the Pacific Electric Railway believes that it pays to spend money soliciting freight, this has not been done to any great extent heretofore for the reason that under the present methods business has come to the road faster than equipment could be supplied to handle it.



TYPICAL WAY STATION OF LOS ANGELES PACIFIC COMPANY

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, OCTOBER 8, 1910 No. 15

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 11,000 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 8, 1910.

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Our Convention Issue

This issue of the ELECTRIC RAILWAY JOURNAL, like those published prior to the annual conventions for many years, consists of two parts: the current issue or news section, and the special convention section. The latter this year is devoted to a subject which is attracting more attention now than ever before, namely, the promotion of traffic. In one sense the promotion of traffic is allied with publicity work, about which so much is being said at present. Its object is to give the public a better knowledge of the service which a company can furnish and is furnishing, and so to increase the gross receipts of the company. A canvass of the situation among the electric railways of the country showed that there are very few which are not doing something along this line. Some have greater opportunities than others, and some are utilizing to better advantage the opportunities which they have, but practically all are advertising their service in some way, such as by the issue of time tables, circular letters or folders, or by direct solicitation, or in daily newspapers. For the last two years the Transportation & Traffic Association and, prior to that time, the American Street & Interurban Railway Association have had committee reports on the promotion of passenger traffic. It was largely the interest expressed in the report of this committee last year and the exhibit accompanying that report which suggested to the publishers of this paper the devotion of their convention issue of 1910 to the subject of the promotion of traffic.

Promotion of Traffic

Promotion of traffic is a very broad subject, and in such a condensed summary of methods as is presented in the convention souvenir section of this issue it is possible only to refer briefly to the principal features of the work of a few representative companies. The 70 electric railways from which information was obtained by personal visits of the editors or by correspondence are located from Maine to the Pacific Coast and include large as well as small properties. They have been divided into five geographical groups and each group is considered in a separate chapter. Among other features of traffic promotion work about which information was obtained may be mentioned newspaper advertising, timetables and descriptive folders, car advertising, chartered and special-car service, and personal solicitation of excursion parties. The interurban railways west of the Allegheny Mountains are devoting much attention to building up freight traffic, and in the chapters devoted to the roads in the Central States, Mississippi Valley States and Pacific Coast States freight solicitation methods and industrial development work are treated at length. No doubt many companies other than those which are referred to in this issue have devised equally interesting and valuable methods of traffic promotion, and the publishers regret that limitations of time and space made it impossible to include them. On the

whole, it is believed that the contents of the souvenir section form an outline of typical practice of electric railways in this comparatively new but almost unlimited field of effort.

Another Collision of Interurban Cars

As we go to press news comes of another disastrous head-on collision between interurban cars, this time on the Illinois Traction System, near Staunton, Ill. The reports are not very definite as to the cause, but the collision appears to have been due to a fatal mistake on the part of the crew of a northbound car in not heeding the signals carried by a southbound car indicating a second south-bound section. The first section was passed safely, but the north-bound car struck the second section on a curve at the foot of a long grade and 36 persons, including four officials of the Illinois Traction System, were killed. The layman is fully justified in asking with real concern whether the train order system is adequate under the conditions existing in high-speed electric railway operation. Something must be done to make collisions of high-speed cars as remote a contingency as possible. While the human element must be depended upon for absolute safety, we believe that it should be assisted by some automatic or mechanical means. If there is no other recourse, the simple staff system, in spite of its inflexibility, at least affords a train crew evidence which any man can understand showing that it has an indisputable right to the section of track which the staff governs.

Registration at the Convention

It will be a very great convenience to the officers of all of the associations which will meet in Atlantic City next week, as well as to the delegates themselves, if those in attendance will make use of the advance registration cards sent out by the secretary the first part of this week. The plan of sending out advance cards on which delegates can register their names, the names of the companies with which they are connected and their official titles has been adopted to reduce the congestion at the registration booth during the first few days of the convention, but the cards were not utilized last year as extensively as they might have been. The time per individual at the registration booth is reduced practically one-half if those at the association booth have simply to issue a badge, instead of issuing both a badge and a registration card, and this time saved is useful both to the delegate and to the association. It is needless to add that to have a correct registration those who fill out the cards should write their names and the names of the companies with which they are connected clearly. The names in question may be very familiar to the secretary of the association, but not to the stenographer who transcribes the card or to the compositor who sets the list of those in attendance. Preferably the cards, if made out in advance, should be typewritten, so that all chance of error will be reduced to a minimum. This is one of the little ways in which the delegates in attendance can facilitate the work of the convention. In this connection, although not directly related to registration, a word might be said in regard to promptness of starting meetings. This is a duty which delegates owe to the officials of the organization as well as to each other. The time saved to the different associations if enough delegates are in the convention rooms on time so that meetings can be promptly started would amount to considerable in the aggregate. To "run on time" is as good for an association as for a railroad.

FIRE PROTECTION IN OPEN STORAGE YARDS

The description published elsewhere in this issue of a car-storage yard equipped with standpipes and nozzles for fire protection brings up the subject of the comparative merits of storage in the open and in car houses, as well as that of protective devices against fire in the open yard. In comparing the merits of these two systems of storage we must balance the saving made in insurance premiums and in the cost of car house construction when cars are stored in the open against the deterioration of the paint and varnish on the car caused when cars are exposed to the weather as in a yard. The average insurance rate on cars in the open is from 25 cents to 50 cents, as against, say, an average rate for cars in sprinkled car houses of 30 cents and a rate for cars in unsprinkled car houses of 60 cents or more. We doubt, however, whether the saving in premiums thus secured, added to the interest on the cost of a car house, is as large, in most cases, as the losses caused by deterioration of cars in open storage. Steam railroad practice is often cited as a precedent for outside storage of cars, but the comparison is not an exact one because few steam railroad companies aim to maintain as high an outside finish for their coaches as city railway companies. Moreover, the steam railroad coach is more weather-tight than the ordinary city car, and is not equipped with electrical apparatus, which undoubtedly also undergoes some deterioration when open storage is used.

The use of standpipes for fire protection for cars is not new, as standpipes with elevated nozzles were employed for car house protection in Newark a number of years ago, but their use for the protection for cars in outside storage yards is probably novel and certainly interesting. In considering this installation the first question naturally to arise is in regard to the relative advantages of these standpipes and of a corresponding number of hydrants with hose stored in covered houses. The principal arguments in favor of the standpipes are that as the nozzles are located on elevated platforms the operator is able to see every part of the yard and can thus easily locate a fire; that the equipment is always in place and ready for immediate use; that it is probably less liable to accident than hose; that each nozzle can be handled by a single man, and that a minimum amount of space is required. On the other hand, it is questionable whether the standpipe equipment, being exposed as it is to the weather, would not be more apt to deteriorate than hose and hydrants, and whether with a hose equipment a larger number of streams could not be more readily directed on a single point than with a system of standpipes. Either system can be so arranged, of course, that city fire steamers can be connected with the car yard fire service and thus supply additional pressure if necessary.

The cheapest, simplest and probably the most effective protection against fire in open storage, where it is practicable, is to have plenty of room between the tracks, with open aisles down which fire engines or other fire-fighting apparatus can be brought. To this precaution should be added ample entrance facilities and enough trackage room so that cars near those on fire can be removed from the zone of danger. It is doubtful whether expensive fire walls afford any better protection against fire than these open spaces. Certainly they often interfere greatly both with ordinary work in the yard and with the fire department where its services are needed. Of course, where the ground area is limited the fire wall offers a most

satisfactory barrier against the spread of fire, and it should be as effective in the car yard as in a car house.

MORE DETAILS OF PHILADELPHIA OPERATIONS

Fuller details of the results of operation and more open discussion and publicity concerning the affairs of the property than have been ventured heretofore are contained in the annual report of the Philadelphia Rapid Transit Company for the fiscal year ended June 30, 1910. An abstract of the report was published in the issue of the Electric Railway Journal for Sept. 24, 1910, page 480. The losses due to the irksome strike are set forth without reserve; the policy that makes no secret of the appalling sum which the walkout of employees and the subsequent riots and interruption of service cost the company is a wise one. The action of the company in giving the figures of its burdensome rentals for underlying properties and in presenting more than the usual number of details is in line with progress; such figures should be thoroughly understood.

The Philadelphia Rapid Transit Company was organized to assume control on July 1, 1902, of the various existing street railway systems in Philadelphia and to construct the Market Street Elevated Railway. During the eight years that intervened from that time to the close of the 1910 fiscal year the company has received from shareholders in cash practically the full payments due on their capital stock, a total of $30,000,000. It has "earned only a deficit" in four years out of eight. Its annual earnings and income have increased from $15,436,574 to $18,501,357, or 19.9 per cent. Its charges for interest and rentals have risen from $6,743,843 in 1903 to $8,374,463 in 1910, or 24.2 per cent.

It is evident from this showing that the company needs the full advantage of its possible gross earnings and that a strike inflicts serious loss. President Charles O. Kruger shows that in the seven months of the fiscal year which preceded the declaration of the strike the company made, as compared with the corresponding period of the previous year, an increase of $681,964 in gross receipts and of $285,819 in net. The maintenance of the same rate of increase during the rest of the year would have yielded a gross increase of $1,261,469. In the 66 days of the strike the actual loss in passenger receipts, compared with the corresponding period of the preceding year, was $1,558, 105. The normal passenger earnings of the company, based on the record of the 1909 fiscal year, averaged $50,185 per day and the continuance of revenues at the same rate would have meant, for the entire 66 days, gross of $3,312,210. In this estimate we disregard the expected normal rate of increase in 1910 over 1909 and also the fact that the strike did not cripple operations during the best traffic seasons. The company was fortunate to have kept so large a proportion of its regular business while the disorder prevailed as these figures appear to indicate.

Of course, these amounts do not express the full measure of the loss to the company, which was enhanced, first, by the delay that intervened between the final settlement of the strike and the restoration of normal traffic conditions; second, by a heavy increase in current expenses, and, third, by extraordinary expenses of $836,856 incurred in protecting the property.

As the passenger earnings of the company amounted in 1910 to upward of $18,300,000 per annum, the actual loss is an impressive proportion of the revenues, both gross and net. The extraordinary expenses for protection are equal to an additional 4.5 per cent of the gross receipts and income for the year. The entire loss to the community, of course, was much greater, as the estimate just given does not touch the effect upon other industries of the sinister sympathetic strike; nor does it measure the economic loss of idle men and idle industries. These are heavy burdens which the strikers and their sympathizers laid upon the Philadelphia Rapid Transit Company and upon the citizens of Philadelphia.

Under the depressing influence of the strike gross receipts of the company from all sources showed the first decrease since the organization of the system on the present basis in 1902. As stated, the gross receipts from all sources did not meet all the requirements, and with operating expenses of 53.4 per cent of gross earnings and miscellaneous income, with a charge for taxes and licenses of 8.5 per cent and with fixed charges of 45.3 per cent, the deficit is thus shown to be equal to 7.2 per cent on all the receipts of the company during the period. This is less than the apparent loss in gross suffered by reason of the strike.

To what extent, if any, the system received any actual betterment from the heavier operating expenses is a matter that is not ascertainable. The operating expenses equaled 3.6 per cent more of combined passenger receipts and miscellaneous income in 1910 than the corresponding ratio in the previous year. If the operating expenses be considered in relation to the sums representing the totals of passenger and miscellaneous receipts in 1910 and 1909, which, of course, include an amount of income from other sources than operation, it is found that the proportion of the totals expended for maintenance was 11 per cent in 1910 and 9.7 per cent in 1909. The corresponding statistics for the other items of expense were as follows: Transportation, 24.5 per cent in 1910 and 23.5 per cent in 1909; power, 7.9 per cent in 1910 and 7.7 per cent in 1909; general expense, 10 per cent in 1910 and 8.9 per cent in 1909. A trivial part of these increases is attributable to an increase of about 1 per cent in trackage during the year, which made the total track 628 miles.

No feature of the report is deserving of more earnest consideration that that which pertains to the heavy fixed charges with which the revenues have to cope. The total fixed charges, taxes and licenses amounted to $9,944,321, which is equal to 53.7 per cent of the total revenue and income from all sources. Of this total $1,569,858, or 8.5 per cent of the aggregate earnings and income, represents taxes and licenses, leaving $8,374,463, or 45.2 per cent, as the portion of total gross from all sources which had to be applied to fixed charges. The distribution of this large amount in the detailed statement of fixed charges for the year shows that $6,989,326 net was paid as rentals on stocks of underlying companies. While the actual total thus paid was $7,249,116, this was reduced by $259,790 dividends on stocks owned. The other items which are part of the total cover in the main bond and mortgage interest and ground rents. For maintenance of the organization of underlying companies $36,300 was expended and for registration of stocks and trusteeships $10,120. Two unusual items are accident annuities, $1,250.

A company owes a duty to its stockholders which publicity in respect to these matters, whether of favorable or unfavorable facts, helps to fulfil.

NEW 60-TON LOCOMOTIVES OF ILLINOIS TRACTION COMPANY

The Illinois Traction System is just putting into service six 60-ton electric locomotives that exhibit several novel features of design. With the exception of the trucks and electrical equipment, these units were designed and built by the railway



New Illinois Traction Locomotives—Side View of Locomotive in Service

They will be used in handling trains of freight to and from the new St. Louis freight terminal. Accompanying illustrations show the general features of design of these locomotives and the special details of construction. The following statement presents the general data regarding each of the six units:

Length of underframe over all	34 ft. 0 in.
Length of body over all	31 ft. 4 in.
Truck center distance	19 ft. 0 in.
Truck wheel base	7 ft. 2 in.
Height, track to sill	3 ft. 5 in.
Height, bottom of sill to top of roof	9 ft. 4 13/16 in.
Width over all	9 ft. 3 in.
Width inside	8 ft. 5½ in.
Drawbar pull	30,000 lb.
Weight	120,000 lb.
Body construction	Steel box
Underframe	Six 10-in., 40-lb. I-beams
Body bolsters	Steel plate
Trucks	American Locomotive Company
Wheels	36-in. Midvale rolled steel
Truck bolsters	Cast steel
Springs	Pittsburg Spring & Steel Co.
Journal boxes	Symington, 5½ x 10 in
Motors	Four G.E. 69-C, 200 hp each
Control	General Electric Type M with C 83-A controllers
Gears and pinions	General Electric
Airbrakes	Westinghouse schedule E L
Brakeshoes	American Brake Shoe & Foundry Company
Couplers	National Malleable Castings Company
Pilots	Angle iron
Headlights	Wagenhals
Sanders	Illinois Traction System
Trolley base	U. S. B.
Trolley retrievers	Knutson No. 2
Paint	Sherwin-Williams
Varnish	Murphy

UNDERFRAMING

The chief members of the underframing of these locomotives are six 10-in. I-beams which are continuous from bumper to bumper. The sills are tied together by 10 crossings, which include iron spacing blocks with their ends shaped to fit the contour of the I-beams. The spacing blocks between the center sills are malleable iron, each cast with a hole through its center to enclose and support the cable conduits. At each crossing the sills and spacing blocks are held together by two 1-in. tie rods passing through the webs of the sills and through bosses cast on the spacing blocks. Yellow-pine nailing pieces 4½ in. square, are bolted to the longitudinal sills to carry the cross flooring, which is 1¾ in. thick.

CAST-STEEL BUFFER

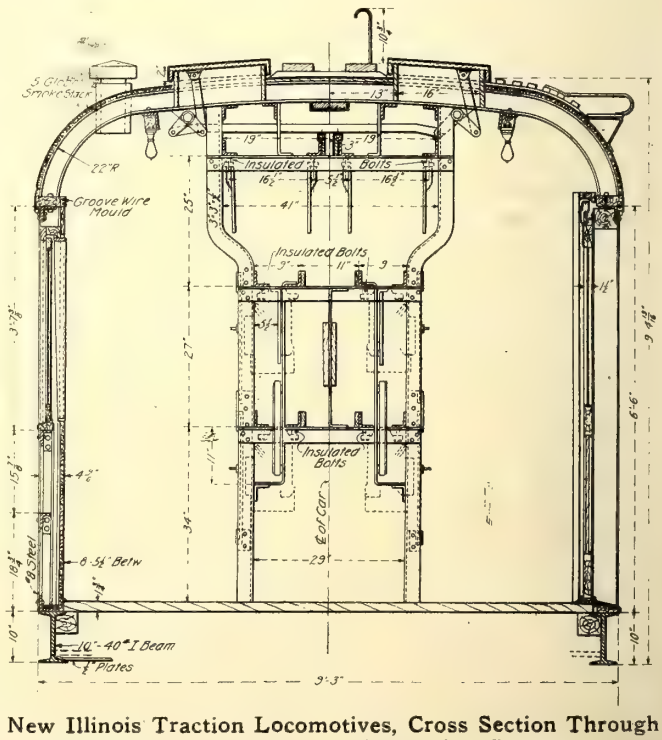
At each end of the underframe the six I-beam sills butt against a combined end sill and buffer, which is a single casting of steel weighing about 1000 lb. and having a vertical face of 11¾ in. The general form of this combination buffer and end-sill casting is illustrated and the method of attaching the sills thereto by the use of 1-in. x 8-in. pocket irons and 1-in. rivets is shown.

The front face of the buffer piece has a radius of 3 ft. 9 in. at the center. The back edge of the top part of the buffer casting has a radius of 9 ft. 3 in. This gives the casting an extreme depth of 16 in. along the center line of the locomotive and 8 in. at the ends where the side sills are attached. The large cast-steel end sills are designed to furnish support for coupler radius bars and the locomotive pilots.

The body bolsters are made up of 1¼-in. x 12-in. steel plates, the top pieces passing over the center and intermediate sills and under the side sills. The ends of the top pieces are upset to form shoulders against which butt the lower bolster plates. The nuts on all bolts passing through the bolsters are protected with National lock washers.

BODY FRAMING

The body framing of each of the locomotives is made up of structural steel shapes and supports a turtle-back roof. The side posts of the body framing are 3-in. x 3½-in. x ⅜-in. angle irons connected at the bottom by angles of similar section and riveted to the tops of the side sills. The tops of the posts are riveted to continuous angles 3½ in. x 3½



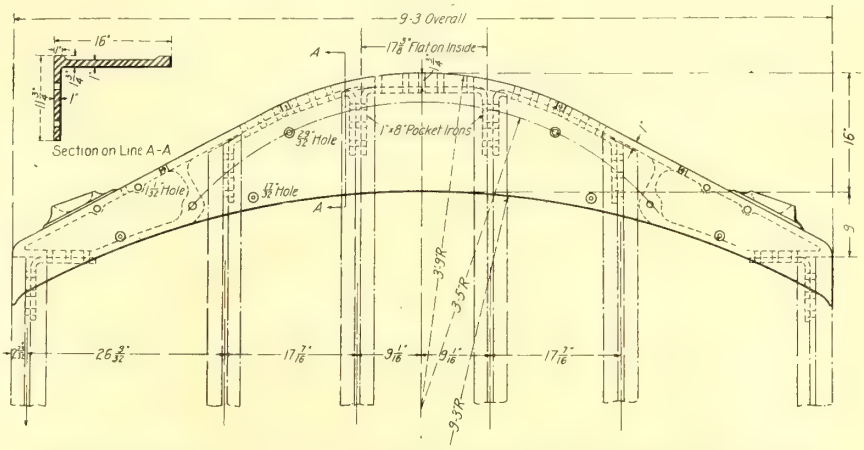
New Illinois Traction Locomotives, Cross Section Through Body Showing Frame for Supporting Contactors

in. x ⅜ in. in section. Continuous roof carlins made of angles having the same section as the side posts are spaced on centers of about 16 in. The total rise of the arched roof is 24 in. and the carlins at the sides of the body are bent to a radius of 22 in. Five-eighths inch rivets join the angle-iron carlins, the side posts and the top plates. The carlins are also tied together

by 10 ½-in. bolts extending lengthwise of the car, and the roof also is stiffened by four angle-iron purlins riveted under the carlins. The roof is covered with matched poplar protected from the weather by No. 6 cotton duck.

The ends of the locomotive bodies are built to a radius of 9 ft. 3 in. and each contains two windows and a door. Angle-iron framing equal in weight to that of the sides supports the end sheathing. The top pieces are reinforced at the corner posts with ⅜-in. gussets.

Each side of the locomotive body has two sliding doors and four arched windows; one door, at the motorman's corner, is 2 ft. wide and the other, at the center, is 4 ft. wide. The doors are built to slide. The windows, all of which may be dropped into pockets, have glass 26½ in. x 30⅛ in. in size. The exterior of the framework of each locomotive is sheathed with No. 8 sheet steel having butted joints riveted to the angles of the body framing. Matched yellow-pine sheathing, 13/16 in. thick, is used on the inside. The end doors are sheathed with No. 14 steel and carry brackets to support the arc headlights and trolley retrievers. Roof mounts, steps and footholds are provided according to the specifications of the Master Car Builders' Association.

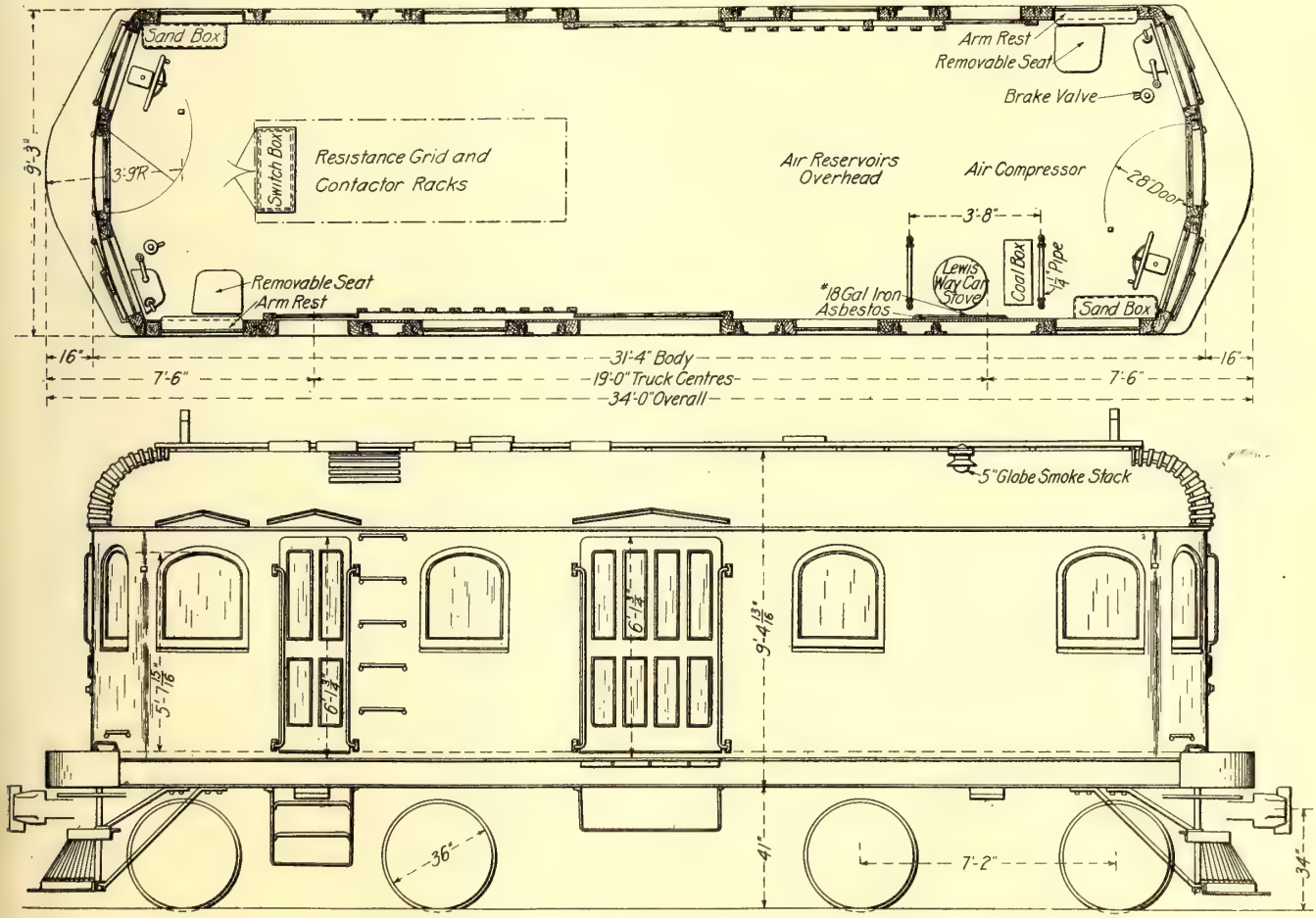


New Illinois Traction Locomotives—Cast-Steel End Sill and Buffer

COUPLER AND DRAFT GEAR

The locomotives are fitted with the Bosenbury type of M.C.B. contour coupler, made by the National Malleable Castings Company. These couplers have spring carriers supported by radius plates bolted to the cast-steel buffer pieces. The coupler anchorage is riveted to the center sills and includes a spring pocket carrying one ⅞-in. steel spring with a 5½-in. outside diameter and one ¾-in. steel spring with a 3¼-in. outside diameter. The swivel pin is 2 in. in diameter. The length of the coupler from the center of the pulling face to the center of the swivel pin is 4 ft. 9 in. and the center of the swivel pin is 4 ft. 3 in. ahead of the truck center. The unique feature of the coupler is the extreme depth of the knuckle, 16 in., which prevents the parting of a train at severe breaks in grade. This type of coupler and attachment has been developed by J. M. Bosenbury, superintendent motive power and equipment of the Illinois Traction System, and is standard for all equipment of that road.

The pilots of the locomotives are formed of 3-in. x 4-in. x ½-in. angles riveted together and supported directly under the buffer pieces, being braced against the side sills by struts ½ in. in diameter.



New Illinois Traction Locomotives—Plan and Elevation

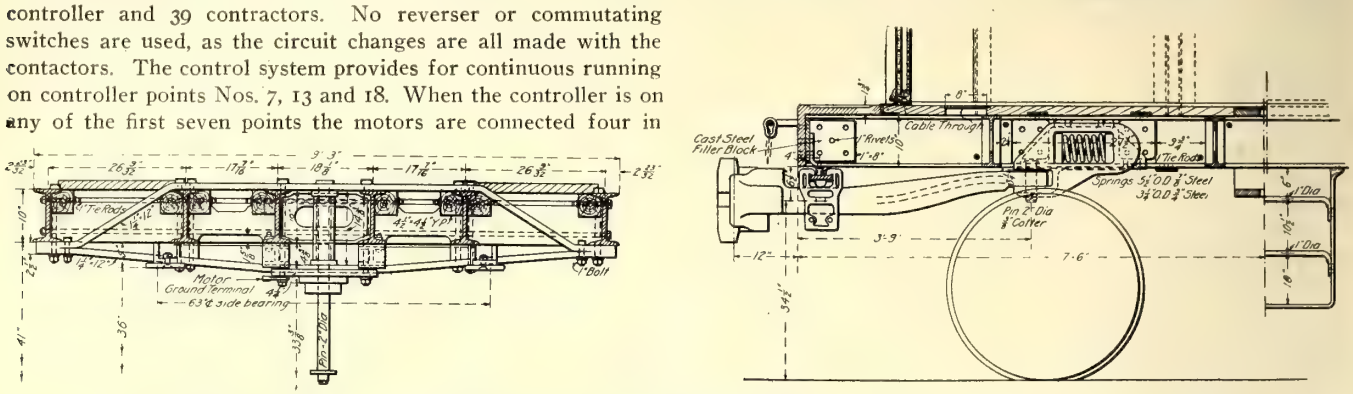
ELECTRICAL EQUIPMENT

The electrical equipment of these six new electric locomotives of the Illinois Traction System is designed to provide a high drawbar pull during the complete range of acceleration.

Each truck carries two GE 69-C motors rated at 200 hp on 500 volts and geared for slow speed. The Sprague-General Electric control as designed for these locomotives includes an 18-point controller and 39 contractors. No reverser or commutating switches are used, as the circuit changes are all made with the contactors. The control system provides for continuous running on controller points Nos. 7, 13 and 18. When the controller is on any of the first seven points the motors are connected four in series; on the next six points the motors are connected in series-parallel and on the last five points the motors are in full multiple. This series, series-parallel and full-multiple method of connection assures a high starting torque with a low power demand as compared with the usual series-parallel system of control. Cut-out switches are so arranged that the motorman can cut out any one motor without interfering with the operation of the others.

A floor plan on page 647 shows the location of the principal parts of the control apparatus within the body. Double-end operation is provided for by controllers placed at the left side at each end of the body close to the motorman's side windows. A sectional view on page 646 shows the method of supporting the contactors by means of a structural steel framework, which provides for complete accessibility to all working parts of the control equipment. Direct ventilation of the resistance grids, which are supported above the contactors, is provided for by 12 openings in the turtle-back roof. One of the illustrations shows the construction of these openings and their covers. The openings are located six on either side of the running board. Each opening through the roof of the car is 16 in. square and located directly above some part of the control resistance. The covers of the 12 openings are hinged and may be raised or lowered simultaneously by a set of bell cranks operated by a lever which has a ratchet lock.

The air compressors and air-brake reservoirs are within the locomotive body. The motor-compressor set stands on the floor and the reservoirs are hung from the purlins close to the roof directly above the compressor. Each locomotive is heated by a Lewis way-car stove. The smoke pipe from the stove terminates in a 5-in. Globe ventilator smokejack.

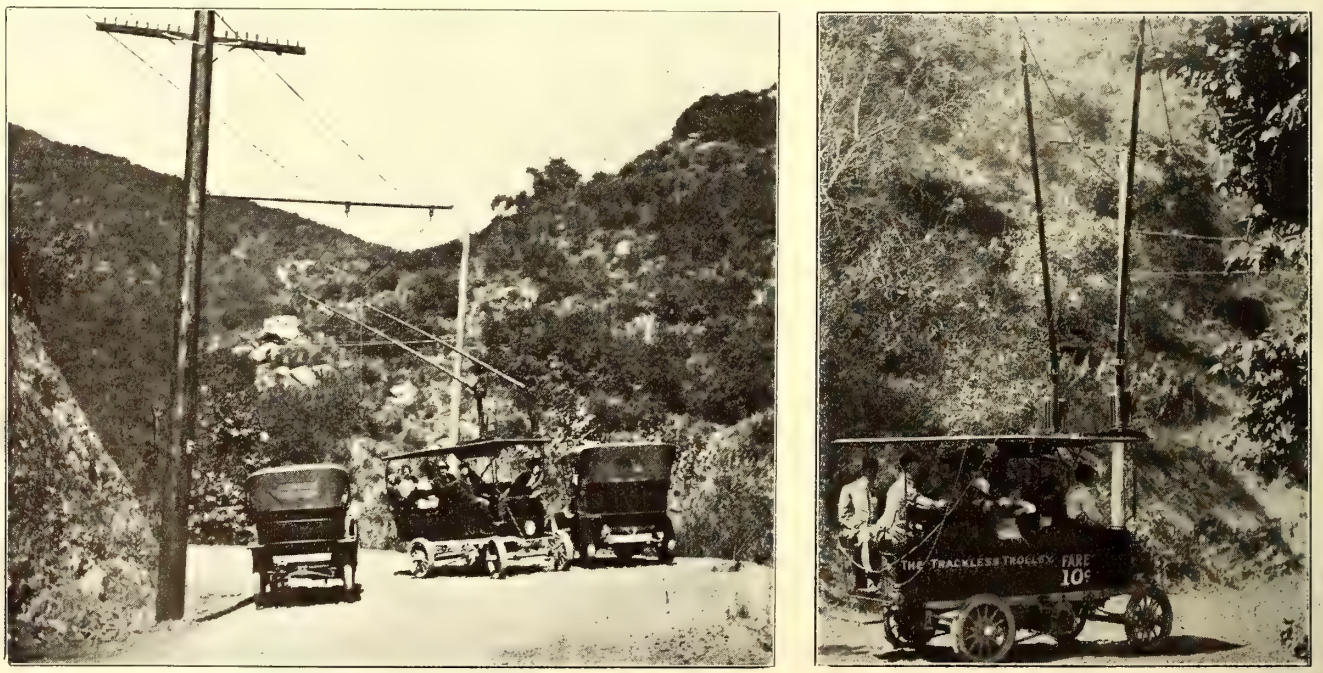


New Illinois Traction Locomotives—Section of Underframing at Bolster and Coupler with Attachment

CALIFORNIA TRACKLESS TROLLEY LINE

Through the courtesy of Charles S. Mann, president of the Laurel Canyon Utilities Company, Los Angeles, Cal., the following additional particulars are available of that company's trackless trolley line, which was briefly referred to on page 436 of the Electric Railway Journal, Sept. 17, 1910:

This is the only trackless trolley line now operated in the United States. Commercial service was inaugurated Sept. 11. The line is built in Laurel Canyon, near Hollywood, which is a suburb of Los Angeles, and it serves to connect Bungalow Town, a new settlement 1½ miles up the canyon, with the Los Angeles Pacific Railroad at the mouth of the canyon. The first bus leaves the settlement at 7.45 a. m. and the last at 11.15 p. m. During the greater part of the day the service is half-hourly; the fare is 10 cents.



California Trackless Trolley Line

The roadway is a winding path, cut out of the side of the mountain to an average width of 25 ft. It has a high bank on one side of the road and a mountain brook on the other. The average grade is about 8 per cent and the maximum grade is 12 per cent. This highway is also largely used by auto-

mobiles, but experience has shown that the trackless trolley buses are able to turn out for any passing vehicle or any obstruction and still have a safe clearance. For two weeks during the early part of September it was found necessary to operate over a portion of road which was being plowed up for a change in grade. This work made it necessary to drive the cars across deep furrows over a stretch of soft plowed ground, all of which was accomplished successfully.

No turn-out is used on the road. The grades are continuous and the car going down hill is enabled to coast about half the distance on gravity so that the car going up has the power right of way. The car going down attaches its collectors to the wire only where the grade is not sufficient to permit coasting. There has been no trouble from the collectors leaving the wire, although some very sharp curves have to be passed. The one man who operates a bus collects the fares before starting and then takes his position as motorman, remaining in place until he reaches the terminal. Only in rare instances is it necessary for him to get out and attach the trolley. Such action would be due either to faulty operation or to exceptionally rough places passed over at excessive speed. The collectors are not wheels, as was stated in the earlier article on this line, but are under-running shoes of sliding type. They have given very satisfactory results so far, but the company does not wish to publish the details of construction until certain details have been perfected.

The motor equipment per bus consists of two 15-hp series motors, which drive the wheels through sprocket chains. The controller does not differ materially from the regular railroad type. The weight of the car is about 3000 lb. and its carrying capacity 16 passengers. While no tests have been made as to the amount of power required, the company has found that the equipment mentioned is ample even when the cars are loaded beyond their ordinary capacity. The maximum speed under favorable conditions is about 25 m.p.h. and on the 12 per cent grade about 8 m.p.h.

The cost of a bus completely equipped is about $2,500. Mr. Mann states that this figure is rather high owing to the novelty of the vehicle and local causes such as a strike.

The overhead construction does not differ materially from that for the ordinary electric railway, except that an additional wire is required for the return current and a few departures due to certain conditions of grades, curves and right of way for pole lines.

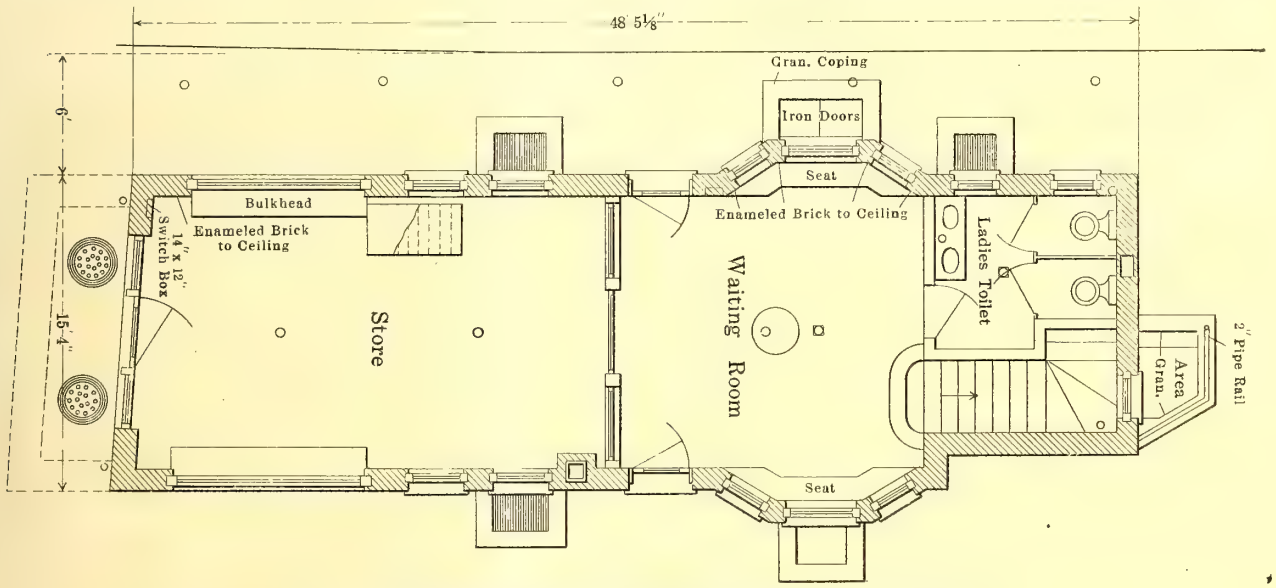
Arrangements are being made in Pittsburgh for a mammoth "Land Show," which is to be held Oct. 17 to 29. The exhibits will include those of the United States Government, boards of trade, companies and State exhibits.

AN ARTISTIC TRANSFER STATION IN ST. LOUIS

The United Railways Company, of St. Louis, has recently completed a transfer station at the corner of Hodiamont and Easton avenues—the junction of two city lines, one cross-town line and three suburban lines. The new building is not only interesting for the compactness of its design, due to the limited area available at the junction, but also for architectural treatment which marks a distinct advance in American city buildings for like purposes. As shown in the accompanying half-tone illustration, the striking artistic appearance of the building has been obtained by employing the long, sloping ornamental roof so characteristic of the Swiss chalet. This kind of roof lends itself admirably to the protection of large areas. In this case efficient protection for passengers who are transferring in rainy weather is furnished by having the eaves project over the two sets of tracks along each side of the building.



Transfer Station, United Railways of St. Louis



Plan of Transfer Station for the United Railways of St. Louis

The building line proper is embraced in an area only 48 ft. 5⅛ in. long by about 15 ft. 4 in. wide. The exterior of the street floor is of brick with stone trimmings and the interior is of enameled brick except for some glazed brick in the store; the upper floor is of wood treated in the Swiss fashion, as already mentioned. The lower portions of the roof are carried over the rails on 8-in. x 8-in. yellow pine posts, which are set on concrete piers between each pair of tracks. Although small, the building serves for other operating purposes besides

the transfer of passengers. The basement contains a storage room, a heating plant, bins for coke, sand and salt, and a men's toilet. The ground floor, which is shown in the plan on page 649, has a store in the front part, the remainder being divided into a waiting room and women's toilet. The upper floor is used as a division headquarters for one of the suburban lines ending at this location. Acknowledgments are due to Richard McCulloch, vice-president and assistant general manager of the company, for courtesies extended in preparing this article.

REPORT ON THE PROGRESS OF STREET RAILWAY REHABILITATION IN CHICAGO

The Board of Supervising Engineers of Chicago Traction has just published its second annual report covering the year ended Jan. 31, 1909, and an advance report presenting financial and statistical information for the year ended Jan. 31, 1910. A review of the first annual report of the board appeared in the Electric Railway Journal for Nov. 13, 1909, page 1021. The new report covers in detail the operations of the two boards of engineers which are supervising the rehabilitation of the Chicago City Railway, Chicago Railways and the Calumet & South Chicago Railway properties.

Board No. 1 embraces the work of the Chicago City Railway and the Chicago Railways. Its members are: Bion J. Arnold, chairman; George Weston, representing the city of Chicago; Harvey B. Fleming, representing the Chicago City Railway Company; John Z. Murphy, representing the Chicago Railways Company; F. J. Parke, secretary and auditor, and L. H. Davidson, assistant secretary. Board No. 2 covers the work of the Calumet & South Chicago Railway Company. It is made up of Messrs. Arnold Weston and A. L. Drum, representing the Calumet & South Chicago Railway, and Harvey B. Fleming, representing the Chicago City Railway Company under the operating agreement between the Calumet & South Chicago Railway Company and the Chicago City Railway Company.

The second annual report is a book of 522 pages, 6 in. x 9 in., illustrated with numerous double-page insets and full-page halftone engravings. The text is subdivided into 15 chapters devoted to such subjects as organization, pay-as-you-enter cars, ventilation of street cars, chemical treatment of ties, through routes, accounting, financial and statistical exhibits, report of the chief engineer of the work, descriptions of organization and work of the engineering divisions of the board, digest of meetings, and text of ordinances.

CALUMET & SOUTH CHICAGO

The valuation of the Calumet Electric Street Railway Company and the South Chicago City Railway Company as made by Bion J. Arnold and George Weston is described. The methods employed in doing this work were similar to those used in the valuation of the Chicago City Railway and the Chicago Union Traction properties. After discussion, $5,000,000 was agreed upon as representing the value of all tangible and intangible assets of the companies as of Feb. 1, 1908, and this figure was inserted in the ordinance as the basic price to be paid by the city if at some future date it should elect to exercise its option to purchase the properties at this price, plus the cost of such extensions and improvements as might have been added in the meantime, as prescribed by the ordinance.

A condition precedent to the acceptance of the ordinance required the consolidation of the two companies, which was effected May 9, 1908, under the name of the South Chicago City Railway Company. The rehabilitation program as stated in the ordinance requires that all work shall be carried out under the supervision of a board of engineers having substantially the same powers and duties as in the case of the Chicago City Railway and the Chicago Railways, but acting independently thereof. The ordinance provides that the rate of fare for a continuous trip in one general direction within the present or future limits of the city shall be 5 cents and that transfers shall be honored between the Calumet company and the Chicago City Railway Company and the Chicago Railways Company within the limits of definite zones. Through routes are provided between the systems mentioned. The ordinance of the Calumet company approved an operating agreement with the Hammond, Whiting & East Chicago Electric Railway Company, and obligated the Calumet company to enter into an equitable operating arrangement with the Chicago City Railway, subject to the approval of the Board of Supervising Engineers. The full text of the ordinance and operating agreement is published in the second annual report of the board.

WORK SUPERVISED

Chapter 3 of the second annual report presents a general summary of the work performed by the traction boards during the fiscal year ended Jan. 31, 1909. The Chicago Railways Company accepted its franchise ordinance on Jan. 28, 1908, just prior to the opening of the year under review, and on Feb. 15, 1908, John Z. Murphy was appointed as the representative of that company on the board. The work of rehabilitating the Chicago Railways system proceeded promptly. In consequence the responsibilities of this board were doubled as compared with the preceding year. The magnitude of additional work devolving upon the board during this period is in a measure evidenced by the increase in the number of employees from a minimum of 66 on Feb. 1, 1908, to a maximum of 126 in September, 1908, which was reduced to 105 on Feb. 1, 1909, the average number employed by the board throughout the year being 105.

The boards held 125 meetings during the year, at which were approved certificates for construction and rehabilitation work aggregating $13,850,551. Plans, specifications and drawings for the work covered by these certificates were designed, examined and approved, work orders were authorized, and the actual work in the field was supervised. Securing of bids was authorized and contracts were approved for the purchase of materials and performance of work for all roads. The report next includes a list of the contracts for material placed during the year. Some of these were as follows:

Air-brake equipments	1,025
Brick	1,636,200
Car signs	2,600
Clay conduit, duct feet	2,900,000
Creosoted blocks, square yards	6,000
Crushed stone and screenings, cubic yards	110,266
Concrete gravel, cubic yards	18,000
Concrete mixers	12
Cement, barrels	219,252
Copper cable, miles	385
Electric switches	350
Granite paving blocks, square yards	1,019,000
Gear cases	2,600
Headlights	1,300
Paving pitch, gallons	522,424
Pneumatic drills	18
Poles, tubular steel	1,100
Rail bonds	2,000
Registers (fare)	350
Rail, tons	38,500
Rail joints	4,000
Rotary converters	11
Steam track crossings	30
Spikes, screw	1,050,000
Sprinkler tanks, 4,000 gallons	12
Snow plows	5
Snow sweepers	22
Trolley catchers	2,350
Track special work, layouts	85
Ties	242,629
Welded joints	10,000
Wire, galvanized span, feet	45,000
Wire, copper, miles	231

The report contains a concrete statement of the work accomplished up to Jan 31, 1909. A considerable amount of this work has been described in detail in current issues of the Electric Railway Journal. Arrangements for reconstruction work by the Calumet & South Chicago Railway Company were not completed until late in the season of 1908, and such time as was available was largely devoted to placing the existing property and equipment in the best practicable condition to enable it to furnish the best service possible under the circumstances.

The conclusions of the board regarding pay-as-you-enter cars in Chicago, the factors leading up to the design of the Chicago type of car and some results obtained by the operation of these cars are given. The report also presents communications to the board from B. J. Arnold, J. Z. Murphy and Octave Chanute on the subject of wood preservation. As a result of investigations

the track ties were treated with chloride of zinc and encased in concrete.

INSTALLATION OF THROUGH ROUTES

Physical obstructions to the operation of the 21 through routes described in the ordinances of Feb. 11, 1907, are being gradually eliminated. Some of the difficulties, however, are beyond the control of this board, such as bridges, steam railroad subways and elevated railroad columns, but every effort is being made to have these obstructions also removed through the proper authorities. It was not thought advisable to create new temporary through routes by diverging from the through routes as prescribed by ordinance, because in such cases the public would become accustomed to the temporary through routes and discontinuance would be embarrassing, even though the service supplied by them was largely supplanted by the permanent routes. On the other hand, there would be no objection to establishing an abbreviated through route along the same lines as laid down in the ordinances, but which, for some reason, could not be carried through to either one end or the other. The latter plan has been followed.

It was decided that it would not be advisable to install temporary special work around the elevated road columns as at present located, which temporary special work would not provide safe clearances. If this were done and the railway companies took the chances of accidents, it might naturally follow that it would indefinitely defer the necessary relocation of the interfering columns.

The report contains a detailed statement setting forth the physical obstructions to the operation of the through routes as they existed on Feb. 1, 1909, and those which had been removed between that date and July, 1910.

PUBLICITY OF ACCOUNTS

In accordance with the requirements of the traction ordinances, the customary annual auditing of the accounts of the railway companies by accountants appointed by the city comptroller was concluded in April, 1909, and the reports were duly rendered to the city comptroller. Owing to receivership proceedings and legal complications involving the underlying properties of the Chicago Railways Company, this company was delayed in accepting its ordinance. However, the accounts which naturally would pertain to the joint accounting between the city of Chicago and the Chicago Railways Company, in case the ordinance should be accepted, were kept in one set of books, later to be personally examined by the city comptroller, chairman of the board, auditor of the board and a representative of the accounting firm that previously had audited the books. Subsequently the vouchers and books of the Chicago City Railway Company were similarly examined.

In addition to these audits, still another investigation, covering the entire period of two years during which the railway companies had been operating under the ordinances, was brought about through certain allegations made during the early part of 1909, to the effect that private discounts which the Chicago City Railway Company had received from manufacturers had not been properly applied in the joint account with the city, but had been appropriated by the railway company's individual account. As the subject soon became a matter of public interest, it was deemed advisable by the city administration to institute a further examination of the accounts of both the Chicago City and the Chicago Railways companies, in order that all matters of accounting in which the city under the traction ordinances was interested might be subjected to the most critical review from both interested and disinterested sources. The railway companies as well as this board assented to the proposed investigation, which was conducted by independent auditors appointed by Mayor Fred A. Busse and resulted in proving that the matter of private discounts had been taken cognizance of by this board and that they were duly accounted for on the books of the company.

Such changes and corrections as all of these audits and examinations disclosed to be proper were made and the corrected accounts were published in the annual report for the fiscal year 1907-1908. This work caused a regrettable postponement of the issuance of the first annual report, as well as the present report, but the desirability of publishing correct operating and financial statements justified the delay. Coincidently the books and accounts of this board were audited by a firm of accountants selected by Mayor Busse, which reported in part as follows:

"There is every evidence that an effective control is maintained over the progress of the rehabilitation work and all expenditures in connection therewith. With regard to the matter of rebates, to which we refer at some length in our separate report on the railway, we found that the board was fully informed regarding these special arrangements, but for its knowledge whether or not all rebates are credited that should be we believe that in the main it must depend on the good faith of the officials of the company.

"As to the board's own expenditures we cannot do better by way of informing you of the amount and character of these expenditures than to submit an abstract thereof, which is enclosed with and made a part of this report. We would add that we made a careful analysis of the various expense accounts and investigated all items of any importance and found properly approved vouchers on file therefor. According to figures shown in the board's books, which figures we have verified for ourselves so far as related to the Chicago City Railway Company, the total cost of the rehabilitation amounted, up to January 31, 1909, to $25 490,890.58. The total expenditures of the board were $397,224.51, which is slightly over 1½ per cent of the rehabilitation expenditures. In view of the importance of the work, the magnitude of the amounts involved and the character of the services desired, the above ratio of expense would not appear to be unreasonable or excessive."

FINANCIAL REPORTS

The entire cost of the rehabilitation, in accordance with the terms of the ordinances, is added to the capital investment, and no portion during the rehabilitation period is charged to operating expenses, as would be the case under customary accounting procedure. The ordinances fix arbitrarily upon 70 per cent of the gross earnings for operating expenses and taxes. In case the actual operating expenses, including expenditures for renewals, exceed 70 per cent, the excess of renewals is charged to capital account; on the other hand, should the actual operating expenses be less than 70 per cent, the difference is applied to the cost of renewals and correspondingly reduces the charge to capital account. These provisions apply to the rehabilitation period only.

Under these peculiar conditions and in view of the many operating difficulties encountered at a time when a complete reconstruction of roadway and plant is being effected, due largely to interference with traffic affecting gross revenues and to the inability of the companies to take advantage of low operating conditions in the summer months because of the necessity of doing track work at that time, a comparison of the operating results of these companies with other traction properties could not be fairly made; neither could the results shown be used as a criterion for future operating economies. These abnormal conditions prevailed to a greater or lesser degree throughout the period of rehabilitation, which expired for the Chicago City Railway April 15, 1910, and will expire for the Chicago Railways January 28, 1911, and for the Calumet and South Chicago Railway November 29, 1911 (with certain exceptions in the last case, as stated in the ordinance).

CONTRIBUTIONS TO THE CITY

Comparison of the contributions of the companies to the city of Chicago for the past two years shows as follows: Year ended Jan. 31, 1908, $1,564,618.47; year ended Jan. 31, 1909, $1,386,877.96.

The companies contributed to the city's treasury $177,740.51 less in 1909 than in 1908, notwithstanding the fact that the gross earnings of the two contributing companies have increased $757 257. This condition is paradoxical on the face of it, but it was nevertheless anticipated in the estimates made when the ordinances were being formulated and was fully exploited before the local transportation committee of the City Council at that time. The situation arises from the fact that

the gross earnings of the properties cannot normally increase with sufficient rapidity to take care of the interest allowance of 5 per cent on the new capital invested, which in the short space of four years will amount to approximately fifty millions of dollars. This is more aptly illustrated in the succeeding exhibits relating to capital investments. These decreases will continue to a limited degree until the end of the rehabilitation period, when, normal conditions prevailing, each year thereafter should show consistent increases in the amounts contributed to the city.

The combined balance sheet of the Chicago Railways Company, Chicago City Railway Company, Calumet & South Chicago Railway Company and the Southern Street Railway Company for the year ended Jan. 31, 1910, as presented in the advance report of the board for that year, shows a value as stated by traction valuation commissions of $55,775,000. Certificates have been issued by the Board of Supervising Engineers for a total of $42,754,978, which with the current assets as of Jan. 31, 1910, $3,523,177, gave total assets of $102,053,155. The liabilities include: Capital, $98,529,978; reserve for damages, $1,231,889; city of Chicago, proportion of profits, less taxes and licenses paid in advance, $1,274,917, and the companies' proportions of profits, $1,016,371, making the total liabilities, $102,053,155.

The accompanying table shows the operating statistics of the three Chicago properties for the fiscal years ended Jan. 31, 1909 and 1910, as reported in the annual reports of the Boards of Supervising Engineers.

TABLE OF OPERATING STATISTICS

	Chicago City Ry. Co.		Chicago Rys. Co.		Calumet & So. Chicago	
General:	1910	1909	1910	1909	1910	1909
Miles of track owned (single)	250.77	252.29	317.336	326.84	96.386	94.445
Miles of track operated (single)	264.46	247.82	308.475	306,446	93,268	94,198
Gross earnings per mile of single track owned	$37,918.50	$33,862.93	$39,210.43	$33,769.03	$9,142.07	$8,886.55
Gross earnings per mile of single track operated	$35,728.74	$34,473.73	$40,216.69	$35,638.29	$9,447.80	$8,913.70
Gross earnings of system	$9,508,822.85	$8,543,280.58	$12,442,882.32	$11,037,071.16	$881,177.47	$839,296.19
Paid to employees (wages)	[1]$3,479,393.16	[2]$3,533,354.86	[3]$5,058,148.34	[4]$4,609,515.02	[5]$437,282.97	[6]$374,273.16
Average number of employees	5,632	5,968	8,116	6,409	429	615
Per cent of gross earnings used in operation (including reserve for taxes and damages)	70.00	70.00	70.00	70.00	70.00	70.00
Per cent of gross earnings reserved for damages	8.96	5.80	6.27	7.40	5.89	5.00
Per cent of gross earnings reserved for taxes	5.52	5.35	4.92	3.37	.86	1.02
Transportation:						
Total passengers carried	312,864,537	282,791,209	427,138,380	373,643,388	23,804,926	20,768,593
Passengers carried for revenue	183,585,222	167,508,754	245,510,655	217,400,335	16,466,243	15,675,315
Passengers carried on transfers, employees and other free passengers	129,279,315	115,282,455	181,627,725	156,243,053	7,338,683	5,093,278
Total revenue car miles	35,319,683	33,646,585	46,157,999	43,857,066	4,311,115	3,953,612
Total car miles	35,748,460	34,202,740	.....	44,021,454	.....	3,971,415
Per cent of transfer and free passengers to fare passengers	70.42	58.58	72.22	70.00	44.57	32.73
Average gross earnings per passenger (cents)	3.03	3.02	2.90	2.95	3.70	4.04
Average passenger earnings per passenger (cents)	2.92	2.95	2.85	2.89	3.45	3.76
Average expense per passenger, including 5 per cent interest on agreed valuation of property (cents)	2.72	2.68	2.57	2.53	3.81	4.30
Average operating expenses per passenger (cents)	2.13	2.11	2.03	2.07	2.59	2.83
Average interest charge per passenger, based on agreed valuation of property (mills)	5.96	5.70	5.32	4.65	1.22	1.22
Average profit per passenger (mills)	3.01	3.35	3.41	4.20	0	0
City's proportion (55 per cent) of profit per passenger (mills)	*1.51	1.84	1.87	2.31	0	0
Company's proportion (45 per cent) of profit per passenger (mills)	1.50	1.51	1.54	1.89	0	0
Power:						
Kilowatt output in hours (all plants)	128,836,492	119,295,740	155,719,853	100,213,656	17,793,358	15,000,061
Total rated kw capacity (all plants)	39,695	33,005	34,014	22,981	4,653	3,400
Load factor (all plants) 24 hours	37.19	41.11	52.26	49.80	38.67	50.23
Cost per kw-hour (all plants) (cents)	0.87	‡0.64	0.963	1.023	1.09	0.97
Average kw-hour per car per day of 18 hours	518.65	538.00	473.00	312	585.85	...
Energy consumed per car mile (kw-hour)	3.40	3.55	3.33	2.558	3.34	3.79

Also paid to employees on construction and rehabilitation work: [1]$865,301; [2]$1,422,715; [3]$2,548,124; [4]$1,177,146; [5]$94,304; [6]$48,171.
*Chicago City Railway Company only, as Southern Street Railway Company's divisible earnings transferred to capital.
‡Except primary charge.

ORGANIZATION OF STAFF

The report of Bion J. Arnold, chief engineer of the work, to the Board of Supervising Engineers, Chicago Traction occupies 117 pages of the annual report of the board. Mr. Arnold first describes the engineering organization. The working force of the chief engineer has been organized in divisions with a division engineer who had specialized in the particular work covered by his division in charge, all of the divisions being under the general superintendence of an assistant chief engineer. The scope of each division is limited as far as practicable to the itemization made standard by the American Street & Interurban Railway Accountants' Association classification insofar as it relates to the respective divisions. In this manner the total monthly construction costs as reported by any division can be used as a check against the monthly statements of the companies for additions to capital account.

The personnel of the chief engineer's organization, at the conclusion of the year reported, included the following:

Chief engineer of the work, Bion J. Arnold; assistant chief engineer of the work, Geo. Weston.

Division D, track and roadway: Division engineer, R. F. Kelker, Jr.; assistant division engineer, C. E. Thomas; field engineer, F. E. Morrow; engineers, C. E. Raff and P. J. Kealy.

Division E, electrical transmission and distribution: Division engineer, Edward N. Lake; assistant division engineer, R. H. Rice; field engineers, W. F. Sims, E. J. Ward.

Divisions G and I, buildings and fixtures (Div. G), power plant equipment (Div I): Division engineer, R. A. Sanborn; assistant division engineer, C. C. Wright; consulting architect, E. E. Roberts.

Division K, cars and car operation: Division engineer, Wray Thorn; engineer inspectors, F. C. Thomas, E. J. Sigwalt; traffic inspector, O. H. Tousey; assistant traffic inspector, J. A. Doane; car inspectors, C. H. Cross, J. W. McDonald.

Division P, tunnels: Division engineer, Wm. Artingstall; structural designers, S. T. Smetters, T. R. Williamson.

Drafting room: Chief draftsman, F. W. Steeg; assistant chief draftsman, J. C. Neely, Jr..

Division of accounts: Auditor, F. K. Parke; chief clerk, C. G. Snyder.

General office: Private secretary to chief engineer, A. I. Downey.

TRACK AND ROADWAY DIVISION

The minimum number of men employed in the track and roadway division has been 12, maximum 31, and the average 21. The inspectors have been located in Chicago and at various other places. The minimum number stationed outside of Chicago at any one time has been four, the maximum nine, and the average six.

Inspection of all material and labor entering into the work in connection with the rehabilitation of tracks and roadways was constantly maintained by this division. The system of inspecting paving blocks at the point of shipment has been maintained, and to that end inspectors have been stationed at the several quarries, seven men being located in Wisconsin, South Dakota, New York and North Carolina.

There was no change in the method of inspecting cross-ties and switch-tie lumber, which provides for all inspection to be made prior to delivery to the railway companies. In addition to the inspection made directly by the division force, the in-

spection of rails, tie rods, etc., was carried on through a firm of inspecting engineers which reported to the board.

PAVING

Approximately 476,300 yards of granite pavement was laid. In addition to this, creosoted wood-block pavement was placed on all the boulevard intersections on the Chicago City Railway Company's lines where tracks have been rehabilitated, and 3588 sq. yd. of this pavement placed on Dearborn Street by the Chicago Railways Company. The track report describes the layout of special work at four new car houses and in each instance through tracks are provided for so that cars can be run directly through the bays onto the streets at opposite ends of the houses. During the year the headroom under five steam railways was increased to permit the operation of large street railway cars and five steam railway grade crossings were removed on account of track elevation.

DIVISION OF ELECTRICAL TRANSMISSION AND DISTRIBUTION

The work of the division of electrical transmission and distribution was subdivided into the following classifications: Bonding, conduit, feeders, trolley and miscellaneous. In addition to the field work necessary to supervise the actual installations, consisting of surveys, inspection and reports of progress, a large amount of office work was necessary in the preparation of specifications, plans, reports and estimates.

The following subjects are described in detail in the electrical section of the report: Feeder calculations, negative returns and the use of aluminum for underground electric cables.

Calculations for positive feeders have been in progress during the year for the systems of the Chicago City Railway Company and the Chicago Railways Company. Those for the former have been made to provide for the operation of the estimated number of cars which will be in service at the close of the rehabilitation period for that system, which is the winter season of 1909-1910. The negative returns were all calculated upon the basis of the requirements of the Chicago Municipal Code.

The Chicago City Railway Company purchased two miles of 1,623,000 cir. mil paper-insulated lead-sheathed aluminum cable (1,000,000 cir. mil copper equivalent), which was installed on trial during the season of 1909. This was the first installation of this kind in Chicago.

BUILDINGS AND POWER PLANT EQUIPMENT

The divisions of buildings and fixtures and power plant equipment have been combined and the work handled under one organization, as set forth in the first annual report. The number of engineer-inspectors employed in the inspection, supervision and checking of rehabilitation expenditures during the year 1908 has varied with the amount of construction work being done. The maximum number of inspectors employed has been thirteen and the minimum seven.

An engineer inspector has been detailed at each location where the progress of active construction work required his constant attention. Where work was less active several such locations were assigned to one inspector.

All engineer inspectors were and are required to make daily labor reports, monthly material estimates, monthly progress reports and special progress reports, as work demands; to keep complete daily data of construction work in field books, and to compile unit cost data. Each must be familiar with plans and specifications and see that work is done in conformity with them. In addition to the inspection work by the chief engineer's office, cement, steel reinforcing bars, and other materials have been tested and inspected by a firm of inspecting engineers. Complete written instructions to engineer-inspectors are issued to each man and with these he is required to be thoroughly familiar.

RECORDS AND REPORTS

Estimates as received from the engineer-inspectors in the field are priced and tabulated each month, together with the records received from the auditor of the rehabilitation expenditures of the railway companies for that month. In general the same forms, with a few changes, are used as during the first fiscal year.

A preliminary estimate is sent to the auditor on the tenth day of each month of the expenditures for the past month. This is corrected and a final estimate sent to the auditor when the accounts of the companies have been checked up in detail. This final estimate must be completed within the time set in the ordinances for correcting certificates.

All work orders, requisitions, purchase orders, contracts and extras are checked and approved as the construction work progresses. Digests of the requisitions, contracts, extras, etc., without prices, are given to the engineer-inspectors so that they may intelligently inspect the work in the field.

NEW CAR HOUSES

The report describes and plentifully illustrates the various car houses built by the two companies under the supervision of the board. Illustrated descriptions of these car houses have appeared in the Electric Railway Journal as follows: Chicago City Railway, Thirty-eighth Street and Cottage Grove Avenue car house, June 20, 1908, page 113; Seventy-ninth Street and Vincennes Road car house, April 11, 1908, page 597; Sixty-ninth Street and Ashland Avenue car house, May 8, 1909, page 864; Chicago Railways Company, West Twenty-fifth and Leavitt Streets car house, April 3, 1909, page 623; Madison Street and Fortieth Avenue car house and shops, Aug. 29, 1908, page 537. Two other new structures are described in the report. These are the Archer Avenue and Rockwell Street car house of the Chicago City Railway and the Lincoln and Wrightwood Avenues car house of the Chicago Railways.

SHOP ADDITIONS

The construction of a new fireproof carpenter shop, paint shop and additions, located at West End and Park Avenues, was commenced by the Chicago Railways Company during the year 1908. This enlarged building covers an area of 340 ft. by 225 ft. and will have a capacity of 125 cars. A pressed-brick wall fronts on each street, with a transfer table traversing all tracks at both ends of the shop.

A reinforced concrete saw-tooth roof has been built over the entire building, with the exception of the paint storeroom and glass storage-room. This roof is supported on concrete girders spanning about 60 ft., with two rows of concrete columns in both the paint shop and carpenter shop. Exceptionally efficient lighting and ventilation are obtained by the use of saw-tooth skylights.

The entire building will be heated by the blast system. Large overhead galvanized iron ducts extend from the fan room throughout the building. The outlets are placed about 6 ft. 6 in. above the floor line. In the paint shop these outlets are provided with dust collectors.

SUBSTATIONS

Five substations have been estimated as being required to supply the necessary electric current to the system of the Chicago City Railway Company when rehabilitated. The total ultimate capacity of these five stations is 50,400 kw, exclusive of the Plymouth Court substation battery, and 52,640 kw including this battery. Four of these substations were built prior to Feb. 1, 1908, and construction work on the fifth has been started. All new substation buildings of this company are to be of substantial fireproof construction with pressed-brick walls, both inside and out, book tile roofs, carried on structural steel trusses with composition roof covering, and concrete floors with a red tile wearing surface; in fact these substation buildings have been designed to be thoroughly fireproof and also to present a very attractive appearance.

An illustrated description of the Forty-second Street and Wabash Avenue substation of this company was presented in this paper for Aug. 15, 1908, page 462.

Work has been performed during the year 1908 on four substations for the Chicago Railways Company. The table on page 654 shows the location, size and capacity of these substations.

The Lill Avenue substation of the Chicago Railways Company was illustrated and described in this paper for Jan. 2, 1909, page 6.

ROTARY CONVERTER SUBSTATIONS, CHICAGO RAILWAYS COMPANY.

Location and machinery installed Feb. 1, 1909.	Ultimate capacity.	Total floor area, sq. ft.	Sq. ft. per kw ult cap.
Van Buren and Jefferson streets.			
5x2,000 = 10,000 kw	6x2,000 = 12,000 kw	8,060	.673
Milwaukee Avenue.			
2x2,000 = 4,000 kw	3x2,000 = 6,000 kw	4,742	.790
Lill Avenue.			
Under construction.....	3x2,000 = 6,000 kw	4,294	.716
West Twenty-fifth and Leavitt Sts.			
Under construction.....	3x2,000 = 6,000 kw	4,294	.716
Total, 14,000 kw	30,000 kw		Av. .724

DESCRIPTION OF ROTARY CONVERTER SUBSTATION MACHINERY

The 25-cycle, 9000-volt, three-phase alternating current generated by the Commonwealth Edison Company at the Fisk Street and Quarry Street power houses is transmitted underground to the various substations of the companies, where it is stepped down and transformed from alternating current to 600-volt direct current and delivered to the direct-current feeder systems of the street railways.

Rotary converters of standard manufacture of 2000-kw capacity have been installed as a standard unit for all substations of both companies. The size of 2000 kw was adopted for the reason that it was sufficiently small for economy of operation and large enough to secure a low first charge per kilowatt. With a machine of 2000-kw capacity no sub-base is used. The pillow blocks and field frames of the unit are carried on sole plates, which are supported on two concrete foundation walls. Cross girders running lengthwise of the building are placed under the field frames.

Air-blast reactances have been installed between the low tension windings of the transformers and the rotary converters. Each transformer and reactance is bottom-connected and takes air through its base, which is supplied with a damper for cutting off the air supply when out of service.

By the electric operation of all oil switches in the station it is possible to place the alternating-current line and converter panels in line with the alternating-current switchboard. All substations have been provided with electric 3-motor traveling cranes of sufficient capacity to lift the largest piece of apparatus in the station.

It has been found practically unnecessary to supply any independent method of heating the substations, as the stations are in service practically 24 hours per day and sufficient heat is generated in the operation of the electrical apparatus to give a comfortable working temperature. Special facilities for ventilation are provided in all of the substations. Large windows have been placed in the side walls of the stations both above and below the crane rail. All of these windows have pivoted sash with wire glass and are mechanically operated from the floor.

TUNNELS

This division was organized in April, 1908, shortly after the Chicago Railways Company accepted its ordinance, for the purpose of supervising the lowering of the roofs of the old tunnels, and to prepare plans and specifications for and to supervise the rebuilding of the Washington Street and La Salle Street tunnels as provided in the ordinance.

Upon the acceptance of its ordinance by the Chicago Railways Company on Jan. 28, 1908, the responsibility for reconstructing the tunnels was assumed by the board, and in addition to supervising the work of lowering the Van Buren Street tunnel, previously referred to, this division, during the year 1908, worked upon the plans and specifications providing for the reconstruction of the Washington Street and La Salle Street tunnels.

DIVISION OF ACCOUNTS

The division of accounts continues to keep a running check upon the expenditures of the street railway companies falling under the supervision of the Board of Supervising Engineers and in a general way is conducted in the following routine:

The two terms "work order" and "special accounts," are used synonymously. Applications for work orders or special accounts are submitted by each of the railway companies, requesting the authority of the board to proceed with the work specified therein and charge its cost to either capital account or renewals, as the case may be. These applications, after having been approved by the division engineers interested therein, are returned to the division of accounts for approval as to form and are then submitted to the assistant chief engineer for his approval, and by him handed to the board for final action, and as the chairman of the board is also the chief engineer of the work, his approval or disapproval is obtained in board meeting, where the final classification of the account is made. After the approval of the board is obtained one copy of the application is retained by the secretary for the board's files and the remaining copies are returned to the respective railway companies.

Upon receipt of properly approved applications, the auditors of the respective railway companies prepare work orders or special accounts in regular form covering the work so approved, and send five copies to the board.

These copies are first submitted by the division of accounts to the assistant secretary for comparison with the applications previously approved, and when approved by him are returned to the division of accounts, whence they are distributed as follows: One copy, bearing the assistant secretary's O. K., for filing in division of accounts; one copy to assistant chief engineer; one copy to chief clerk of engineering department; one copy to each division engineer interested.

REPORTS FROM RAILWAY COMPANIES

Daily reports are received from the railway companies covering all data relating to rehabilitation accounts, consisting of:

Material manifests, being record of materials sent from storerooms.

Material returned, being record of materials returned to storerooms.

Material transferred, being record of materials transferred, which is so ruled as to show the charges from storerooms, vouchers journal entries, accounts receivable, material transferred, horses and pay-rolls for each division of each special account or work order. A general summary sheet is then written which shows the total charge to each division of each account and the total charge to each account. The recapitulation of expenditures and summary sheets is written in duplicate, the copy being sent to the division engineer interested and the original retained in the auditing department's files.

A statement showing the total charges to each of the several engineering divisions is prepared by the auditor and checked against the companies' reports, and a letter is addressed to each division engineer showing the charges to be checked by his division and specifying date upon which the final report must be returned.

Before a final monthly certificate is issued, all vouchers affecting rehabilitation or storeroom accounts are checked against the accounts in the offices of each railway company, and also against the cash records, in order to verify the fact that payments therefor have actually been made.

DIVISION OF DRAFTING

In the fiscal year ended Jan. 31, 1909, the division of drafting made 641 original drawings and tracings; filed 1246 foreign prints, which were indexed numerically and topically; fulfilled 1658 blueprint orders; printed, bound and distributed 2382 sets of specifications, and from 53 new forms, 8½ in. x 11 in., printed 23,825 sheets.

The second annual report of the board contains a digest of the minutes of board's meetings Nos. 96 to 199 inclusive and a condensed record of the proceedings of board No. 2 for the fiscal year. The ordinances authorizing the Calumet & South Chicago Railway Company to construct and operate a street railway in Chicago and the ordinance granting the consent of the City Council to an operating agreement between that company and the Chicago City Railways are printed in full.

A further extension of electric traction on the Lancashire & Yorkshire Railway (England) to Ormskirk is about to be entered upon. The company intends to develop an electric scheme for a line between Liverpool, Ormskirk and Southport by way of Burscough Bridge.

A STUDY OF TRACK DEFLECTION AND MATERIALS

The track work of the surface railways in Chicago, which has largely been rebuilt during the past three years, has been carefully studied by the Board of Supervising Engineers of Chicago Traction. In its annual report the board describes its studies of track deflection and track materials. The following information on these subjects appears in the report just issued by the board:

TRACK DEFLECTION

In order to determine the amount of deflection of the rails in concrete construction, a special deflectometer was designed by the track and roadway division for the purpose of obtaining accurate data by a mechanical means to ascertain whether or not the movement was of sufficient magnitude to tend toward a disintegration of the foundation—which would shorten the life of the track. Investigations were made, therefore, to determine the rigidity and action of the different types of construction under traffic. These observations were extended over several streets in various parts of the city. The deflectometer consists of a simple lever mounted on a suitable frame and having at its outer end a pointer which moves over a scale. Clamps are provided for attaching the shorter end of the pointer to the rail head, tie or concrete sub-base.

When the tests were first begun it was expected that deflections of the rails amounting to as much as ¼ in. or ½ in. would be obtained. The results obtained were an agreeable surprise, for the maximum vertical deflection recorded was 5/64 in. In a large percentage of the track no vertical deflection whatever was noted. The tests showed that a slightly greater vertical deflection occurred at the rail joints and usually decreased away from the joint. Where deflection did occur, the average seemed to be about 1/32 in. The same general results were obtained on all the three types of track on which tests were made. No deflection whatever was noted in the concrete. Only in a very few cases was any deflection of the ties recorded, and where this was indicated it was found that the ties had not been properly tamped. In other words, it was determined that practically all movement took place between the base of the rail and the tie plate. The horizontal movement of the rail was recorded in practically every case where tests were made, and averaged about 1/64 in. This horizontal movement seemed to be a constant factor and varied but little in any case.

It was conclusively demonstrated that the eye greatly exaggerated the apparent movement of track under load. It was discovered that track which seemed, to the trained observer, to have a deflection of about ¼ in. in reality did not move more than 1/64 in.

As a result of this investigation particular attention is called to the conclusion, based on extended tests, that the concrete foundation, as laid, was practically rigid. The problem was to fasten the rail to the tie so that the rail and foundation would act as a unit. In all of these types a tie plate is used. In type No. 1 the rail is fastened to the steel ties by means of special wedge and clip devices. In types Nos. 2 and 2-A the screw spike is used to fasten the rail to the wooden tie. It was concluded that no criticism could be applied to these forms of fastening. In some cases where the deflection was noted it was discovered that the rail fastenings were not tight. It is probable that in types Nos. 2 and 2-A the tie plate sinks into the tie slightly with the compression of the wood fibers under the applied loads, and this may account for part of the vertical deflection noted. The deflection at the joint is probably explained in the following manner:

There is always an opening left in the concrete for the welding, a process which is done after the concreting. Before the weld is made the rail fastenings on the ties adjacent to the joint are loosened and the rail apparently is buckled by the welding process; consequently, it does not resume its original position on the tie, except while the weight of a car is upon it.

The importance of using tie plates in concrete track construction was also demonstrated. Tests were made in various cities on concrete track work where no tie plates had been used and serious deflections of the rail were discovered, due to the base of the rail cutting into the tie. Further injury as a result of this deflection was evident from the condition of the concrete, which had crumbled away from the rail.

An interesting feature of the test was that the speed of the cars passing over the track was not a factor in the deflection. Tests were made with the speed of the cars constant accelerated and retarded, but no appreciable difference was recorded. In other words, only the actual weight of the cars seemed to affect the deflection and no wave motion in the rail existed, for no deflection could be discovered except when the car was actually over the point of reading. In order to determine whether there was any movement of the pavement in sympathy with the movement of the rail, steel pins 18 in. long were driven through the pavement into the earth and the instrument was mounted upon them. It was discovered that there was no appreciable movement of the pavement.

CHARACTERISTICS OF TRACK AND ROADWAY

In the report for the first fiscal year were stated the general theories upon which the track construction was based and certain characteristics which were deemed worthy of mention were pointed out.

As a result of investigations carried out during the past season, an additional standard of construction was developed, termed "Type No. 2-A." In this type of track construction the small truncated pyramid of earth which was left between the ties in type No. 2 is omitted, the excavation being made level and rolled, and ties are spaced 3 ft. center to center instead of 4 ft., as in type No. 2.

The elimination of the pyramid above mentioned permits the rolling of the subgrade with a steam roller prior to placing the concrete in the trenches and thereby insures a more solid foundation than could be expected of type No. 2 construction, as well as a better distribution of the load over the subgrade.

The examination of track made by means of the deflectometer showed that whenever a movement of the rail occurred the movement was taken up between the rail and the tie plate; in no instance did a tie move under load except when the concrete had been improperly tamped. Having thus determined the location of the movement in the track, it was noted that the concrete lying about the rail base, instead of adhering to the metal, shrank away from it in setting. This left an extremely small void between the bottom of the rail base and the top of the set concrete. Therefore, it was evident that the concrete directly under the rail could carry no load except when the rail was deflected and forced down upon its surface. In other words, the entire load was supported and distributed over the foundation by the cross-ties until the rail came in contact with the concrete immediately under the rail base. Therefore, it was thought desirable to diminish the spacing of the ties from 4 ft. center to center to 3 ft. center to center in order that the load coming upon the track might be more evenly transmitted to and distributed over the concrete foundation by increasing the number of ties.

TIE SPACING

Before arriving at a definite conclusion as to the proper tie spacing, two stretches of track were laid in order to obtain comparative results. The ties laid 2 ft. center to center largely increased the cost of construction and made the proper tamping of the ties quite difficult. It was, therefore, concluded that the desired result could be obtained by the spacing of the ties 3 ft. center to center, thereby reducing the cost resulting from closer spacing, permitting an effectual tamping of the concrete about the ties, and at the same time introducing the factor of safety not secured with ties spaced 4 ft. center to center.

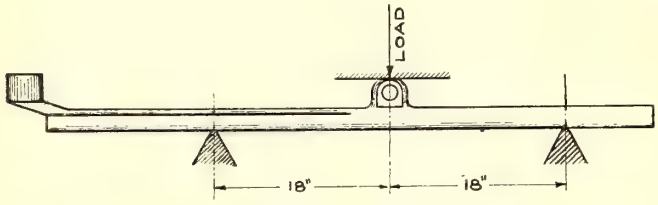
TIE RODS

Tests were made of the tensile strength of tie rods of three different methods of manufacture. The first of these methods was the welding of the round terminal to a flat bar; the second was the reducing of the flat portion and upsetting to make the round terminals, and the third was turning over edgewise

the ends of the flat bars and upsetting to make the round terminals. The rods made by the first and second methods in every case broke at the junction of the round and flat portions, each showing practically the same tensile strength. Those made by the third method in a majority of the tests failed in the threaded terminal, but developed a considerably higher tensile strength before failing than those made by the first and second methods. A fourth method of manufacture is now being tried, which consists of rolling the flat section of the rod from 1-in. round bars.

MATERIAL STUDIES—MANGANESE STEEL

As it was thought desirable to obtain information as to the character of the manganese steel placed in the track as special



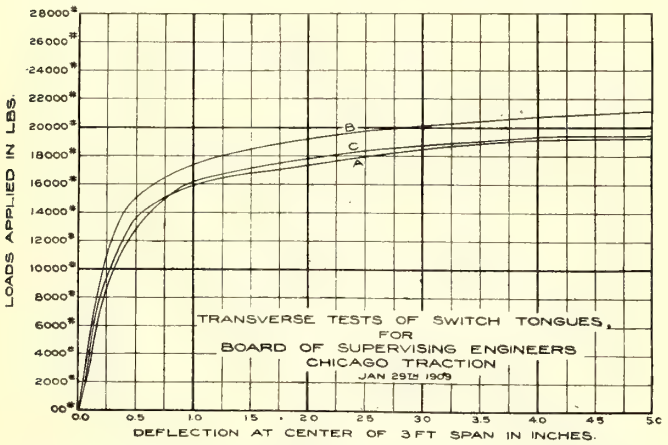
Track Material Studies—Application of Load to Manganese Steel Switch Point

work, a number of switch tongues were purchased from the manufacturers supplying the special work. These tongues were tested for physical characteristics by a firm of inspecting engineers. The results obtained were as follows:

A ½-in. Morse standard twist drill was used in these tests. The drill was used for a period of two minutes, resharpened, and this operation repeated four times. All of the samples were practically undrillable. The depth of the hole after completion of each test was measured to the nearest 0.001 in., and these measurements are tabulated below.

Sample Tagged	Depth of Hole After Test.
"A"	.030 inch
"B"	.029 inch
"C"	.039 inch

A 7/16-in. diameter steel ball was set on the face of the sample and subjected to a load of 35,000 lb. Upon removal the



Track Material Studies—Results of Tests on Manganese Steel Switch Points

diameter of the impression on the surface of the specimen was measured. In each case this was found to be 0.32 in., indicating that, so far as the surface hardening was concerned, the three samples were practically the same.

The switch tongues were successively subjected to the transverse tests. The loads were applied in an identical manner and every precaution was taken to make the test conditions the same. The application of the load was as indicated in an accompanying engraving and the results of these tests are also shown by curves.

In addition to the physical tests, chemical analyses were made by two representative analytical chemists as follows:

ANALYSIS NUMBER 1.

	"A" Per Cent	"B" Per Cent	"C" Per Cent
Carbon (combustion)	not made	not made	not made
Carbon (color)	1.020	0.620	0.850
Silicon	0.286	0.480	0.331
Manganese	12.270	11.820	13.240
Manganese (check)	not made	not made	not made
Phosphorus	0.060	0.068	0.084
Sulphur	0.035	0.023	0.032
Copper	not made	not made	not made

ANALYSIS NUMBER 2.

	"A" Per Cent	"B" Per Cent	"C" Per Cent
Carbon (combustion)	1.100	1.260	1.240
Carbon (color)	1.010	1.150	1.190
Silicon	0.470	0.260	0.350
Manganese	11.440	10.880	12.480
Manganese (check)	11.280	10.960	12.560
Phosphorus	0.067	0.056	0.084
Sulphur	0.021	0.036	0.033
Copper	None	0.340	0.090

HOLDING POWER OF TRACK AND SCREW SPIKES

Tests were made of the relative holding power of screw and track spikes in the various kinds of ties used. The accompanying table shows the comparative holding power. The table also shows the per cent of holding power of the track and screw spike in the various kinds of ties referred to, the holding power in oak ties assumed at 100 per cent. These tests show a high percentage of efficiency of the screw spike in soft woods over the track spike.

HOLDING POWER OF TRACK AND SCREW SPIKES IN VARIOUS TIES.

(Treatment, Zinc Chloride.)

Kind of Tie.	Screw Spike Pounds.	Track Spike Pounds.	Efficiency of Screw Spike Per Cent.*
Oak, untreated	9007	5893	153
90 per cent heart yellow pine, untreated	7018	3535	177
Short leaf pine, treated	6233	3520	177
Loblolly-pine, treated	5490	2869	191

*Referred to track spike as 100 per cent.

COMPARATIVE HOLDING POWER OF SPIKES.

	Track Spike Pounds	Per Cent	Screw Spike Pounds	Per Cent Pounds*
Oak, untreated	5893	100	9007	100
90 per cent heart yellow pine, untreated	3535	60	7018	78
Short leaf pine, treated	3520	60	6233	69
Loblolly-pine, treated	2860	49	5490	61

*Referred to untreated oak as 100 per cent.

NEW YORK ELECTRICAL SHOW

The fourth annual electrical exposition will be held at Madison Square Garden, New York, Oct. 10-20 inclusive, under the general direction of George F. Parker, who has been in charge of previous expositions of this kind in New York. Some 70 leading manufacturers, laboratories and private inventors in the general electrical field will be represented and about 50,000 ft. of space will be available to exhibitors. Among those who have already arranged for space are: Watson Stillman Company, Spencer Turbine Cleaning Company, the New York Edison Company, Edison Electric Illuminating Company of Brooklyn, United Electric Light & Power Company, Electrical Testing Laboratories, Crane Company, Duntley Manufacturing Company, General Vehicle Company, Edison Storage Battery Company, Keller Manufacturing Company, Richmond Sales Company, Cutler-Hammer Company, Safety Insulated Wire & Cable Company, General Electric Company, United States Light & Heating Company, Jos. Dixon Crucible Company.

There will be a specially fine display of electric vehicles, lamps, batteries and material of interest to the users of electric current. The Edison, Brooklyn and United companies will also have elaborate exhibitions. There will also be a demonstration of the long-distance telephone. Incidental to the exposition the convention of the Electric Vehicle Association of America will be held during the term of the exposition.

Subject to confirmation by the Railway Board the Indian Government has granted a concession in perpetuity to construct 17 miles of tramways between Maungdaw and Buthingdaung, in the Akyab district, to the Arracan Flotilla Company, Limited, of London and Burma. The government guarantees to supplement the net earnings by an annual subsidy, and under certain conditions will purchase the line eventually.

OPERATIONS OF EXPRESS COMPANIES ON ELECTRIC RAILWAYS

The number of electric railways which have made contracts with old-line express companies for handling their package business has increased rapidly during the past two years. In some cases the business of the express companies is confined solely to through interurban traffic, the railway company reserving all local business. On many roads, however, the low rates on commodity freight offered by the railway are ample protection against any encroachment on its legitimate freight traffic and the old-line express company under the terms of its contract is free to solicit local as well as through business. The extent of the operations of the old-line express companies will be noted from the following list of electric railways in all parts of the country. The names of the railway companies have been furnished by the express companies with one exception. The American Express Company declined to furnish any information. Except for the possible omission of a few roads over which this company operates, the list is complete:

ADAMS EXPRESS COMPANY

Conway (Mass.) Electric Street Railway.
Frederick (Md.) Railroad.
Lackawanna & Wyoming Valley Railroad, Scranton, Pa.
Meadville & Conneaut Lake Traction Company, Meadville, Pa.
New Paltz, Highland & Poughkeepsie Traction Company, New Paltz, N. Y.
Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.
Rhode Island Suburban Railway, Providence, R. I.
Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.
Wheeling (W. Va.) Traction Company.

AMERICAN EXPRESS COMPANY.

Albany Southern Railroad, Albany, N. Y.
Cedar Rapids & Iowa City Railway, Cedar Rapids, Ia.
Grand Rapids, Holland & Chicago Railway, Holland, Mich.
Iowa & Illinois Railway, Clinton, Ia.
Metropolitan Street Railway, New York City.

CANADIAN EXPRESS COMPANY.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.
Windsor, Essex & Lake Shore Rapid Railway, Windsor, Ont.

DOMINION EXPRESS COMPANY.

Brantford & Hamilton Electric Railway, Hamilton, Ont.
Galt, Preston & Hespeler Street Railway, Galt, Ont.
Hamilton & Dundas Street Railway, Hamilton, Ont.
Hamilton, Grimsby & Beamsville Electric Railway, Hamilton, Ont.
Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.
Preston & Berlin Railway, Galt, Ont.

GREAT NORTHERN EXPRESS COMPANY.

Spokane & Inland Empire Railroad, Spokane, Wash.

NATIONAL EXPRESS COMPANY.

Connecticut Valley Street Railway, Greenfield, Mass.
Hudson Valley Railway, Glens Falls, N. Y.
Orange County Traction Company, Newburgh, N. Y.

NORTHERN EXPRESS COMPANY.

Everett Railway, Light & Water Company, Everett, Wash.

PACIFIC EXPRESS COMPANY.

Dayton & Troy Electric Railway, Dayton, Ohio.
Western Ohio Railway, Lima, Ohio.

UNITED STATES EXPRESS COMPANY.

Aurora, Elgin & Chicago Railroad, Chicago, Ill.
Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.
Chicago & Milwaukee Electric Railroad, Chicago, Ill.
Chicago & Southern Traction Company, Chicago, Ill.
Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.
Detroit (Mich.) United Railway.
Elgin & Belvidere Electric Company, Chicago, Ill.
Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.
Frederick (Md.) Railroad.
Galesburg & Kewanee Electric Railway, Kewanee, Ill.
Grand Rapids, Holland & Chicago Railway, Holland, Mich.
Hagerstown (Md.) Railway.
Illinois Traction System, Peoria, Ill.
Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.
Indiana Union Traction Company, Anderson, Ind.
Kokomo, Marion & Western Traction Company, Kokomo, Ind.
Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.
Marion, Bluffton & Eastern Traction Company, Bluffton, Ind.
Maryland Electric Railways, Baltimore, Md.
Michigan United Railways, Lansing, Mich.
Ohio Electric Railway, Cincinnati, Ohio.
Otsego & Herkimer Railroad, Hartwich, N. Y.
Rockford & Interurban Railway, Rockford, Ill.
Southern Michigan Railway, South Bend, Ind.
Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.
Toledo & Chicago Interurban Railway, Kendallville, Ind.
Toledo & Indiana Traction Company, Toledo, Ohio.
Toledo & Western Railroad, Toledo, Ohio.
Trenton & New Brunswick Railroad, Trenton, N. J.
West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa.
Winona Interurban Railway, Winona Lake, Ind.

WELLS FARGO & COMPANY.

Central California Traction Company, San Francisco, Cal.
Chicago, Lake Shore & South Bend Railway Michigan City, Ind.
City & Suburban Railway, Brunswick, Ga.
Columbus, Delaware & Marion Railway, Columbus, Ohio.
Columbus, Marion & Bucyrus Railway, Delaware, Ohio.
Detroit, Monroe & Toledo Short Line Railway, Monroe, Mich.
Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.
Electric Package Agency, Cleveland, Ohio:
Cleveland, Southwestern & Columbus Railway.
Lake Shore Electric Railway.
Mansfield Railway, Light & Power Company.
Northern Ohio Traction & Light Company.
Elmira & Seneca Lake Traction Company, Elmira, N. Y.
Erie Railroad, Rochester, N. Y.
Fort Wayne & Springfield Railway, Decatur, Ind.
International Railway, Buffalo, N. Y.
Inter-Urban Railway, Des Moines, Ia.
Joliet & Southern Traction Company, Joliet, Ill.
Los Angeles Inter-Urban Railway, Los Angeles, Cal.
Los Angeles Pacific Railway, Los Angeles, Cal.
Los Angeles & Redondo Electric Railway, Los Angeles, Cal.
Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.
Northern Electric Railway, Chico, Cal.
Oregon Electric Railway, Portland, Ore.
Ohio Electric Railway, Cincinnati, Ohio.
Pacific Electric Railway, Los Angeles, Cal.
Peninsular Railway, San Jose, Cal.
People's Traction Company, Galesburg, Ill.
Pittsburgh, Harmony, Butler & Newcastle Railway, Pittsburgh, Pa.
Riverside & Arlington Railway, Riverside, Cal.
Rock Island-Southern Railroad, Monmouth, Ill.
Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.
San Francisco, Vallejo & Napa Valley Railway, Napa, Cal.
Sheboygan Light, Power & Railway Company, Sheboygan, Wis.
Stark Electric Railroad, Alliance, Ohio.
Tama & Toledo Electric Railway & Light Company, Toledo, Ia.
Warren & Jamestown Street Railway, Warren, Pa.
Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.
Youngstown & Ohio River Railroad, Youngstown, Ohio.
Youngstown & Southern Railway, Youngstown, Ohio.

CONVENTION OF THE COLORADO ELECTRIC LIGHT, POWER & RAILWAY ASSOCIATION

The eighth annual convention of the Colorado Electric Light, Power & Railway Association was held at Glenwood Springs on Sept. 21, 22 and 23. A program had been arranged which provided for the presentation of the following papers: "Mazda Street Series Lighting," by H. L. Allen, Denver; "Some Observations in Cultivating Friendly Relations with the Public," by J. M. Connelly, Denver; "Notes on Distribution Pole Lines," by J. C. Lawler, Colorado Springs; "Creosote Treatment of Our Native Lodge-Pole Pine Poles," by George R. Ogier, Denver; "The Place of Rotary Condensers and Induction Generators in Transmission Systems," by A. L. Jones, Denver; "Steam Turbines," by E. M. Gilbert, Denver.

The first session was called on the afternoon of Sept. 21, 1910, and the roll call showed 60 members present. The reading of the minutes being dispensed with, President William T. Wallace gave a short address, especially emphasizing the growth of membership and influence of the organization, its duties and opportunities. In view of the probability of passage of a public service commission law in Colorado, Mr. Wallace stated that the association should openly interest itself to bring about the enactment of a measure which would be fair to the public and the service company alike, and a special committee was recommended to represent the association in conferences with other bodies which would be affected by such a measure.

During the evening an executive session was held, and reports of the treasurer, the auditor, etc., were received.

J. M. Connelly, Denver, in his paper discussing the advantages to a public-service company of cultivating friendly relations with the public, showed in what way wrong impressions are frequently conveyed, especially to representatives of newspapers, by reason of indifference or rudeness. He entered a special plea for publicity concerning the affairs of a company in order to keep the public informed as to its needs and intentions.

In the paper "Creosote Treatment of Our Native Lodge-Pole Pine Poles" George R. Ogier, Denver, claimed that by creosoting the useful life of pine poles would be increased from 5 years to 20 years. The author stated that creosoting not only prolongs the life of the durable species of wood in use, but it prolongs the life of the inferior and cheaper woods, and enables the utilization of inferior woods, which without the preservative treatment would have little or no value. The discussion on Mr. Ogier's paper indicated that in the dryer climates the part of the pole above ground receives very little benefit from treatment. Carbolineum and creosote painting have been tried by some members and seem to be a palliative only, usually leaving a hard shell, but allowing decay to proceed under the shell. Concreting was advocated by W. G.

Matthews, superintendent of line for the Denver City Tramways, who is using a great deal of concrete setting, and to some extent concrete collars for poles partially destroyed at the ground line.

The committee on the grounding of secondaries, of which J. A. Clay was chairman, submitted a report based on the replies received from 17 companies to 13 questions relative to the grounding of secondary circuits. Attention was called to the rule of the National Electrical Code that motors operating at a potential of 550 volts or less be thoroughly insulated from the ground where feasible. The committee recommended that the question of grounding be brought more forcibly before the member companies in order that more definite information and a closer study and results may be obtained. Finally, following a résumé of the situation by W. D. Wallace, a resolution was introduced and carried endorsing grounding secondary circuits carrying up to 150 volts, leaving the question of motor circuits open, though practice is strongly for grounding up to 440 volts and many companies have definite rules to such effect. A further resolution endorsed the grounding of motors, switch and transformer cases on secondaries operating at 220 volts and above.

Following the presentation of the report of the nominating committee the following officers were elected: M. L. Corbett, manager of the United Hydroelectric Power Company, president; J. A. Clay, San Juan Water & Power Company, vice-president. An amendment to the constitution of the association makes the secretary an appointee of the president.

PROGRAM OF THE AMERICAN ASSOCIATION

The following program has been drawn up for the meetings of the American Street & Interurban Railway Association at Atlantic City, Oct. 11 to 13. All sessions will be held at the Greek Temple near the end of the convention pier:

Tuesday, Oct. 11—9:30 a. m. to 12:30 p. m.

Registration and Badges. (Convention Pier.)

Tuesday, Oct. 11—2 p. m. to 5 p. m. (Open Session.)

Convention Called to Order.
Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Announcements.
New Business.
Reports of Committees.
- (a) Subjects.
- (b) Active Membership.
- (c) Associate Membership.
- (d) Compensation for Carrying United States Mail.
- (e) Brill Prize.

Address—"The Coney Island Fare Question," by Frank R. Ford, Ford, Bacon & Davis, New York, N. Y.
Address—"Electric Railway Securities," speaker to be announced.

Wednesday, Oct. 12—2 p. m. to 5 p. m. (Executive Session.)

Appointment of Nominating Committee.
Reports of Committees.
- (a) Welfare of Employees.
- (b) Interstate Commerce Commission Affairs.
- (c) Insurance.
- (d) Public Relations.
- (e) McGraw Dictionary.

Address—"The Public Side of Street Railroading," by Patrick Calhoun, president United Railroads of San Francisco, San Francisco, Cal.
Address—"The Philadelphia Question," by Charles O. Kruger, president Philadelphia Rapid Transit Company, Philadelphia, Pa.

Thursday, Oct. 13—2 p. m. to 5 p. m. (Executive Session.)

Report of the Committee on Education.
Address—"Franchises," by Charles V. Weston, president, South Side Elevated Railroad Company, Chicago, Ill.
Address—"What Interurban Railway Companies Do for the Public," by Joseph A. McGowan, secretary and treasurer, Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.
Address—"Taxes and Licenses," by Guy E. Tripp, Stone & Webster, Boston, Mass.
Report of Committee on Nominations.
Election of Officers.
Installation of Officers.
Resolutions.
Unfinished Business.
Adjournment.

MEETING OF KANSAS ASSOCIATION

The thirteenth general meeting of the Kansas Gas, Water, Electric Light & Street Railway Association was held in the Mercantile Club Rooms, Kansas City, Kan., on Sept. 27 and 28, 1910. The papers which were presented at the meeting were only of passing interest to those identified with the management of electric railways. It was voted to hold the next meeting of the association at Independence, Kan., in September, 1911. Officers of the association were elected as follows: W. R. Murrow, secretary and manager of the Independence Electric Company, president; J. H. Rathert, superintendent of the Junction City Water-Works Company, first vice-president; B. F. Eyer, vice-president of the Manhattan Ice, Light & Power Company, second vice-president; H. A. Walker, secretary and treasurer of the Liberal Light, Ice & Power Company, third vice-president; James D. Nicholson, secretary, treasurer and manager of the Newton Electric Light & Power Company, secretary-treasurer; A. M. Patten, general superintendent and purchasing agent of the Topeka Railway; L. O. Ripley, and E. S. Springer, manager and contracting agent of the Leavenworth Light, Heat & Power Company, Leavenworth, executive board.

MEETING OF PUBLIC RELATIONS COMMITTEE AND STATE ASSOCIATION EXECUTIVES

It will be remembered that at a mid-winter meeting of the American Street & Interurban Railway Association, last January, the committee on public relations was enlarged by the appointment to that committee *ex officio* of the presidents of the different State street railway associations and the president of the Canadian Street Railway Association.

C. Loomis Allen, chairman of the committee, has issued a call for a meeting of the enlarged committee, which now consists of thirty-two members, on Tuesday, Oct. 11, at Atlantic City. The meeting will be held at 11 a. m. at the West Solarium, at the Marlborough-Blenheim Hotel, and its object will be to discuss the program to be followed by the committee in its future work. It has been thought that nearly every president of the State associations will be in attendance at the Atlantic City convention, or if he is not able to be present, that he will appoint some other official of the State association to attend the meeting of the committee on public relations. The time and place have been selected with the object of making them as convenient as possible for all members who attend.

A hearing was held before Commissioner Bassett, of the Public Service Commission of the First District of New York, on Sept. 28, 1910, to inquire into the service furnished by the New York & Queens County Railway with particular reference to the line of the company to College Point. W. O. Wood, president and general manager of the company, said that the company was laboring under a considerable disadvantage inasmuch as 25 cars ordered some time ago had been delayed in their arrival and could not possibly be equipped in the shops of the company before Oct. 11, 1910. Mr. Bassett instructed E. G. Connette, transportation engineer of the commission, to inquire into the situation and confer with Mr. Wood.

SHOP DEVICES IN ST. CATHARINES, ONT.

The accompanying illustrations show four different labor and cost-saving methods devised by W. H. Horton, electrical engineer of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., and used in the shops of that company. Fig. 1 is a commutator slotter made on the principle of a common slide rest. It carries a cutter made of an old file which is operated by a hand lever and link as shown. With this slotter 99-bar commutators of the G.E.-57 type can easily be undercut in 15 minutes. Fig. 2 shows this device installed on the slide rest of a lathe.

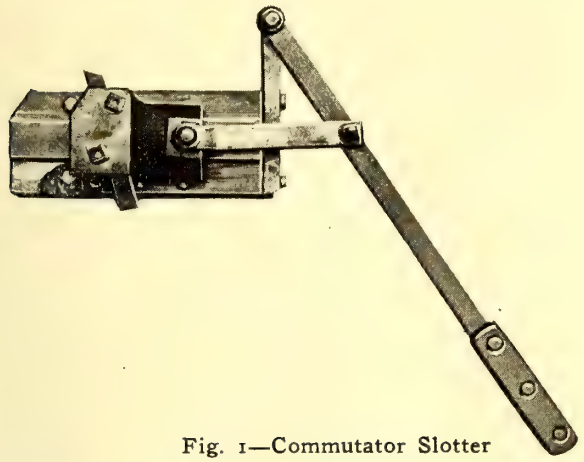


Fig. 1—Commutator Slotter

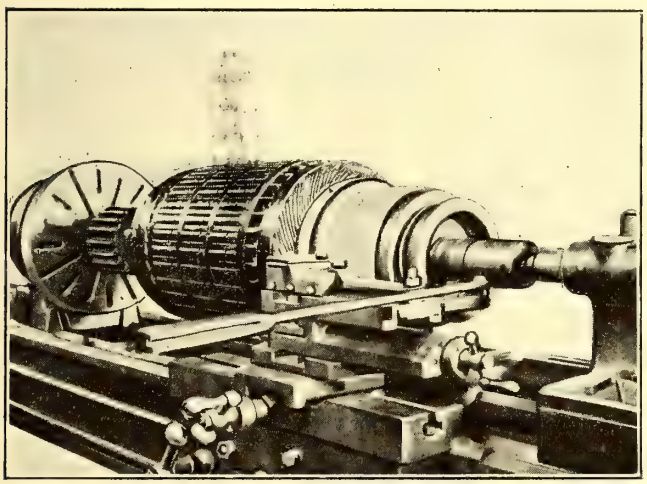


Fig. 2—Commutator on Lathe Ready for Slotting

For boring armature and axle bearings the company uses a simple cylindrical chuck which is screwed on to the lathe spindle as illustrated in Fig. 3. This has proved a very satisfactory device since the bearing requires no centering; all that is necessary is to push the bearing into the chuck and clamp it with the set screw. Bushings are used for odd-sized bearings, the single set screw passing through a clear hole in the bushing to clamp both the bushing and the bearing. No armature binding has been experienced with bearings bored in this chuck because the inner side, when bored, must be parallel with the outer side of the shell. One man can bore many bearings in a day with this chuck, as no time is lost in centering. A large number of bearings can be bored, say 1/32 in. small, for stock and when armatures require bearings the latter can be fitted with this chuck without disturbing the original alignment. Fig. 4 shows an armature bander which was made of a 15-in. diameter double-flange, cast-iron pulley, 1½ in. wide between the flanges. The banding wire is led from the spool seven or eight turns around the pulley after which the wire is led in the right direction by the lower right-hand trolley wheel which serves for the sheave. A piece of trolley rope over the pulley is used for a brake. This rope is fastened to a bracket at one end and is kept taut by cast-iron weights at its free end. The tension of the wire is increased simply by adding more weight on the end of this rope. This banding outfit has been found efficient and simple and does as good work as more costly devices used for the same purpose.

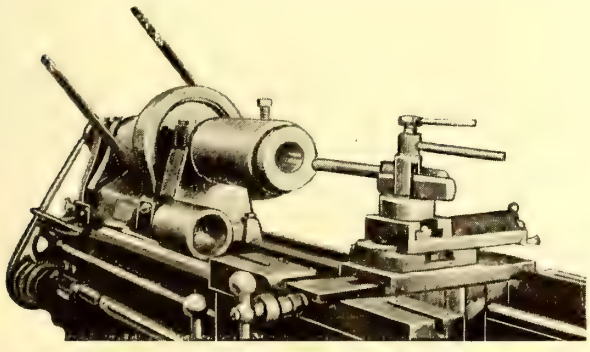


Fig. 3—Application of Cylindrical Chuck for Boring Bearings

Fig. 5 shows a car wheel tire-heater consisting of a piece of 1½-in. pipe bent into a circle with ⅛-in. holes 1 in. apart drilled all around on the inside. Natural gas for heating is supplied through the valve on the left and air is furnished through the valve on the right from a forge blower driven by a 1-hp motor. The pipe circle rests on a 3-in. thick cast-iron ring which is surfaced on the upper side and ribbed on the lower side. The brick foundation has a large center hole through which the water used for cooling the tire is drained away. A 2-ton chain hoist suspended from a trolley running on I-beams is used to lift the wheels and axles in position over the tire. When the tire is heated sufficiently the wheel is lowered into it and the tire cooled off. This apparatus has been found to be very satisfactory. For instance, four old tires have been taken off and four new tires put on for a total gas consumption of 830 cu. ft., the natural gas costing 30 cents per 1000 cu. ft. The time taken to remove an old tire varied from 6 minutes 25 seconds to 10 minutes. The time taken to apply a new tire varied from 21 minutes 30 seconds to 25 minutes.

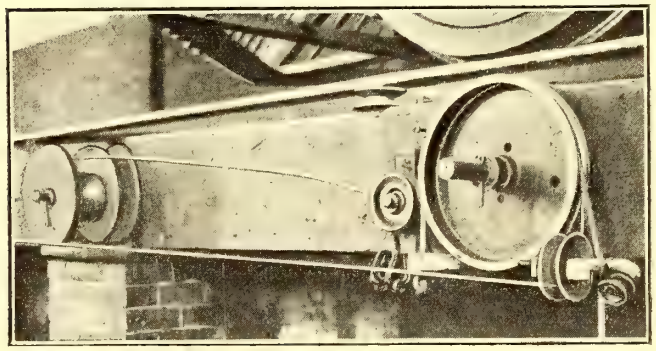


Fig. 4—Armature Bander

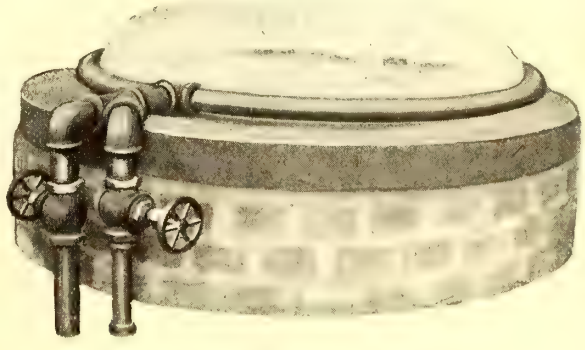


Fig. 5—Car-Wheel Tire Heater

PARLOR CARS FOR THE OREGON ELECTRIC RAILWAY

On page 636 of the souvenir section of this issue reference is made to the parlor cars operated by the Oregon Electric Railway between Portland and Salem. Through the courtesy of C. A. Coolidge, general manager of the Oregon Electric Railway, this paper is able to present herewith some additional information about these cars, which have now been in service for about four weeks. The cars are being operated at the rear end of three-car trains. The first car in the train is a combination baggage, smoking and passenger car and the second car is a passenger trailer. The parlor car is equipped with motors and General Electric type M control and the forward end is vestibuled so as to provide a covered passageway through to the forward cars. The two parlor cars now in service are named the "Champoeg" and "Sacajawea."

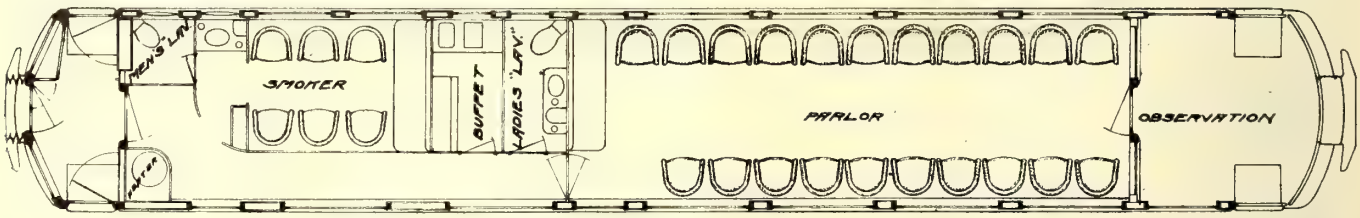


Interior of Observation Compartment

An accompanying engraving shows the floor plan of the cars. At the rear end is an observation platform 8 ft. 4 in. long enclosed with a bronze railing and covered with a standard steam railroad pattern observation dome with an awning. The parlor-car compartment is 25 ft. 11 in. long and contains 21 seats along the side and a sofa across the front end. In the forward end of the car is a smoking compartment containing six seats and a sofa and a buffet, together with lavatories for ladies and gentlemen. The length of the cars over buffers is 62 ft. 1¾ in. and the width over all is 9 ft. 6 in. The car bodies weigh about 37,000 lb. and the total weight, including motors and equipment, is 88,700 lb.

The side sills are made up of 4½ in. x 7¾ in. and 1⅞ in. x 6 in. pine timbers with a 5-in. x 7¾-in. sill plate bolted between. The center and intermediate sills are 6-in. I-beams. The floor is of double thickness with a layer of Keystone hair insulation ½ in. thick between the two layers of boards. The windows have wide double bottom sashes with art-glass semi-elliptic sashes above. All movable sashes are hung on O. M. Edwards spring balance fixtures and are fitted with rings and rollers made by the same company.

The interior of the car is finished in selected dark mahogany with inlaid borders of colored woods. The ceiling is of Empire style, decorated in green and gold. Green silk Pantasote curtains are hung over all windows. In the toilet rooms and buffet the finish is white enamel. The parlor compartment is furnished with 21 reed chairs with dark-green plush cushions. These were furnished by Heywood Brothers & Wakefield Company. The floor of the parlor compartment is covered with a thick Wilton carpet woven with a green and gold border. The smoking compartment is furnished with six mahogany colored reed chairs upholstered with dark-green leather, and the sofa across one end is upholstered in the same material. The floor of the smoking room, buffet and lavatories is covered with inlaid linoleum. The buffet is furnished with a sink with hot and cold water spigots, an ice chest under the sink, a linen closet, a nickel-plate hot-water urn and a two-burner alcohol stove.



Floor Plan of Observation Parlor Car for Oregon Electric Railway

The car is heated with a Peter Smith No. 2-C hot-water heater which also heats water for the buffet. Two 100-gal. steel water-storage tanks are hung under the car body. They are encased to prevent freezing and pressure is supplied by connecting with the air-brake system. The hot-water supply

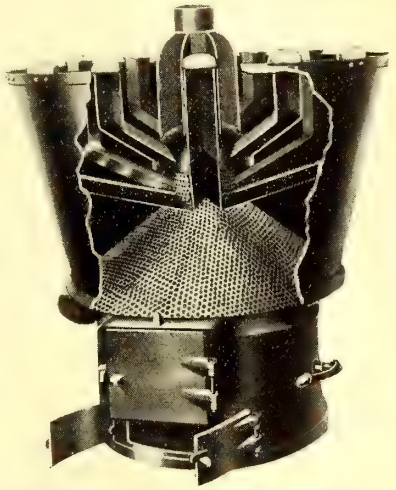


Observation Parlor Car for Oregon Electric Railway

is stored in a 20-gal. tank mounted above the car heater. Other special equipment of the car includes Edwards self-raising steel vestibule trap doors, Westinghouse air brakes, Baldwin trucks with 5-in. x 9-in. journals and 36-in. wheels designed for mounting two GE-73 motors. The cars were built by the Niles Car & Manufacturing Company, Niles, Ohio.

A SELF-CONTAINED SAND DRYER

The Thomas W. Pangborn Company, New York, is making for electric railway service the compact sand dryer shown in the accompanying illustration. A patent for this dryer is now pending. The strongest feature asserted for this dryer, aside from its fuel economy, is that it insures the absolute removal of moisture in the sand without impairing its value by burning or calcination. This is accomplished by keeping the wet sand from direct contact with the firebox and by carrying away the moisture by air currents. A perforated screen which has the shape of an inverted funnel is used for this purpose. The neck of this funnel surrounds the chimney while the conical part is separated by an air gap from the firebox. The perforated screen keeps the damp sand away from the firebox, but allows the heated air to pass freely from the firebox and under the sand. As the sand dries, it drops through the perforations of the screen and runs down the inclined surface of the firebox to the storage bin. As sand will resist the passage of air and heat, several inverted angle flues project from the firebox through the sand, extending to the top of the hopper into the open air. This arrangement allows the hot air to absorb the moisture from the sand in the interior of the hopper and to discharge through these flues.



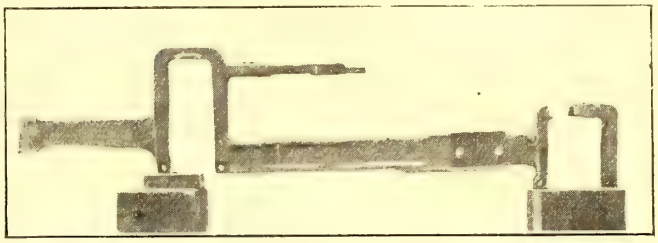
Part Interior View of Sand Dryer

The established principle that heat transmitted through an iron wall is obtained in greatest volume from rough surfaces is applied in this dryer. The inside of the firebox has several concentric rings projecting toward the fire and radial ribs on the outside radiate the heat under the perforated screen. As the sand comes in contact only with the heated air, it will not burn, even if the firebox is red hot. Small doors in the hopper permit the easy removal of material that will not pass through the perforated screen. The green or wet sand requires no further attention after being shoveled into the hopper. The capacity of the dryer is governed entirely by the amount of moisture and foreign matter in the sand and the degree of heat to which the stove is brought. The dryer stands 4 ft. from the floor to the top of hopper. The hopper is 4 ft. in diameter at the top and 37 in. at the bottom. The base is 30 in. in diameter; height from floor to top of firebox, 18 in. The complete dryer weighs 1,400 lb. The stove is adapted for use with hard or soft coal, coke, or wood or can be equipped with oil or gas burners.

The report of the Liverpool Tramways for 1909 shows that the ratio of fatalities to passengers carried was 1 in 30,382,235. At the instance of the management 285 prosecutions took place, an increase of 70 as compared with the previous year. Of this number, 60 prosecutions were for riding on steps, buffers and platforms. There were 25 cases of prosecution of persons who avoided or refused to pay fares and two of persons who refused to leave a full car. The length of track operated was 109½ miles, an increase of 2 miles as compared with 1908.

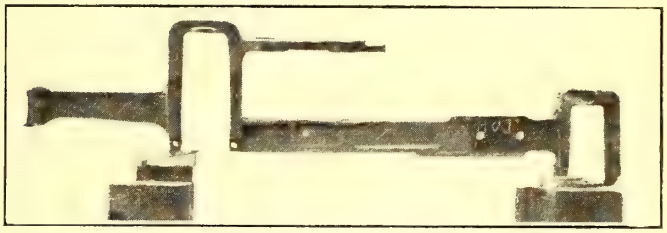
ELECTRIC WELDING WITHOUT RESISTANCE LOSSES

The Garwood Electric Company, Garwood, N. J., has recently put before electric railway companies an electric welding system in which no grid or water rheostats are necessary to secure the low voltage and high amperage required for this work. The apparatus includes a specially designed motor and a double-commutator 50-volt to 75-volt generator coupled and mounted on one cast-iron base. There is furnished with this apparatus



Broken Truck Frame

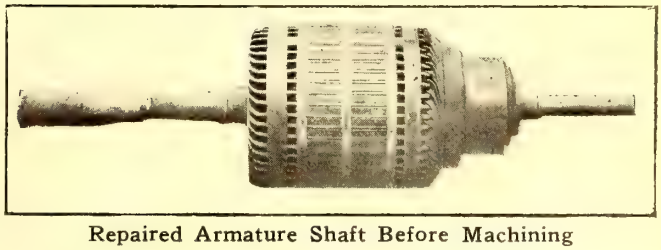
a switchboard carrying one starting rheostat for the motor, one field rheostat for the generator, one set of automatic solenoids and one special circuit breaker. The rest of the apparatus includes a head shield for the operator and a flexible cable to permit welding at a considerable distance from the motor-generator set. Either single or double arcs are furnished, so that in the latter case two operators can weld independently from one set and each can use a different voltage. In operation the motor-generator set is connected to the railway circuit, lowering the voltage to 50 volts or 75 volts and



Repaired Truck Frame

raising the amperage in practically the same proportion. The voltage regulation is entirely automatic without the waste of power incident to reducing the voltage through water rheostats or grid resistances.

This system of welding is adapted for repairing almost any iron or steel material used in electric railway work. Two of the accompanying illustrations show a truck frame before and after welding a break, while the third illustration shows a repaired armature shaft before machining. Axle caps and boxes, journals, bolsters, gear cases, worn and broken gears, brake links, etc., can also be repaired by this method. Motor



Repaired Armature Shaft Before Machining

cases broken at the junction of the oil boxes and the wall of the casting can usually be repaired and reinforced in from two hours to three hours for $1.50 to $2, including current and labor. Broken truck frames have been welded in one and one-half hours to two hours for a cost of about $1 each. Broken armature shafts and journals are repaired without disturbing the windings in from three to four hours at a cost of from $2.75 to $3.50. Broken shafts can also be butt-welded in a satisfactory manner. One of the most interesting uses

of this system is adding metal to eliminate flat spots from car wheels. A flat spot covering an area of, say, 2 in. has been covered in 10 to 15 minutes at a cost of about 25 cents, which included dressing down the welded part with a file. This operation can usually be performed without removing the car truck, only a little jacking up of the car being necessary.

While no great skill is required in manipulation care should be taken in choosing the metal for the welding bars. The heat generated during the welding burns out part of the carbon, silicon and manganese. To offset this effect the welding pieces should be of a higher grade metal than that used in the object welded so that the junction will be stronger instead of weaker than the rest of the structure.

A SAFETY BRAKE SHOE

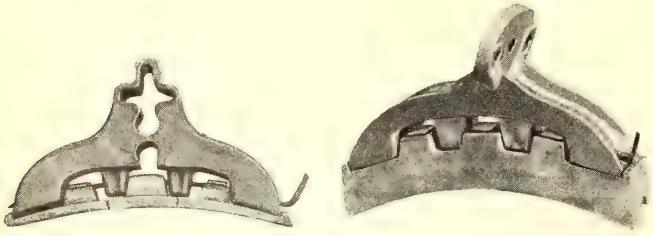
The Lancaster Iron Works, Inc., Lancaster, Pa., have recently begun to make cast-iron brake shoes on an extensive scale both for electric and steam railways. The distinctive feature of these shoes is the use of three steel keepers which prevent broken or partly worn shoe treads from falling on the track to cause disasters. By this means it is possible to take advantage of the high frictional coefficient of cast iron without



Figs. 1 and 2—View of Keeper, Keepers in Shoe and Shoe Tread

incurring the risk incident to some other designs. The keepers are cast into the lugs of the shoe and extend through them into the tread for about ⅛ in. They are 1⅜ in. wide x 1⅜ in. deep and about 3/16-in. thick. As shown in Fig. 1, the keepers are made with a V-notch on each side so that when the shoe is cast they are most thoroughly embedded and anchored in the molten metal.

The manufacturers of this shoe claim that the three-keeper design is superior to the single-keeper shoe in at least two important respects; first, three keepers will positively pre-



Figs. 3 and 4—Worn Shoe and New Shoe Complete

vent the shoe from being twisted or displaced, thus insuring the equalization of braking pressure over the wheel tread; second, a three-keeper shoe will wear until there is very little tread metal left, whereas a considerable portion of the single-keeper shoe is likely to drop out because it is held only at one place. Fig. 2 of the accompanying illustration shows how the keepers are cast in the lugs and also shows a shoe tread; Fig. 3 shows how a shoe broken in three parts would still be safe and serviceable; Fig. 4 shows an assembled shoe and head. The makers point out that the percentage of steel in the scrap of this shoe is much smaller than in the steel-back shoe or similar types where steel is used to hold the cast-iron tread.

COMBINED SAFETY AND SLACK STRAP

The electric railway lineman finds it advantageous to reduce to a minimum the number of tools which he has to carry. Realizing the advantages of a single device, if it will do the work of two or three devices, Mathias Klein & Sons, Chicago, have just put on the market a safety strap so provided with fittings that it serves equally well as a slack strap. The combined safety



Combined Safety and Slack Strap

and slack strap is made of heavy leather in a single piece 1¾ in. wide and 7 ft. long. The fittings include two safety snaps, one fixed at one end of the strap and the other provided with a roller so that it will move freely. The buckle frame also carries a substantial roller and when the free end of the trap is guided over this roller, as shown in the illustration, the strap may be used to give a double purchase in pulling up slack with a comealong. By throwing the tongue of the buckle into any of the holes along the strap, the load can be held at any desired position. As every lineman regularly equips himself with a safety belt, this strap, which will replace the safety belt and provide for pulling up slack, should be found very convenient.

A NON-CORROSIVE IRON OF HIGH MAGNETIC PERMEABILITY

The American Rolling Mills Company, Middletown, Ohio, is now producing an iron which is intended largely to meet two wants: First, for a metal in which electrolytic corrosion is reduced to a minimum through the elimination of substances which are of opposite polarities; second, for a metal of high magnetic permeability which would not become permanently magnetized. The following are two sample analyses of this metal:

	Per Cent	Per Cent
Sulphur	.025	.023
Phosphorus	.004	.004
Carbon	.010	.010
Manganese	.010	.020
Total impurities	.049	.057
Purity of metal	99.951	99.943

It will be observed from the foregoing that the manganese content, which is held to be the principal corrosion factor, is remarkably low; also that silicon is entirely eliminated by the time the ingot stage is reached. The metal is soft, ductile and easily worked and welded. In working, the metal acts something like steel. The general physical properties of a test specimen 8 in. long were found to be as follows:

Limit of elasticity	41,260 lb. to 46,700 lb.
Ultimate strength	49,770 lb. to 53,950 lb.
Elongation	33 per cent
Reduction of area	57.3 per cent to 68.3 per cent

It is not asserted that this ingot iron is absolutely non-corrodible but that it corrodes very much less than any other metal of which iron is the base. The electrical conductivity of a bar of this iron has been found to be 12.85 per cent of commercial copper wire, whereas the unannealed Norway iron compared with it had a conductivity of 11.8 per cent.

CHANGE IN THE GOLDSCHMIDT THERMIT COMPANY

Announcement is made of an important change in the management of the Goldschmidt Thermit Company, New York, N. Y. Commencing Oct. 1 E. Stutz, vice-president and general manager, retires from the direction of the company, which passes under the management of William C. Cuntz.

Mr. Cuntz brings to his position a thorough knowledge of the steel business and a wide acquaintance with the railway and street railway officials of the country, having been connected for 18 years with the Pennsylvania Steel Company.

HIGH PRESSURE STANDPIPE SYSTEM FOR CAR YARD PROTECTION

The Cleveland Railway Company has recently installed at its Woodhill Road yards a fire protection equipment designed by Henry N. Staats, manager of the American Railway Insurance Company. As shown in the accompanying drawings, the system consists of a series of standpipes, six in this case, arranged in a line down the center of the yard. On one side of the line are six storage tracks, either in use or proposed, and on the other eight. It is proposed to protect cars at any point in the yard from serious fires and to extinguish any blaze that may originate before it gets start enough to menace other property.

Above the ground these standpipes consist of standard trolley poles with a small metal platform near the top, which is reached by a metal ladder. Starting with a 7-in. tube, the diameter of the pipe is gradually decreased to 4 in. at the top. The joints are shrunk to insure strength and at the top one a 5 in. x 4 in. reducer is installed. A Hart monitor nozzle with 1⅛-in. tip is turned onto the top by means of threads.

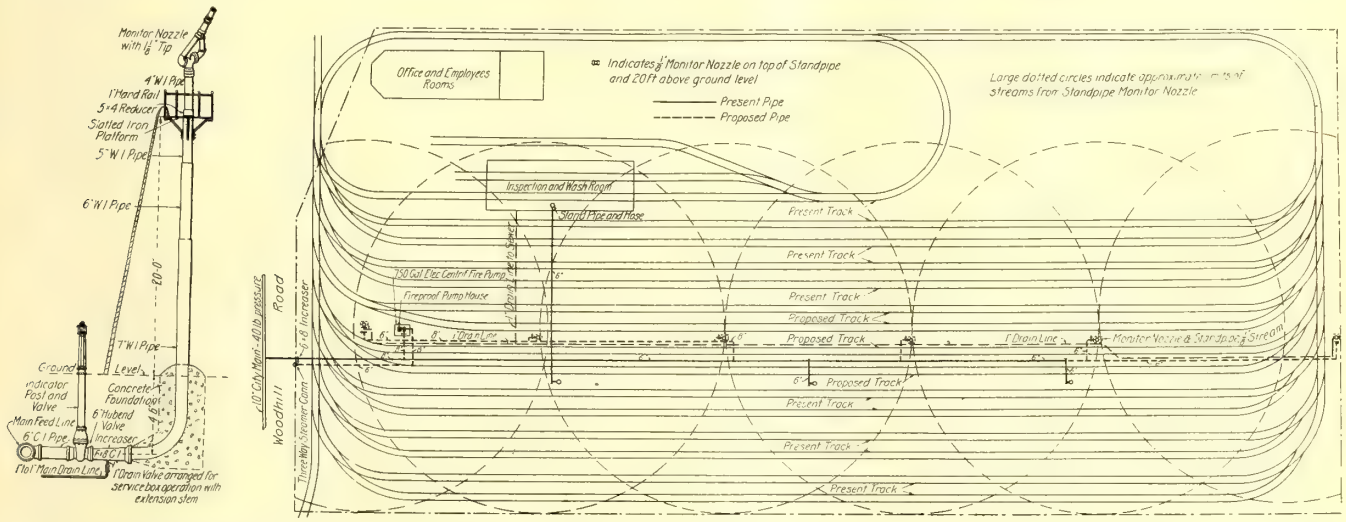
The pole is curved at the bottom to obviate the necessity of making an elbow connection in the concrete setting, which extends to a depth of 4 ft. 6 in. into the ground. Here it connects with a 6-in. Hubbard valve by means of a 6-in. x 8-in. increaser. This size is used because the 7-in. pipe will not fit into the bell of the 6-in. valve and allow the use of lead or any other material. An indicator post rises from this valve to a distance of about 4 ft. above the ground and the other side of the valve is connected with an 8-in. city water main by means of a reducer.

The heavy solid line in the illustration of the layout indicates a 6-in. water main that was laid in the yard some years ago to take care of several hose plugs which are also shown. This would not carry a sufficient volume of water for the standpipes, so a new 8-in. main was laid to care for the first three and was tied into the old one, which for the present will supply the others. A part of the old line at the street end of the yard has been converted into a steamer connection. The hydrants and the remainder of the old main will be removed. A 1-in. hose connection will be made near the base of each standpipe, so that the work of the nozzles may be accelerated by additional streams within the car when necessary. There will also be a test valve at this point to ascertain whether the pipes are thoroughly drained after use by the drain pipe, which connects near the valve under ground.

The pipes stand 20 ft. above the ground level to the operator's platform, and in this case are spaced 115 ft. apart. In the future this distance will be reduced to 100 ft., as it is believed the efficiency will be materially increased by the change. The plans contemplate the use of two streams of 500 gal. water per minute on any car in the yard. While a regular city fire engine was used to furnish pressure at the test referred to in last week's issue, a 750-gal. centrifugal electrically operated pump has been ordered for this yard. The city water pressure at this point is only from 40 lb. to 50 lb. An automatic starting rheostat will be placed on the switchboard with wire connections to the top of each pipe, so that the operator may turn on the water when he reaches the indicator and start the pump as soon as he is on the platform at the top. He will thus lose no time in getting to work.

No fire pump is needed where a constant pressure of 80 lb. can be had on the city water mains, provided the mains are ample to deliver the required amount of water. However, in some cases both steam and electrically operated pumps may be used, to be sure of power at all times.

In the test that was made Saturday, Sept. 24, three of the standpipes were in operation a portion of the time, but later on the pressure was turned upon two and then upon one. None of them wavered in the least when the big volume of water was forced into them, the peculiar division of the stream at the base of the nozzle equalizing the pressure almost perfectly. Nor did the joints in the pipes show any sign of leakage or weakness of any kind. Once when only one nozzle was in operation the pressure at the engine showed 150 lb. and for quite a time it was maintained at 130 lb. The nozzles were in such good order that they could be turned horizontally with one hand or moved perpendicularly with perfect ease. The streams covered the tracks in good shape, although there was a strong wind from one side for a portion of the time. The stream was somewhat shortened by this, but the force was sufficient to make protection certain with the system. It is believed that when the new pump is installed there will be no trouble whatever to secure all the pressure that is necessary.



Plan of Woodhill Road Yard of the Cleveland Railway, Showing Fire Protection Areas and Detail of a Standpipe

As in other forms of fire protection, the main object of this method is to form a water wall about any car that may take fire, so that the fire may not be communicated to other cars. At the same time it is expected that the fire will be extinguished easily, notwithstanding the distance that the water may be thrown. Two nozzles will play on a fire at any point and furnish a volume of water sufficient to take care of any blaze that may originate in the yards.

The Twin City Rapid Transit Company of Minneapolis has arranged to equip its main yard with this system.

A booklet recently published by the Carnegie Steel Company contains an assembly of some steel specifications of that company, the Association of American Steel Manufacturers and the American Society for Testing Materials. Electric railways will be particularly interested in the Carnegie specifications for steel wheels and axles.

TREATED CANVAS CAR ROOFING

Although cotton canvas has been the standard material for passenger-car roofing for a long time, it possesses one prominent defect, namely, that the paint on the cotton roofing will crackle and sometimes blister under the effect of heat, or even from the movement of the car after the canvas has hardened. The effect of this crackling is to permit moisture to get underneath the paint to the cotton fiber. The interposition of the paint prevents the canvas from drying quickly and thus an opportunity is presented for damage by mildew germs. The actions of these organisms causes the canvas to rot so that a new carhead lining is necessary long before the actual life of the canvas, due to wear, has been reached.

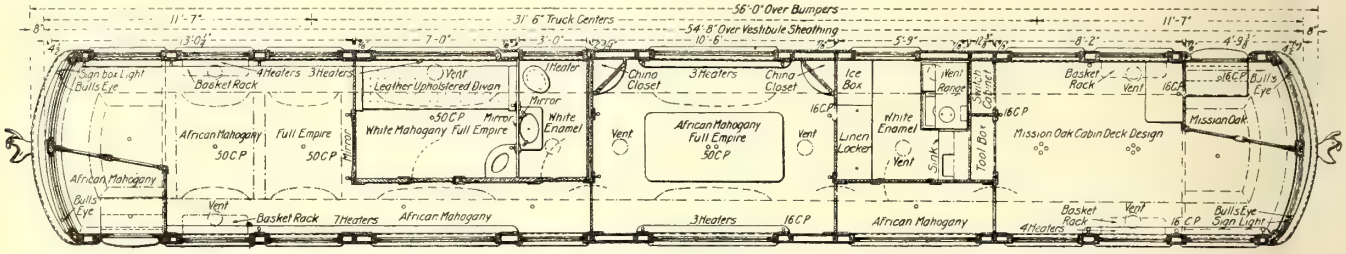
To overcome this objection to the usual type of cotton canvas roofing the William L. Barrell Company, New York, placed on the market a few years ago a specially woven and treated canvas named "Con-ser-vit." The treatment applied to this material makes each fiber proof against the deleterious action both of mildew and water. This treatment does not include the use of linseed or other oils, or paraffine wax or similar preparations, which the manufacturers of "Con-ser-vit" claim is deleterious. It is also asserted that this roofing remains pliable for years, as shown by its successful use under a wide range of climatic and atmospheric conditions in the United States. It has also been used extensively as car roofing and as an insulating material in the construction of steel cars for electric railway service. Of course, a special material of this kind costs more than untreated canvas, but the difference in price is more apparent than real when life is considered. The user is perfectly safe in applying one less coat of roofing paint, whereby even the first cost of the treated canvas would come within the price of ordinary roofing, irrespective of economies in maintenance. This material is supplied in all widths up to 9 ft. and three weights and grades. It has been found applicable also for covering small buildings, tool boxes, etc., on the right-of-way.

As a means of encouraging farmers to use the service of the Iowa & Illinois Railway between Clinton and Davenport, Ia., the company has erected at country highway crossings a number of well-built wooden sheds into which the farmers can put their horses while they take a trip to one of the terminal cities. No charge is made for the use of these sheds. Each farmer has a padlock to prevent the loss of his team or robes.

THE BEEBE PRIVATE CAR

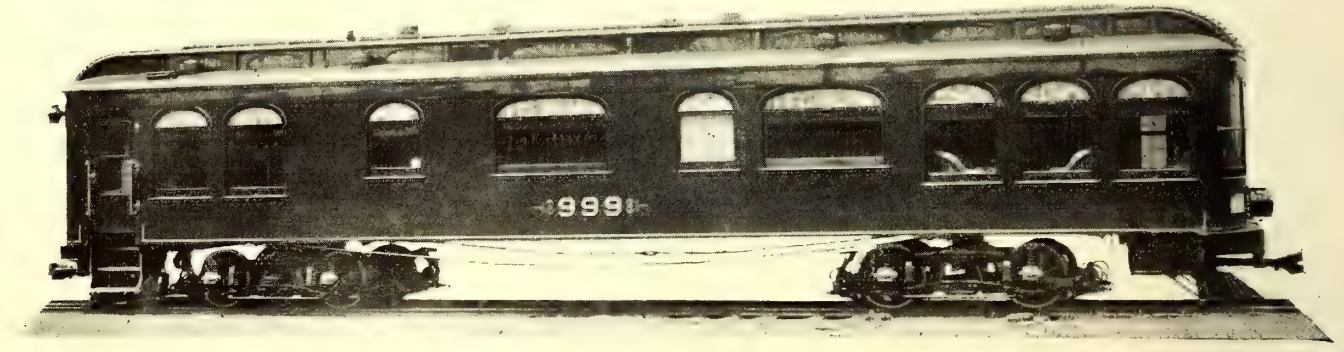
The G. C. Kuhlman Car Company, Cleveland, Ohio, has recently completed for the directors of the Beebe syndicate lines of Central New York the handsome private car shown in the accompanying illustration. The builders were given a free hand to build the finest possible car and the completed work shows how successful they were in producing an unusually handsome piece of rolling stock.

As shown on the accompanying plan, the car, which has a maximum width of 8 ft. 4 in. over the sheathed sills and a length of 54 ft. 8 in. over the vestibules, is divided into eight compartments, as follows: Motorman's cabs at opposite diagonal corners of the car; a smoking or lounging room; a buffet



Beebe Private Car—Plan Showing Division of Compartments, Furnishings, Lighting Scheme, etc.

kitchen with pipe connections for hot water to a washstand in the toilet and retiring room; a dining room, including two china closets; a combination toilet and lavatory; a retiring room, and a sitting room. The smoking room is finished in mission oak with cabin ceiling; the dining room in African mahogany with inlay lines and beamed ceiling; the parlor in African mahogany also, but with full Empire ceiling. The retiring room is finished in white mahogany and the lavatory and kitchen in imitation white enamel tiling. The floor of the toilet room is covered with ⅛-in. marble and that of the kitchen and motorman's cabs with interlocking rubber. The cabs are also supplied with rubber mats. The finished floor in the rest of the car is of polished oak.



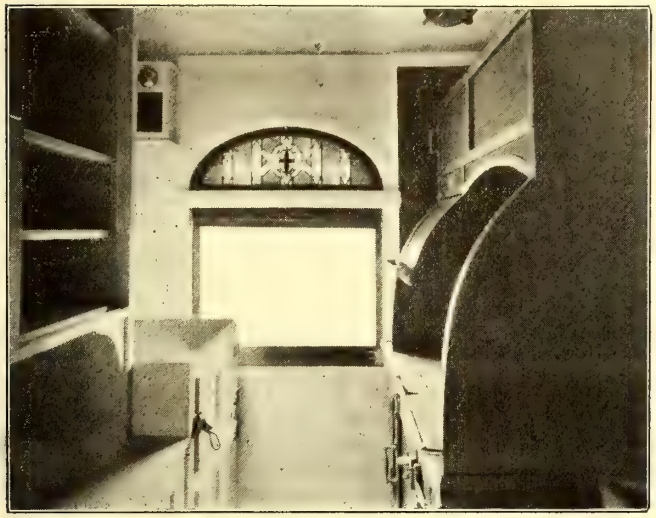
Beebe Private Car—Side View, Showing the Arrangement of the Sash and One of the End Observation Windows

It will be observed from the side view of the coach that this car is built with very large windows and there are also observation windows at the ends. All of the trimmings both inside and outside the car are in brush brass, including the rods across the windows. A bronze foot rail is also placed across the front observation windows at a suitable height from the floor.

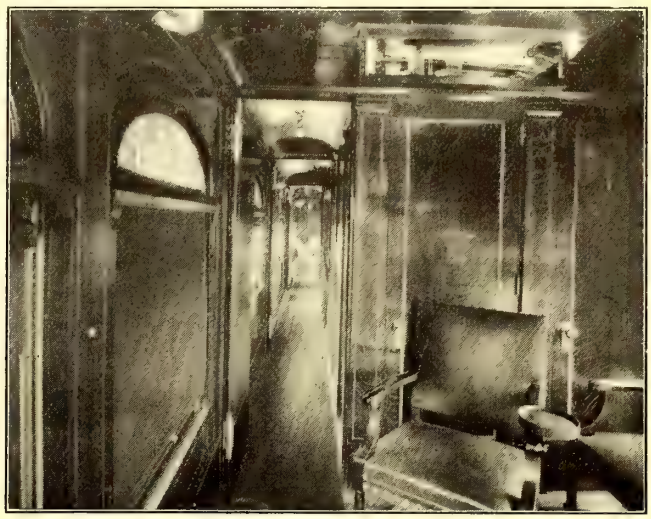
The kitchen equipment consists of a buffet and combination range, oven and broiler and hot-water heater. It has also an ice box large enough to take about 75 lb. of ice and still allow room for food requiring refrigeration. A copper-covered sink and shelf, which is operated by a chain rack, is connected by piping with the hot- and cold-water tanks. Beneath this sink and shelf is a copper-covered serving board under which food supplies, camp stools and other articles may be stored. This section is also provided with storage closets for cooking utensils, linen, etc. The furniture installed in the car includes a leather-upholstered divan in the retiring room; a table and leather-upholstered chairs in the smoking room; wicker chairs with

plush seats in the sitting room, and a table and leather-upholstered chairs in the dining room. The car is also supplied with a desk and four portable side tables, two of which are finished in misson oak and two in mahogany to match the finish of the smoking room and the sitting room respectively. Mirrors are placed in the toilet and retiring rooms.

All outside sash is glazed with 3/16-in. polished plate and all inside sash with 5/32-in. polished plate glass. An art glass is used over the side windows and in the monitor deck. The glass in the toilet room and the corresponding sash on the opposite side of the car are of Florentine design, molded. The curtains throughout the car are of silk Pantasote mounted on



Beebe Private Car—A Portion of the Kitchen and Pantry



Beebe Private Car—View of the Corridor

Haviland rollers with Curtain Supply Company's No. 88 ring fixtures. Curtains of the same material are also provided in both the cabs. Ample ventilation has been secured by the use of single 8-in. globe ventilators in each compartment. The opening below the ventilators in the interior of the car is covered with grill work and a wire mesh screen.

The car is exceptionally well lighted. As shown on the plan,



Beebe Private Car—Sitting Room with Temporary Table



Beebe Private Car—The Smoking Compartment

the lighting scheme embraces the use of groups of four 16-cp lamps in the smoking room, 50-cp single lamps in the sitting room and single 16-cp lamps at frequent intervals throughout the rest of the car. The layout of the electric heaters is also shown on the plan. All lighting circuits lead to an asbestos-lumber lined switch cabinet built against the rear partition inside the motorman's cab.

The general dimensions of this car are as follows: Length over the vestibule sheathing, 54 ft. 8 in.; length over the bumpers, 56 ft.; maximum width over all, 8 ft. 6¼ in.; width inside of the walls of the car below the windows, 7 ft. 5¾ in.; top of rail to top of bumper, 3 ft. 5½ in.; top of rails to top of the roof boards at the center, 12 ft. 10¾ in. The bottom framing is made up as follows: Each side sill is built up of one 3½-in. x 7-in. angle, one ⅜-in. sill plate and one 7-in. channel with wood filler; the center and intermediate stringers are 6-in. I-beams with similar wood fillers. All cross sills and bracings for the entire framing are of steel and white oak. The rough floor has two thicknesses, one being on top of the sills and stringers and the other 2 in. above. The space between these floors is filled with mineral wool.

The body framing of the car consists of white ash corner posts, 1¾-in. x 4⅜-in. ash double posts between each pair of windows, 1¾-in. intermediate posts in the center of the double windows, white ash side window sills and Southern poplar sheathing under the window sills and the sides of the car. The roof framing consists of 17 steel carlins with an upper roof of ½-in. Southern poplar covered with No. 8 cotton duck. A copper gutter is placed on the roof over each vestibule side door, and a 1-in. half-oval iron molding is placed on the edge of the rear hood to protect the hood from the trolley rope.

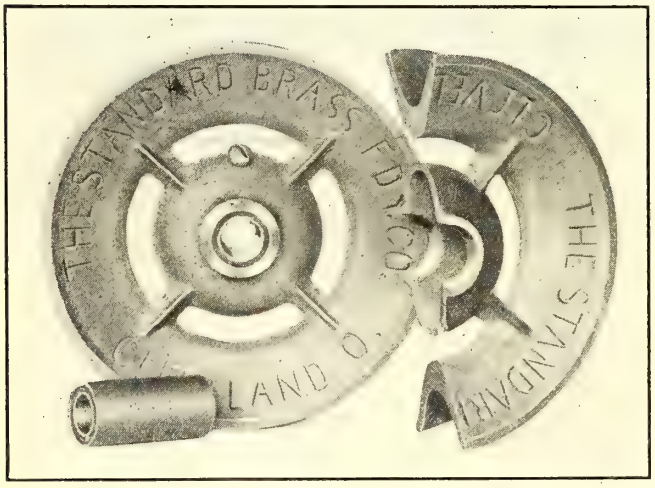
The motorman's compartments are furnished with Edwards trap doors, covering the steps, and with folding theater stools. The door closing and opening into each motorman's compartment has drop sash.

Among the car fittings are Crouse-Hinds arc headlights, McConway-Torley couplers, emergency tool box, Westinghouse air

brakes, De France pneumatic sand box, 12-in. Dedenda gongs in the motorman's compartment, a push-button system wired to an annunciator in the kitchen, Miller fire extinguisher. Van Dorn No. 18 couplers capable of operating on a 43-ft. radius curve are used when this car is coupled to another. The four-motor equipments are of Westinghouse manufacture. The car is arranged for both overhead and third-rail current collection.

TWO NEW TROLLEY WHEELS

The Standard Brass Foundry Company, Cleveland, Ohio, which operates one of the largest brass foundries in the United States, has recently added the manufacture of trolley wheels to its other work. The two designs which the company has placed on the market are the result of many preliminary service experiments with various compositions and shapes of wheels. One of the two designs is for Holland harps exclusively, while the other is generally applicable. The wheels are made in diameters of 4 in., 5 in. and 6 in. with U- or V-shaped grooves. It is stated that only new lake copper and new tin are used in



Complete Trolley Wheel; Half Wheel Showing Oil Chamber and the Bushing

all of the wheels, the alloy being proportioned to secure maximum toughness and softness. One of these wheels is shown in the accompanying illustration. The flanges of all of the wheels are heavy and can be rebent to shape in the shop. The large oil well is replenished by the removal of one screw. The bushings are of graphite. The tread of the 6-in. diameter wheels is fully ½ in. thick. One of the features noted on handling these wheels is their perfect balance.

STATISTICS ON USE OF ELECTRIC WELDED JOINTS IN CHICAGO

The Board of Supervising Engineers of Chicago Traction, in its second annual report, presents the following table showing the results obtained from the electric welding of rail joints which is being done for the Chicago Railways and the Chicago City Railway companies by the Lorain Steel Company:

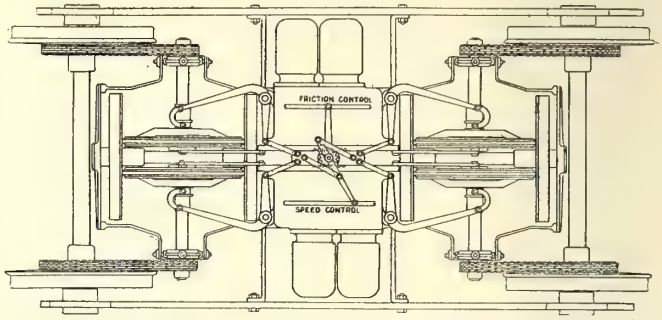
RECORD OF ELECTRIC WELDING OF RAIL JOINTS.

Year. Railway.	First fiscal			Second fiscal			Total		
	Welds.	Breaks.	Per cent.	Welds.	Breaks.	Per cent.	Welds.	Breaks.	Per cent.
1907—C. C. Ry...	4,711	189	4.0	....	194	4.1	4,711	383	8.1
1907—C. Rys.....	4,377	241	5.5	....	46	1.0	4,377	287	6.5
1908—C. C. Ry...	....	...	..	9,272	206	2.2	9,272	206	2.2
1908—C. Rys.....	....	...	..	8,613	147	1.7	8,613	147	1.7
Total, C. C. Ry ..	4,711	189	4.0	9,272	400	..	13,983	589	4.2
Total, C. Rys.....	4,377	241	5.5	8,613	193	..	12,990	434	3.3
Grand total.....	9,088	430	4.7	17,871	593.	..	26,973	1,023	3.8

GASOLINE RAILROAD CARS

The Railway Motor Car Corporation, Philadelphia, Pa., is specializing in the construction of gasoline railway cars which are intended for application on roads in sparsely built-up communities on small branch lines, in city owl service and for other conditions where the seat load-factor is too low for profitable electric operation. The principal feature of these cars is the use of the Lambert noiseless friction drive. This mode of power transmission, which will be referred to in detail later, is said to give the necessary flexibility in speed control so essential in a railway vehicle.

Among the cars built by the Railway Motor Car Corporation

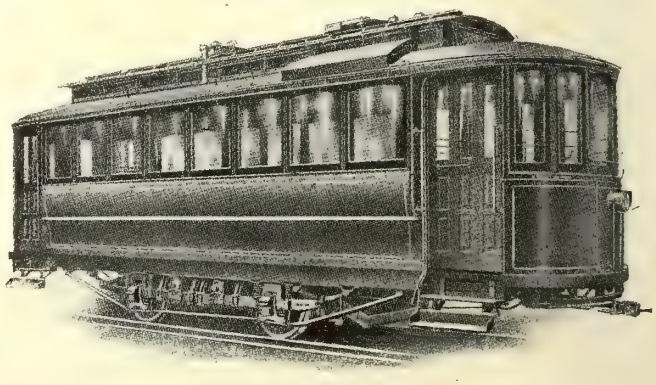


Power Transmission Connections on Truck of Gasoline Car

is one now in use on the estate of the late E. H. Harriman. Two others of the company's type "B" have been made, respectively, for the Baltimore (Md.) & Washington Transit Company and the Schuylkill & Dauphin Traction Company Williamstown, Pa. At present the company is building two distinct designs: type "B," as noted, for 30 passengers, and a higher speed suburban-interurban type "C" for 35 passengers and a baggage compartment. The principal differences in dimensions and equipment are as follows:

	Type B	Type C
Truck wheelbase	7 ft. 6 in to 8 ft.	10 ft.
Length over all.....	32 ft.	33 ft.
Length of body, inside...	21 ft.	23 ft.
Width over all.....	8 ft. 1 in.	8 ft. 6 in.
Height from rail.....	11 ft. 10 in.	
Vestibuled platform	4 ft. 4 in.	4 ft. 6 in.
Motor	6 in. x 6½ in.	7½ in. x 9 in.
Horse-power	60	100
Motor speed, r.p.m.....	500	500
Maximum m.p.h.	25	35
Weight of car, complete..	21,500 lb.	28,000 lb.
Gasoline per mile.....	⅛ gal.	¼ gal.

Important points to be noted in connection with both types of cars are that they make use of standard car bodies and standard



Single-Truck Gasoline Car for 30 Passengers

trucks. Thus the type "B" car illustrated has a Brill body mounted on a Brill No. 21-E single truck and the same construction holds true of a type "C" car now under way, except that the wheelbase is 10 ft. instead of 8 ft. This adaptability is ascribed to the use of a drive which does not rack the car framing through jerky starts and severe vibrations and to the employment of engines which can be set on standard truck framing. Joint pounding is minimized as no weight is placed on the axles. All equipment is carried under the unbroken floor of the car, but nevertheless is readily accessible for inspection and repair. Externally the cars do not differ in appearance from the

usual electric car except that the roof carries a radiator instead of a trolley base and pole equipment. It will be observed that the weight of the non-baggage car seating 30 passengers is 23,000 lb., which gives the very reasonable weight of only 767 lb. per passenger.

In past installations the company has used engines of the Rutenber and Davis types, but it is now building a 100-hp, 7½-in. x 9-in., four-cylinder, four-cycle horizontal engine of its own design. The operations of the engine are controlled from two wheels set on the platform one over the other. One wheel carries out the forward and reverse movements and in doing so throws the friction wheels in and out of engagement with the four driving disks; the other wheel regulates the change in speed ratios, that is, it shifts the driven friction wheels in and out from the centers of the driving disks. Both controlling wheels are shaft-connected and are so pivoted as to avoid any movement of the corresponding wheels on the other platform. It will be understood from this that the car may be operated from either end. The four 30-in. diameter driving disks are of aluminum, which was chosen because of its high frictional coefficient. The driven friction wheels have insets of a fiber composed of compressed paper and straw. It is stated that this friction disk and wheel transmission has been found more efficient than gearing.

AUTOMATIC SIGNALS ON THE OHIO VALLEY SCENIC ROUTE

Among improvements in electric railway equipment in the last few years none has been so marked perhaps as in automatic signals. These have advanced from the crude and dangerous hand-light signals, which have been the undisputed cause of accidents, to high-speed automatic signals dependent only on the passage of the car and requiring nothing further on the part of the motorman than observation. Among signals of the latter type are those made by the Nachod Signal Company, Philadelphia, Pa.

In the Nachod automatic signal type "C" the signal box



Fig. 1—Car Approaching a Siding

containing the indications is located in advance of the trolley contactor so that the motorman sees by the change of this signal that he has set stop signals at the far end of the block. The control of the signals is through overhead trolley contactors and all changes in indications are caused at the instant when the car runs under them. The signals are successfully and continuously worked at car speeds of 40 m.p.h. and over in passing the contactors. If the power should leave the line while the car is in the block the signals would not have been changed when it returns, but would reappear exactly as before the interruption.

A set of these signals to protect one block of signal track consists of two signal boxes mounted on poles and four trolley contactors in the wire in the branches leading to the single track. There is required but one line wire connecting the boxes. The trolley contactors consist of contact strips mounted near the wire, but insulated therefrom and extremely flexible so that they make a certain and continuous contact throughout their length without jarring or throwing the wheel. They are

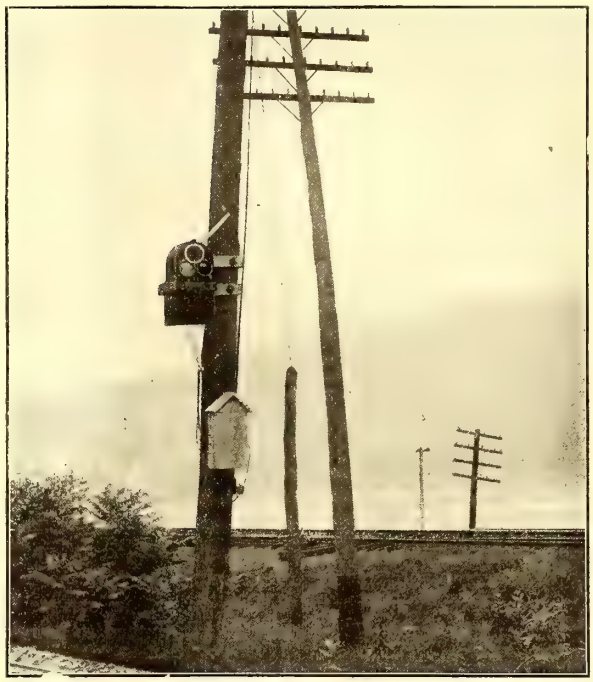


Fig. 2—Signal Box, Indicating Neutral or Empty Block

4 ft. long, weigh only about 18 lb., and accommodate the various sizes of wheels equally well.

The signal aspect is in duplicate, as there are separate night and day indications, white for "proceed" and red for "stop." The night indications are lights; the day indications are enameled aluminum disks counterweighted to fall to the indicating position. They are protected from the weather and are visible through a clear glass roundel. The moving parts of the signal forming the relay are immersed in an oil tank below the aspect. Thus both the magnets and switches receive the benefit of oil immersion. On the Chicago & Milwaukee Electric Railroad these signals are used in a service where three-car trains with three trolleys up pass through the block at 40 m.p.h.

The accompanying illustrations show signals on the line of the Steubenville & East Liverpool Railway & Light Company (Ohio Valley Scenic Route), of which W. R. W. Griffin is general manager. In Fig. 1 the car is approaching the observer to leave the block, the signal being set red. As soon as it passes the contactor at this end of the block the signals will be restored to normal or neutral. Fig. 2 shows a signal box indicating neutral or a void, which means that the block is unoccupied and may be taken from either end. A car entering from the end shown will set white signal here and red at the far end. The signals are arranged for permissive operation; that is, cars may follow into the block, but until they have all left they will not be restored to the neutral indication. The system has the desirable flexibility which enables cars having entered to leave the block by either end.

The leads from the line before entering the signal box pass through the wooden box below shown in the figure. This box is provided with enclosed fuses which act also as disconnecting switches when the signal box is to be handled. A lightning arrester is attached below this box.

Plans are being considered for the electrification of a portion of the North Western Railway near St. Petersburg, Russia.

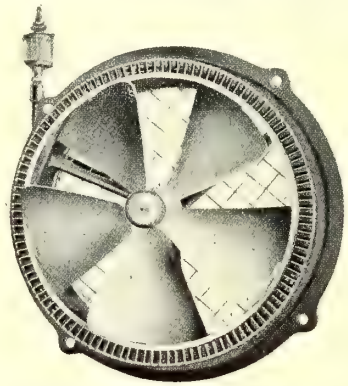
A DURABLE GEAR LUBRICANT

The Joseph Dixon Crucible Company, Newark, N. J., is widely known for its graphite lubricants, but it is not generally borne in mind that these lubricants also have a place in the electric railway field. One of its products, known as graphite wood grease, is especially made for railway motor gearing. This is a graphite grease with which is incorporated a certain percentage of finely ground cedar fiber. The wood fiber absorbs the oily constituent of the lubricant and provides a cushion for the gears, thereby reducing gear noises to a negligible minimum. It is asserted that this lubricant also does not clog the gear or cake to the slightest degree. It is also stated that this lubricant is far more durable than a plain grease which contains neither flake graphite nor wood fiber.

Other standard Dixon products used in connection with electric railway operations are the following: "Ticonderoga" flake lubricating graphite to increase the efficiency of any oil or grease; graphite air brake and triple valve grease, a general lubricant for the entire air brake system; graphite curve grease to reduce the wear of curved tracks, switches and the flanges of car wheels. This company will display its graphite products at the Atlantic City convention.

A STEAM TURBINE BLOWER FOR MECHANICAL DRAFT

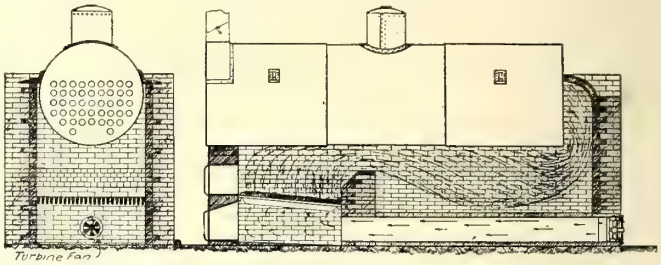
The following paragraphs present some particulars of the "Typhoon" turbine blower made by the L. J., Wing Manufacturing Company, New York, to supply boilers with mechanical draft. These blowers have been widely installed in various classes of power plants, among these being the stations of an Eastern electric railway where 14 blowers are in service and 30 more are under order. The blower is guaranteed to consume not more than 2½ per cent of the boiler horsepower developed in high-pressure boilers.



Blade and Turbine Without Casing

The best results are obtained by having the blowers controlled automatically so that they will stop and start with the rise and fall of the steam pressure. This is accomplished by placing a balance valve in the steam line of the blower and connecting its arm to the arm of a damper regulator. To obtain a balanced draft condition above the grates the blowers should be run at a speed sufficient to deliver enough air for the required capacity of the boiler. The damper is then set so as to cause the flames to rise vertically.

This turbine blower is a combination of a special blower and a steam turbine. The blower is of the propeller type, its blades being helicoids of revolution. The turbine consists of a series of drop forged buckets (or vanes) cast into a metal ring, mounted on the periphery of the blower. Steam is directed on the buckets by expanding nozzles mounted on the steam chest. The principal parts are shown in the cut in this column. The spider is made of gray cast iron. The steam chest which is the principal part of the spider is cored out in the casting process. There are three shoulders in the steam chest in which the nozzles are mounted. The shaft which is made of Shelby steel tubing, is driven in the hub of the spider and held fast by a round point set screw. The bearing consists of a phosphor bronze bushing which is screwed into the hub of the blower. The latter is cast of aluminum alloy, bronze or other metal as may be required by the service. At the extremity of each blade of the blower are lugs to which the bucket ring is firmly mounted. The buckets are made of drop forged steel. The nozzles are made of hard bronze and are of the expanding type so designed that usage does not alter the steam consumption. After the rotating member is slipped on the shaft a steel plug tipped with a tempered thrust disk is screwed into the end of the shaft. The plug prevents the rotating member from coming off the shaft. Screwed on to the hub of the blower is a metal cap on the inside surface of which is sunk a tempered steel disk bearing on the thrust disk of the plug. The rotating member is lifted clear of the steam chest and nozzles by screwing on the cap. The cap is locked in position by a set screw. Lubrication is accomplished by means of an oil cup feeding the hollow shaft through a bent pipe. The casing on which the spider is mounted consists simply of a flanged cast-iron cylinder, containing a cast-iron muffler ring, and it entirely encloses the turbine. The muffler ring has openings which allow the exhaust steam to mix thoroughly with the air.



End and Longitudinal Elevations of Boiler, Showing the Application of a Turbine Fan

ASBESTOS INSULATED RECTANGULAR WIRES

For several years the D. & W. Fuse Company, of Providence, R. I., has been manufacturing an asbestos insulated wire known under the trade name of "Deltabeston." Its insulating and heat-resisting properties have brought it into extensive use for railway and hoisting motors, field, armature and controller coils, arc-lamp magnets, heating units and for many other devices subjected to severe overloads or high temperatures. This wire requires a temperature of 1000 deg. Fahr. to start the disintegration of its asbestos covering, and a temperature of 1800 deg. to decompose the asbestos completely. Thus a coil can be run at a dull red heat without causing a breakdown in its insulation.

These qualities have created a demand for "Deltabeston" wire of rectangular section as well as round. At first it seemed easy to treat a square or a flat wire like the round wire, but it was only after much experimenting that the present method was perfected. During the past year the company has sold a large amount of rectangular "Deltabeston," made with strong, uniform insulation of practically the same thickness on the corners as on the flat surfaces.

The advantages of square or flat wires for certain purposes are numerous. For instance, about 10 per cent greater copper section can be put into a given winding space by the use of rectangular wires than by employing round conductors. This is due to the perfect bedding secured by using wires with flat sides between which practically no space is wasted. The reduction of lost space in a winding is advantageous in two other ways: First, less compound is needed to fill a coil if it is to be impregnated; second, the heat radiation is greatly improved by avoiding spaces filled with a comparatively poor heat conductor.

An advantage of almost equal importance is that certain features of winding operations are facilitated by the use of flat-sided wires, especially when large conductors must be handled. Thus there is a great tendency for round wires to cut into any flat insulation between layers, due both to the tension in winding and to chafing in service. With flat wires the pressure of the conductors on the between-layer insulation is distributed over large surfaces instead of being applied in lines at the center of every wire. Greater stress, therefore, can be applied in winding a flat wire with less chance of injuring the insulation underneath it.

News of Electric Railways

Columbus Strike

Assaults upon cars at Columbus occur periodically, notwithstanding the fact that a number of men are on trial for attacking cars and that some of them have already been convicted. On the evening of Sept. 29, 1910, two cars were damaged by explosives and another was stoned. George Taylor was arrested on the charge of placing the explosives on the track in this case. Alvin C. Donovan, a grocer on St. Clair Avenue, Columbus, was arrested and held for a day or two, but was finally released on a bond of $5,000. The police refused to divulge the charge that will be made again Donovan.

Nelin Kintz, 21 years of age, who confessed to throwing stones at cars, was sentenced to an indefinite term in the Mansfield reformatory. This was the first conviction in the riot cases. Dominic Reto, an Italian, also pleaded guilty to the same charge, but sentence had not been pronounced up to Saturday, Oct. 1, 1910.

The first trial before a jury, that of Peter Palladino, another Italian, lasted two days and was bitterly contested. Police officers and others testified that Palladino and Reto hurled something at a car on Leonard Avenue during a riot. Palladino was found guilty by the jury, and will probably be sentenced to a term in the penitentiary. Walter Guyn, 32 years of age, who pleaded guilty to throwing stones at cars, has been sentenced to serve one year in the penitentiary.

Seven more suits for damages, aggregating $6,000, have been filed against Franklin County, in which Columbus is situated, by employees of the Columbus Railway & Light Company as the result of injuries sustained during the strike. This makes the total of suits of this kind about $26,000.

John F. Brady, leader of the strike breakers, was placed under indictment on Sept. 27, 1910, on two charges, one of which was shooting to kill and the other shooting to wound. Brady is accused of firing the shots that wounded two women during a disturbance on the street. He was released on a bond of $4,000.

On Oct. 1, 1910, the grand jury returned an indictment against James N. Orr, one of the organizers of the Columbus union of conductors and motormen who are on strike, on the charge of having placed dynamite on the street railway tracks in Bexley, a suburb, about three weeks ago. As a result of the explosion one man was injured and several others had narrow escapes. His bond was fixed at $5,000, and Charles Miller, business agent of the union, is one of the men who signed the bond. Indictments were also returned against A. C. Donovan, the grocer previously mentioned, on the charge of throwing dynamite at a car.

Within the past 10 days 60 indictments have been returned by the grand jury, the majority of which are against men accused of taking part in the riots. Several indictments are for perjury growing out of evidence given at the trials which have been in progress for several days.

Hearing on Rapid Transit Proposal in New York

A hearing was held before the Public Service Commission on Oct. 1, 1910, on the plans agreed upon by the commission and the Interborough Rapid Transit Company for the third-tracking of the Second, Third and Ninth Avenue elevated lines, extensions of certain lines in the Bronx, the connection of the Queensboro Bridge with the Second Avenue line, and the opening of the Steinway Tunnel. In the offer now pending the company is willing to take a franchise on its elevated extensions running 25 years, with three extensions of 20 years each. For this it will pay 2 per cent of the gross increase in receipts at the express stations, and will submit to a readjustment of the payment at the end of each franchise period. Therefore, should the franchise for third tracks and extensions prove exceptionally profitable, the city would have a chance at the end of 25 years and at the end of each 20 years thereafter to work out a new basis of compensation. In addition to the third-tracking of the Second, Third and Ninth Avenue elevated lines to complete third-track express routes on all from the Harlem River to the Battery, the Interborough Rapid Transit Company proposes the following extensions:

1. A two-track elevated route from the 143d Street station of the Third Avenue elevated through private property on Willis Avenue and Bergen Avenue to a connection with the Westchester Avenue line of the Interborough Rapid Transit Company.

2. A three-track elevated route from Third and Pelham Avenues through Pelham Avenue to Webster Avenue, to Gun Hill Road, to White Plains Road.

3. A two-track elevated route from Eighth Avenue and 149th Street through Macomb's Dam Lane to Central Bridge, over Central Bridge to 162d Street, to River Avenue.

4. An elevated route from Second Avenue on Fifty-ninth Street, between Fifty-ninth and Sixtieth Streets, to Queensboro Bridge.

5. An underground route from about Vanderbilt Place and Forty-second Street, Manhattan, under Forty-second Street and the East River, to a point in Long Island City near Jackson Avenue and following the line of the so-called Steinway Tunnel.

Commissioner Eustis explained that the arrangement of the improvements on the Second and Third Avenue elevated lines would involve the construction of a new four-track bridge across the Harlem River and a connection to allow express trains from the West Farms extension of the subway operated by the Interborough Rapid Transit Company to switch to the Second Avenue elevated down the east side to the City Hall.

E. W. Winter, president of the Brooklyn Rapid Transit Company, and J. F. Calderwood, vice-president of the company, conferred recently with Chairman Willcox of the Public Service Commission regarding the plan of the company to run its elevated trains from the Williamsburg Bridge through the Delancey-Centre Street subway to Chambers Street. The Brooklyn Rapid Transit Company has filed two written propositions for the use of the subway.

The Fourth Ward Transit Committee of the Borough of Queens has filed with the Public Service Commission the consents of the property owners along Jamaica Avenue for the construction of the Jamaica Avenue subway, known as Route No. 13. While only 51 per cent are necessary, consents aggregating 65 per cent of the value of the abutting property have been obtained from the junction of Broadway and Jamaica Avenue, Brooklyn, to Grand Street, Jamaica.

The Board of Estimate has approved the action of the Public Service Commission in granting permission for the construction of the so-called Utica Avenue route in Brooklyn. The proposed route is in Stuyvesant Avenue from Kosciusko Street to Fulton Street, to Utica Avenue, to Flatbush Avenue, about four miles, and is an extension of the Brooklyn-Manhattan-Long Island City route which will operate from the Hudson River under Fourteenth Street and the East River, following the line of the tri-borough route to the commencement of the Utica Avenue extension at Stuyvesant Avenue and Kosciusko Street.

The Public Service Commission has issued a pamphlet describing the proposed tri-borough rapid transit subway and elevated road. It gives a brief history of the system and its composite parts, made clearer by an outline of the points of difference between the route and the Interborough Rapid Transit Company's proposal. There will be four separate tunnels, with arrangements for better ventilation. The station platforms will be straight and built to accommodate 10-car express trains and 6-car locals. Bids are to be opened for construction and operation by private capital of the whole system on Oct. 20, 1910, and on Oct. 27, 1910, for construction by sections with municipal funds.

The Pelham Park & City Island Monorail Company announced that on Oct. 5, 1910, it would open its regular service between the Bartow Station of the New York, New

Haven & Hartford Railroad and the monorail station on City Island, two miles away. The company ran its first car in July, 1910, but on the initial trip the car jumped the track and injured a number of passengers. Since then the road has been virtually reconstructed, it is said.

Under an order to be issued by Justice Whitney, of the Supreme Court, George W. Linch, receiver for the Second Avenue Railroad, will abandon the franchises of that company in sections of street where tracks never have been laid. The order also will authorize the removal of unused tracks from Houston Street to Fourteenth Street in First Avenue; in Allen Street from Houston to Grand Street; in Pearl Street from the New Bowery to Peck Slip and in Peck Slip from South Street to Pearl Street.

The Public Service Commission has adopted a report from Commissioner Bassett approving the project of citizens of the section of Flatbush from Prospect Park to Sheepshead Bay to construct a new rapid transit line on the assessment basis. The new line is proposed as a branch of the Eastern Parkway subway, and would run down Nostrand Avenue about 5.7 miles almost due south to Sheepshead Bay. The northerly end of the route is 5.26 miles from the City Hall, Manhattan, and its terminus in Sheepshead Bay is 10.96 miles from the City Hall. Commissioner Bassett states that in view of the difference in cost between a subway and an elevated structure the property owners who propose to bear the assessment ought to decide which type of road they want. He also believes that construction should not be begun until the Eastern Parkway line running into Flatbush and Atlantic Avenue is under construction.

Southern Pacific Electric Lines in Berkeley

W. R. Scott, superintendent of the Southern Pacific Company, has announced that within six months the time of transportation between Berkeley and San Francisco will be shortened 10 minutes on the Southern Pacific Company's ferry system, and that the 35 minutes now made by the San Francisco, Oakland & San José Railway, the Key Route, will be reduced to 30 minutes. The Southern Pacific Company is expending $3,000,000 in improving its lines tapping Berkeley, Oakland and Alameda. The San Francisco, Oakland & San José Railway is also constructing another line in Sacramento Street. It is announced that the Southern Pacific Company will electrify its Berkeley ferry system by March, 1911, shortly before the three years' time limit granted by the City Council for installing the system is reached. The rails of the Ninth Street line are nearly all laid, and only a short gap in the vicinity of Albany and the north city line remains to be closed to complete the Shattuck Avenue-Ninth Street loop. The Ellsworth Street line, which branches off the main Berkeley trunk line at Adeline Street, continues along Woolsey Street to Deakin Street, thence across a private right of way to Ellsworth Street, and terminates at the southern entrance of the campus of the University of California. This line is graded and the track laid for its entire distance. The switch at Berkeley station for the operation of trains both ways on the Shattuck Avenue-Ninth Street loop line has been installed and the work of ballasting the new lines is progressing. The Shattuck Avenue line will extend north from its present terminus at Berryman station along Henry Street through the new tunnel to what is known as The Circle in Northbrae, where there will be a union depot for the trains of the San Francisco, Oakland & San José Railway and the Southern Pacific Company.

Decision Regarding Low-Fare Tickets in Detroit.—The Supreme Court of Michigan has refused to grant a rehearing from its decision that the Detroit United Railway must sell workingmen's tickets at the rate of 8 for 25 cents within specified hours and within the city limits as extended.

Reducing the Number of Poles in Louisville.—The Louisville (Ky.) Railway is co-operating with the telephone, telegraph and lighting companies in Louisville in removing its poles in the downtown section of the city. Wherever buildings are strong and substantial enough and the company is able to secure the consent of the property owners, it is anchoring its wires to the walls of buildings. The feed wires of the company are now underground and ultimately the company will have only a few poles in the downtown section of the city.

Boston Elevated Railway Files Plans for New Stations.—In accordance with the recommendation of the Massachusetts Railroad Commission, dated May 25, 1910, the Boston (Mass.) Elevated Railway has filed plans with the commission for an elevated station at Green Street and Washington Street, on the Forest Hills extension of the rapid transit system. The plans provide for a station of the side platform type with north and south-bound platforms about 360 ft. long and the usual sidewalk entrances and exits. The Green and Washington Street station will accommodate eight-car trains on each side.

Recommendation for Toronto Municipal Railway System.—The City Engineer and the City Solicitor of Toronto have presented to the Board of Control of Toronto a report recommending that the city construct an electric railway on Gerrard Street, in North Rosedale, on St. Clair Avenue and in other newly annexed districts, comprising 9.7 miles, of which 1¼ miles would be single track. The total cost of the proposed railway is estimated at $570,000, including $250,000 for the overhead and track work and $320,000 for permanent pavements. The question is to be referred to the electors of the municipality on Jan. 1, 1911.

Exhibit of Railway Appliances.—The Railway Appliances Association, Chicago, Ill., is preparing for its annual exhibition of railway appliances used in the construction and maintenance of railways, which is to be held at the Coliseum, Chicago, the week of March 20-25, 1911, inclusive. The twelfth annual convention of the American Railway Engineering & Maintenance of Way Association and the spring meeting of the Railway Signal Association will be held during that week. Application for space to be considered in the first allotment must be filed in the office of the secretary, John R. Reynolds, 303 Dearborn Street, Chicago, Ill., not later than Nov. 1, 1910. Those entering applications later than Nov. 1, 1910, will be allotted space in the order of the filing of their applications with the secretary of the association.

Importunate Claim Adjusters on the Ft. Wayne & Wabash Valley Traction Company.—It is reported that since the accident on the line of the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., on Sept. 24, 1910, the office of that company has been overrun with persons whose object has been to secure authority from the company to adjust the claims arising from the accident. Some of the offers made to the company by these ghouls have been of an infamous character, and one recently made was that these outside claim agents secure the power of attorney from the victims or from their representatives to settle the claims and then play into the hands of the company. J. M. Barrett, who is connected with the claim department of the Ft. Wayne & Wabash Valley Traction Company, recently forcibly expelled from his office certain self-appointed claim adjusters who made a proposition of this kind, and declared that if they had been lawyers he would have had them disbarred. Full details of the interview are given in the *Ft. Wayne News* for Sept. 26, 1910.

Complaint Regarding Time of Delivery of Interchange Shipments.—The Public Service Commission of the Second District of New York has received a complaint from Frederick H. Beach, receiver of the Eastern New York Railroad, which operates an electric railway between Ballston and Middlegrove, Saratoga County, against the Delaware & Hudson Company, which intersects with this road in Ballston, stating that the Delaware & Hudson Company has refused to deliver interchange shipments at satisfactory morning hours to insure their delivery by the complainant railroad to paper mills along its route. It is alleged that up to three months ago cars were transferred at 8 o'clock a. m., but since that time the deliveries have been later. The complaint also states that the Eastern New York Railroad has been unable to arrange for the establishment of through routes and joint rates and charges for transportation of freight from its line to points on the Delaware & Hudson Company's road, and further asks that it be allowed 48 hours' free time for the loading and unloading of cars. The complaint has been served on the Delaware & Hudson Company and answer will be filed within 10 days.

Financial and Corporate

New York Stock and Money Market

October 4, 1910.

There has been more life in the stock market during the last week and prices have improved. While outside orders are still few, much better sentiment is expressed and commission houses expect to receive business as soon as quiet is restored in politics. Interborough-Metropolitan issues continue active at about the prices quoted a week ago.

The money market has been a trifle stiffer, owing to advance in foreign rates and demands from the West. Rates to-day were: Call, 2⅜ to 2⅞ per cent; 90 days, 4¼ to 4½ per cent.

Other Markets

Rapid Transit stock was the feature of the Philadelphia market to-day. The total sales for the day were 20,542 shares, and the closing price was 20⅞. This sudden movement was caused by the concerted action of the local bankers interested in traction matters to have E. T. Stotesbury become a director of the company, in virtual charge of the finances.

In the Chicago market during the week there has been some activity in Series 1 and 2 Chicago Railways certificates, and prices have advanced a few points. Other tractions are dull.

Massachusetts Electric shares have again been active in the Boston market, and the selling prices of both the preferred and the common have advanced about 2 points. Boston Elevated has sold at unchanged prices.

There has been a little buying of United Railways shares in the Baltimore market at slightly lower figures during the week, and there has been the customary steady trade in the bonds of the same company.

Quotations of various traction securities as compared with last week follow:

	Sept. 27.	Oct. 4.
American Railways Company	a43¼	a44
Aurora, Elgin & Chicago Railroad (common)	*46	33
Aurora, Elgin & Chicago Railroad (preferred)	85¼	a89
Boston Elevated Railway	129½	128¾
Boston & Suburban Electric Companies	a14¼	14¼
Boston & Suburban Electric Companies (preferred)	a72	72
Boston & Worcester Electric Companies (common)	a10	10½
Boston & Worcester Electric Companies (preferred)	*35	36
Brooklyn Rapid Transit Company	76¼	77
Brookiyn Rap. Transit Company, 1st ref. conv. 4s	84	83¾
Capital Traction Company, Washington	a130	128¾
Chicago City Railway	*102¾	*102¾
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a63	a65
Chicago Railways, ptcptg., ctf. 2	a16½	a16
Chicago Railways, ptcptg., 3	a8	a8
Chicago Railways, ptcptg., ctf. 4	a5	a5
Cleveland Railway	*91½	91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	145	148½
Georgia Railway & Electric Company (common)	a116	a117
Georgia Railway & Electric Company (preferred)	a86½	87
Interborough-Metropolitan Company (common)	20⅞	20⅞
Interborough-Metropolitan Company (preferred)	55⅞	56½
Interborough-Metropolitan Company (4½s)	81⅞	81½
Kansas City Railway & Light Company (common)	a23	24
Kansas City Railway & Light Company (preferred)	a79	80
Manhattan Railway	138	143
Massachusetts Electric Companies (common)	a18¾	a20
Massachusetts Electric Companies (preferred)	82½	a84
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a62	a62
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	67½	68
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a45	a45⅜
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a18⅛	a20⅞
Philadelphia Traction Company	82	a82
Public Service Corporation 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	59	a58
Third Avenue Railroad, New York	9⅛	9
Toledo Railways & Light Company	8¼	8¼
Twin City Rapid Transit, Minneapolis (common)	111¼	112½
Union Traction Company, Philadelphia	a43½	a46
United Rys. & Electric Company, Baltimore	14¼	14⅝
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	56	57
Washington Ry. & Electric Company (common)	a33	a32½
Washington Ry. & Electric Company (preferred)	a89	a88½
West End Street Railway, Boston (common)	a84	a84½
West End Street Railway, Boston (preferred)	a100¾	*100¾
Westinghouse Elec. & Mfg. Company	62½	70½
Westinghouse Elec. & Mfg. Company (1st pref.)	*125	129

Report of New Haven Subsidiary Properties

Following the practice of other years, the New York, New Haven & Hartford Railroad gives the results of operations of the subsidiary Connecticut Company and the Rhode Island Company in the annual report for the year ended June 30, 1910. The operations of these two companies compare as follows:

Year ended June 30, 1910.	Connecticut Company.	Rhode Island Company.
Earnings:		
Passenger	$6,775,445	$4,136,285
Mail	9,469	3,908
Express	272,592	183,821
Chartered cars	27,430	13,656
Sale of power	46,926	57,538
Park earnings	49,148	.....
Advertising	22,867	16,477
Miscellaneous	†740,436	29,124
Total earnings	$7,944,313	$4,440,809
Operating expenses:		
Maintenance of way and structures	$834,048	$316,391
Maintenance of equipment	518,725	264,124
Operation of power plants	784,590	375,289
Operation of cars	1,735,549	1,044,953
General expenses	588,678	536,929
Miscellaneous expenses	283,435	.....
Total operating expenses	$4,745,025	$2,537,686
Net earnings	$3,199,288	$1,903,123
Income from other sources	.....	62,113
Total income	$3,199,288	$1,965,236
Taxes, rentals, etc	326,202	1,391,671
Net income	*$2,873,086	$573,565

*Net income to Feb. 28, 1910, amounting to $2,254,278, paid over to New York, New Haven & Hartford Railroad.

†The operations of the gas, light and water departments to Feb. 28, 1910, are included in the income statement; from March 1, 1910, they are included in the income statement of the Housatonic Power Company.

Earnings of the Connecticut Company in the preceding year were $7,988,831 and expenses were $4,305,603. Earnings of the Rhode Island Company in the year ended June 30, 1909, were $4,160,785 and expenses were $2,313,954.

In his report regarding the affairs of the New York, New Haven & Hartford Railroad Charles S. Mellen the president, says in part:

"There has been completed 6,000 ft. of 4- and 6-track single phase electrification in the vicinity of Glenbrook, Conn., which construction is to be a typical form to be generally used in the electrification of the Harlem River branch and the line from Stamford to New Haven. We have received one of the two electric freight locomotives, both of which were designed to handle freight trains operating between Harlem River and New Haven, or heavy passenger trains between Grand Central Station and New Haven. The one received has proved more than adequate in the tests of both of these services. It is expected that the second locomotive ordered will be received before this report is printed. Surveys have been completed for the electrification of the main line and yards on the Harlem River branch, and general designs for electrical catenary superstructures have been completed for this electrification. Surveys have also been completed for the electrification of the main line between Stamford and New Haven.

"Plans for the rehabilitation of the Warren power station are practically complete. The rearrangement will eliminate the present direct current machinery; thus converting the station into a straight alternating current plant. Bids are now being obtained for the purchase of the necessary apparatus. Requisitions have been placed for material to cover the multiple unit equipment necessary to better the control of cars now operating between Providence, Fall River and Bristol, which arrangement will produce a more flexible and reliable system of train operation.

"The company has accepted the provisions of chapter 601 of the acts of 1910 of the General Court of the Commonwealth of Massachusetts authorizing the ownership of the capital stock of the Berkshire Street Railway Company, and to date has acquired by purchase 19,365 shares out of a total of 19,481 shares."

The operating revenue of the New York, New Haven & Hartford Railroad for the year was the largest in the history of the company, amounting to $60,693,668, an increase of 11.66 per cent over the preceding year.

The profit and loss account shows a charge of $299,232 for "extraordinary renewals in prior years on street railway properties in Connecticut."

Proposed Sale of Treasury Bonds of the Detroit United Railway

J. C. Hutchins, president of the Detroit (Mich.) United Railway, has addressed the following circular to stockholders of the company, in which reference is made to the improvements made to the property of the company out of the earnings and to the proposed sale of $1,500,000 of the bonds of the company now held in the treasury:

"Since the discontinuance of the dividend on the stock of this company in 1907, conditions have been such as to seriously interfere with the financing of the property. The marketing of the bonds having been retarded by the attitude of the city of Detroit, it has been necessary to meet capital expenditures in the main out of earnings instead of by the proceeds from sales of bonds, which under the existing circumstances could not be advantageously sold.

"Since the beginning of 1907 more than $4,000,000 has been expended on the property out of earnings and the financial position of the company materially strengthened. In addition to the necessary upkeep and development of the property and providing for the floating debt which existed in 1907, $1,500,000 has been paid on account of the $3,000,000 of 3-year gold notes which were then outstanding, leaving a balance of $1,500,000 still to be met. If this amount can be provided for, it is the intention to resume dividends on the stock, and the co-operation of the shareholders is asked for this purpose.

"Of the bonds held in the treasury of the company, $1,500,000 are now offered to the shareholders to be underwritten at 82½, the intention being to obtain a loan on the bonds and underwriting for one year from February, 1911, which will provide for the payment of the $1,500,000 balance due on the $3,000,000 gold notes above referred to. The price at which the bonds are being offered will yield a return of about 6 per cent on the investment.

"It is hoped that before the expiration of the year during which the loan is to be carried the differences between the city and the company will be satisfactorily adjusted, enabling the bonds to be sold and relieving the underwriters of their obligation, for which they will then receive a bonus of 2 per cent on the amount of their respective underwriting. As the question of the resumption of dividend will entirely depend upon the required amount of the underwriting being obtained, shareholders are particularly requested to assist in getting the full amount taken up."

Holding Company Proposed for Montreal Street Railway and the Montreal Light, Heat & Power Company

Patrick Dubee, secretary of the Montreal (Que.) Street Railway, in a circular addressed to the shareholders of the company, says in substance:

"Your directors, in conjunction with the directors of the Montreal Light, Heat & Power Company, have ascertained the relative value of the two companies as being $250 per share for the Montreal Street Railway and $190 per share for the Montreal Light, Heat & Power Company. Both boards are of opinion that the interests of their shareholders will be best served by an intimate union, which can be best effected through a holding company that would exchange its securities for the shares of the two companies on the above basis.

"Assuming that all the shares were exchanged upon the basis outlined, this would imply a capitalization for the holding company of $57,300,000, on which the total net income would be: 1907, 4.69 per cent; 1908, 5.03 per cent; 1909, 5.48 per cent. The current fiscal years of each company will show that the rate of increase in the net income has been fully maintained, notwithstanding the liberal reductions in gas and electric rates during the past three years; and with contemplated economies after union, a further increase in the combined net income can be expected. An expression will be asked from the shareholders at the next general meeting."

The net income of the companies for 1907, 1908 and 1909 follows:

	Montreal Street Railway.	Montreal Light, Heat & Power Co.	Total.
1907	$1,040,358	$1,647,467	$2,687,825
1908	1,136,411	1,745,848	2,882,259
1909	1,229,676	1,911,201	3,140,877

Columbus Railway & Light Company, Columbus, Ohio.—The Columbus Railway & Light Company has omitted the quarterly dividend on the $5,000,000 of preferred stock of the company. In January, April and July, 1910, dividends of three-quarters of 1 per cent each were paid.

Denver (Col.) City Tramway.—The Denver City Tramway has notified the holders of the outstanding first mortgage 6 per cent gold bonds of the Metropolitan Railway dated July 30, 1891, maturing Jan. 1, 1911, aggregating $953,000, that provision has been made for the payment of the principal of the bonds and the accrued interest thereon on Jan. 1, 1911, at the office of the Mercantile Trust Company, New York. Pursuant to the provisions of the first and refunding sinking fund mortgage 25-year 5 per cent gold bonds of the Denver City Tramway dated Nov. 1, 1908, $953,000 par value of these bonds are authorized to be issued for the purpose of paying off and discharging the first mortgage 6 per cent gold bonds of the Metropolitan Railway. Clark, Dodge & Company, New York, N. Y., and the International Trust Company, Denver, Col., announce that they are prepared at any time prior to Jan. 1, 1911, to exchange for the bonds of the Metropolitan Railway at 100 and accrued interest to Jan. 1, 1911, first and refunding sinking fund mortgage 25-year 5 per cent gold bonds of the Denver City Tramway at 95 and the accrued interest to date of exchange or to purchase the 6 per cent maturing bonds at 100 and accrued interest.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The decree ordering the sale of the property of the Indianapolis & Cincinnati Traction Company on Nov. 3 or 4, 1910, has been made official by Judge Carter of the Supreme Court at Indianapolis. Henry Clay Allen has been appointed master commissioner to make the sale. In the decree the minimum price is given at $1,045,000. The committee which represented the bondholders and which attempted to reorganize the company, but failed, is preparing to bid on the property.

Kansas City Railway & Light Company, Kansas City, Mo.—It is announced that the syndicate headed by Lee, Higginson & Company, which last spring underwrote Metropolitan Street Railway, Kansas City, Mo., and Kansas City Railway & Light Company notes and bonds to a total of $8,218,000, has been closed, all of the syndicate holdings having been sold.

New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J.—The Board of Public Utility Commissioners of New Jersey has approved the sale by the New Jersey & Hudson River Railway & Ferry Company of $100,000 of 4 per cent mortgage bonds. The proceeds from the sale of these bonds are to be used for the extension of the company's tracks and additions to the power house.

Ohio Traction Company, Cincinnati, Ohio.—The Ohio Traction Company paid a dividend of 1 per cent on its $2,500,000 of common stock on Oct. 1, 1910. The only former dividend of the same amount was paid on Nov. 1, 1909.

Portland (Me.) Railroad.—Maynard S. Bird & Company, Portland and Rockland, Me., offer for subscription at a price to net the investor about 4⅜ per cent the unsold portion of $250,000 of first consolidated mortgage 3½ per cent gold bonds of the Portland Railroad, due July 1, 1951, but callable after July 1, 1931. These bonds are issued to pay for improvements and acquisitions made in the last few years. Of the total authorized issue of $3,000,000 of bonds, $1,600,000 are outstanding, $900,000 are reserved to retire bonds due in 1913 and 1915 and $500,000 are reserved for future extensions and additions.

Public Service Corporation of New Jersey, Newark, N. J.—Drexel & Company, Philadelphia, Pa., and J. P. Morgan & Company, New York, N. Y., have purchased the entire issue of $4,000,000 of collateral 3-year 5 per cent gold notes, dated Oct. 1, 1909, secured by deposit of $5,000,000 of the company's general mortgage bonds.

Scioto Valley Traction Company, Columbus, Ohio.—J. D. Ellison and William N. King have been elected directors of the Scioto Valley Traction Company to succeed E. K. Stewart and W. S. Courtright.

Second Avenue Railroad, New York, N. Y.—George W. Linch, receiver of the Second Avenue Railroad, has received permission from Justice Amend, of the Supreme Court, to issue $2,500,000 of receiver's certificates, to bear interest at

6 per cent and mature in a year. The money is to be used to pay the interest due on Nov. 1, 1910, on $5,682,000 of 5 per cent consolidated mortgage bonds, held by the Guaranty Trust Company, and to pay $544,854 in franchise taxes, the amount on which the receiver and the State reached an agreement. Some of the money will also be used to improve the road and the equipment. The receiver predicted an increase of $250,000 a year in the earnings of the company by reason of the establishment of a new terminal for the cars at Worth Street and Broadway, on which work is in progress.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The Sheboygan Railway & Electric Company, which has taken over the Sheboygan Light, Power & Railway Company, has filed a mortgage in favor of the Wisconsin Trust Company, Milwaukee, Wis., as trustee, dated Aug. 15, 1910, to secure an issue of $600,000 of sinking fund refunding and improvement 5 per cent gold coupon bonds due in 1926, but redeemable on any interest day at 105 and interest. Of the new bonds $400,000 are reserved to retire a like amount of first mortgage bonds of the Sheboygan Light, Power & Railway Company, dated 1896, and due April 1, 1926, and $160,000 have been issued and are outstanding. The officers of the Sheboygan Railway & Electric Company are: Ernest Gonzenbach, president and general manager; W. O. Morgan, vice-president; August Westermeyer, secretary and treasurer; John A. Chesney, assistant secretary and assistant treasurer.

Washington, Berwyn & Laurel Electric Railway, Washington, D. C.—The Washington, Berwyn & Laurel Electric Railway, which is owned and operated by the Washington, Baltimore & Annapolis Electric Railway, has been disposed of by that company to C. F. Norment, president of the Washington Railway & Electric Company, representing that company.

Yonkers (N. Y.) Railroad.—Leslie Sutherland, receiver of the Yonkers Railroad, has applied to the Public Service Commission of the Second District of New York for permission to issue $160,000 of 2-year 6 per cent receiver's certificates, the proceeds to be used for additional equipment in the sub-station of the company at a cost of $48,500, the relaying and renewing of track at a cost of $87,000, and the balance, $24,500, to be used to defray the expense of constructing additional lines in Yonkers.

Dividends Declared

Aurora, Elgin & Chicago Railroad, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Boston (Mass.) Suburban Electric Companies, quarterly, $1 preferred.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1⅛ per cent, common.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbus, Newark & Zanesville Electric Railway, Newark, Ohio, quarterly, 1½ per cent, preferred.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 1 per cent, common.

Ohio Traction Company, Cincinnati, Ohio, 1 per cent, common.

Ottawa (Ont.) Electric Railway, 2½ per cent, quarterly.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common; extra, ½ of 1 per cent, common.

Portland (Maine) Railroad, 2 per cent.

Porto Rico Railways, San Juan, Porto Rico, quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil, quarterly, 2½ per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred.

West Penn Traction Company, Connellsville, Pa., quarterly, 1½ per cent, preferred.

Winnipeg (Man.) Electric Railway, 2½ per cent, quarterly.

Traffic and Transportation

Increase in Wages and in Passenger Tariff on New York, New Haven & Hartford Railroad

The New York, New Haven & Hartford Railroad makes the following reference in its annual report for the year ended June 30, 1910, to the advances in wages made to its employees and the increase in the passenger tariffs of the company to offset the increase in administration charges due to the additional wages:

"Serious advances in the wages paid to employees were granted in the last quarter of the fiscal year ended June 30, 1910, which advances did not become effective to any great extent until the beginning of the present fiscal year, July 1, 1910.

"Based upon the same number of employees working the same time as in this past year, these advances aggregate as below, viz.:

Maintenance department	$162,900
General office clerks	58,500
Operating department	1,536,106
Total	$1,757,506

"It was impossible to continue the business of the company on the basis of the tariffs heretofore in effect and pay these increases, and changes were made in our passenger tariffs to become effective as soon as possible under existing laws, substantially as below:

	Amounting to
Ten cents advance between New York, Providence and Boston, by rail	$109,869
Same by New England Navigation Company, in effect May 1, 1910	80,963
Five cents in and out of New York, one way fares, in effect June 4, 1910, interstate, and July 1, 1910, intrastate	225,216
Five cents between Hartford and Springfield, in effect June 4, 1910	37,417
Five cents per trip "family fifty trip tickets," in effect July 1, 1910	31,662
Commutation to and from New York and points in New York State, in effect July 1, 1910	118,390
Commutation between New York and interstate points, in effect June 4, 1910	102,466
Between New Haven, New York, Bridgeport, boat lines, 25 cents and 10 cents, in effect June 4, 1910	26,562
Increase from 2 to 2¼ and 2½ cents per mile, certain lean lines, in effect July 23, 1910	305,692
Miscellaneous, in effect June 4, 1910	20,516
Total passenger	$1,058,753
Allow for shrinkage, due to increased use of mileage tickets, 20 per cent	200,000
	$858,753

"The above increases should return to our treasury about 50 per cent of the loss occasioned by the advances in wages above referred to, leaving the balance to be overcome by such increased proportions as will accrue to our company from the advances in through freight rates on connecting roads' business, which advances have been made but are not yet effective, owing to their having been suspended by the Interstate Commerce Commission pending investigation regarding the reasonableness of the same.

"It is believed such advances will ultimately be allowed, though after considerable delay. The above advances, with such economies as are yet possible in the operation of the property, should enable the company to maintain substantially the same net result as heretofore, and pay the usual rate of dividend upon its stock."

Adjustment of Wages of Employees of Boston & Northern Street Railway and Old Colony Street Railway

The Boston & Northern Street Railway and the Old Colony Street Railway, Boston, Mass., have issued the following statement regarding the conclusion of negotiations between the companies and their employees looking to a new agreement between the companies and representatives of the men to cover a period of one year and seven months, dating from Oct. 1, 1910:

"Sixteen delegates representing the 16 divisions of the Boston & Northern Street Railway and Old Colony Street Railway recently presented a new agreement for the consideration of these companies covering a period of one year and seven months, starting with Oct. 1, 1910. The old agreement under which the men had been working expired Sept. 30, 1910.

"The new agreement asked for by the men called for practically a 27½ per cent increase in the wages of motor-

men and conductors and about 20 per cent increase for shopmen, repair men and others. After a number of conferences between the delegates and officials of the company, covering a period of about 10 days, an agreement was reached, the same to be submitted to the local divisions for their vote upon its acceptance or rejection. It was voted on and approved.

"The new agreement is substantially the same as the old and covers a period of four years. Under this new agreement the wages of the men, as before, are subject to readjustment at the end of two years. The new scale for the conductors and motormen provides for the payment by these two companies of 22½ cents per hour the first year of employment, 23½ cents the second year, 24½ cents for the third, fourth and fifth years, 25½ cents for the sixth and seventh year and 26½ cents for the eighth year and all years thereafter. The classes remain as in previous years, this new scale providing for a uniform increase of 1½ cents per annum. For the pit men and other employes in these classes the increase amounts to about 5 per cent.

"Throughout the conference with regard to this new agreement between the officials of the companies and the men representing the employees there was the greatest harmony and general good feeling."

Abington and Brockton Fares to Be Investigated.—The Selectmen of Abington have petitioned the Massachusetts Railroad Commission for a change in the fares on the Old Colony Street Railway between Brockton and Abington. A hearing will be assigned by the board.

Complaint Closed Against Poughkeepsie City & Wappingers Falls Electric Railway.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of the Board of Trustees of Wappingers Falls against the Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., regarding the rate of fare charged between Wappingers Falls and Poughkeepsie. At a hearing held at Wappingers Falls on Sept. 19, 1910, the company acceded to the request of the complainants for reduced fare between those places.

Interurban Employees Being Examined in Writing.—On Sept. 26, 1910, the officials of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., began a series of written examinations of its motormen and conductors to discover the efficiency of its employees. The examinations are being conducted by M. P. Reed, general superintendent of the company, in his office in South Bend, and in order to avoid interference with the operation of cars or the running time of the crews schedules have been adopted so as to permit the men to take the examinations at intervals covering several weeks.

Indiana Railroad Commissioners Inquire Into Accidents.—The Railroad Commissioners of Indiana on Sept. 29 and 30, 1910, examined a number of witnesses in connection with an investigation into the causes of the recent collisions on the Indiana Union Traction Company's lines at Tipton and Union City. A. W. Brady, president, and H. A. Nicholl, general manager of the Indiana Union Traction Company, testified. The attorney who appeared for the trainmen whose negligence is claimed to have caused the collisions stated that he had advised the men not to testify before the commissioners, as their statements might be used against them in criminal actions for manslaughter which are pending. The commissioners are said to have admitted that under the statutes defining the powers of the commission to take testimony the trainmen could not be compelled to testify at the hearings. The commissioners have decided to withhold the publication of the result of their investigation until after it has been submitted to Governor Marshall, who, it is reported, intends to make some drastic recommendations in his message to the Legislature, which convenes in January. W. J. Woods, chairman of the railroad commission, expects to call a conference of the managers of the interurban railways in the State to discuss plans for preventing similar accidents. M. H. Hovey, a signal engineer, has been called on by the commissioners to discuss with them the practicability of installing block signals on all interurban roads. It is known that the commissioners favor block signaling as an effective means for preventing collisions.

Personal Mention

Mr. J. F. O'Connell has been elected assistant secretary of the Lincoln (Neb.) Traction Company to succeed Mr. E. B. Ransom, resigned.

Mr. C. M. Graves has been elected first vice-president of the Cœur d'Alene & Spokane Railway, Spokane, Wash., to succeed Mr. A. L. White.

Mr. Joseph B. Stewart, assistant to Mr. Matthew C. Brush, general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has resigned from that company.

Mr. E. K. Ford, formerly with the Wilkes-Barre Gas & Electric Company, Wilkes-Barre, Pa., has been appointed commercial agent of the Albany Southern Railroad, Hudson, N. Y.

Mr. T. R. Crumley, superintendent of motive power of the Evansville (Ind.) Railways, has also been appointed superintendent of motive power of the Owensboro (Ky.) City Railroad.

Mr. G. W. Rounds has resigned as general superintendent of the Savannah (Ga.) Electric Company, effective on Oct. 15, 1910, to become general superintendent of the Tacoma Railway & Power Company, Tacoma, Wash.

Mr. A. J. Purington has resigned as manager of the Toledo & Chicago Interurban Railway, Kendallville, Ind., to become general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Mr. Richard T. Higgins, Winsted, Conn., has been appointed a member of the Connecticut Board of Railroad Commissioners by Governor Frank B. Weeks, of Connecticut, to succeed Mr. Andrew F. Gates, whose resignation was announced in the Electric Railway Journal of Oct. 1, 1910.

Mr. S. W. Reynolds has been appointed general claim adjuster of the Illinois Traction System, with headquarters at Springfield, Ill. This is an office recently created. Mr. Reynolds has been connected with the Chicago, Ottawa & Peoria Railway, La Salle, Ill., as land commissioner for the last four years.

Mr. D. B. Clark, whose resignation as master mechanic of the Cincinnati (Ohio) Traction Company was noted in the Electric Railway Journal of Oct. 1, 1910, has accepted a position with the selling department of the Hooven, Owens, Rentschler Company, Hamilton, Ohio, and will probably be connected with the Chicago office of that company.

Mr. W. C. Myers has been appointed superintendent of electric shops and equipment with jurisdiction over electric car inspections and maintenance during construction and operating periods on the Oakland, Alameda and Berkeley line of the Southern Pacific Company, which is being equipped with electricity. Mr. Myers was formerly with the General Electric Company.

Mr. David E. Matthews, second inspector for the Railroad Commissioners of the State of Indiana, has been appointed chief inspector to the commissioners to succeed Mr. Alexander Shane, whose appointment as general manager of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., was announced in the Electric Railway Journal of Sept. 14, 1910.

Mr. Henry C. Hasbrouck, Troy, N. Y., and **Mr. W. P. Coleman,** New York City, have been appointed traveling accountants for the Public Service Commission of the Second District of New York to visit the offices of the corporations under the jurisdiction of the commission, check up their methods of accounting and assist the smaller companies in the preparation of the reports to the commission which are required by statute.

Mr. E. T. Steel, manager of the Ponce Railway & Electric Company, Ponce, Porto Rico, has been appointed general superintendent of the Savannah (Ga.) Electric Company to succeed Mr. G. W. Rounds, who is to become general superintendent of the Tacoma Railway & Power Company, Tacoma, Wash., on Oct. 15, 1910. Before becoming connected with the Ponce Railway & Electric Company Mr. Steel was purchasing agent of the Savannah Electric Company.

Mr. E. L. Brockway has resigned as superintendent of feeders of the Metropolitan Street Railway, New York, N. Y., to accept a position as representative and construction engineer with T. J. Cope, Philadelphia, Pa., electrical construction contractor and manufacturer of underground specialties. Mr. Brockway has been engaged in underground electric railroad work with the Metropolitan Street Railway for the last 12 years and superintended the installation of the feeder system during the change of power from cable to electricity.

Mr. Matthew C. Brush has resigned as general manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to become assistant to Mr. C. S. Sergeant, vice-president of the Boston (Mass.) Elevated Railway. Besides being general manager of the Buffalo & Lake Erie Traction Company, Mr. Brush was general manager of the Jamestown, Chautauqua & Lake Erie Railroad, the Chautauqua Steamship Company and the Lackawanna Traction Company. An extended biography of Mr. Brush was published in the Electric Railway Journal of Sept. 11, 1909, previous to his taking up his duties with the Buffalo & Lake Erie Traction Company.

Mr. H. T. Edgar, whose appointment as manager of the Seattle (Wash.) Electric Company was noted in the Electric Railway Journal of Oct. 1, 1910, gained his first experience in the electric light business with the Edison Electric Illuminating Company, New Brunswick, N. J., with which he became connected in January, 1886. In the fall of 1886 Mr. Edgar entered the employ of the Edison Electric Light Company, New York, N. Y., the parent company, of which Mr. J. H. Vail was then general superintendent. He remained with this company until Jan. 1, 1893, when he was appointed secretary and general manager of the Georgia Electric Light Company, Atlanta, Ga. In April, 1897, Mr. Edgar resigned from the Georgia Electric Light Company to represent the Jandus Electric Company and the Buckeye Electric Company, Cleveland, in New York and New England. On March 1, 1899, he became associated with Stone & Webster, Boston, Mass., and was appointed manager of the Lowell (Mass.) Electric Light Company. In the fall of 1901 Mr. Edgar was elected vice-president and manager of the El Paso Electric Railway, also a Stone & Webster property, and supervised the construction of the electric railway in El Paso, which was placed in operation in the spring of 1902. In the fall of 1905 he was elected vice-president and manager of the Northern Texas Traction Company, Fort Worth, Tex., from which position he has just resigned to become manager of the Seattle Electric Company.

Mr. E. E. Potter, general manager of the Seattle (Wash.) Electric Company, has been appointed executive head of a new department established at the home office of Stone & Webster, Boston, Mass., to appraise railroad and electric properties. Mr. Potter will assume his duties on Oct. 15, 1910. Effective on that date, Mr. H. T. Edgar, manager of the Northern Texas Traction Company, Forth Worth, Tex., is to succeed Mr. Potter as manager of the Seattle Electric Company, as announced in the Electric Railway Journal of Oct. 1, 1910. The establishment of the new department, which will be officially known as the appraisal department, has been made necessary by the growing business of Stone & Webster in appraising the physical property of electric companies and railway systems in the East and the South and suggesting plans for the readjustment of the finances of such companies. Mr. Potter became connected with the Seattle Electric Company in November, 1907, as assistant to the late Howard F. Grant, who was then general manager of the company. In April, 1908, he was appointed manager of the Seattle Electric Company. His duties as manager began immediately following the financial depression of 1907 and continued through the preparations for the Alaska-Yukon-Pacific Exposition and during the period of the exposition. Mr. Potter was largely instrumental in organizing the Stone & Webster Club of Washington, which comprises in its membership officials and department heads of the properties controlled by Stone & Webster in Seattle, Tacoma, Bellingham and Everett.

OBITUARY

Horace F. Hardy, secretary and treasurer of the South Side Elevated Railroad, Chicago, Ill., is dead.

Construction News

RECENT INCORPORATIONS

Fairview Interurban Railway, Delta, Col.—Incorporated in Colorado to build an interurban railway from Delta to Cedar Edge and a spur to the Fairview coal mines. Another branch will run from Delta to the upper part of Montrose County. Capital stock, $250,000. Incorporators: Charles G. Montz, Mudge Zeigler, Henry Zeigler and Watson Z. Zeigler. [E. R. J., Oct. 1, '10.]

Hagerman Valley & Western Railway, Hagerman, Ida.—Application for a charter has been made in Idaho by this company to build steam and electric railways in Idaho. Capital stock, $200,000. Directors: J. Morton, W. Coltharp, H. Stroud, W. Clifford, E. M. Bell and J. Stewart Clark. [E. R. J., Aug. 14, '10.]

Logansport & Southern Traction Company, Frankfort, Ind.—Application for a charter has been made in Indiana by this company to build an electric railway to connect Frankfort and Logansport and intervening towns in Clinton, Carroll and Cass counties. Capital stock, $25,000. Directors: Owen E. Brumburgh, Elmer E. Sheridan and James R. Brown. [E. R. J., May 14, 10.]

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—Incorporated in Kentucky to build a 50-mile electric railway to connect Hodgenville and Glasgow via Lincoln Farm and Mammoth Cave. A company with the same name and incorporators was incorporated in Arizona in March, as noted in the Electric Railway Journal. Incorporators: L. W. Preston, J. C. Preston, J. A. McDaniel, J. F. Taylor and J. L. Williams. [E. R. J., Sept. 24, '10.]

St. Paul Railway Promotion Company, St. Paul, Minn.—Application for a charter has been made in Minneapolis by this company to construct a network of interurban lines radiating from St. Paul and also to operate telegraph and telephone lines in connection with the projected electric railways. Capital stock, $400,000. Incorporators: W. J. Hoy, H. C. Struchen, W. L. Sontag, E. J. Dunnigan, John D. Dandson, C. E. Van Kirk, Kay Alexander, Walter L. Van Ormun, C. M. Converse and A. C. Orthausen.

***Midland Pennsylvania Railroad, Pottsville, Pa.**—Chartered in Pennsylvania to build a 43-mile railway to connect Midland, Killinger, Berrysburg, Gratz, Sacramento, Hegius, Weisample, Maple and Gordon. Ground was recently broken at Killinger and engineering corps are busy at other points. It is probable that gasoline cars will be used. Capital stock, $430,000. Directors: Walter E. Harrington, Pottsville, president; John H. Williams, Charles G. Shodle, Joseph D. Romberger, Harry B. Reeves, Edgar D. Rank and Harry I. Silliman, Philadelphia.

Twin City Railways, South Bend, Wash.—Application for a charter has been made in Washington by this company to build an electric railway to connect South Bend and Raymond. Capital stock, $10,000. Incorporators: J. B. Crary, Aberdeen, and J. B. Bridges. [E. R. J., Sept. 3, '10.]

FRANCHISES

Montgomery, Ala.—C. F. Woodward and associates have been granted a franchise by the City Council to build a street railway in Montgomery from the railroad depot to the city limits. [E. R. J., Sept. 10, '10.]

Montgomery, Ala.—The Montgomery Traction Company has been granted a franchise by the County Board of Revenue to build an extension of its lines in Montgomery.

Portersville, Cal.—F. U. Nofziger, representing the Portersville Northeastern Railroad, has been granted a franchise by the Supervisors to build an electric railway over the county road between Portersville and Springville. [E. R. J., July 23, '10.]

Denver, Col.—The Denver City Tramway has asked the City Council for a franchise to operate over the lines of the Denver & Intermountain Railroad, which it recently absorbed, in Denver and to lay a third rail. The franchise also provides for a few changes in the route of the proposed extension of the tramway line to Fort Logan by way of West Alameda and Valverde.

*St. Vital, Man.—Joseph Bernier, Manitoba, secretary of the Rural Railway, Manitoba, has applied to the Municipal Council for a 30-year franchise to build a 5-mile electric railway from either Winnipeg or St. Boniface to St. Vital. Charles E. Lewis, Minneapolis, Minn., is president.

Springfield, Mass.—The Springfield Street Railway has asked the City Council for a franchise to extend its tracks into the Armory grounds in Springfield.

*Jefferson City, Mo.—The Jefferson City Bridge Company has been granted a franchise by the City Council to construct an electric railway in Jefferson City. This proposed railway will connect Jefferson City with suburban towns on the Callaway side of the river. A. J. Moerschel and Cecil W. Thomas, Jefferson City, are backing the enterprise.

Billings, Mont.—The Eastern Montana Electric Railway has accepted the franchise granted it by the City Council to build its tracks in Denver. According to the franchise the company must begin work within eight months and have 12 miles completed outside the city limits within three years. This proposed 85-mile railway will connect Laurel, Bearcreek, Billings, Red Lodge, Rockvale, Belfry and Fromberg. F. A. Kesselhuth, chief engineer. [E. R. J., July 2, '10.]

Ellwood City, Pa.—The Pittsburg, Butler, Slippery Rock & Grove City Railway, Butler, has been granted a franchise by the City Council to build an electric railway in Ellwood City. This proposed 20-mile electric railway will connect Butler, Slippery Rock, Grove City, Prospect and West Liberty. [E. R. J., Aug. 27, '10.]

Richmond, Va.—The Richmond & Henrico Railway has applied to the City Council for a franchise to extend its tracks in the West End of Richmond. W. S. Forbes, president. [E. R. J., Sept. 14, '10.]

Roanoke, Va.—The Roanoke Railway & Electric Company, Roanoke, has been granted a franchise by the County Supervisors to build an extension of its line on Virginia Avenue and Grandin Road in Roanoke.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—The electors passed a by-law on Sept. 15, '10, authorizing an expenditure of $484,000 to be used for extensions and improvements to the municipal street railway system.

Little Rock Railway & Electric Company, Little Rock, Ark.—This company advises that it is now rebuilding about 4 miles of track with Lorain Section 72-331 6-in. high T rail and paving with brick on the company's portion.

*Vancouver, B. C.—It is reported that surveys are being made to build a proposed electric railway from Barkerville, B. C., down the Willow River to connect with the Grand Trunk Pacific Railway at or near Ft. George.

St. Clair Traction Company, Belleville, Ill.—This company, recently incorporated, is securing right-of-way for its projected railway to connect Belleville and Freeburg. Edward L. Thomas is interested. [E. R. J., Sept. 17, '10.]

Union Elevated Railroad, Chicago, Ill.—A contract has been awarded by the Board of Supervising Engineers, Chicago Traction, to the Strobel Steel Construction Company for making changes to the supporting structure of the Union Elevated Loop of Chicago so that proper special work may be installed to permit the through joint operation of street car service by the Chicago Railways and the Chicago City Railway companies. Twenty-two columns supporting the elevated structure interfere with the clearance for the large new cars, and these columns will be relocated by the contractor at a cost of $115,000. The removal of these obstructions will permit the through-route operation of cars on six of the 22 proposed through routes.

Chicago, Kankakee & Champaign Electric Railway, Kankakee, Ill.—This company is reported to have completed preliminary arrangements and secured the necessary capital for building its proposed 75-mile railway to connect Kankakee and Champaign. It is expected to begin work soon at Kankakee and extend it south through Iroquois County, running nearly parallel with the Illinois Central Railroad to Urbana and there continue to Charleston via Villa Grove. George M. Bennett, Urbana, president. [E. R. J., July 24, '09.]

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has completed the work of building an additional track between Mishawaka and South Bend, and it is now double tracking the entire distance between South Bend and Elkhart. This improvement includes the elimination of all the curves and obstructed track.

Tri-City Railway, Davenport, Ia.—This company is now building a 1-mile extension of its Twenty-seventh Street line in Davenport.

New Orleans Railway & Light Company, New Orleans, La.—This company is considering plans to build an extension of its line around Audubon Park.

*Baltimore, Md.—Press reports state that plans are being considered for building an interurban railway to connect Walbrook, Forest Park, Howard Park, Villa Nova and Sudbrook Park, a distance of about 4 miles. Among those interested are J. Glenn Cook, H. C. Gilbert and T. B. Williams, all of Baltimore, and Abbott Morris, Norfolk, Va.

Hattiesburg (Miss.) Traction Company.—This company is reported to be considering plans for building a 30-mile extension to connect Laurel and Hattiesburg.

Public Service Railway, Newark, N. J.—The Board of Public Utility Commissioners of New Jersey has approved an ordinance adopted by the Newark Board of Street & Water Commissioners granting permission to this company to construct and operate street railway connections between its tracks in Bridge Street, Front Street and Ogden Street, Newark, it being found that the permission sought is necessary and proper for the public convenience.

Union Railway, New York, N. Y.—The Public Service Commission ordered a hearing to be held on Oct. 7 on an application of this company to build a 3-mile crosstown railway in the Bronx to connect Westchester Avenue on the east and Jerome Avenue on the west, the route being along the general line of East 167th Street.

*Penn Yan, N. Y.—It is reported that right-of-way has been secured to build an electric railway from Penn Yan to run along the east shore of Lake Keuka 14 miles to Keuka Landing and from that point to Savona and thence into Steuben County to Canandaigua or Geneva.

New York & Stamford Railway, Port Chester, N. Y.—The Public Service Commission, Second District, has granted the application of this company for permission to build two turnouts in Mamaroneck and the approval of plans for such turnouts.

Tidewater Power Company, Wilmington, N. C.—This company reports that it will soon rebuild 3 miles of track in paved streets in Wilmington.

Fostoria-Fremont Railway, Lima, Ohio.—This railway, which is being built to be operated in connection with the Western Ohio Railway for through service to Cleveland, reports that it is now grading 20 miles for its proposed railway to connect Fostoria and Fremont.

Toronto (Ont.) Railway.—This company has signified its intention of proceeding immediately with the construction of 25 miles of new track in Toronto.

Mount Hood Railway & Power Company, Portland, Ore.—This company has granted the contract to A. Mason to grade its extension between Montavilla and Gresham. Work will begin at once under the direction of Smith, Kerry & Chase.

Slippery Rock & Grove City Street Railway, Grove City, Pa.—This company reports that all concrete work, bridges and culverts are completed, grading is two-thirds done and the line is about ready for the ties. It will connect Slippery Rock and Grove City. James A. Jolliffe, secretary. [E. R. J., Aug. 6, '10.]

*Oval, Pa.—Meetings are being held in Oval for the purpose of considering plans for the organization of a company to build a railway in the Nippenose valley.

Philadelphia & Western Railway, Philadelphia, Pa.—This company has begun surveying for its proposed extension into Conshohocken. It is the purpose of the company to continue the line to other towns in the Schuylkill Valley.

Titusville Electric Traction Company, Titusville, Pa.—This company announces that it will build a 6-mile extension from Tryonville to Townville, provided the local Board of Trade will assist in raising the necessary capital.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has begun work building several new lines in Chattanooga and on its Chickamauga Park short line.

Austin (Tex.) Electric Railway.—This company has been granted right of way over the Congress Avenue Bridge and will build an extension to South Austin of about 2 miles. The company will place contracts during the next six weeks for building 1½ miles of track and overhead line.

San Antonio (Tex.) Traction Company.—This company reports that it completed and placed in operation on Oct. 2 the 1½-mile extension of its South Flores Street line to Harlandale.

Manitowoc & Northern Traction Company, Manitowoc, Wis.—This company is said to be considering plans for extending its railway to Mishicott.

SHOPS AND BUILDINGS

Vallejo & Northern Railway, Vallejo, Cal.—This company will soon build a new station between Main Street and Second Street in Woodland.

Georgia Railway & Electric Railway, Atlanta, Ga.—This company has just completed its brick machine shop at Virginia Avenue and car house on Butler Street in Atlanta. The carpenter and paint shop, now framework, will be rebuilt of brick, so that the entire plant will soon be fireproof.

Rockford & Interurban Railway, Rockford, Ill.—This company has begun grading for the erection of its car shops on North Second Street in Rockford. The structure will be of reinforced concrete.

Bowling Green (Ky.) Railway.—This company advises that it is now building a concrete and brick car house at Deerfield, which is about 2 miles distant from Bowling Green.

Oklahoma (Okla.) Railway.—This company expects to begin the construction of its principal work shop on Ollie Street, Oklahoma. The structure will be 96 ft. x 216 ft. This will be followed by the building of paint shops, inspection shops, car construction shops and two large storage houses.

POWER HOUSES AND SUBSTATIONS

Little Rock Railway & Electric Company, Little Rock, Ark.—This company advises that it is now installing in its power house in Little Rock a 1000 kw rotary converter purchased from the Westinghouse Electric & Manufacturing Company.

Pacific Electric Railway, Los Angeles, Cal.—This company is installing at its power house on Bertie Street, Pomona, new transformers and a generator, which will double the present capacity of the plant.

Connecticut Company, New Haven, Conn.—This company has begun work on an addition to its power station on Grand Avenue in New Haven. The building will be 50 ft. x 45 ft. and 30 ft. high. A smokestack about 125 ft. high will also be erected.

Chicago, Kankakee & Champaign Electric Railway, Kankakee, Ill.—Press reports state that this company will soon build a power plant at Urbana and another at Kankakee. George M. Bennett, Urbana, president.

Berkshire Street Railway, Pittsfield, Mass.—This company has let the contract to Fred T. Ley & Company, Springfield, for building its new power house at Zylonite. The structure will be 150 ft. x 100 ft., is to be of brick and concrete construction and will consist of a basement, main floor and a fan room projecting above the first story. Preliminary arrangements have been made and construction will begin at once.

Oklahoma (Okla.) Railway.—This company has begun work and contracts have been placed for the installation of 2000 kw additional generating capacity at the power house and the corresponding number of converting units at the substation, which will involve an expenditure of at least $165,000.

Utah Light & Railway Company, Salt Lake City, Utah.—It is said that this company will soon replace the temporary transformer station between Murray and Midvale with a new building.

Manufactures & Supplies

ROLLING STOCK

Austin (Tex.) Electric Railway expects to close an order during the next few weeks for two closed single-truck cars.

Johnstown (Pa.) Traction Company has placed an order with the J. G. Brill Company for six new cars.

Meadville, Conneaut Lake & Linesville Railway, Meadville, Pa., has built a new baggage and express car in its own shops.

Colorado Springs & Interurban Railway, Colorado Springs, Col., expects to build soon six 38-ft. closed trail cars in its own shops.

Little Rock Railway & Electric Company, Little Rock, Ark., is rebuilding and converting 15 13-bench open cars into center-aisle cars with drop platforms. Consolidated heaters are being installed on these cars.

Norfolk & Bristol Street Railway, Foxboro, Mass., noted in the Electric Railway Journal of July 30, 1910, as considering the purchase of two new cars, expects to close an order for these cars within a few days.

Hudson & Manhattan Railroad, New York, N. Y., will soon order 30 steel passenger cars for service between Newark and New York. The general size and arrangement of these cars will be the same as those now being operated.

El Paso (Tex.) Electric Company, noted in the Electric Railway Journal of July 23, 1910, as having ordered six single-truck prepayment cars from the Cincinnati Car Company, has specified the following details for these cars:

Length of body.....21 ft.	Hand brakes.....Peacock
Over vestibule.....33 ft.	Headlinings .....Agosote
Width over sill.....8 ft.	Headlights ...Crouse-Hinds
Sill to trolley base..9 ft. 4 in.	Journal boxes....Symington
Body .....composite	Motors.....2 G. E. 80
Interior trim.....mahogany	Push button signal
Underframe .....composite	battery system
Axles .....4½ in.	Registers .....International
Brakeshoes.A. B. S. & F. Co.	Roofs.....Monitor deck
Bumpers.....angle iron	Sash fixtures...Dayton locks
Car trimmings.....bronze	Seats .....Heywood
Couplers.....C. C. Co. radial	Seating material.....rattan
Curtain fixtures....Forsythe	Step treads.....Universal
Curtain material...Pantasote	Trolley retrievers....Wilson
Destination signs....Hunter	Ventilators.....deck sash
Gongs....14-in. P. Wall Co.	Wheels.....St. Louis

TRADE NOTES

Electrische Kraftbetriebe und Bahnen, Berlin, and **Eugene Eichel,** consulting engineer, have moved their office from 106 Alte Jacobstrasse to 42 and 43 Krausenstrasse, Berlin.

Silliker Car Company, Halifax, N. S., of which C. J. Silliker is president, is said to have passed to the control of W. B. Tenant, St. John, and J. R. Douglas, Amherst, N. S.

U. S. Metal & Manufacturing Company, New York, N. Y., has moved its Chicago office from the Railway Exchange Building to suite 1104-1105 McCormick Building, Michigan Avenue and Van Buren Street.

McKeen Motor Car Company, Omaha, Neb., reports that it has recently delivered the following cars: One 70-ft. to the Southern Pacific Company, No. 45; one 70-ft. to the Chicago Great Western Railroad Company, No. 1001; one 70-ft. to the Rock Island Lines, No. 9023. This makes a total of 88 McKeen cars in daily service in the United States and Mexico.

Pittsburgh Testing Laboratory, Pittsburgh, Pa., has moved its New York office from 1 Liberty Street to 50 Church Street, Hudson Terminal Building. The company's interests in New York and New England have been placed in charge of Wm. F. Zimmerman, M. E., second vice-president. Mr. Zimmerman, who reassociated himself with the company last spring, has had 25 years' experience in the engineering, manufacturing and contracting field.

Western Electric Company, New York, N. Y., announces that the Pére Marquette Railroad is soon to join the long list of railroads using the telephone in place of the telegraph to dispatch trains. This railroad has ordered instruments, selectors and line material to equip a line from Saginaw,

Mich., to Toledo, Ohio., approximately 135 miles in length. This is understood to be the first step in adopting the telephone system over the entire road. The equipment is being furnished by the Western Electric Company.

W. N. Matthews & Brother, St. Louis, Mo., have bought a controlling interest in the Davis Expansion Boring Tool Company. The stock bought formerly was held by Alexander Landan and A. E. Lenssler. W. N. Matthews will be president and treasurer of the company. Emery E. Davis is vice-president, and Claude L. Matthews is secretary. The company's business will be increased and several new tools will be added to the line it handles, among which is an expansion reamer invented by Mr. Davis.

Duncan McDonald, president of the Pay-As-You-Enter Car Corporation, has just returned from a trip to Europe, where he attended the International Street and Interurban Railway Congress at Brussels in company with Thomas W. Casey, general manager of the corporation, to demonstrate the possibilities of pay-as-you-enter cars on European tramways. Mr. McDonald reports that prospects are promising for the trial of this type of car in Paris. Mr. Casey will not return for another week, as he expects to visit several English cities in the interest of the company.

Westinghouse Air Brake Company, Pittsburgh, Pa., in its annual report for the year ended July 31, 1910, shows net earnings for the year of $4,653,102, as compared with $2,039,273 in 1909. After charging off $429,824 for depreciation, etc., there remained a surplus of $4,223,278, as compared with $1,920,557 last year, representing 30.16 per cent earned on the $14,000,000 capitalization against 13.72 per cent earned in 1909. The payment of $2,749,268 in dividends, against $1,374,481 last year, left a balance of $1,474,010, which brought the total surplus up to $6,931,760. The company has moved its offices from Richmond, Va., and Cincinnati, Ohio, to the Candler Building, Atlanta, Ga.

ADVERTISING LITERATURE

Brandt Cashier Company, Chicago, Ill., lists and illustrates in a 20-page booklet its various models of automatic cashiers.

Chicago Concrete Machinery Company, Milwaukee, Wis., has issued a booklet illustrating the various types of Chicago concrete mixers which it makes.

Murphy Varnish Company, Newark, N. J., has issued a booklet describing the Murphy systems of railway finishing for wooden and steel cars of both steam and electric railways.

Garwood Electric Company, Garwood, N. J., is mailing a series of illustrations which show various broken car parts and other miscellaneous machinery repaired by the use of Garwood electric welding equipment.

Leeds & Northrup Company, Philadelphia, Pa., has printed a booklet devoted exclusively to its coming convention exhibit of electrical measuring instruments. Among the latter is the well-known Herrick inspection test set.

Carnegie Steel Company, Pittsburgh, Pa., has issued a pamphlet of standard specifications for steel products published by the Association of American Steel Manufacturers, Carnegie Steel Company and the American Society of Testing Materials.

Goldschmidt Thermit Company, New York, N. Y., has included in its publication "Reactions," for the third quarter of 1910, the following articles: "Electrolysis Again," "Thermit Weld on Main Driving Shaft of S. S. Manhanset," "Thermit Weld on Large Dredge Pump Shell," "Thermit on the Vaudeville Stage," "Around the Railroad Shops" and "Welding Electric Motor Cases on the United Railroads of San Francisco."

Bird-Archer Company, New York, N. Y., has issued a 48-page catalog entitled "Boiler Troubles and Their Prevention." The contents include "About Boiler Compounds," "Action of Feed Water Impurities Within the Boiler," "Oil and Grease Within the Boiler," "Corrosion," "Methods of Feeding Boiler Compounds," "Hints About Blow-Off Valves," "Guarantee of Bird-Archer Boiler Compounds."

Pettingell-Andrews Company, Boston, Mass., has issued a de luxe catalog of electric lighting fixtures for residences, offices and public buildings. The book is 12 in. x 15 in. in size and is bound with heavy board covers and soft leather back. Nearly 400 stock and special fixtures are illustrated with artistic half-tone engravings. The catalog is a beautiful piece of book-making and is in keeping with the handsome fixtures which it illustrates.

The J. G. Brill Company, Philadelphia, Pa., prints in the "Brill Magazine" for September the twenty-first in the series of articles describing the street railway system of some important city of the world with particular reference to the type of car which is used. The city considered is Cleveland, Ohio. The publication also contains the following articles: "Plantation Equipment for Peru," "Café-Chair Service of the Chicago & Milwaukee Electric Railroad," "Cars for the Lehigh Valley Transit Company," "Equipment for Guadalajara, Mexico," and "Cars for the Houston Electric Company." The subject of the biographical sketch in the present issue is John M. Roach, president of the Chicago Railways and managing receiver of the Consolidated Traction Company.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has issued a 42-page catalog in which is discussed the durability of steel rails treated with titanium alloy. The reports of several prominent metallurgists on their investigations of the company's product are quoted. Numerous illustrations are presented showing titanium rails in service on some of the important steam and electric railroads in the United States. Among these are the Boston Elevated Railway, Chicago & Oak Park Elevated Railroad, Interborough Rapid Transit Company, Los Angeles Railway, New York State Railways, New York Central & Hudson River Railroad, Baltimore & Ohio Railroad, Chicago, Milwaukee & St. Paul Railroad and Chicago, Rock Island & Pacific Railroad. The publication also contains a number of illustrations showing the effects of various tests applied to titanium rails.

NEW PUBLICATIONS

Switchboards. By Hervey S. Walker. Walker Electric Company, Philadelphia, 1910; 213 pages; illustrated. Price, $1.00, express prepaid.

The author of this book is a well-known specialist in switchboard design and manufacture. In one sense his book is an advertisement of the work of his company, but in another it can be considered as a valuable résumé of switchboard history, design and operation. Illustrated descriptions are presented of many switchboards and switchboard instruments as installed for every variety of alternating current and direct current service.

Hendricks' Commercial Register. New York: S. E. Hendricks Company, 1910; 1344 pages. Price, $10.

This well-known buyers and sellers' register has now reached its nineteenth annual edition. It is a valuable guide for buyers of practically everything required in the operation of an electric railway and in fact any other public service utilities. Fully 100 pages are required merely to index the contents. The total number of classifications is 35,481, and the number of names and addresses exceeds the enormous total of 350,000. The classifications are so arranged that the book can easily be used for either purchasing or mailing purposes.

Miscellaneous Tests on Car Equipment. By Eugene C. Parham and John C. Shedd. McGraw-Hill Book Company, New York, 1910; 156 pages with index; illustrated. Price, $1.00 net.

This book should be welcomed by car maintenance engineers, as it brings together in simple form a mass of pertinent data, which otherwise could be secured only piecemeal from the files of technical papers and different text books. However, this book is much more than a compilation, as it is largely the outcome of the shop and laboratory experience of the authors. It contains a novel chapter on current collectors, wherein some practical hints are given on trolley wheel pressure. Other chapters discuss tests on fuses, circuit breakers, controllers, resistance, lightning arresters, cables, brushes, etc. Part 2, called "Motor Tests," is of more ambitious scope, treating of such matters as tests of motor balancing, heating, efficiency, speed and train resistance. This book also includes a chapter on reviving shocked persons, and a catechism based on the data in the book. This volume is bound uniform with its companion "Shop Tests on Car Equipment," which was written by the same authors.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Street & Interurban Railway Association and Its Affiliated Associations

VOL. XXXVI NEW YORK—OCTOBER 11, 1910.—ATLANTIC CITY No. 15A

PUBLISHED DAILY BY

McGraw Publishing Company

James H. McGraw, President. H. M. Wilson, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
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News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

NEW YORK, 239 WEST THIRTY-NINTH STREET.
ATLANTIC CITY, MILLION-DOLLAR PIER.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
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TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9500 *copies are printed.*

NEW YORK—OCTOBER 11, 1910.—ATLANTIC CITY

PROGRAM FOR TO-DAY

9.00 a.m.	Traymore Hotel, Meeting of the Claim Agents' Association.
9.30 a.m.	Annex Court Hall, Convention Pier, Meeting of Accountants' Association.
9.30 a.m.	Aquarium Court Hall, Convention Pier, Meeting of Engineering Association.
9.30 a.m.	Greek Temple, Convention Pier, Meeting of Transportation & Traffic Association.
12.00 m.	West Solarium, Marlborough-Blenheim, Meeting of Public Relations Committee of American Association.
12.00 m.	Traymore Hotel, Group Photograph of Claim Agents' Association.
1.00 p.m.	Marlborough-Blenheim, "Get-Together-Luncheon," Accountants' Association.
2.00 p.m.	Greek Temple, Convention Pier, Meeting of American Association.
2.00 p.m.	Aquarium Court Hall, Convention Pier, Meeting of Engineering Association.
2.00 p.m.	Traymore Hotel, Meeting of Claim Agents' Association.
2.30 p.m.	Aquarium Court Hall, Convention Pier, Meeting of Accountants' Association (Joint Meeting with Engineering Association).
2.30 p.m.	Solarium, Marlborough-Blenheim, Entertainment for Ladies.
6.00 p.m.	Windsor Hotel, Dinner, Claim Agents' Association.
8.30 p.m.	Marine Hall, Convention Pier, Smoker and Indoor Baseball Game—Railway Men *vs.* Supply Men—"Stag."
9.00 p.m.	Ball Room, Marlborough-Blenheim, Ladies' Progressive Euchre (Prizes).

Promptness in Attendance

The American Street & Interurban Railway Association and each of the affiliated associations have programs this year which are replete with interesting topics, and it would be a pity if the time available for their discussion were materially reduced through delay in commencing the meetings of the associations. It is safe to say that all of the committees have worked hard on the compilation of their reports, and practically all of them make recommendations which they desire considered by the association to which their reports are to be presented. We bespeak for these gentlemen, as well as for the hard-working officers of the associations themselves, prompt attendance at the meetings of the association and a full discussion of the papers and valuable reports presented.

Program of the Week

No better evidence of the wide field covered by the American Street & Interurban Railway Association and its affiliated organizations is shown than by a glance over the list of topics contained in the official convention program. Altogether 28 committee reports and 25 papers are scheduled for presentation. Five years ago, with the methods then in vogue, it would have been impossible for the association to have considered this number of papers and reports except in a most cursory way. Conditions are far different now, because the reports are printed and distributed in advance so that the members can study them to advantage before coming to the convention. Each topic is most carefully considered by a committee for nearly six months, and the reports are written after a knowledge of the practice of the member companies on the subject under consideration has been gained by the replies to data sheets sent out by the committees.

The program of the American Association includes reports of 11 working committees besides 7 addresses or papers covering a wide range of subjects to be presented by gentlemen prominent in the executive management of electric railway properties in the East and the Far West.

The Accountants' Association will consider the reports of three committees whose work has extended over the year and will listen to six papers on accounting subjects. Of these papers, two will be presented by gentlemen not actively engaged in electric railway operation, but invited as authorities on the subjects which they will discuss. Particular interest attaches to both of these outside addresses, because the recent report on electric railways published by the Census Bureau is an example of the value which the bureau can be to the industry and because Professor Cooley's connection with a number of recent appraisals of electric railway properties lends additional importance to any opinions which he may express on the treatment of overhead charges in accounting practice.

The New Engineering Committees

This year the program of the Engineering Association includes reports from two new standing committees appointed last winter. These are the committee on heavy electric traction and the committee on buildings and structures. The formation of a committee to deal exclusively

with subjects relating to the equipment of elevated, subway and electrified steam railroads greatly enlarges the usefulness of the association and was responsible at least in part for the acquisition of the Pennsylvania Railroad as a member of the American Association. The problems of heavy electric traction are in many respects closely allied with those of heavy interurban and rapid transit roads, and the American Street & Interurban Railway Engineering Association can be of great assistance in their solution. The new committee has begun its work by recommending admirable specifications for heat-treated axles and by proposing standard clearances for third-rail location. Next year it purposes to consider general maintenance of heavy electrical equipment.

The committee on buildings and structures is an outgrowth of the committee on way matters, which found itself overburdened with important subjects relating only to track construction and maintenance. This year the new committee has confined its work to general recommendations concerning terminals. It has a large field for future work, which includes car houses, repair shops, bridges and miscellaneous railway structures.

The Work of the Claim Agents

The program of the Claim Agents' Association meetings will consist principally of seven papers, each of which will be the subject of a general discussion. The policy of working by committees has not been followed to so great an extent by the claim agents as by the other associations. Perhaps the most important single event in the work of the claim departments during the year has been the arrangement effected, at the suggestion of the Claim Agents' Association, by the parent association with the Hooper-Holmes Information Bureau. It is expected that one of the members of this bureau will be in Atlantic City early this week to address the Claim Agents' Association so that the members can obtain a better knowledge of the actual workings of the bureau than they could derive from the notices which have been published in regard to it. In addition to the papers by members of the association, Henry C. Page, general manager of the Worcester Consolidated Street Railway, has consented to present an address on the methods by which the operating and claim departments can coöperate. The final paper on the program relates to the criminal negligence of employees and will be presented by E. F. Schneider, general manager, Cleveland, Southwestern & Columbus Railway, whose remarkably successful campaign in instructing employees and the public on the avoidance of accidents has created much interest in the Central West.

Standardization in Transportation

At first thought, transportation methods do not seem to lend themselves as readily to unification and standardization as those relating to accounting or engineering matters. Possibly it is for this reason that standardization was begun later in the transportation department than in electric railway accounting and electric railway engineering. Nevertheless it is a significant fact that practically all of the reports presented this year before the Transportation & Traffic Association are directly in the line of standardization.

Of course, the reports of the committees on city rules and on interurban rules relate directly to this subject. The main conclusions of the other committees, however, also embody important recommendations along these lines. Thus the committee on express and freight traffic suggests a method of prorating the operating expenses of a company operating both passenger and freight business, so that the relative costs between these two departments could be accurately determined. The committee on the training of transportation employees recommends a standard course of instruction for "breaking in" motormen and conductors, and the committee on construction of schedules and timetables includes under its other recommendations standard definitions of straight and swing runs, and suggests the standardization of other terms in common use in street railway work. The report of the committee on passenger traffic is devoted exclusively to the subject of rates, and while rates can hardly be "standardized" in the usual acceptation of that term, the committee recommends strongly the establishment of a minimum of 2 cents per mile for interurban roads. Finally the committee on transfers and transfer information makes five distinct recommendations on standardizing transfers, a branch of the work in which the greatest variety of practice exists to-day.

The Exhibits

To many of those in attendance at the convention the exhibit of railway appliances and materials is the most interesting feature of the week. Admirable as have been the exhibits in the past, it is no exaggeration to say that the display at this convention surpasses those of all previous years, both in point of size and in attractiveness. In spite of the handicap of three days of stormy weather last week the Million Dollar Pier has been so transformed that it would hardly be recognized by those who saw it a week ago. The first impression on entering the pier is that of stepping into a beautiful garden embellished with vine-clad pergolas and inviting summerhouses. The most prosaic pieces of apparatus which are being displayed seem to have received a touch from a magician's wand.

More than 180 manufacturers are represented among the exhibits, and the booths occupy about 70,000 sq. ft. of floor space. The representation of Western manufacturers at this year's convention is particularly gratifying. Last year at the Denver convention the Eastern manufacturers, at a very large expense, sent comprehensive exhibits of their apparatus and materials, and this year the Western manufacturers have responded in kind. The Manufacturers' Association is national in its scope and membership no less than the American Association and its affiliated associations, and no better evidence of this fact could be had than the cosmopolitan character of the exhibits, whether the conventions are held in the East or in the West.

Too much praise cannot be given to the exhibit committee for its untiring efforts to make this feature of the convention an unqualified success. For more than a week nearly all of the members of the committee have been hard at work on the pier superintending the installation of the exhibits and holding daily meetings at which many valuable suggestions have been made for improving the exhibit arrangements. The attendance of the members of the committee in Atlantic City so far in advance of the convention has been made possible by the liberal policy of the manufacturing companies, which permitted their representatives to come to the convention and spend their time and money in the interests of the common good. We feel sure that this liberality is fully appreciated by the other members of the Manufacturers' Association and by all of the railway men for whose benefit the exhibit committee has worked so untiringly.

Perhaps the most noticeable feature of the exhibits is the large number of devices offered for use in connection with pre-payment cars, which fact affords ample evidence that this type of rolling stock has come to stay. The various examples of steel construction and metal fittings for cars indicate the tendency toward securing greater strength in car construction concomitant with a reduction in weight. The constantly increasing severity of electric railway service on many city and interurban railways is shown by the extensive displays of higher-grade special track work, wheels, axles, gears and pinions. While catenary construction has become almost an old story, it will be found that the improvements being made in this class of material also are worthy of notice.

Conventionalities

Who says we can't "come back"?

Are you an associate member? If so, where is your badge?

H. E. Weeks, secretary of the Accountants' Association, enjoyed himself on the special train from Chicago.

A. A. Anderson, general manager of the Springfield Consolidated Railway, Springfield, Ill., arrived on the Chicago special train Monday. He is accompanied by Mrs. Anderson.

Major Evans, with his silk hat, frock coat and cane, was a conspicuous figure in the lobby on the Pier Sunday afternoon. The better the day, the better the clothes.

J. W. Porter, of the Electric Service Supplies Company, did enough convention work in Chicago before starting for Atlantic City to entitle him to a pension. He was a transportation committee man. He is the great advocate of "lower berths only."

J. R. Wiley, of the Standard Underground Cable Company, and A. S. Littlefield, of the Lorain Steel Company, were two old-timers whose presence on the Chicago special train crowned the services of the day with the proper degree of reverence and austerity.

George Weston, assistant engineer, of the Board of Supervising Engineers, Chicago Traction, was a popular passenger on the Chicago special train. The chairman of the board, B. J. Arnold, will probably reach Atlantic City before the convention adjourns.

President John I. Beggs of the Milwaukee Electric Railway and Light Company reached Atlantic City Sunday evening. He was a passenger, during the latter part of his trip, on the St. Louis convention special, having boarded that train at Harrisburg, Pa.

Among the first arrivals from the West were W. H. McAloney, superintendent of rolling stock, and W. M. Casey, trainmaster of the Denver City Tramway Company, who were seen on the Boardwalk on Sunday afternoon. After the Denver convention they could not be kept away from this convention.

W. O. Wood has temporarily resigned his position as president, general manager, purchasing agent and a few other odd jobs on the New York & Queens County Railway, and has accepted a position as chief barker for Heywood Brothers & Wakefield Company. His maiden effort yesterday morning drew a large crowd at the booth of his confident and admiring new employers.

Among the early arrivals were S. W. Gunsalus, superintendent of transportation, and Fred M. Hulett, inspector of equipment of the Southwest Missouri Railroad, Webb City, Mo. They left their home city Friday, and after spending a day in St. Louis came to Atlantic City on the St. Louis special, which arrived Sunday afternoon.

Eight past presidents of the American Street & Interurban Railway Association are at the convention, or are expected in Atlantic City this week. They are: Albion E. Lang, president 1897-98; Charles S. Sergeant, president 1898-99; John M. Roach, president 1899-1900; Herbert H. Vreeland, president 1901-02; Jere C. Hutchins, president 1902-03; W Caryl Ely, president 1903-06; John I. Beggs, president 1906-07, and H. M. Littell, president 1882-83.

It is a long journey from San Francisco to Atlantic City, but men do make it, and for the purpose of attending conventions. Thomas Finigan, purchasing agent, and J. H. Handton, claim agent, of the United Railways, San Francisco, arrived on the Chicago special train yesterday. They are mighty good travelers. They do not get tired. They are always early, especially Finigan.

A. W. Brady, president of the Indiana Union Traction Company and first vice-president of the American Association, is in Atlantic City, but neither H. A. Nicholl, general manager of the company and a member of the committee on interurban rules, nor E. C. Carpenter, claim adjuster of the company and president of the Claim Agents' Association, was able to come to the convention on account of urgent business affairs at home.

Music hath charm, and some of it has been transmuted into the bowery loveliness of the exhibit halls, through the efforts of that talented organ virtuoso, E. F. Chaffee. Before each meeting of the exhibit committee last week Mr. Chaffee inspired every member with the strains of some familiar hymn, played on the magnificent pipe organ in the Greek Temple. No small part of the success of the committee's untiring work this year may be attributed to the musician's art.

The registration of delegates and guests at the convention was very heavy yesterday. Up to 5:00 p. m. 727 badges had been issued by the Manufacturers' Association to members and 126 badges to ladies and guests. The American Association registered 112 delegates, and the registration of the other associations was as follows: Engineering Association, 149; Transportation & Traffic Association, 67; Accountants' Association, 50; Claim Agents' Association, 31. Thirty associate members badges were issued and 210 railway guests and ladies were registered. The grand total of all classes was 1502.

Ralph E. Moore, of the General Electric Company, is receiving the congratulations of his many friends upon his appointment as assistant general manager of the Philadelphia district of the company. In this position Mr. Moore succeeds the late Theodore P. Bailey. Mr. Moore has attended many electric railway conventions in the interests of his company, as he has been manager of the railway department of the Philadelphia district since 1900, when he succeeded H. J. Crowley in that position. He was connected with the original Thomson-Houston Electric Company and has been in Philadelphia in the interests of the General Electric Company since the year 1894.

Winnipeg, Canada, is a fast-growing city. So rapid is the influx of home-builders to that important inland center of His Majesty's American empire that those who administer the public service affairs of Winnipeg can hardly venture away for a week-end lest a new suburb of 10,000 population may, in the meanwhile, spring into existence and be demanding railway, light or power service on their return. This being the off season for suburbs, Messrs. W. Phillips, general manager; Richard R. Knox, traffic superintendent, and George Garrett, superintendent of shops of the Winnipeg Electric Railway, have come to the convention to renew friendships and see the exhibits.

The "pool on the run" of the special train from Chicago gave the journey something of the atmosphere of a sea trip. G. H. Atkin, J. R. Blackhall and E. H. Noyes were the pool committee. The pool was on the time that the rear truck of the last car would pass off the Delaware River bridge and enter Jersey soil. Fifty tickets were sold. C. K. Knickerbocker and H. L. Monroe were timekeepers, and as a matter of course they were the objects of much anxiety and suspicion. The anxiety arose from the fact that they had to decide the time without stop-watches and the suspicion arose from natural causes. The train left the bridge at 56 minutes and 38 seconds after 12 o'clock (12:56:38). The nearest number to this, 12:57, was held by W. H. Stevenson. The second prize went to J. R. Wiley and the third to B. H. Rider. The prizes were very neat and attractive and were made of various coins of the realm.

THE BASEBALL GAME TO-NIGHT

The Yama-Yama indoor baseball game and smoker to-night in Marine Hall on the Convention Pier promises to be one of the most enjoyable and unique features of the week's entertainment. The railway men and the supply men are expected to give an exhibition of inside baseball that will rival the coming duels between Connie Mack's Athletics and Peerless Leader Chance's Cubs. A quintet of talented musicians has been engaged to provide music and other stunts, and the committee in charge will gladly accommodate any amateur performers who are willing to take a chance on getting the "hook." For this one night only the ladies must be content to play euchre by and between themselves.

THE ST. LOUIS SPECIAL TRAIN

The special convention train from St. Louis arrived here Sunday afternoon. The train, which was composed of four Pullman sleeping cars, an observation car and a library buffet, left St. Louis at 1:00 p. m. Saturday and made an eventful run to this city. The party consisted of about 70 railway and supply men from the Missouri city, as well as several railway men from Texas and Southwestern cities. The train was operated under the personal supervision of C. C. Curtice, district passenger agent of the Pennsylvania Railroad at St. Louis. One of the features of the service afforded by the railroad was an attractive directory giving the names of the passengers, the companies which they represented and the number of the car and section occupied by each. Arthur S. Partridge, master of transportation, aided very materially in making the special a successful venture.

RECEPTION TO THE OFFICERS OF THE ASSOCIATIONS

The reception to the presidents and other officers of the New York associations and their wives, which was held in the lobby of the convention pier last night, opened brilliantly the social activities of the week. The guests of the evening received at the east end of the lobby. Besides President Shaw, the following officers and ladies were in the receiving line:

A. W. Brady, first vice president of the American Association; Mrs. Jos. R. Ellicott; Mrs. D. A. Hegarty; H. C. Donecker, secretary of the American Association; Mrs. Donecker; Thomas N. McCarter, second vice-president of the American Association; Mrs. H. H. Adams, Gen. George H. Harries, third vice-president of the American Association; H. S. Swift, president of the Accountants' Association; Mrs. Swift; R. I. Todd, president of the Traffic & Transportation Association; Mrs. William H. Huelings, Jr.; John I. Beggs, past-president of the American Association; H. K. Bennett, third vice-president of the Claim Agents' Association; Mrs. Bennett; W. J. Harvie, acting president of the Engineering Association; J. W. Corning, secretary of the Engineering Association.

The lobby presented a charming sight during the evening. The handsome gowns of the ladies added to the effect of fairyland produced by the floral decorations of the booths and the soft colors of the lamps in the ceiling of the hall. A ladies' quartet rendered a selected repertoire of songs during the reception, and later an orchestra played for dancing after the floor had been cleared.

Charles O. Kruger, president of the Philadelphia Rapid Transit Company, has been elected a director of the company, to succeed Clarence Wolf, resigned.

Frederick W. Whitridge, receiver for the Third Avenue Railroad, New York, returned to New York on the "Mauretania" on October 7. Mr. Whitridge spent most of his time in Scotland, where he went for a rest.

THE LIGHT THAT FAILED

Last night the city was shrouded in darkness for a time owing to the failure of the electric distributing plant to work properly. Inquiry of the manager of the local plant elicited the following information: The Atlantic City plant is what is known as the two-faced system. This method is operated by crossing the F rheostat with the lightning arrester abaft the forward exciter. Wednesday night the armature of the transformer short-circuited with the brushes of the wattmeter, causing the commulator to synchronize with the collector ring, which closed one face of the voltmeter, causing the currents to seek escape through the back door. This explanation appears to be the correct one and will be readily understood by the technical engineer, but to enable the layman to understand the matter we may say that the essence of the juice in the dinghummer coalesced with the lead fuse, which failed to vitrify properly, thus causing the current from two lines to run through one wire, burning out a fuse in the substallation. The matter has been adjusted.

THE VALUE OF A COMPANY MAGAZINE

The Sioux Falls Traction System has been publishing a four-page paper "now and then" for the past two years under the name "On the Cars." A. W. Warnock, general passenger agent of the Twin City Rapid Transit Company, recently wrote to F. M. Mills, editor of the paper, who among other positions also has the titles of president, treasurer and general manager of the Sioux Falls Traction System, asking what his experience had been with the publication. The following is Mr. Mills' reply:

Sept. 25, 1910.

Mr. A. W. Warnock, G. P. A.,
Twin City Lines,
Minneapolis, Minn.

Dear Sir: Your favor received and we forward copies of "On the Cars" as requested. In answer will say that we issue the paper "now and then," usually about once in three months.

I am not prepared to speak as to the advantages derived from its publication. It gives us a chance to keep in touch with our patrons, to publish our time schedules and rules and make announcements from time to time and an opportunity to get even with our critics and keep the people posted on car ethics and etiquette.

We have been unable to decide whether it is a good thing for the company or not. The only tangible acquirement we have to our credit is a libel suit, which entitles ours to rank as a real newspaper.

The writer, being an old newspaper man and still troubled with the disease known as cacoethes scribendi, must have his fun and if any malice can be shown may have to pay for it. So if your ambition has journalistic tendencies we warn you to derail in order to avoid collision with the ambulance chaser.

Very truly yours,
F. M. MILLS.

The following was overheard on one of the special trains to the convention: "No, my wife didn't come after all. She got the dress all right. And she got the hat. Yes, and she got the shoes, too, but at the last minute she found that the shoes didn't fit. So she couldn't come."

The Birmingham (England) Corporation Tramways sell workingmen's tickets at greatly reduced rates. On some lines a charge of only 2 cents is made for a trip of 4½ miles. These low rates are in effect only up to 8 a. m., but the return ticket which is purchased at the time of paying the going fare is good at any time of the day.

A WELCOME TO THE RAILWAY MEN

Hail to the Human Trolley Wires!
The men who run their cars
From Everywhere to Everyplace
Beneath the twinkling stars.

A welcome to you, mighty host,
Is blazoned on this page!
A welcome to you, one and all,
You builders of the age.

A welcome to the salt sea waves,
Which in the Summer Time
Embrace the fairest sylphlike forms
From every earthly clime.

A welcome from the people of
This city by the beach,
Which for renowned attractiveness
Is something of a peach.

A welcome, too, from Mr. Young,
Who's pleased again this year
To have you hold your meetings on
His Million Dollar Pier.

Inventive Genius welcomes you,
And—know it for the truth—
You'll find the warmest welcome here,
AT EACH PARTICULAR BOOTH.

E. B. GRIMES.

SCHEDULE OF ROLLER CHAIR COMMITTEE

The roller chair committee has prepared a complete schedule of assignments of members, to be in charge during the week of each of the three checking stations which have been established. The accompanying table shows the name of the member of the committee in charge of each station at all hours of the day, from 9:00 A. M. to 7:00 P. M.

SCHEDULE OF ASSIGNMENTS OF CHAIR COMMITTEE

MONDAY					
Hours	9-11	11-1	1-3	3-5	5-7
Pier	Keys	Cory	Olds	Smith	Frantz
Marlborough	Green	Lavelle	Horn	Hegeman	Dunham
Chalfonte	Denton	Verner	Weston	Nicholl	Mason
TUESDAY					
Pier	Mason	Denton	Verner	Weston	Nicholl
Marlborough	Frantz	Keys	Cory	Olds	Smith
Chalfonte	Dunham	Green	Lavelle	Horn	Hegeman
WEDNESDAY					
Pier	Hegeman	Dunham	Green	Lavelle	Horn
Marlborough	Nicholl	Mason	Denton	Verner	Weston
Chalfonte	Smith	Frantz	Keys	Cory	Olds
THURSDAY					
Pier	Olds	Smith	Frantz	Keys	Cory
Marlborough	Horn	Hegeman	Dunham	Green	Lavelle
Chalfonte	Weston	Nicholl	Mason	Denton	Verner
FRIDAY					
Pier	Verner	Weston	Nicholl	Mason	Denton
Marlborough	Cory	Olds	Smith	Frantz	Keys
Chalfonte	Lavelle	Horn	Hegeman	Dunham	Green

W. E. Wilkinson, of the Pressed Steel Car Company, who is chairman of the roller chair committee, is endeavoring this year to provide more efficient service than ever before. The committee will appreciate the coöperation of members and guests to that end. The greatest measure of assistance will be rendered by observing the request to wear the official convention badge at all times, and in plain sight. By doing this neither members, guests nor the committeemen will be subjected to embarrassment, owing to any question arising over the privilege to use the chairs provided. The committee will welcome any complaints or suggestions relating to the roller-chair service. Rules governing the use of the chairs will be found in the booklet of general information and program of entertainment, page 10. In addition to the regular service each day, the committee has arranged for additional service, as follows: On Monday evening, from 8:00 to 10:00 P. M., on account of the officers' reception at the Convention Pier. On Wednesday evening, from 8:00 to 9:30 P. M., on account of the vaudeville performance at the Apollo Theater. On Thursday evening, from 8:00 to 10:00 P. M., on account of the promenade concert and ball at the Convention Pier.

THE CONVENTION BADGES.

The design selected for the convention badge is particularly appropriate, suggesting, as it does, the atmosphere of the sea. Below the spreading eagle, which surmounts a miniature electric railway car, is a life preserver, which forms the central medallion of the badge. A windlass, wheel and anchor, inside the life preserver, are emblematic of life on the ocean wave. The American, British and Mexican flags typify the three divisions of the North American Continent and add a touch of color. The color of the ribbon attached to the badge indicates the association with which the wearer is affiliated. The following is the key to the color scheme adopted: American Association, marine blue; Accountants' Association, orange; Engineering Association, brown; Claim Agents' Association, green; Transportation & Traffic Association, gray; Manufacturers' Association, red; guests, light blue; ladies, white; associate members, purple; members of finance, entertainment and exhibit committees of the Manufacturers' Association, dark blue and red stripe.

ASSOCIATE MEMBERSHIP

The committee on associate membership is anxious to add 500 new associate members to the association during the coming week. The constitution of the American Street & Interurban Railway Association says that those eligible for membership as associate members are "individuals, copartnerships and corporations who are actively identified with street and interurban railway interests, and other persons who, in the opinion of the executive committee, have had experience of such a nature as to render desirable their connection with the association."

There ought to be at least 500 men at the convention this year who are eligible for membership under this definition but have not yet joined the association. Each one of these should sign an application blank immediately, and hand it with a five-dollar bill either to one of the attendants at the association headquarters or to any member of the committee on associate membership. It will prove the best five-dollar investment he ever made.

It is pretty hard to miss a member of the associate membership committee. They can be recognized by their badges. But their names follow: H. H. Adams, S. W. Mower, F. D. Hall, Paul Winsor, M. H. Bronsdon, W. J. Harvie, J. S. Doyle, M. C. Brush, Martin Schreiber, Charles T. Herrick, E. O. Shryock, J. M. Larned, T. A. Cross, W. J. Kehl, Charles J. Bendt, Joel Hurt, Charles Madden, L. P. Crecelius, E. O. Ackerman, F. A. Healey, L. C. Shipherd, J. B. Crawford, H. A. Davis, W. Worth Bean, John Z. Murphy, M. M. Lloyd, A. W. Warnock, C. F. Holmes, W. H. McAloney, J. J. Johnson, W. J. Jones, P. E. Mitchel, D. A. Hegarty, G. J. Kuhrts, Frank Dabney and Warren H. Fiske.

One of the first railway men on the Boardwalk was H. H. Adams, superintendent of rolling stock and shops, Metropolitan Street Railway, New York. He put his own "John Hancock" on the Chalfonte register on Saturday, and also wrote the names of Mrs. Adams and their son.

PRESIDENT CARPENTER'S ADDRESS TO THE CLAIM AGENTS' ASSOCIATION

It is with the most pleasant memories of our former meetings that I bring you greetings to this, our seventh annual convention. We have felt from the general interest manifested throughout the year that this convention would have the largest number of persons in attendance of any of our conventions, and I am glad to know that the number of delegates now registered shows this to be the fact.

The past year has been one of great activity in railway circles. With the increase in business comes the increased responsibilities necessary for its care. Increase in business brings a corresponding increase in accidents, with the burden of their care resting upon the claim departments. Some localities seem to have been particularly favored by Dame Fortune, and troubles have been few, while in other places the hand of Fate has laid a heavy hold and the toll of human lives and property has been great indeed.

There are few, if any, conditions that can arise quickly that will so severely shake a company from stem to stern as a disastrous accident where the loss of life is great and injuries many and serious. Then it is that the claim adjuster must keep his head level and his wits alert. He is the "buffer" of the treasury, against whom claimants must come before their claims are allowed.

The matters which have come before your officers the past year have received their prompt attention. For several years it has seemed desirable for a contract to be made with some information bureau, whereby data regarding claimants could be quickly exchanged among its members. This year the executive committee of the parent organization, following the recommendations of our executive committee, entered into a contract with the Hooper-Holmes Information Bureau. This contract entitles each member company of our parent organization to full information from the bureau, at a very small cost.

You were advised by circular letter of the plan of reporting and requesting information upon claimants. From results since the contract was made, we are led to believe that the plan is not understood by all. In order that we may be fully advised along the lines upon which the bureau operates, Mr. Hooper will address us on Wednesday.

I desire to express my hearty thanks to the various committees which have coöperated with me in such a willing manner, also to the officers who have responded promptly to every call. It has, indeed, been a great pleasure to have been associated with such pleasant gentlemen and to know that the work of the year has been carried along without a single jar. I desire also to thank kindly the gentlemen who have given their time and thought to the preparation of the papers upon the various subjects to come before us. I feel no hesitancy in saying that as we listen to the papers as they will be presented we shall hear expressed the ideas of some of the brightest minds of our membership.

That we have been fortunate in again being permitted to return to Atlantic City goes without saying. The city is known largely by its reputation to furnish pleasure to its guests. Enjoy its hospitality while here in whatever way you may each desire.

A fine spirit of good-fellowship has heretofore prevailed, by reason of which we entertain the kindliest feeling, each to the others. Continue this fellowship. Extend your acquaintances while the opportunity is present. Take home with you that which is good and practical and of benefit to your company. Talk over with your superiors those things from which you derive benefit. Put into practical use the suggestions suitable to your own conditions. In this way the usefulness of our associations will be manifest, and we shall occupy the place of importance to which we are entitled.

CLAIM AGENTS' DINNER TO-NIGHT

The annual dinner of the American Street & Interurban Railway Claim Agents' Association will be held at the Hotel Windsor this evening from 6 to 8 o'clock. Ladies will attend and all claim agents or representatives of the claim departments at the convention, or any ladies in attendance with them, are cordially invited to be present at the dinner. Tickets will be on sale by the members of the committee, H. K. Bennett, C. B. Hardiman and C. A. Avant. The price will be $2.50 per plate. Those who have not yet purchased tickets but wish to attend the dinner should secure their tickets from one of these members of the dinner committee before 12 o'clock to-day, as the committee is anxious to know how many will be present. A few speeches will be made after the dinner, but they will conclude by 8 o'clock, so as to allow those who wish to attend the ladies' progressive euchre at the Marlborough-Blenheim or the indoor baseball game at Marine Hall to do so.

ARRANGEMENT OF EXHIBIT HALLS

Delegates will notice a slightly different arrangement of exhibit halls this year from that which prevailed at the convention of 1908. Then the upper floor of Building No. 2, or Marine Hall, was used for exhibit purposes and the lower floor of the building was closed. This year the lower floor has been opened for exhibits and Marine Hall has been retained in its normal condition as an amphitheater with rows of seats and a stage. This plan doubles the space available in the building for convention purposes. The exhibit committee first thought of using Marine Hall for exhibits, but this would have involved the removal of all the seats and of the stage. The committee finally decided to keep the hall in its present condition and hold the entertainment and smoker this evening there. This decision is in line with the policy adopted this year of concentrating as far as possible the activities and evening entertainments of the association on the Pier, a plan exemplified by the location of the reception held last evening at the Pier.

DEATH OF C. W. REINOEHL

On Sunday afternoon early arrivals at the convention were shocked and saddened by a report which came over the long-distance telephone that C. W. Reinoehl, superintendent of the frog and switch department of the Pennsylvania Steel Company, had been killed in an automobile accident near Buena Vista, N. J., while en route from Steelton to Atlantic City. Mr. Reinoehl was driving the car himself at a moderate speed, when he looked backward to see a following car, which contained a party of friends. In doing so he lost control of the car, which skidded to one side of the road and turned over twice. He was thrown out and the car fell on him, inflicting injuries from which he died in a few moments. William R. Miller and H. Barbee, both of the Pennsylvania Steel Company, who were in the automobile with Mr. Reinoehl, were thrown out, but escaped with minor injuries. When news of the accident reached Atlantic City Howard F. Martin went to Buena Vista in a fast automobile and took charge of Mr. Reinoehl's body.

Mr. Reinoehl entered the employ of the Pennsylvania Steel Company in 1880 and had been superintendent of the frog and switch department since 1904. He leaves a widow. His business associates who are in attendance at the convention have been the recipients of many expressions of sympathy in their loss, and all of Mr. Reinoehl's friends feel saddened and depressed as the result of his tragic death.

The funeral services will be held at Steelton, Pa., Wednesday afternoon.

ADDRESS OF PRESIDENT TODD OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The delegates of the Transportation & Traffic Association are, I feel, most sincerely to be congratulated in meeting in this "Fair City by the Sea" for the third annual convention of this association. The surroundings are in marked contrast to those of one short year ago when our meetings were held almost under the shadow of the Rockies; but it will be our most earnest effort and desire that the exceedingly interesting and instructive meetings held last year shall be continued during our present convention and that even greater and more successful results shall be accomplished by the members and various committees of the association.

One of the many important matters which have been considered by your officers and executive committee at its recent meetings has been the change in the name of the association from "The American Street & Interurban Railway Transportation & Traffic Association" to "The American Electric Railway Transportation & Traffic Association," following the proposed change in the name of the parent association to "The American Electric Railway Association," and your officers and executive committee have unanimously decided to recommend to this association certain changes in the constitution and by-laws, which are required by this change of name, after corresponding action has been taken by the parent organization. We believe that the changes in the name of the association and in the constitution and by-laws will tend to broaden the work of this body and enlarge its field of activity and usefulness.

During the present year your officers and executive committee have thought it wise to add two committees to the standing committees of this association which are already in active work and have accomplished such admirable and efficient results during the past three years. The work of the committee on "topics and subjects," in the selection and discussion of live, up-to-date subjects for the preparation of papers to be brought before this association, and in many other directions, we believe will be of great advantage to the work of the association.

The committee on "construction of schedules and timetables" was appointed in line with the suggestion of one of our largest member companies, that this most important factor in the operation of all street railway systems had been given very little concerted thought or action by this association, and we believe that the first report of this committee, which will be presented during the present meeting, will be found to be of very great interest to the member companies and deeply instructive to all.

When we consider that this Transportation & Traffic Association has been in existence for only approximately three years, we believe that we may feel justly proud of the results accomplished. But in so wide a field as this association covers there still remain many subjects for the most careful consideration and investigation.

The adoption by this association at the 1909 convention of a standard set of rules governing the operation of interurban lines and the operation of city lines, and their approval by the parent association, has, we believe, marked a very decided advance in the successful operation of city and interurban properties. We feel that the further development of the rules and regulations governing particularly the operation of high-speed interurban cars should be followed up most carefully and thoroughly by this committee, and that joint meetings should be arranged between the interurban rules committee and the rules committee of the American Railway Association, so that by these conferences and discussion of rules we may still further secure, if that be possible, the benefit of the many years' experience of the steam railroads in their rules governing the operation of their lines, methods of dispatching, etc., and that we may adopt any additional rules which may be found advantageous in the operation of interurban lines.

We should most earnestly strive at all times to perfect these rules in every possible way, to keep them up to date, and to have them contain the very latest and most modern practice in operating rules. The interurban rules will be of particular interest and importance to those companies which operate high-speed interurban lines, and therefore realize that for the safe and successful operation of such lines these rules are of the most vital importance.

The adoption by all member companies of these standard rules governing the operation of both city and interurban lines will, we believe, mark a long step forward in the systematic and successful operation of all their properties.

No two factors can be more important in the successful operation of any property than standard rules governing the operation of the lines, and the standardization as far as possible of cars with particular reference to height of drawbars, bumpers, platforms, etc., together with the standardization of equipment, including journals, axles, brake shoes, etc. In this standardization work the results accomplished by the Engineering Association have also been of great benefit to all member companies.

The report of the committee on training of transportation employees will, we trust, be of particular interest to the members of the association and bring out a very full and free discussion of this most important subject. In these times, when the attempt is so constant to make the general feeling of the public antagonistic and hostile toward all corporations, it would be impossible to place too much importance on the securing of the most capable and efficient employees, and on their training and discipline. To a very large extent, the employees of any company represent to their patrons and the general public the corporation itself, and those employees who come directly in contact with the public, if of the proper type and thoroughly trained and disciplined, can accomplish most wonderful results in molding public sentiment in favor of, rather than against, the corporations.

The greatest asset that any company can have is the good will and friendship of its patrons. Every company and every employee should use their utmost endeavors to secure and retain cordial and friendly relations with the public. The best means of accomplishing these results will, we trust, be most earnestly considered and thoroughly discussed during our meeting.

The committee on topics and subjects has selected a number of interesting subjects for the preparation of papers to be read before your association at this meeting, which we trust will be of very great interest to all of the members present and result in even larger attendance than at previous sessions. The work, however, of your association, as at previous meetings, will very largely be devoted to the reports of the regular committees of this association and the full discussion of these reports. We trust that all members will be present and take an active part in the consideration and discussion of all reports and papers presented.

In closing, I wish to express my most heartfelt thanks and appreciation to the officers and members of the executive committee, to the secretary, and all members of this convention for all the assistance given during my term of office, and to the chairmen and members of the standing committees for the hard and conscientious work performed by all members of these various committees. Anyone who has experienced the honor of being president of this association cannot but feel proud of, and deeply grateful for, the loyal, earnest and able support given him by its officers and all members of the association.

The Rochester, Syracuse & Eastern Railroad was the subject of an illustrated article which was published in "Commerce" for September, 1910, a magazine issued at Rochester and devoted to industry and trade.

THE CLAIM AGENTS' ASSOCIATION

The first meeting of the American Street & Interurban Railway Claim Agents' Association was held at the Traymore Hotel yesterday afternoon. President E. C. Carpenter was unable to be present, owing to important business engagements, so that J. S. Harrison, first vice-president of the association, presided. Secretary Davis read a letter from Mr. Carpenter in which he stated that he had been looking forward to the meeting with the greatest interest, and it was a great disappointment to him that he would be unable to be present.

Mr. Carpenter's address as president of the association was then read by the secretary. It appears elsewhere in this issue. The secretary then presented the report of the executive committee, containing the minutes of the committee held January 26 and June 15.

The secretary then read his annual report. He stated that during the year 300 letters relating to the association had been received and answered by him. It also contained a list of various official announcements issued by the association.

According to the program, a paper was then to be presented by James R. Pratt, Baltimore, Md., on "What Matters Particularly Interesting to Claim Departments Ought to Be Subject to Legislation, and How Can the Claim Agents Best Exert Proper Influence to Obtain Such Legislation?" Mr. Pratt was unable to reach here, and notified the secretary that he would be unable to reach Atlantic City until this morning, so that his paper will be taken up at the morning session to-day.

About 50 were present at the meeting. A committee was appointed to send a telegram to Mr. Carpenter on his inability to be present at the opening session.

RECORDS OF CONVENTION BENEFITS

Under date of Oct. 1 Secretary Donecker sent the following letter to the chief executive officer of all member companies of the American Street & Interurban Railway Association:

"My Dear Sir:—

"A plan which has been successfully followed by some few of the member companies in past years seems to contain so much merit as to warrant our bringing it to your attention, so that, if you desire, you could make use of it in connection with the coming convention.

"Briefly, the plan is that each representative who attends the convention shall, after returning to his home city, prepare and file with his superior officer a somewhat detailed report of his personal observations of practice and equipment which appear sufficiently valuable to apply to the operation of the company with which he is connected. This report should outline the new ideas developed at convention meetings or through the interchange of thought with delegates outside the meeting halls with respect to any department or phase of electric railway operation. Problems solved and doubts dispelled should be definitely set forth and new developments and improvements in mechanical appliances and apparatus as they affect your particular company should be clearly defined. In many instances, the immediate application of new methods and equipment is not feasible and when an opportunity to utilize them does arrive they are either forgotten or overlooked. Filed records of the kind described to a large extent eliminate this trouble.

"We are sure that the merits of the system in many other directions will appeal to you, without the necessity of our going into further detail.

"The plan, as described above, covers only its application to the individual company, but it has been our thought that herein there is a field in which the association might, with your coöperation, be of considerable benefit to the companies as a whole. The idea is that shortly after the close of the convention we should invite each member company to file with us a copy of the synopsis of the reports submitted by its officials with especial reference to such portions of these reports as would be of more than local interest. The association would then make a careful study of the material obtained, and would publish the result in the form of a confidential bulletin to be sent to all companies participating. Suggestions as to association work in general, with reference to the especially interesting parts of committee reports and papers, with the thoughts that these may have brought about as to lines of investigation and work which, in your opinion, the association should take up, will also be welcomed. We should also be pleased to receive, if agreeable, a brief statement as to the returns received throughout the year through participation in association work.

"As a preliminary move, it is respectfully suggested that the plan be brought to the attention of your representatives before their departure for the convention, perhaps at a meeting to discuss possible improvements in practice or equipment. This would tend to bring about definite lines of investigation during convention week."

SEABOARD AIR LINE SPECIAL

For the first time in the history of the American Street & Interurban Railway Association, a special convention train was run from Atlanta, Ga. The train was composed entirely of electric-lighted Pullman cars furnished by the Seaboard Air Line Railway through C. D. Wayne, assistant general passenger agent, Atlanta. The train left Atlanta at 11:30 a. m., Saturday, Oct. 8, and arrived in Atlantic City on the following afternoon. Twenty-three railway and supply men made up the party, which is the largest single delegation ever attending the convention from the Southeastern States. The train was in charge of Mr. Hampton, of the Seaboard Air Line Railway, who paid every attention to the passengers.

THE SPECIAL TRAIN FROM CHICAGO

The special train from Chicago started at three o'clock on Sunday afternoon under lowering skies as the second section of the 18-hour Pennsylvania Special and arrived in Atlantic City at two o'clock Monday afternoon as a section of a slow local train, but the sun was shining. The train was composed of one sleeping and observation car, six sleepers, two diners and one buffet-smoker. The equipment was the most modern steel passenger cars, for which the Pennsylvania system is noted, and the service was up to the standard of the best fast trains.

T. R. Wilt, city passenger agent of the Pennsylvania lines at Chicago, was in charge of the train and was tireless in his attention to his guests. The work which the transportation committees of the American and the Manufacturers' Association had done made the trip one of great comfort and much pleasure to each passenger. Messrs. J. M. Roach, E. C. Faber, J. W. Porter, L. E. Gould and Hiram J. Kenfield constituted these committees. The passenger list contained 118 people, among them a considerable number of ladies.

Ten steel passenger cars make a rather heavy train, and it was to have been expected that the schedule of the 18-hour train would not be maintained. But as only a very few upper berths were occupied and as, in consequence, the cars were not badly crowded, the comfort which the party enjoyed compensated for the late hour of arrival at the scene of the convention.

Gen. G. H. Harries, W. F. Ham, H. W. Fuller and C. S. Kimball, of the Washington Railway and Electric Company, arrived on Sunday.

MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The first meeting of the American Street & Interurban Railway Transportation & Traffic Association was held yesterday afternoon at the Greek Temple. The hall had been tastefully decorated with flags. President R. I. Todd called the association to order at 3 P. M. and read his presidential address. This is published elsewhere in this issue.

The president then called for the report of the executive committee. This gave an account of the meeting of the committee on January 28, when the committees of the association were appointed. At this time also a letter was received from C. S. Sergeant, vice-president, Boston Elevated Railway, suggesting that a committee be appointed to report on schedules and timetables. This suggestion was received favorably and a committee on this subject was appointed. The report also mentioned the action taken by the executive committee at the other meetings during the year.

Secretary Donecker then presented the report of the secretary and treasurer. He stated that the total expenses during the year had been $3,555. Of this amount $2,123 had been for printing and distributing the proceedings and for other printing required for the association. The remainder, $1,432, was for all other purposes. The secretary also called attention to the facilities possessed at the headquarters for supply of information

President Todd then called for the report of the committee on passenger traffic. It was read by J. W. Brown, and is published elsewhere in this issue.

At the suggestion of Mr. Brush, the president then called for the paper on the "Creation of Passenger Traffic," by J. F. Keys, general passenger agent of the Detroit United Railway. This paper is published elsewhere in this issue.

Mr. Keys called attention to some 20 samples of advertising cards and timetables used by the Detroit United Railway, which were posted on the walls of the convention hall. He added that cards of this kind were carried on every car of the Detroit system, both city and interurban.

DISCUSSION ON PASSENGER TRAFFIC

M. C. Brush, Boston Elevated Railway, called attention to the statement of Mr. Keys that the Detroit United Railway made no special excursion rates and carried no excursions. Mr. Brush said that he agreed absolutely with that policy, but knew there were many who held the opposite view. Referring to his experience on the Buffalo & Lake Erie Traction Company, he said that he had had considerable experience in trying to compete with steam railroads in excursion business. He said that the Lake Shore Railroad gave a round-trip rate of $1.25 for a journey of 192 miles, whereas the regular rate on his electric road was $1.65 one way. Buffalo & Lake Erie Traction Company had never endeavored in any way to compete with any such reduced rate. It would mean that it would have to haul the passengers for less than a half cent a mile, and he did not believe that electric railways could afford to do that. A steam railroad, with from 5 to 14 coaches behind one locomotive, might be able to do so, but an electric railroad would have to provide separate cars for every 50 or 60 passengers, with separate crews for each car. This would make the labor cost and other expenses incident thereto prohibitive, and for that reason his company had not undertaken to compete with the steam railroads in that class of business. He added that the Erie Railroad had practically discontinued running any excursions, the president of the company maintaining that the liability to accident and the contingent losses destroyed any profit that might otherwise accrue to the company. This year, for the first time in the history of the Erie Railroad, it ran no excursion trains to Chautauqua, whereas in previous years it had run excursions of from 6 to 14 cars. He then asked whether Question 3 in the committee's data sheet referred to raising or to lowering electric railway rates to meet steam railroad competition.

John F. Keys, Detroit United Railway, said that the fares on that line were practically governed by local franchises. During the summer the steam railroads frequently ran Sunday excursions from Detroit to Toledo, charging 75 cents for the round trip. The rate on the electric road is $1.50.

E. C. Hathaway, Norfolk & Ocean View Railway, said that company had two lines operating to the seashore, and on both of those lines the steam railroad rate for excursions was less than a cent a mile.

D. A. Hegarty, Little Rock Railway & Electric Company, thought that banners and dasher signs were not of much service at night. The monitor ventilators in his cars were used to display signs that can be read at night from the sidewalks, as the light from the car shines through them. The lettering is white on a black ground. Such signs as "Go to Forest Park" and "Take a Moonlight Ride on the Mountains" were used. These advertisements were changed the same as the advertising on the dasher.

John F. Keys explained that the bulk of the travel is in morning and at night, when the banners can be seen. In the evening, in the heart of the city, the streets are lighted up so well that the advertisements can be read as easily as in the day time. The type used is large enough so that the banners can be read at night. He knew of nothing that in any way compared with the advertising on the front of the cars.

W. B. Rockwell, Eastern Pennsylvania Railways, said he was not afraid of any competition of the steam roads.

As regards advertising, every attraction should be self-sustaining. Such things as a band, fireworks and attractions of that kind drew considerable money, but they also involved considerable expense, and when there was no means of getting it back, except from the car fares, he believed it was a false method.

G. W. Parker, Detroit United Railway, thought that the steam road competition between Detroit and Toledo, referred to in Mr. Keys' paper, had been a very good thing for his company, because the steam trains are scheduled to leave at a certain time in the morning and to return at a certain time in the evening, whereas, with the interurban limited service, passengers did not have to stay in Toledo or in Detroit, but could come back at any time they pleased, and the contrast was all in favor of the electric line. He was of the opinion that steam railroad competition, even including cut rates, was a good thing for the electric lines. The steam roads were creators of traffic, as well as the electric lines. If the regular rates are charged on Sundays and holidays, however, the people must be taken care of in good equipment on a limited schedule, so arranged as to give all the service required for comfort.

J. W. Brown, Aurora, Elgin & Chicago Railway, said that company had carried 20,500 people as excursionists during the past six weeks, between Chicago and Elgin and Aurora. The "Chicago American," one of the Hearst newspapers, had boomed this excursion business daily in large headlines, and the readers of the paper, by clipping a certain number of coupons and paying a small amount of money to the newspaper, would receive a ticket good for the round trip from Chicago to Elgin or to Aurora and return, as might be desired, on some specific date. These dates were arranged by the company on a schedule so that it would not interfere with the big days of business which would come during that period.

The result had been that the company had done a large business, and in many cases the patrons who travelled on these cheap excursion tickets had returned at the regular rates. The company had also had this method of advertising in connection with two of its local parks, and the people had patronized the city lines to various local points.

Mr. Brush said he thought a mistake often made was that all efforts for the creation of passenger traffic were confined to the creation of traffic primarily during the summer months. He thought most electric roads would be glad if they could do away with their summer business, provided they could substitute in place of it a business continuing 365 days in the year. A company often has a park line doing a good business for 100 days during the year, but during the other 265 days of the year the company carries a tremendous unproductive investment in open cars. In addition the company has to put on these open cars, for this special service in the summer, a lot of inexperienced men, who are costly to the company. He believed that a plan which had proved effective in the Far West, of having the local chamber of commerce or board of trade try to make the community a success, a manufacturing success, had more to do with the creation of passenger traffic than all the parks, pleasure resorts, band concerts, fireworks exhibitions or anything of that kind that could be conceived of. The railway company unquestionably was the first public service corporation to benefit by any increase of population in the city. It benefited more quickly than the gas company, the telephone company, or the electric company. If railway companies would coöperate with the secretaries of the chambers of commerce and manufacturers' associations in their different communities in endeavoring to bring to their city interests which would encourage the laboring class of people to go there, the result of expenditure in that field would be far greater than would come from trying to get 500 people to go to a park.

H. C. Page, Worcester Consolidated Railway, said it was a question in his mind how much money a company could afford to spend for summer business. The park business was often an expensive luxury and there were very few parks in Massachusetts that paid their expenses. He formerly had on his system 14 parks; and this year he operated only 6 parks. The gross receipts on the lines reaching the abandoned parks were no less than they were a year ago, and he felt that the company had made money by cutting down its park business.

Carl A. Sylvester, Middlesex & Boston Street Railway, said a word in favor of parks. One park on his road during the course of a year attracted about 500,000 people. He considered it one of the best features of the company's business. They could not afford to even consider abandoning the park.

E. F. Peck, Schenectady Railway, described a park about eight miles from the city of Schenectady, where the company own about 175 acres of land, on Ballston Lake. The property has been laid out in lots 100 by 150 feet. These lots are rented for $25 a year, and the holders are given a ten-year lease. Five years ago there were 15 cottages on the park, and to-day there are more than 150. The campers invite their friends out to week-end parties, and a large traffic on Saturdays and Sundays results. One part of the park has been reserved as a picnic ground, and in January the company begins to advertise it for fraternal and church picnics; the dancing and boat privileges are rented out. The railroad company has earned better than 10 per cent in the last two years on the park, and the increased earnings of the road make it a good paying business.

C. R. Gowen, Oneida Railway, cited the New York State Fair, held just outside of Syracuse, as an example of ineffective steam railroad competition. The New York Central sells a one-week excursion ticket between Utica and Syracuse for $1.50 and a one-day ticket for $1.25, including admission ticket to the fair. The Oneida Railway charges $2.25, or $1 in excess of the New York Central rate, and carries most of the people during the rush hours.

Mr. Keys, in reply to a question, said that the pocket size folder is the most popular.

E. F. Schneider, Cleveland, Southwestern & Columbus Railway, said that he had previously tried fastening banners to the fenders, but they became soiled or got loose and frightened horses. The system in Detroit obviated that entirely.

Mr. Sylvester exhibited a form of banner fastened on the trolley pole of the car. His company has adopted the slogan "Follow the Flag," and every car that goes near Norumbega Park flies one of these flags.

Mr. Keys said that the cost of the signs referred to in his paper was $1 a hundred for the first hundred and 75 cents for each additional hundred.

C. Loomis Allen, of the Utica & Mohawk Valley Railway, thought that one sentence in Mr. Keys' paper made a pretty good slogan. This sentence was: "The policy is pursued owing to the fact that we feel we are giving excursion rates every day in the year." He thought that put the principle in concise form. Electric railway companies were giving excursion rates every day in the year, and the longer those present stayed in the railway business the more they would realize that fact. Mr. Allen then made a plea for a larger attendance at the meetings of the association. He said that this was only fair to the presiding officer and to the committees who have carried on the work of the association during the past year. Three things attract members to the convention. The first is the convention itself; the second is the exhibits, and the third is the opportunity, by personal contact with other men, to exchange ideas. The latter, he thought, was very valuable, but it was made possible only by the convention. He thought every one in attendance should make it a point to be present to-morrow, and bring every man that was wearing a blue and gray badge. Political conventions were always well attended, and they never lack interest. Legislative bodies always insisted that the representatives duly elected should attend, and he knew of no reason why the delegates to this convention should not show, by their presence, that they appreciated the work of the officers and the committees. He thought the association should have a rollcall, and that out of the 350 roads, members of the association, representatives of more than 20 per cent should attend.

Mr. Brush agreed with Mr. Allen, and moved that at the opening of the session of the Traffic Association, Tuesday morning, the roll of the member companies should be called and note made of the number present from each company. The motion was seconded and carried.

President Todd then announced that the next meeting would be held promptly Tuesday morning at 9:30, and urged all to be present promptly.

Clarence Learned, Boston Elevated Railway, moved that a record should be taken of those in attendance at the present meeting, and that, in passing out of the hall, the delegates should leave their cards on the secretary's desk. The motion was seconded and carried.

The meeting then adjourned.

The number of passengers carried by the Moscow municipal electric and horse cars in 1909 was 143,581,248, against 111,561,960 in 1908. The fares collected during the year on the electric cars amounted to $3,613,993, compared with $2,423,588 in 1908, while the collections on the horse-car lines amounted only to $52,433, against $361,081 in the previous year. It is said that the net profit of the electric line, which is owned by the city, approximated $1,000,000, against $300,000 in 1908.

At the end of the year 1909 there were 176 tramways owned by British municipalities. Only 84 of these tramways, however, were operated by the municipalities which owned them. The total mileage represented by these 84 systems was 2,422, and the capital investment in them was approximately $200,000,000. A total of 7,986 cars were owned by the municipally operated tramways and during 1909 they carried 1,933,118,206 passengers. The total income from operation was approximately $43,900,000.

REPORT OF THE COMMITTEE ON PASSENGER TRAFFIC*

BY F. W. COEN, CHAIRMAN; W. H. COLLINS, W. S. WHITNEY, A. E. POTTER AND C. E. FLAGG

The committee on passenger traffic in the handling of the question "What passenger rate should interurban railways charge?" forwarded to 231 electric railways a data sheet to which 76 replies were received. The answers for purposes of comparison have been divided into three groups, viz., electric railways operating in Western States, comprising the lines between Denver and the Pacific Coast; those operating in the Central States, comprising the lines east of Denver and west of Buffalo and Pittsburgh; and those operating in the Eastern States, comprising the lines east of Buffalo and Pittsburgh.

Present Rates: By far the greater number of roads are charging approximately 2 cents per mile and it is also recommended as the proper charge. This is especially true in the Central States, the Western States at the present time charging somewhat above 2 cents per mile. Some of them recommend a still higher charge. This, no doubt, is due to more expensive construction and operation.

Increase or Decrease of Fares: The increase in most cases seem to have been made where rates had been originally established on a low basis because of steam railroad competition, and in all of these cases reported the statement is made that very little, if any, traffic has been lost, but that more revenue has been derived. Where rates have been decreased the report shows that it was on account of sharp steam railroad competition and that in these cases improvement has been shown.

Competition and Results: Seven of the changes in rates reported were due to steam railroad competition and the figures given show an increase in earnings of from 3 to 20 per cent.

Limited Trains: The operation of limited trains has become quite popular on interurban roads and the reports show that almost 50 per cent of the roads are providing this class of service. That there are only three interurban roads in this entire list charging excess fare is quite remarkable; of the three so reporting, one makes a charge for chair-car service, while the other two operate from the same city in the Middle West. The question naturally arises as to whether the limited service is not being provided on a local service charge, unless sufficient limiteds are operated to take care of the city travel and the locals operated only for country travel where stops are frequent. Where towns and cities are close together, observation shows that passengers will wait for a limited and suffer the inconvenience of a crowded car rather than ride on a local car even with practically no difference in schedule.

Commutation Rates: Commutation rates are in force on a great majority of the properties throughout the United States, although no commutation rates are given on some of the most prosperous roads in the country.

Rates of Fare: The replies to this question are quite uniform when the three groups of States are considered, and the committee is of the opinion that the established rate should not be less than 2 cents per mile and higher in certain localities where construction and operation charges are of necessity very heavy.

The Portland (Ore.) "Carman," which is issued under the auspices of the Brotherhood of Electric Railway Employees of the Portland Railway, Light & Power Company, Portand, Ore., reprinted in its issue of September, 1910, the editorial entitled "The Union Issue in Columbus," which was published in the ELECTRIC RAILWAY JOURNAL of September 3, 1910, page 352.

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10 to 14, 1910.

THE CREATION OF PASSENGER TRAFFIC*

BY JOHN F. KEYS, GENERAL PASSENGER AGENT, DETROIT UNITED RAILWAY

The Detroit United Lines comprise 750 miles of city and interurban railways, radiating through a territory populated by about a million people. Detroit is within easy reach of several island park resorts splendidly maintained by the boat lines running out of Detroit, with which we exchange considerable business. These resorts serve as an attraction to the people living on the interurban lines who seek a change in scenery on the river or on the larger lakes.

North of Detroit lies Oakland County, which has over 365 lakes within its boundaries, many of which are within an hour and a half or two hours' ride on the interurban. In another direction lies the famous bath city of Mt. Clemens, and a short distance beyond, smaller towns on the shore of Lake St. Clair, famous as fishing and shooting grounds. South of Detroit lie Monroe and Toledo; to the west, Ypsilanti and Ann Arbor; to the north Flint and Pontiac, where are located large automobile factories.

Detroit is a great convention city and the Detroit United Lines, with their superior city and interurban service, have had no small part in making these attractions possible. The Detroit Convention and Tourists' Bureau, of whose Board of Managers the author is a member, through its secretary, brought 88 conventions with about 42,000 people to Detroit in 1909, and 110 conventions so far in 1910, with about 140,000 people, and it was largely through the publicity given to the interurban and boat-line attractions in the talks of the secretary and in the literature distributed broadcast by this bureau that these conventions were held in Detroit and are being booked for the future.

The Detroit United Lines are composed of five properties, which in turn are the consolidations of many smaller units, and, as a result, the rates are extremely low on our interurban lines compared to the steam road rates. Franchise provisions over our system call for an average of a little over 1¼ cents per mile. With but few exceptions, the steam roads have failed to meet them, although in some instances they have met our round-trip rates by selling week-end tickets or tickets limited for use to seven days. On Sundays during the summer months some steam roads give excursions and cut our round-trip rates in two, but on these days we are taxed to our limit in spite of them.

In order to suggest possible trips to outsiders seeking recreation, we distribute thousands of bird's-eye map folders through the Central Railway and Hotel Distributing Company in 262 cities in the States of Michigan, Ohio, Indiana, Kentucky, Pennsylvania and West Virginia during the months of May, June, July and August, and often, when local delegations attend conventions with the object in view of securing the location of conventions in Detroit for the following year, they take a large supply of folders with them. Then, too, we supply the local representatives of some of the steam roads and boat lines with folder maps for distribution at their various ticket offices and they are always very glad to get them, as we are mutually benefited if people come to Detroit.

When conventions of any prominence are held, we get out a few hundred map folders marked "Elks' Edition" on the cover, or whatever convention name it may be, and we place these at convention headquarters for distribution, most of them being carried away and kept as souvenirs. We feel that we have such an attractive folder map that, once it is in the hands of the public, it will do us service for some time, as they may often be seen tacked up around the country. We constantly have calls for these maps from

*Abstract of a paper read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10 to 14.

all parts of the United States, which we feel shows that people have seen them somewhere and are interested.

We are always very glad to supply our working timetables to publishers of guides and are thus benefited to a considerable degree by having timetables in at least nine different guides which are published from Idaho to Michigan and Ohio. In this way we get closer to the traveling men, who use electric lines more and more every day.

Having brought strangers to points on our system, we endeavor through advertising, locally distributed, to make our guests as well as our regular patrons wish to see more.

Our efforts to accomplish this are directed in the following channels, and we feel have produced excellent results:

As the seasons progress, we necessarily change our advertising matter. As spring comes on and the wild flowers begin to appear we distribute broadcast on our cardboards banners reading, "To the Wild Flowers," and our information department directs those making inquiries. Frequently a high-school teacher will take her whole botany class out into the country to study the flowers. As the fishing season opens, we plaster the system with banners reading, "Good Fishing on the Interurban Lines," with a picture of an enthusiastic angler landing a fish. We soon have so many telephone calls that there shortly appears on the cars another banner reading, "Fishermen's Specials to Orchard Lake and Algonac, 5 a. m. Sunday;" and we have two good loads nearly every Sunday.

For the benefit of those seeking other forms of recreation we carry banners advertising "Famous Fish, Frog and Chicken Dinners at Lakeside" (Lakeside being a popular resort on our Shore Line Division); "May Festval at Ann Arbor. Take Interurban Cars," or "Band Concert at Belle Isle To-day," or "Baseball To-day," or "Big Boat Launching at Ecorse Saturday." Maybe it is "Homecoming at Algonac, July 20. Take Interurban Cars," or "King Wamba Celebration at Toledo. Take Interurban Cars"; "Ringling Brothers' Circus at Flint," or "Aeroplane Races at the State Fair To-day." Just recently we advertised "Lotus Beds in Full Bloom at Monroe Piers," advertising those giant white water lilies imported from Japan and planted. As a result, two special cars were chartered to take people to see them, and I myself was a member of a party of ten who went to see this beautiful sight. As time passes, other banners appear, such as "See the Autumn Leaves on the Interurban," "Good Duck Shooting. Take Interurban Cars," and later, "Good Ice Boating at Lakeside," or "Good Skating at Belle Isle." During the cooler months we have a sprinkling of banners advertising theatrical attractions or concerts at the Detroit theatres. We continually keep before the public banners advertising our limited service, such as "Six Limited Cars Each Way Daily Between Detroit and Toledo—2 Hours," etc., and frequent changes are made in the color of the print and paper so that the public is kept more or less interested watching to see what is coming next. I am firmly convinced that there is no means of advertising that in any way approaches advertising on cardboards.

We have arranged with the theatres to place on the bottom of their billboards, in towns adjacent to Detroit where they advertise, a small strip reading, "The cars that take you to the theatre will take you home after the performance," this slip being supplied to the bill-poster by us. We also advertise in all of our folders, for the benefit of our interurban patrons, that "Last cars await closing of Detroit theatres."

One form of advertising which is greatly in demand is a baseball calendar, showing where the Detroit Tigers are playing, the home dates being in red and the others in black. At the top of the card is printed the time of all limited cars leaving their respective terminals.

In each station on our system are two framed cards, one giving the time of limited cars at each station on that particular division and the time of local cars at the station where the frame is hung, and the other card giving the time of all limited cars of all divisions leaving Detroit. We also hang the first-mentioned framed cards in conspicuous places in hotels in all towns and cities on our system outside of Detroit.

A supply of local timetables and all-limited folders is always kept in the folder boxes in each station and on hotel desks, this last privilege being extended to us in Detroit hotels, although we are not permitted to hang the frames. These local timetable folders are of pocket size and are printed for each interurban division. They show the schedule of a particular division, and in addition, the time all limited cars leave terminals on all divisions. Our all-limited folder gives the time of all limiteds at each stop, and a synopsis of all local cars leaving terminals and larger places. It also has a synopsis of "owl car" service on all lines in Detroit, this useful information being featured as an inducement for people to keep these folders with them. Each interurban line has an individual color for its own folders. These folders may be had at all interurban stations, hotels, clubs and Baltimore lunch rooms on our system, and are freely distributed in cities and towns adjacent to the territority through which we run. In addition to all this, our timetables appear in 86 newspapers within a radius of 125 miles of Detroit, and we also make a practice of distributing in the stations over our system a one-sheet poster announcing the service which will be given for any particular event, such as the Michigan State Fair. We have a large supply of views on our system which we have freely loaned for use in programs or articles in papers or magazines, and have recently taken a number of new pictures which will be framed and hung in our stations to further induce traffic.

Our advertising has been done at comparatively small expense, and we feel has been the means of bringing a great deal of business to our system; in fact, our operating department has not provided sufficient accommodations to permit us to charter special cars on Saturdays, Sundays and holidays from May 1 to Oct. 1. Unlike most systems, we run no excursions over our lines at all. This policy is pursued owing to the fact that we feel that we are giving excursion rates every day in the year, and the week end finds us carrying to capacity.

It will thus be seen that we depend on advertising largely to create passenger traffic, and our efforts are directed toward getting interurban people to the city and parks or onto the river, and the city people out into the country and closer to nature. By providing frequent, clean and comfortable cars, manned by courteous crews, and maintaining reliable service, we are able to make our trolley service very popular with our patrons either traveling on business or on pleasure bent.

Morgan Crucible Company, Ltd., London and New York, is an exhibitor for the first time at this convention. It shows various types of "Morganite" and "Battersea" carbon brushes and "Battersea" type resistances. This company has an extensive business in England and on the Continent, and has recently opened an office in New York for the distribution of its products in the United States. The method of joining the flexible conductor to the brush itself is somewhat unique The carbon is drilled about ½ in. deep, after which the flexible connection is inserted, being splayed out on the end, and held firmly by a metallic powder, forced in and retained by compression The company is represented by the manager of the American interests, Henderson W. Knott, and by Harry De Steese, who is a special representative at this convention.

THE PAY-AS-YOU-ENTER EXHIBIT

The Pay-As-You-Enter Car Corporation's exhibit consists of three full-size models of as many different types of vestibules and entrance-exit platforms. The models are in front of the pier, facing the Boardwalk. One of the models is a copy of the cars used by the Chicago City Railway; the two others embrace some novel features. One of the latter has a new style, double folding door, with protected steps. This protection is obtained by spring-hinged leaves, which are attached to the lower part of the doors, and which cover the steps at an angle when the doors are closed. The same section shows new style bulkhead doors, which slide past the ends of the seats. This type will be known as the "split corner post" design. It gives full seating capacity, and permits wider entrance and exit. The other new section is of the Metropolitan Street Railway type, except that it has a single door, with two leaves, which fold toward each other to make a continuation of the platform dividing rail. As the doors close, the steps fold up, to secure a fully enclosed vestibule. The company is represented by Duncan MacDonald, president; Thomas W. Casey, general manager, and David Murdock, special representative.

BALDWIN TRUCK DISPLAY

The Baldwin Locomotive Works are exhibiting at their booths, 565-571, two most interesting trucks. One, Class 84-35-S, is for the Southern Pacific Railroad's Alameda electrification. The other is a short wheel base city truck class 54-18-F-2. The heavy truck for the Southern Pacific company has the following data: Gauge, 4 ft. 8½ in.; equalization, two double bar; center pin load, maximum, 35,000 lb.; wheel base, 84 in.; motors, G. E. No. 207 A; wheels, Standard steel-tired of 36½-in. diameter; axle diameter at motor bearing, 6½ in.; journals, 5 in. x 9 in.; weight of truck, complete, without motors, 15,000 lb. The unique features are the steel gusset castings, acting as the supports for the brake work, as well as being ties between transoms and side frames. Another point of interest is the swing bolster arrangement, with solid forged swing links.

The light city truck, class 54-18-F-2, has the following data: Gauge, 4 ft. 8½ in.; equalization, four double bar; wheel base, 54 in.; motors, G. E. No. 216; wheels, Standard forged rolled steel of 34 in. diameter; axle diameter at motor bearing, 4½ in.; journals, 3¾ in. x 7 in.; weight of truck, complete, without motors, 6,000 lb. The equalization of the truck is next to perfection The effect of the motor torque, acting through the equalizing beams, always results in an upward force on the truck frame. The Baldwin Locomotive Works are represented by J. R. Dickey, S. A. Bullock, Charles Peterson, J. A. Hanna and C. F. Dodson.

MODEL PAY-WITHIN CAR

In space 800, Building No. 3, is shown a 22 ft. model of a "pay-within" car built by the Pay-Within Car Company. It embodies several features of "pay-within" construction, and illustrates also the extreme flexibility of this design. The front platforms on this car are of different length, one being 6 ft. and the other 5 ft. over all. The long platform has two sets of 48 in. double folding doors operating outwardly, one set being arranged for manual control from the conductor's control stand and the other for pneumatic control by the motorman. One side of the short platform has one set of single folding doors opening inwardly. They are controlled by the motorman from a lever placed to the right of the controller and directly in front of him. The clear opening of this door is 30 in. The other side of this platform has a sliding door pneumatically operated by the conductor from his control lever on the control stand. This sliding door is a duplicate of the type used with success by the Philadelphia Rapid Transit Company and the Capital Traction Company, Washington, D. C.

The platforms are likewise equipped with folding steps, which are interconnected with the door control devices. The rear platform of this car is sufficiently long to accommodate both incoming and outgoing passengers. It is possible, therefore, both to enter and leave by the rear door and leave by the front door. Various forms of grab handle ideas are shown for the different platforms.

The Electric Service Supplies Company, general sales agent for the Pay-Within Car Company, is showing a number of its specialties, among which may be named the "automotoneer," "International" fare registers and fittings; "Keystone" air valves and other "Keystone" pneumatic devices, including sand trap, gong ringer and whistles; "Imperial" arc headlights etc.

A BRAKESHOE EXHIBIT

The American Brake Shoe & Foundry Company, in its 1910 exhibit, in space 801, Building No. 3, is making another good effort to encourage standardization of brake shoes among electric railways. The exhibit is splendidly illustrative of the great variety of shoes manufactured by the company as well as of the economies and advantages of standardization. Every variety of malleable iron brake heads for all types of trucks taking either narrow or wide gage shoes is exhibited. These shoe designs have been adopted as the standards of the American Street & Interurban Railway Association. The development of these standards and their adoption by about 60 per cent of the electric railways in the United States have been largely due to the efforts of the engineers of this company. The company is prepared to standardize the shoes of any property by furnishing heads which will take any standard shoe without disturbing any part of the present brake mechanism. The exhibit deserves a careful examination. It in charge of W. S. McGowan, F. W. Sargent, E. L. Janes, R. F. Holt, F. L. Gordan, T. B Thompson.

John C. Dolph Company, Long Island City, N. Y., has a nicely arranged booth for the entertainment of his long-time friends and customers. Mr. Dolph is exploiting the insulating specialties manufactured by his company.

The Garlock Packing Company, Palmyra, N. Y., is showing in space 816, Building No. 3, a complete line of Garlock packing samples. H. W. Gulager, Philadelphia, is in charge of the exhibit.

United States Electrical Signal Company, West Newton, Mass., exhibits, in space 547, its standard automatic block signal and its counting signal, which are wired up ready for demonstration under operating conditions. This company has recently developed a crossing signal which is exhibited for the first time. It is so constructed that it automatically sets a bell ringing before the car gets to the crossing. At the same time a semaphore is set as evidence to the motorman that the bell is ringing. The company is also placing on the market an electric railway signal especially designed for interurban service. Among the recent orders received for its standard block and counting signal may be mentioned Public Service Railway, Newark, N. J., 250 blocks; Worcester & Blackstone Valley Railroad, 30 blocks; also a number of blocks for the following roads: Pacific Electric Company; Poughkeepsie Railway, Light & Power Company. Representatives in attendance include Roland F. Gammons, second; W. W. Harrington, John J. Ruddick, J. W. Putnam.

THE JOHNS-MANVILLE EXHIBIT

One of the most interesting displays is that of the H. W. Johns-Manville Company, New York, in spaces 636 and 638, Building No. 2. The latest 600-volt "Noark" car fuse boxes, in capacities of from 100 amp to 400 amp, occupy a prominent place. These boxes take National Electrical Code standard fuses. J-M insulators up to as high as 100,000 volts are well represented, together with porcelain insulators in both petticoat and disk types with pins, fittings, etc., for long-distance transmission systems. J-M fiber conduit is shown with a complete line of fittings, tees, elbows, crosses, etc. This is a molded conduit. The walls are ⅜ in. thick and the material is molded under very heavy pressure to prevent warping, splitting or cracking. The joints are readily made water-tight, acid and gas-proof. The glass-smooth internal bore prevents abrasion of cable-sheath during "pulling through." This conduit is said to be of unusually high insulating efficiency, and to afford thorough protection from electrolysis.

The J-M fiber oil switch tanks shown are made as containers for oil switches and circuit breakers of capacities up to 60,000 volts. They are homogeneous, without grain, strong mechanically and good insulators. J-M transite asbestos wood for fireproofing cars, power houses, etc., and ebony asbestos wood for panels and switchboards are shown in great variety. There is also an extensive exhibit of molded insulation for power houses and electric car apparatus, such as molded mica, electrobestos, vulcabeston, also "Linolite" illuminating devices, friction tape and splicing compound, dry cell batteries, etc.

THE GENERAL ELECTRIC EXHIBIT

The General Electric Company's exhibit is in spaces 112-115. One of the main features is a 100-kw 60-cycle Curtis horizontal steam turbine unit operating at 3600 r. p. m. Horizontal Curtis turbines are made in capacities of from 100 kw to 7500 kw. The apparatus for 1200-volt d. c.. railways includes a complete type "M" control equipment mounted to show its operation and installation. The apparatus is for the control of four 50-hp 600-volt-1200-volt railway motors as used on the Shore Line Electric Railway, Aroostook Valley Railway and elsewhere. Although designed for use with 1200-volt motors, the contractors, reverser and other parts show the latest practice in 600-volt control equipments. The GE-217 600-volt-1200-volt 50-hp railway motor with this equipment is of the box frame, commutating pole type. The 400-kw 1200-volt d.c. rotary converter panel has no exposed live parts on its front.

The complete emergency straight air brake equipment for both motor car and trail car operating with a CP-27 air compressor is for electric railways which require operation of both single cars and short trains. It includes the quick service feature which gives a marked decrease in the time used for applying and releasing the brakes. The air compressor has a glass over it, and the crank is illuminated to show the lubricating system in operation. A CP-27 compressor is also shown "exploded" so that all parts may be thoroughly examined. There are also exhibited two motor car equipments of the electro-air brake system, including CP-28 air compressors. This brake equipment is particularly suited for long high-speed trains making frequent stops. The operation of the brakes with several cars in the train is simultaneous regardless of the number of cars.

Several recent railway motors are exhibited, including the GE-88 form "A" box frame, commutating pole railway on 500 volts; GE-214 box frame, commutating pole railway motor rated at 75 hp on 600 volts; GE-219B. split frame, commutating pole railway motor rated 50 hp on 600 volts. The last motor is shown "exploded." A complete line of railway line material and rail bonds is mounted on display boards. Among the smaller apparatus is a recording steam and air flow motor, an indicating steam meter, a magnetic arc headlight, K-35 and K-42 controllers, switches, rheostats, motorman's valves, etc.

BEACH CARS PROPELLED BY EDISON STORAGE BATTERIES

During the convention the first double-truck car and single-truck Beach battery car propelled by Edison storage batteries will be operated over the Atlantic City & Shore Line Railroad, through the courtesy of J. A. Akarman, general superintendent. The routes will have their terminals convenient to the Million Dollar Pier and the principal hotels. Both cars will be equipped and operated with recording instruments, so that the power consumption may be ascertained at all times for the varying conditions of speed. acceleration, track, traffic, grades, curves, etc.

The double-truck car, designated as "Type 101," will be moved from the works of the Federal Storage Battery Car Company, at Orange, N. J., to Atlantic City under its own power, over the Central Railroad of New Jersey and the Reading Railroad from Winslow Junction. The four driving wheels of this car are independently mounted on stationary axles, in a novel kind of truck frame, and the wheels, of Vandegrift design, are equipped with roller bearings, made by the Railway Roller Bearing Company. Each wheel is independently driven by an electric motor. The gear is shrunk on to an enlargement of the wheel hub There is also a band-drum brake on the wheel, as in automobile work.

The single-truck car, designated as "Type 1," has a battery equipment sufficient to move it from Orange to Atlantic City under its own power, but as it is designed especially for operation over grooved city rails the wheel flanges and tread are not adapted to operate over the T-rails of steam railroads. Hence this vehicle will be shipped to Atlantic City on a flat car. The "Type 1" car as used on the Twenty-eighth & Twenty-ninth Street Crosstown Railroad, New York, is reported to have shown a power consumption of 70 watt-hours per ton-mile, but Mr. Beach believes that several improvements in cars subsequently built will reduce the power consumption to 50 watt-hours per ton-mile. The ton-mile power consumption of the double-truck car in actual operation is still unknown, but it is expected to be even less than the single-truck car.

A cordial invitation is extended to all delegates to ride on the cars, whenever convenient. Passes entitling the holder to transportation will be liberally distributed, but if any delegate should be overlooked he can obtain them at the company's booth, space 523, where full information will be obtainable.

The end sections of pay-as-you-enter cars at the left of the entrance to the hall are a good indication to the laymen of the fact that an electric railway convention is being held at the Pier. They are models of the platforms of cars used by the Metropolitan Street Railway, New York; the Third Avenue Railroad, New York, and the Chicago City Railway. At first, it was planned to exhibit these end sections in Aquarium Court, but the entrance to the court was not large enough to admit them. It was then proposed to carry them over the beach and raise them by a derrick into the court. Finally, the decision was reached to place them at the entrance to the Pier. It is said that Captain Young is very much interested in the pay-as-you-enter plan and is thinking of using one of the sections after the close of the convention in front of each entrance to the pier, so that visitors will have to pay as they enter.

Among the Exhibits

Edison Storage Battery Company, West Orange, N. J., is exhibiting in space 523 the new Edison storage battery, which should attract unusual attention. Represented by D. C. Arlington.

* * *

MacGovern Archer & Company, New York, have no exhibit, but are represented by Frank MacGovern, who is extending the hand of welcome to his many friends and customers.

* * *

Flood & Conklin, Newark, N. J., space 948, show sections of steam and electric cars to demonstrate the advantage of the F. & C. Simplex (four-coat) system of car painting. Represented by H. J. Huhn, L. A. Williams, L. H. Conklin.

* * *

Gold Car Heating & Lighting Company, New York, is displaying in space 612 an interesting line of electric heaters for longitudinal and cross-seat cars; also details of the Gold system of car ventilation. Represented by E. E. Gold, E. B. Wilson, J. M. Stayman, F. H. Smith, F. Cahill.

* * *

C. W. Hunt Company, West New Brighton, N. Y., displays in Building 3 models of conveying and hoisting machinery; industrial railway track and car; "Stevedove" transmission rope; and conveyor buckets. Represented by W. F. Hunt, A. S. Larkin, J. A. McIntyre.

* * *

National Lead Company, New York, is exhibiting in space 810 its various pure white lead products, "Phoenix" metal, heavy pressure metal, and other of its products. The "Dutch Boy Painter" is very much in evidence. Represented by J. B. Mendenhall, of the St. Louis office; William A. Dail, Charles E. Barnum.

* * *

Crocker-Wheeler Company, Ampere, N. J., has a neat reception room in space 540, Machinery Hall. The booth is decorated with some excellent photographs of railway generators, motor generators, power transformers and typical installations of power, railway and industrial plants. Represented by Rodman Gilder, J. R. Wilson, Clarence E. Delafield.

* * *

Heywood Brothers & Wakefield Company, Wakefield, Mass., show in space 962 various styles and types of rattan and plush upholstered "Universal" car seats. Special attention is called to pressed steel car seats recently developed for fireproof pressed steel cars. A handsome brochure of the company's products is being distributed. Represented by Bertram Berry, R. F. Fowler, C. W. H. Frederick.

* * *

D. & W. Fuse Company, Providence, R. I., is in space 633, Building No. 2. The exhibit includes enclosed fuses and safety devices for lighting, heating, power, railway, signal, telephone and telegraph circuits; "Deltabeston" magnet wire, field and armature coils, controller coils, arc lamp magnets, heating units, etc. The company is now making square, as well as round, wire with "Deltabeston" insulation. Represented by W. S. Sisson, H. F. MacGuyer, H. P. Hinds.

* * *

Joseph Dixon Crucible Company, Newark, N. J., shows a large line of graphite products in spaces 516-518, Machinery Hall, including lubricating graphite, foundry facings, crucibles, graphite curve grease, graphite wood grease, brushes, pencils, graphite air brake grease, silica graphite paint, marking crayons, solid or paste form belt dressing, graphite gear grease, graphite journal box grease and graphite commutator compound. Represented by J. J. Tucker, J. M. Willitts, J. A. Condit, R. Belleville, H. W. Chase, Wm. McIntosh.

Carbolineum Wood Preserving Company, New York, is exhibiting in space 690, Building No. 2, specimens of poles, ties and posts treated with Avenarius Carbolineum, showing the preservative effects of carbolineum on wood after it has been in the ground for several years. Pictures of installations for railroads of the open-tank method of treating ties with carbolineum are also presented. Represented by Ernest Hartmann, Ralf Eisenberg, Basil Grant, John J. Wessmiller, John N. Schlude.

* * *

Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., has space 469, Aquarium Court. The steel gear cases exhibited show the latest developments in this line. Weak parts have been strengthened and objectionable features eliminated to produce an ideal steel gear case. As an illustration of the company's special work, some excellent forged steel brake levers are shown as well as coupling sockets and coupling plugs. A junction box of the latest type is also on exhibition. Represented by J. G. Buehler, James Grady, W. R. Kerschner, John Kress, Jr.

* * *

Consolidated Car Heating Company, New York, shows in spaces 876-879 a comprehensive variety of electric heaters for both longitudinal and cross-seat cars for all voltages up to 1200 volts; also switches up to 1200 volts. A "Consolidated" buzzer is shown operating on a 600-volt circuit. To illustrate the durability of its pneumatic door operator, the company shows one that has operated 3,000,000 times without a failure. Electric relays, electric resistance tubes and automatic train signals constitute the rest of the display. Represented by Cornell S. Hawley, Thomas Farmer, W. S. Hammond, H. L. Hawley.

* * *

W. R. Kerschner, New York, is extending the "glad hand" to several hundred customers and friends from all parts of the country. His headquarters are at the booths of the Columbia Machine Works & Malleable Iron Company and Selah & Hoopes. Mr. Kerschner is sole sales agent for the automatic air-brake lock manufactured by Selah & Hoopes, which is on view in space 526. Although Mr. Kerschner has had the sales agency less than two months he has sold nearly 3,000 equipments. It is evident from this record that the merits of the device and its ease of application to all types of air brakes must appeal to the practical man.

* * *

National Carbon Company, Cleveland, Ohio, is displaying in spaces 463-467 a full line of its high-grade Laclede carbon brushes. Before these brushes were placed on the market the company's engineers visited and corresponded with a large number of operating railway men, to accumulate data for use as a basis in brush manufacture. Since its introduction the Laclede brush has been adopted by over 100 of the largest and most exacting electric railways in this country. Records of 500,000 miles have been obtained from a single set of brushes, and even the lowest records run close to 100,000 miles. The wide variation in mileage is not due to differences in the brushes, but to different operating conditions.

* * *

National Lock Washer Company, Newark, N. J., has spaces 650-652, Building No. 2, where it has a very handsome exhibit, consisting of six solid mahogany full-sized car windows. These windows have curtains and curtain fixtures of different styles, also sash locks, sash balances, and the company's new parallel sash guides. There is also displayed a section of an open car and of a Brill semi-convertible car, both equipped with protected groove curtain fixtures. A few of the very many different lock washers are shown; also neat little sash lock, specially designed to hold a street car sash at any height. The latter can be applied without defacing the woodwork. The company proves, in connection with its new parallel sash guides, that

it is possible to have a steel sash fit perfectly in any window without special fitting. Represented by W. C. Dodd, F. B. Archibald, John B. Seymour, Daniel Hoyt, J. Howard Horn.

* * *

Le Valley Vitae Carbon Brush Company, New York, is represented at the convention by its general manager, M. W. Robertson.

* * *

Heany Fireproof Wire Company, New York, is exhibiting its asbestos-covered fireproof magnet wire in space 891, Building No. 3.

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McLeer Electric & Manufacturing Company, Brooklyn, N. Y., has its electric railway department ably represented by C. B. McLeer and J. F. McLeer.

* * *

The E. W. Bliss Company, Brooklyn, N. Y., has its gear and pinion department represented at the convention by Mr. Stone, of the sales organization.

* * *

After two years' absence from the convention, J. H. Denton, of J. H. Denton & Company, New York, is again present to greet his many customers and friends.

* * *

Cameron Electrical Manufacturing Company, Ansonia, Conn., has no exhibit of its manufactures at the convention, but is well looked after by its general manager, J. B. Davidson.

* * *

Harry De Steese is present at the convention not only in the interest of his own business but as a special representative of the Morgan Crucible Company, Ltd., London and New York.

* * *

Electrose Manufacturing Company, Brooklyn, N. Y., manufacturer of Electrose overhead line material and high tension insulators of all types, is represented at the convention by its executive head, Louis Steinberger.

* * *

W. P. McVicker & Company, NewYork, have space 679, Building No. 2, for an exhibit of their work as chemical engineers in boiler compounds. W. P. McVicker is on hand to expatiate on the quality of his company's work.

* * *

Charles N. Wood, of the Wilson Trolley Catcher Company of Boston Mass. is attending the convention in the interests of the "Wilson" catchers and retrievers, and also for the manufacturing companies for which he is the New England agent.

* * *

Barbour & Stockwell Company, Cambridgeport, Mass., has no exhibit, which policy is in accordance with its custom. Its presence at the convention, however, is very much in evidence in the "good fellowship" of F. F. Stockwell, William W. Field and H. R. Luther.

* * *

I. R. Nelson & Company, Newark, N. J., are represented at the convention by Mr. Nelson himself. He says he is too busy to make an exhibit. Mr. Nelson has recently moved from his old factory into a bigger and better shop where he is meeting with promptness the increased demands of his customers.

* * *

Ramapo Iron Works, Hillburn, N. Y., are showing in space 831 a full line of track specialties and manganese products, full automatic parallel-throw switchstand, automatic return safety switchstand, manganese reinforced switch point, solid riser plates, guard-rail clamps with adjustable and reversible filler blocks. Represented by W. B. Lee, A. Gemunder, G. E. Hering, W. W. Snow, J. E. Davidson.

Hunter Illuminated Car Sign Company, New York, has space 434, in Building No. 1, where is shown a model section of a car equipped with the Hunter sign, illustrating the easy manipulation of the sign from the inside of the car. Represented by Lytle J. Hunter.

* * *

New York Switch & Crossing Company, Hoboken, N. J., has space 658, Building No. 2. As pioneers in the development and sale of the anti-straddling tongue switch, this company's exhibit is especially instructive. Excellent examples of a T-rail anti-straddling tongue switch and a girder rail anti-straddling tongue switch, with right or left-hand spring adjustment, are shown; also a layout of girder rail mate, hard-center construction, girder rail cross-over frog, and a 90-deg. street railway crossing, with renewable center. Represented by W. C. Wood, H. R. Sherman.

* * *

Wendell & MacDuffie Company, New York, is well represented. This company is Eastern representative of the Falk Company, Russell Car & Snow Plow Company and D. W. Bosley, as well as special sales agent for asbestos building lumber and reinforced asbestos corrugated sheathing. Considering the wide acquaintance and personal friendship of R. L. MacDuffie among railway managers of the East, the interests of the companies which he represents are certainly in good hands. Other representatives on hand are Henry E. Oestereich and W. C. Bamber.

* * *

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., displays in space 624, Building No. 2, a standard line of overhead material, with Aetna insulation, frogs, crossings, and other overhead construction devices. An excellent illustration of the class of heavy switch work done by this company is shown in a solenoid-operated remote-control switch of 4000-amp capacity. Switches similar to the one exhibited have been made up to 6000-amp capacity, and even as high as 14,000-amp, for the New York Edison and the Commonwealth Edison Companies, of Chicago. Represented by J. M. Anderson, Ernest Woltmann, W. H. Hincker, A. H. Burns, George B. Crane.

* * *

The Western Electric Company is showing in spaces 637-639 a newly-marketed trolley harp called the M-B. The harp has been in continuous service for at least three years and is reported to have given a remarkable record in longevity and regularity of wear to harp, wheel and bushing. Kalamazoo wheels showed an average mileage of 12,500 miles when used with this harp. The wheel lubrication is cared for by wool yarn packing placed in a cavity in the frame of the harp. As the wool yarn is thoroughly saturated with oil, it feeds readily into the bearing installed in the frame. All action takes place within the bushing itself because the spindle is solid in the wheel hub. The bushings are made of cold rolled steel into which the wheel spindle is set. This spindle is made of bronze-bearing metal.

* * *

Consolidated Car Fender Company, Providence, R. I., presents in space 627, Building No. 2, excellent examples of its fenders and wheel-guards. A car platform, equipped with a projecting fender and a wheel guard, is shown in connection with an automatic air-drop device, which trips the fender or wheelguard whenever the emergency air brake is applied. The fenders and wheelguards of this company can be operated in all or any one of three ways—by apron, by motorman or by the special device mentioned. Several types of Narrangansett lockers for electric railway employees are also exhibited. The quality of workmanship used on these lockers may be judged from the fact that in the United States Government specification for navy lockers it is stated that "the lockers must be 'Narragansett' type or equally good." Represented by A. J. Thornley, George Hollingsworth.

Elliott Company, Pittsburgh, Pa., is using space 607, Building No. 2, for an exhibit of its twin strainers, oil purifiers, vertical steam separators and feed water regulators. Represented by W. A. Darrow, of Philadelphia.

* * *

Columbia Lock Nut Company, Bridgeport, Conn., is represented by Fred Atwater, without whom an electric railway convention would be incomplete. The Columbia lock nut is exhibited in space 609, Building No. 2, by the U. S. Metal & Manufacturing Company, the distributor and general sales agent for this lock nut.

* * *

Recording Register & Fare Box Company, New Haven, Conn., is displaying its new fare box in space 561, Machinery Hall. This box has many interesting features. Besides the fare box, there are shown several recording fare registers, trolley wheels, register fittings and car trimmings. Represented by Frank Kennedy, M. DeForest Yates.

* * *

Wallace Supply Company, New York and Chicago, shows in space 960, Building No. 3, car and car builders' equipment, door fixtures, parcel racks, ventilator openers, bronze car trimmings and a general line of car builders' material. Represented by W. Meeteer, E. Mittenhausen, C. C. Chapman.

* * *

Walker & Bennett Manufacturing Company, New York, has employed space 447, Aquarium Court, for a comprehensive exhibit of stationary and reversible car seats for city and interurban service. There are shown some excellent samples of cushions and backs, made with steel frames, for the longitudinal type of city and interurban cars. Represented by Sheridan A. Walker, K. D. Hequembourg.

* * *

Anthracenol Wood Preserving Company, New York, has an exhibit of its "Barol," a coppered carbolineum wood preservative, in space 609 of the U. S. Metal & Manufacturing Company, which is its distributer among steam and electric railways. Information about "Barol" is disseminated at the convention by Fred C. Bartels, president of the preservative company.

* * *

Transportation Equipment Company, New York, exhibits the new "TEC" fare box in space 824, Building No. 3. One hundred of these boxes were recently ordered by the Public Service Railway, Newark, N. J., for its P-A-Y-E cars. There are also 350 of these boxes in service on the Metropolitan Railway Company, New York. The box is novel, in that it registers in dollars and cents the money deposited. Represented by Robert C. Adams.

* * *

Massachusetts Chemical Company, Boston, Mass., is showing insulation specialties in space 635, Building No. 2. Liquid and rubber insulation, such as armalac, enamelac, insulac and other insulating paints, are shown; Walpole and other friction tapes; Neponset and other splicing compounds; and all kinds of mechanical rubber molded specialties. Represented by E. W. Furbush, L. O. Duclos, A. E. Duclos.

* * *

Universal Safety Tread Company, Boston, Mass., is using space 882 in Building No. 3 for its first convention exhibit. Various types of car treads and treads for subway and elevated station traffic purposes are exhibited. The company's executive head, F. W. Langford, is attending the convention in the interest of the company. He is ably seconded by Mr. Whipple, of the Whipple Supply Company, who is sales agent for this tread in the electric and steam railway field. A. E. Langford is also representing the company.

E. L. Post & Company, New York, is represented by R. S. Foster, F. O. Ketcham and J. Frank Lanning, all of whom are expounding the merits of Post's "Zero" metal. In an announcement in a recent issue of the ELECTRIC RAILWAY JOURNAL, the address of this company was given as 50 Church Street, New York. It should have been 50 Cliff Street, New York. Cliff Street has been the address of the company for the past 40 years.

* * *

W. J. Jeandron, New York, has an exhibit in space 677, Building, No. 2, as sole sales agent in the United States for the products of Le Carbone Company, of Paris, France. This exhibit is characteristically French in the neatness of its arrangement and the fine quality and workmanship of the products shown. All types of traction and generator brushes are presented. Although this company has been established in this country less than three years, it is interesting and instructive to learn that 50 per cent of the entire electric railway mileage in the United States is now operated with Le Carbone brushes.

* * *

Standard Motor Truck Company, Pittsburgh, Pa., has spaces 680-681, Building No. 2, where it has a novel exhibit, consisting of four aluminum models of Types C-80, C-60, O-50 and O-45 trucks; also complete plans and details of the trucks which this company manufactures and many photographs. The company has received an order from the United Railroads of San Francisco for 160 type O-50 trucks. The Standard Steel Car Company, of which the Standard Motor Truck Company is a subsidiary, is now building cars for electric railway service as well as for steam service. Represented by R. L. Gordon, A. W. Fields, W. G. Price, W. G. Cory.

* * *

Pantasote Company, New York, in its exhibit, space 956, Building No. 3, gives a demonstration of the waterproof and non-buckling quality of "Agosote" head-lining. A panel of "Agosote" is suspended beneath a pipe, which sprays it continually with water, without injuring it in the least. Fire-resisting "Agosote" only 3/16 in. thick has withstood a flame of 6300 deg. Fahr. for one minute, while the same flame would pierce 1/4-in. steel in 20 seconds. Many samples of "Agosote" in different shapes and finishes are also displayed. "Pantasote" curtains and seats are also shown in various shades and colors. Samples of both "Agosote" and "Pantasote" are furnished. Represented by John M. High, W. A. Lake, A. S. Barrows.

* * *

Wonham, Sanger & Bates, New York, are in space 969, Building No. 3, where they are showing the H. B. life guards, the American automatic track switch, tripartite steel poles, White foundry equipment and Hayes run firebrick. Important among the items of interest to railway officials are the life guard and the automatic switch. Since the convention of 1909 these guards have picked up hundreds of persons unhurt. Fifteen thousand H. B. guards have replaced projecting fenders of various types during the past 12 months. The Chicago City Railway, Chicago Railways, Brooklyn Rapid Transit Company, Metropolitan Street Railway, Third Avenue Railroad, Rio de Janeiro Tramway, Light & Power Company; Richmond Light & Railroad Company are among its many users. The popularity of the automatic switch is shown by its installation on such lines as the Brooklyn Rapid Transit System, Washington Railway & Electric Company, Capital Traction Company, United Railways & Electric Company, Baltimore; Cleveland Electric Railway, Pubelo & Suburban Traction & Light Company and East St. Louis & Suburban Railway. The representatives here include R. Sanger, F. Wonham, H. A. Goode, R. V. Collins.

Lancaster Iron Works, Inc., Lancaster, Pa., has space 551, Machinery Hall, to show Lancaster safety brake shoes and webs for electric and steam service. Represented by J. W. Holman, president.

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Universal Trolley Retriever Company, New York, is in Building No. 3, next to the convention hall. It is exhibiting its "Universal" trolley retriever and is demonstrating its operation. Represented by Edward Shapiro, Peter J. Minck.

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H. R. Langslow Company, Rochester, N. Y., has on view, in space 821, Building No. 3, a prepayment platform laid out with railing, showing a straight nickel fare prepayment machine with automatic registration and automatic released turnstile Represented by A. R. Langslow, C. R. Lattig, F. H. Damon.

* * *

Archbold-Brady Company, Syracuse, N. Y., has space 837, Building No. 3, where it is showing a model catenary bridge, such as is used on the Syracuse, Lake Shore & Northern Railroad, and photographs and blueprints of transmission towers, bridges, etc. Represented by W. K. Archbold, president, and R. L. Allen, engineer.

* * *

Duff Manufacturing Company, Pittsburgh, Pa., has space 968, in Building No. 3, where it is showing its complete line of Barrett track and car jacks, along with the Duff ball-bearing screw jacks and the new forged-steel Duff-Bethlehem hydraulic jacks. It is also showing for the first time a novel bonding drill. The company is represented by George A. Edgin, E. A. Johnson, E. P. Hess.

* * *

U. S. Metal & Manufacturing Company, New York, is at the convention in full force, headed by Charles C. Castle, the head of the sales department. Mr. Castle ought to be a valuable asset to this company, whose organization he joined during the last year, in view of his wide acquaintance, his large circle of personal friends and his genius for salesmanship.

* * *

Lord Manufacturing Company, New York, shows many of its electric railway specialties in space 888, Building No. 3. The display includes a sample of each of the various types of Earll catchers and retrievers; "Luminator" flaming arc lamps; Bradshaw car-skids; laminated soldered rail bonds; "controlators," and lightning arresters. Represented by W. R. Garton, general manager, and Mr. Arnold.

* * *

The G. Drouvé Company, Bridegport, Conn., reports that since last convention time "Anti-Pluvius" puttyless skylights have been installed on the new car houses built by the Connecticut Company at Bridgeport, Conn.; Oneida Railway Company, Syracuse, N. Y.; Detroit United Railway, Public Service Railway car terminal, Hoboken, N. J., and Sioux City Electric Railway Company. These skylights are now being installed for the third order of the Chicago City Railway Company.

* * *

McConway & Torley Company, Pittsburgh, Pa., has in its exhibit, spaces 807-811, Building No. 3, a full-sized Janney radial coupler mounted on a car platform, an application of the equipment identical with that now in service on many electric lines. The coupler itself is the standard Janney M.C.B. type similar to those used on thousands of steam railroad cars. This coupler with the radial feature is now in successful operation on several hundred interurban cars and is being applied to a large number of new cars under construction. The company also is showing a McConway steel-tired wheel.

Niles Car & Manufacturing Company, Cleveland, Ohio, is receiving its friends at space 565, Machinery Hall, where they will be welcomed by J. A. Hanna and F. C. Robbins. The company has no exhibit but is showing numerous photographs of some of its latest types of cars now under construction.

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The Railway Improvement Company, New York, shows in space 836, Building No. 3, some novel coasting time recorders, which are similar to those in use for checking motormen on the New York elevated lines. It is also showing German current clocks, as used in Berlin, Frankfort and elsewhere in Europe. The exhibit also contains the improved "Rico" sanitary hanger, installed in the New York subway cars. The company is represented by Andrew J. Pezzini, Rufus L. MacDuffie, W. O. Wade, A. J. Newell.

* * *

Elmer P. Morris Electric Company, New York, has an interesting exhibit near the aquarium. Standard ornamental lighting and electric railway service iron poles with ornamental brackets and fixtures attached are shown; also ornamental cast-iron seats and flower stands for parks; standard overhead material, and various other specialties handled by this company. Represented by Elmer P. Morris, M. R. Jarvis. Dwight E. Morris, C. H. Lambkin, T. H. Cowden.

* * *

Goldschmidt Thermit Company, New York, has a unique exhibit in spaces 623-625, Building No. 2, comprising various types of compromise girder T and grooved rail joints welded by its new process. Samples of thermit and pure metals are displayed; also broken motor cases repaired by thermit welding; samples of welded pipe of all sizes; a machine designed for welding pipe; tripod crucibles for thermit welding. Represented by William C. Cuntz, Felix Lange, G. E. Pellisier, W. Aldrich, H. S. Mann, W. R. Hulburt.

* * *

Gould Storage Battery Company, New York, in addition to its booth in space 619, has a very interesting exhibit at the entrance to the pier of a car equipped with Gould batteries This car is a duplicate of seven cars now in service on the Third Avenue Railroad, New York, between 110th Street and Fort Lee. These cars have given a good account of themselves. They are equipped with 58 cells type T-H-29 of 420 amp. hours capacity and operate daily from 90 to 100 miles on a single charge. A total of 32 cars of this type has been ordered by the Third Avenue Railroad. Represented by Dr. W. E. Winship, W. S. Gould, C. H. Hayes, Fred Booss.

* * *

Watson-Stillman Company, New York, has an excellent exhibit of hydraulic machinery, including one 35-ton hydraulic bond compressor, a 3,000-lb. telescope motor lift, a 10-ton telescopic car jack, a 9-in. portable "Universal" beam punch, a 10-ton swivel claw jack, and a small motor-driven turbine pump. The new bond compressor has a quick-acting release; it can be put into place, the bond made and the compressor removed in one minute. The "Noscalon" machine and "Noscalon" feed-water treatment constitute another of this company's specialties. Represented by George L. Gillon, Frank H. Clark, Robert Weaver, Edwin A. Stillman.

* * *

Rooke Automatic Register Company, Providence, R. I., is in space 827, Building No. 3. Of all the exhibitors having mechanism to show, this company needs the least display, as the register weighs less than 20 oz., and can be covered by the palm of the hand, or conveniently carried in one's pocket. Despite its small size, this register stands for an important principle in fare collection. This fact can be best appreciated only after listening to a thorough explanation and seeing this machine in operation. George F. Rooke and W. A. Williamson are on hand to demonstrate workings of this register.

List of Exhibits

Acme Indicator Company, Cleveland, Ohio, Space 815, Building No. 3—Street and station indicators. Represented by C. W. Johnson, T. W. Small, A. P. Mackie.

Adams-Bagnall Electric Company, The, Cleveland, Ohio, Space 554-6, Building No. 2—Regenerative flame arc lamps, enclosed arc lamps for all circuits and accessory apparatus. Represented by G. A. Thomson, A. J. Mitchell, E. R. Bryant, R. C. Campbell.

Adams & Westlake Company, The, Chicago, Ill., Space 682, Building No. 2—Car hardware, electric headlights, oil and electric signal lamps, hand lanterns, brake handles, etc. Represented by B. L. Compton, J. A. Foster.

Allis-Chalmers Company, Milwaukee, Wis., Spaces 304-318, Building No. 1—Two racks of air brake equipments, showing straight air and automatic outfits complete; sectional model of Parsons type steam turbine; street railway motors and railway controllers; portable and stationary air compressors; photographs of products of the company. Represented by A. H. Whiteside, F. C. Randall, A. P. Peck, C. A. Burns, J. T. Cunningham, E. T. Pardee, Wm. Pestell, St. John Chilton, C. S. Johann, J. B. Nicholson, L. J. Costa, W. B. Spellmire, F. C. Colwell, J. W. Gardner, F. L. Bunton, J. L. Watson, O. C. Ross, J. C. M. Lucas. Exhibit in charge of F. G. Bolles, commercial engineer.

American Brake Shoe & Foundry Company, Mahwah, N. J., Space 801, Building No. 3—Brake shoes, association standard. Represented by F. W. Sargent, W. S. McGowan, E. L. Janes, R. E. Holt, F. L. Gordon, J. B. Thompson.

American General Engineering Company, New York, N. Y., Space 670, Building No. 2—A. G. E. motor-driven armature machine; A. G. E. Challenger pinion puller and other labor-saving appliances. Represented by George E. Austin.

American Hoist & Derrick Company, St. Paul, Minn., Spaces 795, 793, 791, Building No. 3—Moving pictures of company's machinery use in railroad work. Represented by W. L. Manson, F. J. Johnson and W. O. Washburn.

American Mason Safety Tread Company, Boston, Mass., Space 893, Building No. 3—All types of safety treads, car steps and subway, elevated and station treads. Samples of Karbolith flooring. Represented by Henry C. King.

American Railway Guide Company, Chicago, Ill., Space 404, Building No. 1—Bureau for railroad information, time tables and Pullman reservations. Represented by Geo. E. Armstrong, business manager.

American Railway Supply Company, New York, Space 826, Building No. 3—Conductor and motorman cap and coat badges; employee cap and coat badges; uniform buttons; police badges, etc. Represented by Walter Chur.

American Rolling Mill Company, Middletown, Ohio, Space 606, Building No. 2—American ingot iron rust-resisting products, such as railway culverts, roofing, plates, boiler tubes, etc. Represented by G. H. Charls, G. F. Ahlbrandt.

American Steel & Wire Company, Chicago and New York, Space No. 872, Building No. 3—Rail bands, electric wires and cables, rail-band tools and the Crown band tester. This tester is self-contained, its action not being dependent upon return current through the rail. Represented by B. H. Ryder, J. D. Sutherland, C. J. McGregor, R. K. Sheppard, C. R. Sturdevant.

Anderson, Albert & J. M., Manufacturing Company, Boston, Mass., Space 624, Building No. 2—Insulation line materials; automatic time switches; switches and switchboards; special remote controlled switches; trolley wheels, etc. Represented by J. M. Anderson, Ernst Woltmann, W. H. Hincher, A. H. Burns, G. B. Crane.

Anglo-American Varnish Company, Newark, N. J., Space 829, Building No. 3—Samples of packages, etc. Represented by William Marshall.

Archbold-Brady Company, Syracuse, N. Y., Space 837, Building No. 3—Photographs of transmission lines and special crossing towers, catenary bridges and construction, steel work for car shops and heavy transfer tables. Represented by W. K. Archbold, C. L. Allen.

Atlanta Car Wheel & Manufacturing Company, Atlanta, Ga., Space 684, Building No. 2—Reception room. Represented by Sterling G. Turner, Sam C. Watkins.

Atlas Railway Supply, Chicago, Space 814, Building No. 3—Atlas rail joints, tie plates and braces. Represented by J. G. McMichael, D. Thomson.

Automatic Ventilator Company, New York, N. Y., Space 621, Building No. 2—Car ventilators. Represented by George H. Ford, Leonard J Hibbard, William J. Fleming, Jr.

Badger Fire Extinguisher Company, Boston, Mass., Space 436, Building No. 1—Hand chemical fire extinguishers, chemical engines. Represented by Charles R. Edwards, A. E. Stone.

Baird Electric Company, Chicago, Ill., Space 455, Aquarium Court—Baird selective signal telephone systems for steam and electric railroads; complete central office equipments, with working model of steam and electric railway dispatching lines, dispatcher and ticket office time recorders. Represented by A. Moore, A. E. Case.

Baldwin Locomotive Works, Philadelphia, Pa., Spaces 565 to 571, Machinery Hall—One heavy interurban truck for the Southern Pacific Company (Alameda electrification), class 84-35-S; one light city truck for the Shore Line Electric Railway, class 54-18-F-2. Represented by J. R. Dickey, S. A. Bullock, C. H. Peterson, C. F. Dodson.

Bayonet Trolley Harp Company, Springfield, Ohio, Space 671, Building No. 2—Trolley bases with detachable pole clamps; detachable trolley harps; trolley wheels; sleet cutters. Represented by C. S. Olinger, R. A. Garlough.

Berry Brothers, Limited, Detroit, Mich., Space 840, Building No. 3—Varnishes. Represented by Major Robert E. Mills, George M. Kerr, Ferdinand W. Hormann.

Best Manufacturing Company, Pittsburg, Pa., Space 632, Building No. 2—Valves, fittings, cocks, unions, pipe bends, etc., with sectional parts to show detail construction of each. Represented by John D. Hiles, Charles K. Thomas, C. W. Bergen.

Black Diamond Boring Machine Company, Monongahela, Pa., Space 537, Machinery Hall—Boring machine for boring armature and axle bearings, patent adjustable boring tool, adjustable rolling tool. Represented by T. M. Boggs, A. J. Brown.

Brill Company, The J. G., Philadelphia, Pa., Spaces 403 and 409 in Building No. 1, and track space—Light-weight semi-convertible car with plain arch roof; section of car with new vestibule folding doors; five trucks, namely: No. 21-E single truck, No. 39-E single-motor truck, No. 27-FE1 and No. 27-GE1 short-base pivotal trucks, No. 27-MCB1 light interurban truck, No. 27-MCB3 heavy interurban truck; four styles of "Winner" car seats with pressed steel pedestals and aisle plates; six types of fare boxes; line and unlined woven cane for car seating; pressed steel seat parts and a variety of car and truck springs—all of Brill manufacture; specialties like track scraper, folding gate, "Dumpit" sand box, "Dedenda" gong, ratchet brake handle, brake chain slack adjuster and half-ball brake hanger. Represented by S. M. Curwen, J. W. Rawle, W. H. Heulings, Jr., Geo. H. Tontrup, D. B. Dean, G. M. Haskell, R. H. Thompson, W. S. Adams, J. E. Brill, Edw. Bronenkamp, F. L. Markham, S. T. Bole, F. W. Brill, C. S. Ayres, A. N. Hargrove, A. H. Pease, A. S. Vane, S. M. Wilson, H. B. Baird.

Brown, Harold P., New York, N. Y., Spaces 570 and 572, Machinery Hall—Plastic rail bond; lead-surfaced motor pinions; electrical contact alloys; electrical testing bureau; "Stay-There" track bolt and "O. K." nut lock; motor car mirror; G. P. paint oil; turptone. Represented by Harold P. Brown, J. Maxwell Coote, William Temple, Albert Temple.

Buffalo Foundry & Machine Company, Buffalo, N. Y., Space 825, Building No. 3—Steam hammers; vacuum drying and impregnating apparatus, heavy castings; vacuum pumps, condensers, etc. Represented by E. G. Rippel, sales manager.

Carbolineum Wood Preserving Company, New York, N. Y., Space 690, Building No. 2—Avenarius Carbolineum wood preservative treating methods and specimems of treated ties, posts and poles. Represented by Ralph M. Eisenberg, William E. Graf, Basil Grant, John J. Wessmiller, John N. Schlude.

Chicago Pneumatic Tool Company, Chicago, Ill., Spaces 515-517, Machinery Hall—Electric drills, electric track drills, grinders, spike driving apparatus; pneumatic drills and hammers and electrically driven air compressors. Represented by Thomas Aldcorn, C. B. Coates, George Barden, Edward Aplin.

Chicago Varnish Company, Chicago, Ill., Spaces 893-895, Building No. 3—Specimens of "CE-VE" process. Represented by Geo. S. Bigelow, F. N. Gundrum, Jr., F. L. Olds, T. M. Murray, R. K. Buckman, Jr.

Cleveland Frog & Crossing Company, Cleveland, Ohio, Spaces 575 and 576, Machinery Hall—"Hard Service" manganese frog; combination "Hard Service" manganese and regular rail crossing; switch with "Hard Service" manganese point; "Hard Center" manganese switches, mates and frogs; "Hard Center" manganese crossing; Porter derailing switch; C. C. switch locking device; switch attach-

ments, etc. Represented by G. C. Lucas, L. G. Parker, Geo. Arnold, Jr., Geo. Stanton, S. Balkwill, Jr., A. P. Ruggles.

Coleman Fare Box Company, Buffalo, N. Y., Space 823, Building No. 3—Exhibiting fare boxes for pay-as-you-enter cars; also portable fare boxes. Represented by J. H. Coleman, A. P. Ridley, John Lennox, John Sinclair.

Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., Space 469. Aquarium Court—All steel gear cases, forged steel brake levers, coupling sockets, coupling plugs, junction boxes. Represented by J. G. Buehler, Jas. Grady, W. R. Kerschner, John Kress, Jr.

Consolidated Car Fender Company, Providence, R. I., Spaces 627-629, Building No. 2—"Providence" fenders, "Providence" wheel guards, lockers. Represented by Albert J. Thornley, George Hollingsworth.

Consolidated Car-Heating Company, New York, N. Y., Spaces 876, 877 and 879, Building No. 3—Electric heaters and switches for pressure up to 1200 volts, door-opening devices, buzzer systems, electric relays, electric resistance tubes, automatic train signals. Represented by Cornell S. Hawley, Thomas Farmer, Jr., W. S. Hammond, Jr., H. L. Hawley.

Cooper Heater Company, The, Carlisle, Pa., Space 657, Building No. 2—Pressed-steel hot water car heaters. Represented by W. L. Blackwell, W. R. Crawford, C. S. Brinton, W. F. Pascoe.

Corell Railroad Tie Company, Mount Jewett, Pa., Space 457, Building No. 1—Corell reinforced concrete tie. Represented by H. J. Coreli, W. J. Caverly.

Crocker-Wheeler Company, Ampere, N. J., Space 540, Machinery Hall—Photographic views of railway generators, power transformers, motor-generator sets, etc. Descriptive bulletins of Crocker-Wheeler electric railway apparatus. Represented by J. R. Wilson, Rodman Gilder, Clarence E. Delafield.

Curtain Supply Company, Chicago, Ill., Spaces 883-885, Building No. 3—Ring No. 88 fixtures, Ring No. 89 fixtures for open or closed cars, curtain materials. Represented by W. H. Forsyth, R. F. Hayes, S. W. Midgley.

D. & W. Fuse Company, Providence, R. I., Space 633, Building No. 2—"D. & W." enclosed fuses and safety devices for all electrical circuits, "Deltabeston" magnet wire and field and armature coils particularly adapted for railway motors, arc lamp magnets, heating units, etc. Represented by W. S. Sisson, H. F. MacGuyer, H. P. Hinds.

Davis Expansion Boring Bar Company, St. Louis, Mo., Space 615, Building No. 2—Davis expansion boring tools, for boring car wheels, armature bearings and all classes of metal. Represented by W. N. Matthews, E. E. Davis, J. W. McKeen.

Dearborn Drug & Chemical Works, Chicago, Ill., Space 411, Building No. 1—Scientific treatment for boiler feed waters, prepared to suit conditions shown by analyses of the waters. Represented by George R. Carr, Grant W. Spear, H. G. McConnaughy.

Detroit Steel Products Company, Detroit, Mich., Space 459, Aquarium Court—Detroit steel sash for car houses, power houses, etc., and showing photographs of installations. Represented by Mason Rumney.

Dixon, Joseph, Crucible Company, Jersey City, N. J., Spaces 516-518, Machinery Hall—Lubricating graphite, foundry facings, graphite crucibles, graphite curve grease, graphite wood grease, graphite brushes, pencils, graphite air brake grease, silica-graphite paint, marking crayons, belt dressings, graphite gear grease, graphite car box grease, graphite commutator compound. Represented by J. J. Tucker, J. M. Willitts, J. A. Condit, R. Belleville, H. W. Chase, Wm. McIntosh, L. H. Snyder.

Dossert & Company, Inc., New York, N. Y., Space 813, Building No. 3—Dossert connectors; solderless splicing devices; cable taps; 2-ways of various types; insulated 2-ways and cable taps 3-ways; Y's; lugs, front and back connected angle and swivel; stud connectors, cable anchor equalizers, grounding devices; third rail jumpers. Represented by H. B. Logan, S. A. Jenkins.

Dolph, John C., Company, Long Island City, N. Y., Space 962, Building No. 3—Specialties in insulation. Represented by John C. Dolph.

Drouvé, G., Company, Bridgeport, Conn., Space 459, Building No. 1—Sample car house, "Anti-Pluvius" puttyless skylight and "Straight-Push" sash operator applied to steel sash, showing control. Represented by William V. Dee.

Duff Manufacturing Company, Pittsburg, Pa., Space, 968, Building No. 3—Barrett track and car jacks, geared ratchet lever jacks, Duff ball-bearing screw jacks, Barrett motor armature lifts, car replacing traversing bases and Duff-Bethlehem hydraulic jacks. Represented by T. A. McGinley, G. A. Edgin, E. A. Johnson, E. P. Hess.

Eclipse Railway Supply Company, Cleveland, Ohio, Space 669, Building No. 2—Car fender, destination sign. Represented by Ross Forward.

Economy Oil Cup Company, Augusta, Ga., Space 525, Machinery Hall—"Economy" oil cup. Represented by H. E. Fitzgerald, E. M. Crozier and Wonham, Sanger & Bates.

Edison Storage Battery Company, West Orange, N. J., Space 523, Machinery Hall—Edison storage battery, in detail. Represented by D. C. Arlington.

Edwards Company, The O. M., Syracuse, N. Y., Spaces 832-834, Building No. 3—Window fixtures, extension platform steel trap doors, metal sash, tin barrel spring rollers, padlocks, metal office furniture. Represented by O. M. Edwards, Edw. F. Chaffee, C. H. Rockwell, W. C. Bradbury, T. P. O'Brian.

Electric Omnibus & Truck Company, New York, N. Y., Space 522, Machinery Hall—Field electric omnibuses operated with the Edison storage battery shown in operation on the street in front of the Exhibit Hall, starting each hour. Represented by C. J. Field, R. C. Cilley, C. W. Hussey, W. C. Seaman, V. E. Daniels.

Electric Railway Equipment Company, Cincinnati, Ohio, Space 462, Aquarium Court—Overhead line material, ordinary and catenary types; steel tubular poles; ornamental street lamp posts. Represented by W. A. McCallum, John G. Kipp, A. L. Johnston.

Electric Railway Improvement Company, Cleveland, Ohio, Spaces 892-894, Building No. 3—Electric welding rail-bonding car in operation; rail bonds. Represented by George Long, William E. Huber, Albert Blakely.

Electric Service Supplies Company, Philadelphia, Pa., Space 800, Building No. 3—"Pay-Within Car;" "Automotoneer;" Garton-Daniels lightning arresters, choke coils and grounding devices; Lyon steel gear cases; "Keystone" overhead material, block signals, sand traps, leakless valves, trailer connectors, railway telephones, lamp guards and porch light fixtures; "Protected" rail bonds and bonding tools; "International" fare registers; "Samson" bell and register cord; "Lock-On" controller handle; "Peerless" tension and banding machines; Locke insulators. Represented by Charles J. Mayer, J. W. Porter, J. V. E. Titus, A. H. Englund. M. A. Berg, E. R. Mason, T. C. Brown, R. D. Brown, W. A. Armstrong, Jr., F. A. Strail, G. E. Watts, G. W. Cox, A. F. Paul, F. C. Peck, H. G. Lewis, J. R. McFarlin, H. Hellyer, T. H. Henkle, W. D. Hamer, N. P. Hall, F. H. Jamison, R. Montgomery, G. Miller.

Electric Storage Battery Company, Philadelphia, Pa., Spaces 666 and 668, Building No. 2—Street railway switchboard panel with new average adjuster; illustration of new oil insulator for batteries in lead-lined tank; samples of positive and negative plates; details of storage battery apparatus. Represented by Charles Elizard, G. H. Atkin, H. B. Gay, Edward L. Reynolds.

Elliott Company, Pittsburg, Pa., Space 607, Building No. 2—Twin strainers, oil filter, reducing valve, steam trap, steam separator, oil separator, feed water heaters, feed water regulators, high and low water alarms, blow-off valve, tube cleaners, combined tube cutters and expanders. Represented by H. A. Pastre, W. A. Darrow, Glen M. Porter.

Emery Pneumatic Lubricator Company, St. Louis, Mo., Space 435, Building No. 1—Pneumatic lubricators for air brakes and multiple unit control apparatus, also lubricant sticks used with the lubricators; brake cylinder lubricant for manual application to cylinders and packing leathers of air brakes and switch groups. Represented by E. A. Emery, N. J. McAloney.

Eureka Tempered Copper Works, North East, Pa., Space 670, Building No. 2—Street railway material; commutators, trolley wheels, bearings, brush holders, line material. Represented by O. C. Hirtzel, Fred Rundell, T. E. Lynn, John Risbridger.

Flood & Conklin Company, Newark, N. J., Space 946, Building No. 3—Sections of cars, steam and electric, demonstrating the F. & C. Simplex (four coat) system of railway car painting. Represented by H. J. Kuhn, L. A. Williams, L. H. Conklin.

Ford & Johnson Company, Michigan City, Ind., Spaces 662 to 665, Building No. 2—"Perfection" car seats, canvas-lined and unlined rattan for car seats, steel stationary seats, special designed seats, reed and fiber rush chairs for buffet and parlor cars, railway and station heating. Represented by A. D. Martin, Clarence A. Van Derveer, Walter J. Bennett.

Forsyth Brothers Company, Chicago, Ill., Space 954, Building No. 3—Brinckerhoff unit pressed side construction for steel cars, Forsyth draft gears and buffing devices, Chaffee centering device, steel posts and carlins, one-piece steel doors for steam and electric cars, Forsyth metallic weather strip, steel sash, sash ratchets, buffing device. Represented by A. H. Sisson, Wm. Wampler.

Galena-Signal Oil Company, Franklin, Pa., Spaces 126 to 131, Building No. 1—Reception booth. Represented by C. C. Steinbrenner, E. V. Sedgwick, Geo. A. Barnes, L. R. Speare, E. H. Baker, F. A. Guild, C. H. Thomas, W. A. Trubee, L. J. Drake, Jr., C. A. Record, F. R. Stakelum, A. O. Fletcher, W. A. McWhorter, E. G. Beatty, H. C. Mason, Geo. J. Smith, J. E. Southwell, C. L. Richards, J. C. Glair, W. A. Love, W. O. Stieff, E. M. Hedley, Alfred Green, John A. Wilson.

Garlock Packing Company, The, Palmyra, N. Y., Space 816, Building No. 3—General line of packings. Represented by Herbert W. Gulager, H. N. Winner.

Garwood Electric Company, Garwood, N. J., Space 524, Machinery Hall—Electric welding outfit. Represented by George Hill.

General Electric Company, Schenectady, N. Y., Spaces 112 to 125, Building No. 1—Curtis turbine; Type "M" control equipment; railway motors; rotary converter panel; emergency straight air brake equipment; electro-air brake equipment; railway line material; rail bonds, recording steam and aid flow meter; indicating steam meter; magnetite arc headlight; controllers; switches; rheostats; motorman's valves, etc. Represented among others by J. G. Barry, W. J. Clark, W. B. Potter, C. C. Peirce, S. W. Trawick, R. E. Moore, E. H. Ginn, H. S. Monroe, G. D. Rosenthal, H. C. Marsh, R. I. Cash, H. M. Winter, H. C. Glaze, F. E. Case, E. D. Priest, G. H. Hill, W. G. Carey, Frank H. Gale.

Globe Ticket Company, Philadelphia, Pa., Space 961, Building No. 3—City and interurban railway tickets, books, transfers, cash fare receipts, Pope P. M. coupon transfers, ticket destroyers, ticket choppers and ticket punches. Represented by W. C. Pope, P. C. Snow, R. C. Osman, W. P. Snow, J. Elliott, E. Elliott.

Gold Car Heating & Lighting Company, New York, N. Y., Space 612, Building No. 2—Electric heaters, car ventilators. Represented by Edward E. Gold, E. B. Wilson, J. M. Stayman, F. H. Smith, F. Cahill.

Goldschmidt Thermit Company, New York, N. Y., Spaces 523 and 525, Machinery Hall—Examples of the new thermit welding process by which the entire rail section is welded, comprising compromise joint welds, and regular welds on various sizes of rail sections; welded motor cases, welded pipes, metals and alloys produced free from carbon by the thermit process; appliances used in connection with this process; gasoline preheating torch and a demonstration of the thermit reaction. Represented by W. C. Cuntz, G. E. Pellissier, H. S. Mann, Felix Lange.

Gould Storage Battery Company, Space 619, Building No. 2—Car at the entrance of pier equipped with 58 type T-H-29 storage cells. At booth, grids and batteries and photos of Detroit River tunnel installation. Represented by Dr. W. E. Winship, W. S. Gould, G. C. Hayes, Fred Booss.

Grip Nut Company, Chicago, Ill., Space 674, Building No. 2—"Grip Lock" nuts, square and hexagon. Represented by J. W. Hibbard, E. R. Hibbard, B. C. Wilt.

Hale & Kilburn, Manufacturing Company, Philadelphia, Pa., Spaces 884, 886, 887, Building No. 2—Seats for all types of cars and service; standard seats used by the principal surface, underground and elevated railways; suburban and interurban car seats; all-steel seats; doors, sash and interior finish for steel cars; rattan (canvas-lined) car seat covering. Represented by H. T. Bigelow, A. F. Old, C. W. Laskay.

Heany Fire-Proof Wire Company, New York, N. Y., Space 891, Building No. 3—Fire-proof asbestos covered insulated wire and coils for armatures and fields; Heany Lamp Company's lamps (tungstens). Represented by R. K. Dana, Frank A. Duff, Edward Bond.

Hess-Bright Manufacturing Company, Philadelphia, Pa., Spaces 571-573, Machinery Hall—One set of car wheels and axle, mounted on ball bearings, rotated by motor; two G.E.-80 railway motors, one with ball bearings and one with ordinary babbitt bearings, operated light; sample ball bearings and housings similar to those in service; photographs of various ball bearing cars in operation. Represented by Henry Hess, Cyril J. Hopkins, E. W. Rubencame, R. F. Runge.

Heywood Bros. & Wakefield Company, New York, N. Y., Space 890-891, Building No. 3—Variety of styles of "Universal" car seats. Represented by Bertram Berry, R. F. Fowler, C. W. H. Frederick.

Home Rubber Company, Trenton, N. J., Space 683, Building No. 2—"Black sheet" packing, N. B. O., together with rod packings, automobile tires, etc. Represented by A. R. Foley.

Hunt, C. W., Company, West New Brighton, N. Y., Spaces 937 and 939, Building No. 3—Models of conveying and hoisting machinery; Industrial railway track and car; "Stevedore" transmission rope; conveyor bucket. Represented by W. F. Hunt, A. Summers, Mr. Larkin, J. A. MacIntyre.

Hunter Illuminated Car Sign Company, New York, N. Y., Space 434, Building No. 1—All types of Hunter illuminated car signs. Represented by Lytle J. Hunter, Harry Reisinger.

Indian Refining Company, Inc., Cincinnati, Ohio, Space 675, Building No. 2—Electric railway lubricating oils. Represented by J. V. Smith, A. J. Varrelmann, I. B. Connor, T. U. Franklin.

Indianapolis Brass Company, Indianapolis, Ind., Space 667, Building No. 2—Overhead line material, section insulators, adjustable insulated crossings, frogs, crossings, ears, splicers, etc. Represented by James H. Drew, Fred C. Hornstein.

International Register Company, Chicago, Ill., Spaces 611-613, Building No. 2—Coin-receiving register for prepayment cars; single and double International fare registers, car register fittings, waterproof trolley cord, wire center bell cord, ticket punches and Heeren employees' badges. Represented by A. H. Woodward, John Benham, F. C. Arey.

Jeandron, W. J., New York, N. Y., Space 677, Building No. 2—Electric railway motor and generator carbon brushes Represented by W. J. Jeandron.

Jones & Laughlin Steel Company, Pittsburg, Pa., Spaces 532-4-6, Machinery Hall—Cold rolled axles, spikes, chains, structural sections, bars, cold twisted steel bars, steel sheet piling, cold rolled sections. Represented by E. D. Batchelor, Frank S. Slocum, George B. Mitchell.

Johns-Manville, H. W., Company, New York, N. Y., Spaces 636-638, Building No. 2—Overhead material; rail bonds; high voltage transmission insulators and fittings; fibre conduit; "Noark" service and subway boxes and car fuse boxes for motor protection; dry batteries; fiber retainers for 60,000 volt oil switches; ebony asbestos wood for switchboards; plain asbestos wood for street car construction; friction tape and splicing compound; "Linolite" illuminating devices. Represented by J. W. Perry, G. R. Saylor, H. M. Frantz, R. R. Braggins, H. M. Voorhis, W. H. Robinson, E. B. Hatch, R. C. Buell, A. E. Brown, R. B. Lattin, A. G. Newton, R. C. Cole.

Johnson Coin Counting Machine Company, New York, N. Y., Spaces 659 and 661, Building No. 2—Coin counting machines, registering fare boxes. Represented by C. H. Birdsall, W. P. Butler, S. F. Champion, Jr.

Kenfield Fairchild Publishing Company, Chicago, Ill., Space 407, Building No. 1—Copies of Electric Traction Weekly. Represented by G. R. Blodgett, G. S. Davis, W. J. Field, W. G. Thomas, H. J. Kenfield.

King Fifth Wheel Company, Philadelphia, Pa., Space 686, Building No. 2—King roller-bearing pivot plate. Represented by Amos O. Chase.

Lagonda Manufacturing Company, Springfield, Ohio, Space 676, Building No. 2—Weinland tube cleaners, air, steam, water and electric driven; Lagonda automatic cut-off valves; tube cutters; reseating machines; Lagonda-Enterprise Multiple strainers. Represented by J. P. Maloy, J. H. Johnston, Hart Hill.

Lancaster Iron Works, Lancaster, Pa., Space 553, Machinery Hall—Brake shoes for steam and trolley cars and webb or blocks for cars. Represented by J. W. Holman.

Langslow, H. R., Company, Rochester, N. Y., Space 821, Building No. 3—Automatic fare boxes and "Economy" turnstiles combined collection system. Represented by H. R. Langslow, C. I. Lattig, F. H. Damon.

Leeds & Northrup Company, Philadelphia, Pa., Space 617, Building No. 2—Herrick inspection test set; Wheatstone bridges and other resistance measuring apparatus; standardization apparatus; galvanometers; cable testing apparatus; resistance thermometers and pyrometers. Represented by C. S. Redding.

Lorain Steel Company, Johnstown, Pa., Spaces 850 to 859, both inclusive—Special track work for steam and electric railways; girder and high T-rails; electrically welded joints. Represented by H. C. Evans, F. J. Drake, Jos. MacCarroll, Jr., Wm. W. Kingston, S. P. S. Ellis, A. L. Verner, A. S.

Littlefield, S. P. McGough, E. B. Entwisle, H. C. Stiff, P. M. Boyd.

Lord Manufacturing Company, New York, N. Y., Space 888, Building No. 3—Flaming arc lamps, controlator, Bradshaw car skid, lightning arresters, rail bonds, Earll trolley retrievers and trolley catchers, etc. Represented by W. R. Garton.

McConway & Torley Company, Pittsburgh, Pa., Spaces 807-809-811, Building No. 3—Janney radial coupler equipment, the McConway steel tired wheel. Represented by Stephen C. Mason, E. M. Grove, H. C. Buhoup, J. H. Milliken.

McCord Manufacturing Company, Chicago, New York, Spaces 945, 957, Building No. 3—Universal window fixtures, weather stripping, sash locks, deck sash ratchets, McCord force feed lubricator, McKim gaskets. Represented by B. S. McClellan, E. G. Hunter, J. A. Lemon.

McGraw Publishing Company, New York, N. Y., Spaces 401-405, Building No. 1—Convention Souvenir Number and Convention Daily Issues of Electric Railway Journal; Engineering Record, Electrical World. Represented by James H. McGraw, Hugh M. Wilson, H. W. Blake, L. E. Gould, Rodney Hitt, F. Nicholas, W. Jackson, George J. MacMurray, Frank Armeit, J. A. Kucera, W. K. Beard, C. A. Babtiste, C. T. Walker, E. J. Hunt, C. Henley, F. C. Wells, Miss Murphey, Miss Phelps.

McVicker, W. B. Company, New York, N. Y., Space 679, Building No. 2—Scientific boiler compounds, hydraulic elevator compounds, high grade lubricants, odorless disinfectants, cleansing powders. Represented by W. B. McVicker, C. W. Dean.

Massachusetts Chemical Company, Boston, Mass., Space 635, Building No. 2—Rubber and liquid insulating materials. Represented by Louis O. Duclos, Arthur E. Duclos, E. W. Furbush.

Meyer Safety Guard Company, Omaha, Neb., Spaces 941-943, Building No. 3—12-ft. working model of open car, with guard; small copper model of "pay-as-you-enter-car," with guard. Represented by Martin Meyer, R. N. Burgess.

Midvale Steel Company, Philadelphia, Pa., Spaces 400-402, Building No. 1—Solid rolled steel wheels and built-up wheels, and a midway high carbon steel heat-treated interurban axle. Represented by W. P. Barba, Ernest Harrah, Charles F. Tietze, T. W. Illingworth, Thos. Price, Col. James Thompson, W. S. Edger.

Milburn, Alexander, Company, Baltimore, Md., Space 634, Building No. 2—Portable acetylene lights for construction, inspection and night work; acetylene emergency light (4,000 candle power) for emergency departments. Represented by C. R. Pollard, Jr., I. Stansbury.

Mitchell, W. K., & Company, Inc., Philadelphia, Pa., Space 559, Machinery Hall—Steam header, welded steel; steam separator, welded; pipe bends; pipe fittings; rolled steel pipe flanges; steam trap. Represented by L. H. V. Harvison.

Morgan Crucible Company, Ltd., New York, N. Y., Space 687, Building No. 2—"Morganite" and "Battersea" carbon brushes; "Battersea" type resistances. Represented by Henderson W. Knott, Harry DeSteese.

Morris, Elmer P., & Co., New York, N. Y., Spaces A, B, C—Combination lighting and trolley poles, all types of poll fixtures, ornamental iron settees, chairs and vases for parks, overhead line material, flexible metallic hose for air-brakes, pneumatic tools, brakeshoes, etc. Represented by Elmer P. Morris, M. R. Jarvis, H. S. Tonks, C. H. Lambkin.

Nachod Signal Company, Philadelphia, Pa., Space 568, Machinery Hall—Automatic signal connected for operation with miniature track; high speed trolley contactor; relay unit. Represented by Carl P. Nachod, Fred W. Kulicke.

National Brake Company, Buffalo, N. Y., Spaces 654 and 656, Building No. 2—Ackley adjustable brakes and Peacock adjustable brakes. Represented by Frank D. Miller, W. D. Brewster, S. A. Benedict.

National Brake & Electric Company, Milwaukee, Wis., Spaces 539 to 545, Machinery Hall—Air brake equipments, including motorman's, emergency and variable release valves and various types of governors; also motor-driven air compressors in both stationary and portable types; type "CC-4" D.C.-600-1200 volt air compressor. Represented by R. P. Tell, C. N. Leet, J. J. Nef, S. F. Weston, W. H. Goble, W. M. Bisel, W. D. Glenn, Robt. Long, James Paton, Geo. C. Anthon, B. S. Aikman.

National Car Advertising Company, New York, N. Y., Spaces 842-844, Building No. 3—Auto-scope. Represented by E. H. Jewett and assistants.

National Carbon Company, Cleveland, Ohio, Spaces 463, 465, 467, Aquarium Court—Carbon brushes, arc light carbons and batteries. Represented by D. D. Dickey, W. B. Brady, F. D. Kathe, O. T. Weaver, T. M. McNiece, E. H. Martindale, A. C. Henry.

National Lead Company, New York, N. Y., Space 810, Building No. 3—Pure white lead, "Phoenix" metal, heavy pressure metal, etc. Represented by J. B. Mendenhall, Wm. A. Dail, Charles E. Barnum.

National Lock Washer Company, Newark, N. J., Spaces 650 and 652, Building No. 2—Car curtains, curtain fixtures, sash balances, sash locks, lock washers. Represented by W. C. Dodd, F. B. Archibald, John B. Seymour, Daniel Hoyt, J. Howard Horn.

National Tube Company, Pittsburgh, Pa., Space 653, Building No. 2—Shelby seamless cold-drawn steel trolley pole and welded trolley pole. Represented by J. G. Bateman.

Nelson Valve Company, Philadelphia, Pa., Space 550, Machinery Hall—Power plant valves in steel, iron and bronze. Represented by W. J. Spencer, Carlisle Mason, R. E. Thomas, Leroy Gordon.

New York Switch & Crossing Company, Hoboken, N. J., Spaces 658 and 660, Building No. 2—T-rail anti-straddle tongue switch for interurban service; girder rail, anti-straddle tongue switch with right or left hand spring adjustment; girder rail mate, hard center construction; girder rail crossover frog; 90 deg. street railway crossing with renewable centers. Represented by W. C. Wood, H. R. Sherman.

Niles Car & Manufacturing Company, Niles and Cleveland, Ohio, Space 565, Machinery Hall—Office and reception room, with photographs of cars and catalogs. Represented by F. C. Robbins, J. A. Hanna.

Nuttall, R. D., Company, Pittsburgh, Pa., Spaces 429, 431, 558, 560—Gears, pinions, trolleys, trolley poles, harps and wheels, flexible couplings, etc. Represented by F. A. Estep, Milton Rupert, G. A. Martin, Geo. W. Provost, T. M. Cluley, R. M. Kerschner, Chas. J. Mayer, A. H. Englund, H. G. Lewis, E. R. Mason, W. A. Armstrong, Chas. N. Wood, G. E. Watts, J. S. Monroe, J. W. Porter, M. Berg, J. V. E. Titus, S. K. Colby, E. A. Sharp.

Ohio Brass Company, Mansfield, Ohio, Spaces 601 and 603, Building No. 2—Trolley fixtures, catenary materials, rail bonds, porcelain insulators, Tomlinson automatic and Tomlinson M. C. B. couplers, "O. B." diaphragm sander and whistle valve, "O. B." trolley retriever, luminous arc headlight, electric car signal system. Represented by C. K. King, E. F. Wickwire, J. R. Brown, C. H. Tomlinson, N. M. Garland, A. L. Wilkinson, A. L. Price, W. C. Starkey, G. E. Willis, J. E. Slimp, W. H. Bloss, Nathan Shute, Frank V. Cook, R. J. Deneen, E. C. Brown.

Ohmer Fare Register Company, Dayton, Ohio, Spaces 600-602-604, Building No. 2—Fare registers from 2 to 60 classes of fares; two types of total cash fare registers; special equipment and registers for P-A-Y-E cars; John F. Ohmer's "Turn-In" car. Represented by John F. Ohmer, J. Harry Stedman, W. J. Kuhns, H. B. Ohmer, C. W. Ketteman, C. V. Funk, Walter H. Nelson.

Pantasote Company, New York, N. Y., Space 956, Building No. 3—"Pantasote" upholstery and curtain material; "Agasote" headlining. Represented by John M. High, W. A. Lake, A. S. Barrows.

Parsil Metal Company, Lansdale, Pa., Space 630, Building No. 2—Flower brush holder, pivot journal bearings and wedges, grease guns, oil guns, air pumps. Represented by David B. Flower, Charles W. Wade, F. W. Roth.

Pay-As-You-Enter Car Corporation, New York, N. Y., Spaces 458, 460 and 462, Aquarium Court—Sections of pay-as-you-enter cars of different construction. Represented by Thomas W. Casey, David Murdoch.

Pennsylvania Steel Company, Steelton, Pa. (with Maryland Steel Company, Sparrow's Point, Md.), Spaces 209 to 217, 305-415-417, Building No. 1—Solid "Manard" frogs, switches, mates and crossings; iron-bound switches and mates; spring frogs, switch stands, rails, photographs of work done, etc. Represented by H. F. Martin, C. S. Clark, John C. Jay, Jr., Richard Peters, N. E. Salsich, R. C. Hoffman & Company, R. E. Belknap, J. G. Miller, H. B. Green, F. H. Tackaberry, W. M. Henderson, G. S. Vickery, C. A. Alden, M. W. Long, B. L. Weaver.

Philadelphia Electrical & Manufacturing Company, Philadelphia, Pa., Space 552, Machinery Hall—Tungsten arc lamps, street lighting fixtures, malleable line material of all kinds, trolley wire splicing sleeves, open circuit detectors, etc. Represented by C. L. Bundy, W. O. Dale.

Poole Bros., Chicago, Ill., Space 678, Building No. 2—Railway tickets, folders, advertising booklets, maps, ticket cases and

station supplies. Represented by S. K. Poole, R. W. Hunter.

Pyrene Manufacturing Company, New York, N. Y., Space 817, Building No. 3—"Pyrene" fire extinguishers, "Pyrene" liquid for extinguishing fires. Represented by P. L. Wilbur, E. M. Davidson.

Q M S Company, Plainfield, N. J., Space 805, Building No. 3—Stanwood steel car steps, Stanwood steel folding car step, hand power traveling crane of 3-ton capacity, hand racked trolley, No. 6 style air-balanced load-retaining air hoist, pneumatic pit jack. Represented by C. H. Holbrook,

Railway & Traction Supply Company, Chicago, Ill., Space 685,

Rail Joint Company, The, New York, N. Y., Space 464, Aquarium Court—Weber, Continuous and Wolhaupter rail joints, Represented by L. F. Braine, Mr. McCaskey, W. A. Chapman, E. A. Condit, P. Holbrook, G. W. Smith, W. E. Clark, H. C. Holloway.

Railway Improvement Company, New York, N. Y., Space 836-8, Building No. 3—Coasting time records, current clocks and metal sanitary car straps. Represented by Andrew J. Pizzini, Rufus L. MacDuffie, W. O. Wade, A. J. Newell.

Railway Roller Bearing Company, Syracuse, N. Y., Brill 39-E truck with roller bearing boxes; a roller bearing journal box, operated one year under Philadelphia Rapid Transit Company's car. Four of the latest types of "Rollway" journal boxes. Represented by James N. Vandegrift, Harry D. Weed, John Hulbert.

Ramapo Iron Works, Hillburn, N. Y., Space 831, Building No. 3—Full automatic-parallel-throw safety switch stands, automatic return safety switch stands, manganese reinforced switch point, solid rolled riser plates, guard rail clamps with adjustable and reversible filler blocks. Represented by W. B. Lee, A. Gemunder, G. E. Haring, W. W. Snow, J. Edgar Davidson.

Recording Register & Fare Box Company, New Haven, Conn., Space 561, Machinery Hall—Registering fare boxes; fare registers; register fittings and car trimmings; trolley wheels. Represented by M. DeForest Yates, Frank B. Kennedy.

Reiter, G. C., Canton, Ohio, Space 951, Building No. 3—Pneumatic gong ringer; rotary multiple ringing gongs; single tap gongs; pressed steel gongs, with various finishes. Represented by G. C. Reiter.

Roeblings' Sons Company, John A., Trenton, N. J., Spaces 614 and 616, Building No. 2—Bare wire, wire rope and fittings, wire cloth and netting, insulated electrical wires, cables. Represented by W. P. Bowman, A. B. Conover, U. G. Tingley, M. R. Cockey, G. R. Swan, W. L. Doyle, A. D. Clarkson, A. V. Errickson.

Rooke Automatic Register Company, Space 827, Building No. 3—Fare registers. Represented by G. F. Rooke, W. A. Williamson.

Russell Car & Snow Plow Company, Space 655, Building No. 2.

Sherwin-Williams Co., The, Cleveland, Ohio, Space 631, Building No. 2—Reception booth. Represented by E. M. Williams, F. A. Elmquist, H. E. Billau.

Smith Heater Company, Peter, Detroit, Mich., Spaces 672-673, Building No. 2—Nos. 1-C, 2-C and 3-C hot water heaters; Nos. 1-P, 2-P and 3-P forced ventilation hot air heaters; the first two in operation. Represented by Daniel W. Smith, Elmer J. Smith, Harry S. Williams, M. J. Phelan, R. M. Campbell, W. E. Hinmon.

Smith Premier Typewriter Company, Syracuse, N. Y., Spaces 839 and 841, Building No. 3—New No. 10 correspondence machine with six interchangeable carriages; 10 models of billing machines; H. & M. loose-leaf sales and public record. Represented by H. I. Seddon, W. W. Yerkes, A. N. Ashmore, P. E. Barnes, Miss M. E. Reynolds, Miss B. Hager.

Southern Exchange Company, New York, N. Y., Spaces 626 and 628, Building No. 2—Section long leaf pine octagonal and square poles; section Southern white cedar pole; cross arms, high grade long leaf standard and special sizes; pictures of mills and yards. Represented by E. G. Chamberlin, Walter E. Mitchell.

Speer Carbon Company, St. Marys, Pa., Spaces 618-620, Building No. 2—Carbon brushes; railway motor, generator and stationary motor brushes. Represented by J. S. Speer, G. P. Fryling, A. Mullhaupt.

Standard Coupler Company, New York, N. Y., Spaces 828 and 830, Building No. 3—Brake shoe slack adjuster ("shim slack adjuster"). Represented by E. H. Walker, C. D. Jenks, W. H. Sauvage.

Standard Motor Truck Company, Pittsburgh, Pa., Spaces 680 and 681, Building No. 2—Four aluminum truck models. Represented by R. L. Gordon, W. E. Cory, W. G. Price, A. W. Field.

Standard Paint Company, New York, N. Y., Space 822, Building No. 3—F. & B. and S. P. C. insulation varnishes, compounds and tape; "Flexite" and other preservative paints. Represented by Charles E. Smith, H. A. Inwood, H. E. Lavelle.

Standard Steel Works Company, Philadelphia, Pa., Space 565, Machinery Hall—Steel-tired wheels, rolled wheels, open-hearth steel hammered axles. Represented by E. S. Lewis, C. R. Dodson, A. R. Green, C. H. Petersen, T. W. Weston.

Standard Underground Cable Company, Pittsburgh, Pa., Spaces 688 and 689, Building No. 2—Lead covered and armored power cables; bare and insulated wires; "Colonial" copper clad wire; trolley wire; Davis open air and station terminals; manhole junction boxes; cable jointing materials. Represented by C. J. Marsh, G. L. Wiley, H. P. Kimball, R. S. Hopkins, T. E. Hughes, R. M. Hirst, S. S. Warner, J. R. Wiley, E. J. Pietzcker, J. H. Lytle, R. B. Wilcox, C. A. Brown.

Star Brass Works, Kalamazoo, Mich., Space 820, Building No. 3—"Kalamazoo" trolley wheels and harps. Represented by O. P. Johnson.

Sterling Varnish Company, Pittsburgh, Pa., Space 800, Building No. 3—Insulating varnishes, iron enamel paints, raw refined linseed oil, tank for dipping car fenders. Represented by A. S. King, W. V. Whitfield, W. F. Hebard.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., Spaces 843-845, Building No. 3—Dispatchers' signal system; iron-clad dispatching telephones; street railway portable telephones; test sets; jack boxes; local and common battery private branch exchange switchboards; flush type and non-flush type wall and desk automatic key type intercommunicating telephones. Represented by J. O. Oliver, C. E. Hagues, E. P. Ellis, C. P. Button, H. C. Slemin.

Symington, T. H., Company, Baltimore, Md., Space 803, Building No. 3—Journal boxes, center bearings, side bearings, flexible dust guards. Represented by J. F. Symington, C. J. Symington, W. W. Rosser, A. H. Weston.

Taylor Electric Truck Company, Troy, N. Y., Spaces 527-535, Machinery Hall—M. C. B. quadruple spring truck for heavy high-speed interurban cars; M. C. B. triple spring truck; heavy long base truck; improved short base truck for outside hung motors; extra heavy single 8-ft. wheel base truck; truck springs of Taylor manufacture; malleable center and steel tired wheels; axles. Represented by John Taylor, C. H. Dodge, Thomas Thorns, Walter E. Taylor, G. A. Tupper.

Templeton-Kenley Company, Chicago, Space 651, Building No. 2—Simplex car and track jacks. Represented by J. H. Hummel.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, Space 882, Building No. 3—Specially hardened gears and pinions. Represented by C. E. Sawtelle, Leroy Brooks, Jr.

Transportation Equipment Company, New York, N. Y., Space 824, Building No. 3—Registering fare boxes. Represented by Robert C. Adams.

Trolley Supply Company, Canton, Ohio, Space 608, Building No. 2—"Peerless" No. 10 heavy duty base for high speed and interurban cars; No. 5 Knutson trolley retriever; "Star" trolley base; "Ideal" trolley catcher; semaphore headlight. Represented by J. E. McLain, Joseph Hollis.

Under-Feed Stoker Company of America, Chicago, Ill., Spaces 437-439-441, Aquarium Court—"New" Jones high duty, self-cleaning, entirely automatic, mechanical stoker. Represented by Chas. S. Crowell, D. Hunter, Jr., W. T. Jordan.

Underwood, H. B., & Company, Philadelphia, Pa., Space 521, Machinery Hall—Portable cylinder boring bar set up ready for operation in a small cylinder; portable crank pin turning machine set up on a crank in operation. Represented by D. W. Pedrick, second.

United States Electric Signal Company, West Newton, Mass., Spaces 547-549-551, Machinery Hall—Automatic block signal, automatic block recording signal, highway crossing signal, "Usesco" rail sander. Represented by Roland F. Gammons, second; John J. Ruddick, William W. Harrington, J. Warren Putnam.

U. S. Metal & Manufacturing Company, New York, N. Y., Space 609, Building No. 2—"Diamond" steel poles, Wolfe automatic rail joint lock, "Columbia" lock nuts, paints and varnishes, wood preservative, Cunningham axle. Represented by B. A. Hegeman, Jr., Chas. C. Castle, Edw. D. Hillman, F. C. Dunham, H. A. Hegeman, Arthur Masters.

Universal Safety Tread Company, Boston, Mass., Space 878, Building No. 3—Safety treads, car steps. Represented by F. W. Langford.

Universal Trolley Retriever Company, New York, N. Y., Space 949, Building No. 3—Universal trolley retriever. Represented by Edward Shapiro, Peter J. Minck.

Vacuum Car Ventilating Company, Chicago, Ill., Space 835, Building No. 3—Car ventilators, automatic car step lighting system. Represented by D. I. Cooke.

Van Dorn, W. T., Company, Chicago, Ill., Space 574, Machinery Hall—Nos. 20 and 27 drawbar heads with draft gear; No. 32 MCB coupling with draft gear; No. 31 drawbar head with draft gear; three or four other sizes of the company's standards. Represented by W. T. Van Dorn, H. E. Van Dorn.

Walker & Bennett Manufacturing Company, New York, N. Y., Space 447, Aquarium Court—Stationary and reversible car seats for city and interurban service; also longitudinal cushions and backs made with steel frames. Represented by Sheridan A. Walker, K. D. Hequembourg.

Wallace Supply Company, New York, N. Y., Space 960, Building No. 3—Door fixtures, parcel racks, ventilator openers, car trimmings, bronze car trimmings, general line of car builders' materials. Represented by W. Meeteer, E. Metterhausen, C. C. Chapman.

Warren Webster & Company, Camden, N. J., Space 519, Machinery Hall—Feed-water heaters; steam and oil separators; traps; special vacuum heating system apparatus; air washers (latter in operation). Represented by E. K. Webster, W. F. Bilyeu, E. K. Lanning.

Watson-Stillman Company, New York, N. Y., Space 819, Building No. 3—Portable hydraulic punch, 3000-lb. telescopic motor lift, 10-ton telescopic jack, 35-ton hydraulic rail bond compressor, section of 30-ton hydraulic jack, "Noscalon" machine for feeding, "Noscalon" boiler water treatment. Represented by Geo. L. Gillon, Edwin Stillman, Frank H. Clark, Robt. T. Weaver.

Western Electric Company, New York, N. Y., Spaces 637-639, Building No. 2—Telephone sets, including portable telephones and inter-phone sets, transmitters and receivers, selectors, relays, coils, condensers, transmitter arms, line poles and jacks, protectors, batteries, bells and buzzers; car equipment material including commutators, registers, trolley poles, car wheels, headlights, gongs and bells, high tension switches, "Hawthorn" soldering salts and paste; line material, including trolley frogs, crossing, strain insulators; "Electrose" material of many kinds, mounted on display boards and high tension insulators; "Hawthorn" flaming arc and a line of incandescent lamps. Represented by F. D. Killion, J. L. Ludwig, W. R. Lyall, D. C. Guest, R. P. Miller, M. A. Oberlander, E. D. Himan, H. B. Sullivan, R. H. Harper.

Westinghouse, Church, Kerr & Company, New York, N. Y., Spaces, odd numbers 419-427, 307-319, 219-229, Building No. 1—Copies of booklet "Work Done."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Spaces, odd numbers 419 to 427, 307 to 319, 219 to 229, Building No. 1—Railway motors, controllers, circuit breakers, repair parts. Represented by S. L. Nicholson, C. S. Cook, C. H. Davis, M. B. Lambert, J. J. Sinclair, W. J. Conwell, Thos. Cooper, H. C. Stier, J. C. McQuiston.

Westinghouse Lamp Company, Bloomfield, N. J., Spaces, odd numbers 419-427, 307-319, 219-229, Building No. 1—Railway incandescent lamps. Represented by Walter Cary, T. G. Whaling, B. F. Fisher.

Westinghouse Machine Company, East Pittsburgh, Pa., Spaces, odd numbers 419-427, 307-319, 219-229, Building No. 1—Le Blanc condenser, complete with turbine, motor and air pumps. Represented by E. H. Sniffin, H. Van Blarcom, L. L. Brinsmade, H. P. Childs.

Westinghouse Traction Brake Company, Wilmerding, Pa., Spaces, odd numbers 419-427, 307-319, 219-229, Building No. 1—No. 5 electro-pneumatic brakes, schedule AMM automatic brakes, electric pump governors, automatic car and air coupler, motor-driven air compressors. Represented by A. L. Humphrey, W. V. Turner, W. S. Bartholomew, J. R. Ellicott, E. L. Adreon, E. A. Craig, R. P. Noble, H. S. Clark, P. H. Donovan, R. E. Adreon.

Wharton, Wm., Jr., & Company, Inc., Philadelphia, Pa., Spaces 208, 210, 212, 214, 216, 304, Building No. 1—Switches, mates and frogs of solid manganese steel construction and of manganese steel center construction; spring and locking devices for tongue switches; solid manganese steel crossings and manganese steel T- and girder rails, the girder section having been in service nearly seven years. Represented by V. Angerer, L. R. Ashhurst, Jr., R. C. McCloy, H. F. McDermott, George R. Lyman, J. C. Robinson, F. H. Osborne, A. S. Partridge, J. E. McLain.

Wheel Truing Brake Shoe Company, Detroit, Mich., Space 818, Building No. 3—Abrasive brake shoes. Represented by J. M. Griffin.

Whipple Supply Company, New York, N. Y., Spaces 880 and 881, Building No. 3—Hedley Anti-Climber, preventing climbing of platforms and telescoping of cars; including heavy and light weight rolled steel sections for interurban and city cars, also combination Anti-Climber drawhead for city cars. This company also represents Tool Steel Gear & Pinion Company, Cincinnati, and the Universal Safety Tread Company, Boston, whose exhibits adjoin. Represented by A. L. Whipple, R. J. Owens, H. F. Stevenson, H. F. Keegan.

Whitmore Manufacturing Company, Cleveland, Ohio, Spaces 555-557, Machinery Hall—Gear and pinion from the Spokane & Inland Empire system; gear and pinion from Schenectady Street Railway Company; four other pinions; two pinions and one gear from Chicago Railways Company. Represented by S. W. Whitmore, W. M. Lawyer.

Williams, J. H., & Company, Brooklyn, N. Y., Space 610, Building No. 2—"Vulcan-Bijaw" chain wrench; "Ratchetless" ratchet wrench; track, engineer and car wrenches; lathe dogs; "C" clamps; hooks, etc. Represented by A. S. Maxwell.

Wonham, Sanger & Bates, New York, N. Y., Space 405, Building No. 1—Electric track switch; "H. B." life guard; Hayes Run fire brick. Represented by F. S. Wonham, Ralph Sanger, H. A. Goode, D. Polderman.

Wright Wrench & Forging Company, Canton, Ohio, Space 812, Building No. 3—Wright quick-adjustable monkey and automatic wrenches; Stover pipe wrench. Represented by Wm. B. Haight.

Yale & Towne Manufacturing Company, New York, N. Y., Spaces 542-544, Machinery Hall—Chain blocks, electric hoists, carrying trolleys, cranes. Represented by C. W. Beaver, H. C. Spaulding, R. T. Hodgkins.

Whipple Supply Company, New York, has spaces 880-881, Building No. 3. This is the first convention at which Mr. Whipple is exhibiting products handled by his own company. He has been in business for himself less than a year, but has already secured a good clientele. The exhibit is novel and interesting. Among the specialties are new lightweight sections of the Hedley anti-climber, for city service, seven inches high, with three corrugations. It was found that the standard section of the anti-climber was too heavy for city cars. A special set of new rolls was therefore designed to turn out sections for city cars. The Boston Elevated Railway has specified this section for 100 city cars; the Indianapolis Traction & Terminal Company for 25 city cars, and the New York & Queens County Railway for 25 city cars. Combination anti-climber drawheads are displayed also. These include types used by the Cincinnati Traction Company, Buffalo & Lake Erie Traction Company, United Railroads of San Francisco, and Public Service Railway of New Jersey. About 5,000 cars are now equipped with the Hedley anti-climber. The Cincinnati Tool Steel Gear & Pinion Company's gears and pinions, for which the Whipple Supply Company is general sales agent, are also exhibited. Represented by A. L. Whipple, H. F. Stevenson and H. F. Keegan.

J. H. Williams & Company, Brooklyn, N, Y., are in space 610, Building No. 2. Although a newcomer at the convention, this company has a varied and interesting exhibit of drop-forged specialties. On neatly arranged solid oak sample boards are standard drop-forged tools, such as wrenches, hooks, eyebolts, thumb screws, "C" and planer clamps, lathe dogs, machine handles, etc. There is also a working demonstration of mechanically driven chain pipe tools and ratchetless "Ratcho" track wrenches. The latter should appeal strongly to maintenance of way engineers. Represented by Messrs. Maxwell and Whittemore.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Street & Interurban Railway Association and Its Affiliated Associations

VOL. XXXVI NEW YORK—OCTOBER 12, 1910.—ATLANTIC CITY No. 15B

PUBLISHED DAILY BY

McGraw Publishing Company

James H. McGraw, President. H. M. Wilson, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
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News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

NEW YORK, 239 WEST THIRTY-NINTH STREET.
ATLANTIC CITY, MILLION-DOLLAR PIER.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
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TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9500 *copies are printed.*

NEW YORK—OCTOBER 12, 1910.—ATLANTIC CITY

PROGRAM FOR TO-DAY

MORNING

9.00 a.m. Traymore Hotel, Meeting of the Claim Agents' Association.

9.30 a.m. Annex Court Hall, Convention Pier, Meeting of Accountants' Association.

9.30 a.m. Aquarium Court Hall, Convention Pier, Meeting of Engineering Association.

9.30 a.m. Greek Temple, Convention Pier, Meeting of Transportation & Traffic Association.

AFTERNOON

12.30 p.m. Capt. Young's Villa, Convention Pier, Group Photograph of Engineering Association.

1.45 p.m. Atlantic City Country Club—Ladies' Afternoon, Clock Golf Contest. (Special touring cars leave Marlborough-Blenheim and Chalfonte Hotels at 1.45 sharp.)

2.00 p.m. Greek Temple, Convention Pier, Meeting of American Association (Executive Session).

2.00 p.m. Aquarium Court Hall, Convention Pier, Meeting of Engineering Association.

5.00 p.m. Greek Temple, Convention Pier, Annual Meeting of Manufacturers' Association.

8.30 p.m. Apollo Theater, Amateur Vaudeville and Theatrical Performance.

11.00 p.m. Ball Room, Marlborough-Blenheim, Informal Dancing.

In Atlantic City Again

This is only the second time in its history that the association representing the electric railway interests of the country has met in the same city three times. The only other locality boasting of this distinction is St. Louis, which was selected for the annual conventions of 1885, 1896 and 1904. Cities which have been honored with two conventions are Boston in 1882 and in 1898, Chicago in 1883 and in 1899, New York in 1884 and in 1901, and Philadelphia in 1887 and in 1905. The attendance at the present convention, so far as it could be determined by the registration up to a late hour last night at the headquarters of the association at the pier, will break all records. This indicates that Atlantic City was a popular choice this year. It is needless here to cite the many advantages of Atlantic City for a convention of this kind, such as the many good hotels comparatively near each other, the large exhibit hall, and the equable climate on account of the location of the city on the ocean. The choice of future convention cities will be determined by future conditions as they arise and it is not worth while to discuss them here, but it is safe to say that the logical choice for the convention city this year was Atlantic City.

President Shaw's Address

The address of President Shaw yesterday was devoted principally to the affairs of the association, which he was able to report were in a most gratifying condition. The expenses of administration have been higher this year than ever before, but, as the address states, such a condition of affairs is to be expected in every progressive organization. Facts which are vastly more important than increased expenses are that the association has a good return for the money which it has spent and that the receipts have increased in a much larger ratio than the expenses.

Some of the more important outside activities of the association to which President Shaw refers are those of closer affiliation between it and the State and sectional organizations initiated at the mid-winter meeting and the establishment of better facilities for securing information in regard to accident claimants. The internal affairs of the association are also considered at length and the subject is logically divided under the work of committees, that done at headquarters, and that of the affiliated associations.

President Shaw concludes his interesting address by discussing the general situation. The conditions which he described last year of high operating expenses have become aggravated as the result of the past twelve months. While there has been a slight recession in the cost of materials, there is no doubt that the recompense which companies are obliged to pay for labor is higher on many roads than last year. As 60 per cent of the entire operating expenses of the average road are for labor, the effect on the total operating expenses is very large.

Mr. Shaw repeats the remedies for the present condition of affairs suggested in his address of last year and urges publicity as a means of applying them. He believes that if the public should become better acquainted with the real conditions and high cost of railway operation there would be less seeming

antagonism of interests between it and the companies. The term "public" is generally assumed to include all members of the community in which a railway operates except those actively interested in the ownership or management of the property. But if the make-up of "public" is analyzed, this all-embracing term will be found to include many whose business prosperity is closely allied with the prosperity of the corporation, and a still larger number whose friendship can be gained for the railway company if its cause is just. As President Shaw intimates, if those who are thus directly and indirectly allied with public service corporations would but take the trouble to correct many of the misapprehensions which are prevalent in the minds of their neighbors and friends as to public service corporations, sentiment would be awakened in their favor and but little difficulty would be experienced in obtaining fair treatment.

Express and Freight Accounting

How the expenses rightly chargeable to freight and express can fairly be determined is a problem of long standing. Coincident recommendations that the problem be attacked have been made to both the Accountants' Association and the Transportation & Traffic Association. L. T. Hixson suggests that a uniform basis for apportionment of the operating expenses be reached by conference between members of the two associations. The committee on express and freight traffic of the Transportation & Traffic Association has gone much farther by compiling and recommending for adoption a method of segregating earnings and expenses arising from these classes of business. Its proposed method, fortunately, is given in detail for the consideration of the association.

The plan provides, in brief, for a direct charge to the operating expenses of each department of such items as are plainly attributable to freight or express business and for apportionment of the other items. Where the difficulty lies, of course, is in the apportionment of those expenses which are rightly divisible in some ratio between freight or express and other branches of the service. The members of the committee were able to agree, item by item, on bases of division. In some cases a pro rata charge according to gross earnings is recommended; in others a corresponding charge according to the value of the property involved is held desirable, while in still others a charge in accordance with the car mileage is approved as the proper method of distribution.

The two papers discussing this important subject furnish evidence, first, that traffic officials feel that they need to have freight expenses segregated from other classes of operating expenditures; and, second, that the accountant of a leading interurban system in the Central West appreciates the importance of similar analysis of expenditures in order that the profitableness or unprofitableness of the freight business may be demonstrated. Whatever action may be taken by either or both these associations is of great importance to the industry. If the Accountants' Association decides to take up the matter and prepare a standard classification, it will be confronted by the well-known and deep-seated diversities of opinion existing on the subject. Nevertheless, if there is a demand among members of the association for an investigation into the intricacies of this topic, the association should by all means undertake the task. Even if the final conclusion should be reached that no fair division of all items of expense can be made, the study into the question would furnish information of value. But no matter to what degree the theory of apparent profitableness or unprofitableness of individual rates is carried, the question of the value of the service should be considered in conjunction with the cost of the service in rate-making.

Rail Joints

The progress report on rail joints submitted this year by the committee on way matters is a very interesting discussion of the good and bad features of the various types of joints now in use in electric railway tracks. The rail joint problem has been studied for many years by the ablest track engineers, but a perfect joint has yet to be developed. In paved streets rail joints are much more expensive to maintain than in open track, and because of this defective joints usually are allowed to stand without attention until the pavement, the substructure and the rails are damaged beyond repair. Few rails are actually worn out in service. They become kinked and flattened out at the ends because of defective joints until they are unfit for any purpose except to be cut up for scrap. The committee points out that as the joints represent only a small part of the first cost of track construction and as the life of the track is largely determined by the life of the joints, any additional expenditures within reason for improvements in this detail are fully justified.

It is of interest to call attention to the experiments made by the Board of Supervising Engineers, Chicago Traction, in connection with the second requisite for a perfect joint as given by the committee. The committee says in its report that "a joint should be mechanically strong and should be such that the rail at the joint will be equal in strength and stiffness to the rail itself." This is an old axiom of steam railroad track engineers, who experienced trouble with rails breaking just beyond the fishplates of joints designed to be stiffer than the rail itself. The theory that the joints should just equal the rail in stiffness is based on the phenomenon of progressive wave motion observed in steam railroad track under wheel loads of 25 tons or more. The deflectometer tests made by the Board of Supervising Engineers revealed no deflection of the rails except where the wheels were exactly over the point where readings were taken. In other words, with the heavy girder or T-rail sections used in paved streets and under comparativly light wheel loads, no measurable wave motion takes place in the rails. If the wave motion is absent or so slight as to be incapable of measurement, there could be no objection to the use of a joint having greater stiffness than the rail with corresponding freedom from loose rail ends.

The most important recommendation of the committee is that the top surfaces of the abutting rails should lie in exactly the same horizontal plane. This applies equally to bolted and welded joints. Grinding or filing of the abutting rail heads to an even surface is absolutely essential for satisfactory service, as a difference of even the one-hundreth part of an inch produces a hammer blow, which rapidly increases in violence and destructive effect.

A very interesting contribution to the subject of rail joints was the paper presented by Felix Lange, of Essen, Germany, chief engineer of the Goldschmidt Company. After a strong plea for a perfectly continuous rail, he discussed the strains to which rails are subjected through changes in temperature, and showed that where there are variations in temperature due to the seasons of 100 deg. Fahr. and more, a collar of steel welded about the base and flange of a rail, that is, around only 50 per cent of its section, is insufficient to withstand this strain. The result will be broken joints. His solution of this problem is to weld the entire rail section, except in localities like Southern California, where the range of temperature is not so great. In Europe this is being done by casting the thermit about the web and flange and allowing the slag to pass up around the heads of the rails, which are drawn together by clamps, but this is not practicable in this country owing to the higher content of carbon used in American rails. Hence for American conditions Mr. Lange recommends a weld of the entire section and later grinding off the riser around the head of the rail to give a smooth running surface.

Conventionalities

Good morning. How is your potential?

H. M. Scott, of the Griffin Wheel Company, is attending the convention for the first time. He is under the strict chaperonage of Mr. C. K. Knickerbocker.

Frederich H. Beach, receiver of the Eastern New York Railroad, Ballston Spa, N. Y., is a guest of the convention. He is accompanied by Mrs. Beach.

B. M. Lathrop, superintendent of the Colorado Springs & Interurban Railway, brought Mrs. Lathrop to the convention this year. They came by way of Chicago.

Among the visitors at the hall yesterday and attendants at the meeting of the American Association at the Greek Temple were Commissioner Edward M. Bassett and E. G. Connette, transportation expert of the New York Public Service Commission of the First District.

W. E. Wilkinson had the honor of occupying the first convention chair on the Boardwalk Monday morning. In his capacity as chairman of the roller chair committee he was out bright and early marshalling his forces at the three checking stations which have been established.

Pittsburghers, of whom there are several at the convention, feel quite at home on the Boardwalk. The clouds of black smoke which float out to sea just north of the Pier make some of the Iron City visitors to Atlantic City wonder if they really are 500 miles away from Smithfield Street.

Waldo E. Berry, of the Carnegie Steel Company, is the only salesman from the New York office of that company. Mr. Berry, as a member of the entertainment committee, is serving with Mr. Garland and Mr. Metteer on the golf committee, so the tournament will probably be run on strictly "Colonial" principles. Mr. Berry will also assist in the amateur vaudeville show.

J. A. Pearson, purchasing agent of the Public Service Corporation of New Jersey and the United Gas Improvement Company, spent Tuesday at the convention. Mr. Pearson did not wear a badge and for that reason probably was not recognized by many of the exhibitors, who would gladly have welcomed Mr. Pearson at their booths. He carefully examined, however, many of the exhibits in which he is especially interested.

E. M. Williams, of the Sherwin-Williams Company, called a meeting of himself yesterday morning. He adopted resolutions on a color scheme for convention badges for the future. Eddie is having a good deal of trouble with the red ribbon on this year's badge. He has a lot of new clothes and they are truly gorgeous (as to color), but a red ribbon seems to harmonize with nothing in his wardrobe except his night clothes. Red is peculiarly repulsive to him this year.

The hardest working young woman on the Pier yesterday was Miss C. F. Swenson, who is Secretary Donecker's capable assistant. She is in charge of registration of delegates to the American and Transportation & Traffic Associations and all railway guests and ladies. Single-handed she managed three counters at once from early morning until late in the afternoon, and by her tact and patience greatly facilitated the progress of registration.

C. S. Sergeant, vice-president of the Boston Elevated Railway and past-president of the American Association, arrived in Atlantic City Tuesday morning. The company is well represented at Atlantic City. Besides four or five representatives from the engineering department the company has sent to the convention its treasurer-auditor and its claim agent, three senior division superintendents who had not previously attended a convention, its signal man and its assistant superintendent of the elevated division.

A group picture of the Engineering Association delegates will be taken immediately after the adjournment of the morning meeting at 12.30 p. m. The delegates will assemble in the garden of Captain Young's villa on the north side of the Pier just beyond Marine Hall. Copies of this picture may be obtained from the official convention photographer, Harper Smith, 1637 Boardwalk.

The Metropolitan Street Railway, New York, has a representative delegation of officers at the convention. It includes H. H. Adams, superintendent of rolling stock and shops; L. H. Palmer, superintendent of transportation; William T. Dugan, engineer maintenance of way; F. C. Nordsick, purchasing agent; J. R. C. Armstrong, electrical engineer, and F. T. Wood, assistant to general manager.

Paul Winsor, past-president of the Engineering Assciation and chief engineer of motive power and rolling stock, Boston Elevated Railway, will be missed at this convention. Mr Winsor has been most regular in his attendance at conventions in the past, and his wide experience in engineering work has made his discussion of engineering topics most instructive. He is unable to be in Atlantic City this year on account of business.

Captain Robert McCulloch, president United Railways of St. Louis, and Richard McCulloch, vice-president of the company, will not be here. This is "Aviation Week," and high records for traffic are expected by the United Railways, as well as high records of flight by the aeronauts. The United Railways has a good representation here, however, in J. E. Burgess, C. B. Hardin, M. O'Brien, James Samuel and Dr. E. P. North.

The Pittsburgh Railways Company has sent 14 officers to the convention this year. They are S. L. Tone, second vice-president; P. N. Jones, general superintendent; F. R. Phillips, superintendent of equipment; C. S. Mitchell, auditor; J. A. Laughlin, traffic agent; F. Uhlenhart, Jr., chief engineer; W. H. Boyce, superintendent Beaver division; C. G. Rice, superintendent claim department; J. M. Larned, engineer maintenance of way; G. W. Emery, assistant engineer maintenance of way; Thomas Davin, division track foreman; Michael Walsh, division track foreman; John A. Rogan, master mechanic; and H. K. Gowdy, chief engineer of power stations.

Joseph A. McGowan, the author of the paper before the American Association on Thursday on "What Interurban Railway Companies Do for the Public," is secretary and treasurer of the Terre Haute, Indianapolis & Eastern Traction Company, and a cousin of Hugh J. McGowan, president of the company and also president of the Indianapolis Traction & Terminal Company. Joseph McGowan has been associated with traction enterprises in Indianapolis for the past eight years. Prior to that time he was connected for over 15 years with the Grand Trunk Railway, Portland, Me., where his boyhood and young manhood were spent.

The Syracuse Rapid Transit Railway, the Oneida Railway and the Utica & Mohawk Valley Railway have a large number of delegates in attendance, headed by C. Loomis Allen, vice-president and general manager of the associated lines. Among those in the party are J. E. Duffy, superintendent, Syracuse Rapid Transit Railway; T. C. Cherry, superintendent, Utica & Mohawk Valley Railway; I. H. McEwen, superintendent, Oneida Railway; R. E. McDougall, claim agent, Utica; A. D. Brown, claim agent, Syracuse; P. J. Honold, purchasing agent; J. M. Joel, auditor; C. R. Gowen, general passenger agent; F. W. Watts, general freight agent; W. J. Harvie, chief engineer; J. P. Barnes, electrical engineer; E. P. Roundey, engineer maintenance of way, Syracuse Rapid Transit Railway, and M. J French, engineer maintenance of way, Utica & Mohawk Valley Railway. They are all registered at the Traymore.

The form of Joe Cunningham, of the Allis-Chalmers Company, towers above the crowd.

Fred N. Root, manager of the Root Spring Scraper Company, Kalamazoo, Mich., is attending the convention for his company.

Have you observed that the Brill car, on the Boardwalk, is several lengths ahead in its race with the sand automobile?

The accountants are requested to take account of the fact that their meeting this morning will be held at the Hotel Chalfonte.

Jim Gardner from Chicago is here in the interests of the Allis-Chalmers Company, for which he is manager. Mrs. Gardner is with him, which accounts for his sedateness.

E. T. Pardee, one of the members of the Exhibit Committee, blew in from Boston on Tuesday morning. His rotund figure is a tribute to the Allis-Chalmers Company.

Jack Blackhall, general manager of the Chicago & Joliet Electric Railway, is completing his twentieth attendance at this convention with his genial smile, which has been never known to come off.

Walter S. Heaton, claim agent of the Los Angeles-Pacific Company, Los Angeles, Cal., is in attendance. Mr. Heaton is the only representative of the Los Angeles companies at the convention.

Frank Randall, the tar of tars in the street railway field, looked larger than ever last evening in his six-foot two, capped by a top hat. Randall never could help being in evidence by reason of his figure.

John R. McGivney, purchasing agent, New Orleans Railway & Light Company, is missing from the convention. A careful search has elicited the information that he was scheduled to be married on Wednesday, Oct. 12.

There will be a Dutch supper given at the Marlborough-Blenheim Hotel to-night at 6:30 o'clock by the Southern supply men to the Southern railway men. All Southern railway men are cordially invited to be present.

"The man who dared" held his hand in the pneumatically operated door of the "pay-within" car with an expression on his face which said plainly, "Behold a hero!" And everybody smiled when he said, "Why, it didn't hurt a bit."

It has been noted that Jack Shanahan, general manager of the Washington, Baltimore & Annapolis Electric Railway, has been joyfully renewing old acquaintances, among whom is to be known one Colby from the Pacific slope.

W. O. Wood, president of the New York & Queens County Railway, is establishing the latest novelty in men's attire in the way of chamois gloves and an English walking stick. The style will undoubtedly be copied by many of his admirers

There were objections in some quarters in regard to the strict enforcement of the 1 o'clock closing law in Atlantic City. Mayor Stoy, who was found by an Electric Railway Journal reporter at Old Vienna at 2 o'clock this morning, said that as far as he could see there was no cause for complaint.

One of the latest arrivals at the convention is S. Misaki, engineer-in-chief of the Hanshin Electric Railway, Sutka, Japan. Mr. Misaki is an associate member of the A. S. & I. R. A., and this is his second visit to the United States. He attended the convention held in Chicago in 1899, and is greatly interested to learn what developments have been made in electric traction since that time. Mr. Misaki is making a trip around the world and will remain in Atlantic City for several days. The Hanshin Electric Railway now operates 20 miles of double-track in Hanshin.

A lady visitor, examining the Samson Spot Cord demonstration in the Electric Service Supplies Company exhibit, wanted to know if the "machine" pulling the cord was for the purpose of "saving the conductor the trouble of ringing up fares." The gentlemanly guide threw up his hands and fled.

W. H. Heulings, Jr., of The J. G. Brill Company, was in the Shelburne Grill last evening trying to make up his mind whether "this sort of a convention" was better than the "convention we used to have." Mrs. Heulings was strongly in favor of the new style of gathering, and Mr. Heulings finally agreed to make that decision unanimous.

To meet the objections of certain visitors the Electric Service Supplies Company has provided caps from Mellen's Food bottles for those who prefer this form of mouth piece to test the pneumatic bell ringer. The usual foil caps are still kept on hand for those to whom they seem more natural.

R. E. Adrian, president of the Railway Men's Supply Association of the Railway Master Mechanics and Car Builders' Associations, is at the convention looking over the splendid exhibits. Perhaps he has in mind plans to go this convention one better in June of next year. Mr. Conway, secretary of the Supply Men's Association, is also here.

Between the Wellman dirigible balloon at the Inlet and the convention at the Pier no one can say that the latest developments in transportation are not represented this week at Atlantic City. The general opinion seems to be that electric traction has not much to fear from aerial competition. Dirgibles and aeroplanes may be all right for high fliers, but most people on their travels will prefer to stay nearer earth. In this connection it might be said that Mr. Wellman has stated to some visitors that he hopes to be ready for his long flight toward the end of this week or the early part of next week. Some matters still remain to be attended to in connection with the machinery—otherwise the balloon is nearly ready for its long trip.

Bearing a petition signed by all the directors and many stockholders of the Union Traction and Philadelphia Rapid Transit Companies, a delegation called yesterday on E. T. Stotesbury, head of the banking house of Drexel & Company, requesting him to accept election as a director of the Philadelphia Rapid Transit Company. Ellis Ames Ballard, general counsel of the company, was the spokesman of the delegation, which included Charles O. Kruger, president of the Philadelphia Rapid Transit Company, and J. J. Sullivan, president of the Union Traction Company. Mr. Stotesbury was urged to accept a directorship as a duty that he owed the public. There are no vacancies on the Philadelphia Rapid Transit board, but a number of directors have stated their willingness to resign in order to make way for Mr. Stotesbury.

ACCOUNTANTS TO MEET AT CHALFONTE

Owing to the poor acoustic properties of the Annex Court hall, on the Pier, the Accountants' Association will hold its remaining sessions at the Hotel Chalfonte.

CLAIM AGENTS' DINNER

The annual dinner of the Claim Agents' Association at the Windsor Hotel last evening was one of the pleasing and memorable events of the convention season. The attendance was beyond expectations and there were a number of ladies in the party. The dinner was good and the speeches were as witty as they were brief. The speakers were formally limited to three minutes each. H. K. Bennett was toastmaster and the speakers on the program were Carl Sylvester, F. W. Johnson, W. F. Web, E. C. Carpenter, A. G. Rippey, S. S. Hallam, C. B. Hardin, J. S. Harrison, T. B. Donnelly and C. A. Avant.

ADDRESS OF PRESIDENT SHAW OF THE AMERICAN ASSOCIATION

At your last annual meeting, held in the city of Denver in 1909, I undertook somewhat briefly to relate the history of your association from the date of its formation in 1882. At the mid-year meeting, held in New York in January last, I was privileged to address the members on questions of public opinion and the general conditions confronting electric railway companies. It is now my purpose to bring to your attention a few facts concerning the work of the association during the past year.

MEMBERSHIP AND FINANCES

Naturally, in passing judgment on the efficiency of the work of the association, as well as its ability to continue to carry out the objects for which it was formed, the most important element of consideration must be the strength of its membership and its financial condition, and it is with a feeling of gratitude to the officers who have been associated with me, to the officials of the member companies, to the committeemen who have devoted so great an amount of valuable time and to the associate members, to whose combined efforts all credit must go, that I call attention to our total membership and the healthy condition of the association's finances. There are enrolled today 356 companies, a net increase of 41, and 1108 associates, a net increase of 291 during the present year. I desire to take this opportunity of expressing my appreciation of the action of the new members who have consented to assume their proper share in our work, and again cordially to thank our old members who, both from the standpoints of financial assistance and personal co-operation, have been unwavering in their support. The small number of resignations and the comparatively few delinquents shown in the treasurer's report manifest the great interest sustained throughout the past year and indicate how confidently our members look forward to increasing usefulness on the part of the association.

ASSOCIATE MEMBERSHIP

Speaking particularly to our associates, I would call especial attention to the change in your status as developed by our committee on revision of associate membership. The new plan makes those who under our by-laws are permitted to attend the executive meetings of the American Association eligible as associate members of that body. Other associate members can ally themselves with any of our affiliated associations which possesses the grade of associate membership. This plan undoubtedly places our individual membership on a much more satisfactory basis than before, both as to the identification of the individual with a specific branch of the work and as to a more uniform and equitable arrangement of the benefits conferred. I hope you have appreciated the policy of the association in supplying the associates with printed material during the past year. No better evidence than this can be shown of our recognition of the influence for good which an aroused associate membership can exert; therefore, we have been anxious to place in your hands material facts that will enable you to speak out truthfully and intelligently in behalf of the electric railway industry when the opportunity presents itself. I also wish to express the appreciation that we all feel for the open display of the emblem of your membership, now so generally worn by our associate body. At different times I have spoken of my faith in the good that can be accomplished through the exhibition of this pin and only wish to add now that personal observation of its effect has strengthened my confidence manyfold.

TREASURER'S REPORT

As will be seen from the treasurer's report, the cash balance on Sept. 30 amounted to $14,862.73, an increase of $4,297.62 over the balance shown at the end of the previous fiscal year. It seems well at this time to call attention to the increase in expenses and to say that this is in large part chargeable to the greater cost of printing and distributing the annual proceedings, which, as you know, were considerably enlarged both in number of pages of printed matter per set and in the number of volumes distributed, due, of course, to increased membership, particularly in the associate class. Some other items, however, such as the general distribution of material throughout the year to the large associate membership, the inauguration of the mid-year meeting, the installation of the information service for the Claim Agents' Association, etc., played a minor part in adding to the expense of conducting association affairs. I might say, as a matter of interest, that had the work proceeded on the same basis as in 1908-1909 the expenses this year would have shown a considerable decrease, although, in this connection, I think we all should expect that expenses are not likely to decrease if our association is to progress from year to year.

MID-YEAR MEETING

Our members will recall their approval at the Denver meeting of a resolution providing that the American Association supplement its annual convention meetings by a mid-year meeting, to be held at the time of the winter session of the executive committee at the association headquarters in New York, this meeting to be open only to the presidents of other duly accredited representatives of the member companies and to be held for the purpose of considering in executive session matters of pressing interest to all the member companies. The first meeting under this plan was held at the association headquarters on Jan. 27 and 28 and was attended by about 125 executives of member companies from cities as far apart as Montreal, Canada, and Dallas, Tex. Addresses by men prominent in our business were presented and discussions of lasting value to each one of us ensued. The papers read at the mid-year meeting were subsequently printed, and thus by wide dissemination great interest was aroused in the problems which our industry now faces. As indicative of this interest, many requests for printed copies of the papers have been received from all parts of the country and applications still continue to come in.

At this meeting, also, H. G. Donecker was appointed secretary and treasurer of the association to take the place made vacant by the resignation of B. V. Swenson. In the opinion of your executive committee, Mr. Donecker's previous experience both in association work and before he became connected with our organization eminently fitted him for the office to which he was appointed, and the experience of the past eight months shows that this judgment was correct.

The wisdom of the committee which suggested the mid-year meetings, at which those who shape the policies of the member companies may meet and exchange their views, has been thoroughly demonstrated, and beyond question these meetings will greatly increase the value of membership in the association. To those who attended the first mid-year meeting I need not say "Come again," but I most earnestly urge those who did not participate this year not to fail to be on hand at the next mid-year meeting. None of us can afford to neglect such an opportunity as the mid-year meetings offer to express and hear expressed views and suggestions as to ways and means for promoting the interests of our transportation companies.

CLOSER AFFILIATION WITH SECTIONAL ASSOCIATIONS

Coöperation must be the keynote of association work, and in support of the principle your executive committee at its January meeting approved a plan by which the presidents of the State, sectional and national associations of America should become members of our committee on public relations. This action followed a joint meeting of the representatives and of the public relations committee, which had for its object the consideration of ways and

means by which the various associations representing electric railway properties could work together with the unity of purpose that the mutuality of our interests demands. Your association has endeavored to perfect the arrangement further by arranging for the interchange with the local associations of information pertaining to legislation in the various States, in order that the member companies in these States and in others immediately adjacent should be kept closely in touch with important developments along this line. While some progress has been made in developing this plan, much remains to be done to make it automatic in operation and comprehensive in scope.

INFORMATION BUREAU SERVICE

Recent statistics have shown that approximately 4½ per cent of the gross earnings of the electric railways of this country are expended to effect settlements of accident claims to persons or property and to defray the legal expenses in connection with these claims. On the basis of the combined earnings of the electric railway properties, as shown in the report of the United States Census for 1907, this 4½ per cent represents the enormous total of $18,176,305, as against 3.9 per cent in 1902, representing the total payments of $9,395,545. From this it will be seen that in five years this account has almost doubled, a fact that should impress us with the important duty we owe our companies, first of all in the lessening of the number of accidents, and secondly, in instituting methods by which these companies may be protected from fake or excessive claims. Many officials of member companies engaged in claim department practice have within the past few years made a careful study of the advantages to be derived from reporting the names of claimants to a central bureau to determine whether or not the individual has made previous or concurrent claims against street railways, steam railroads or accident indemnity companies. Their consideration convinced them that benefits were likely to follow, and a trial of the plan has brought full confirmation of this expectation.

Your Claim Agents' Association, as a body, made a careful investigation of this whole matter, with the result that it recommended to your executive committee in January last the acceptance of a proposition from the Hooper-Holmes Information Bureau by which all members of our association can at a nominal expense file information as to claimants and receive information of duplicate claims. For this service the association subscribes to a membership in the bureau at a cost of $500 annually, whereas individual companies which enrolled were required to pay $100 a year for the service for their own particular organization. I think that the association is to be congratulated that it was able to effect such an advantageous arrangement, and the participation in it, particularly of the larger companies, indicates its success. But its real value depends upon general utilization by each and every one of the member companies for whose benefit the contract was made. I would, therefore, ask that you give the matter a thorough trial, the cost being almost negligible and the possible benefits both to your company and the other members being many and valuable.

CHANGE OF NAME AND MEMBERSHIP OF STEAM RAILWAYS

Comment on the progress of electric traction would be incomplete without some reference to its increasing application by steam railroad companies, and it must be with a feeling of pride and lasting gratification to all who have assisted in the development of electric railroading that trains now roll in and out of the magnificent terminals of the steam railroads propelled by electric power. What is more natural, therefore, than that the men connected with steam railroads and engaged in this work of electrification should express a desire to affiliate with our association, which is the only one that has given detailed attention to and has solved many of the problems which they now will be called upon to face? It was with this in mind that your executive committee at its January meeting gave attention to a plan by which the name of the association and its constitution and by-laws should be broad enough to cover electrical operation by the steam railroads of the country. Committees were appointed to consider these two propositions, with the result that you will have presented to you in the report of the executive committee the definite suggestions covering the changes necessary to provide for this new class of membership and a recommendation that the name of the association be changed to "American Electric Railway Association." This plan, I am convinced, will be received without a dissenting vote. That the interest of the steam railways has been aroused is shown by the fact that the Pennsylvania Railroad Company has recently joined the association and that the whole question is now under consideration by most of the other steam railroads which are affected, with what to me appear to be excellent chances of favorable results. The coöperation of the extensive personnel of the steam railroads is bound to work to our mutual great advantage. Their interest, already manifested by participation in committee work, guarantees increased strength, efficiency and influence on the part of your association.

COMMITTEE WORK

The committee reports to be presented at your convention will speak for themselves. It is almost needless for me to speak of the amount of time and energy which the preparation of these reports represents, and, being mindful of the hearty appreciation of the work performed by every one of our committees, I would refer to the reports of the committees on interstate commerce commission affairs. public relations, insurance and compensation for carrying United States mail, as matters calling for attention and perhaps action at this time.

The first of these reports, that is, the one on interstate commerce, emphasizes the need for carrying out the plan of which I have heretofore spoken, that is, of keeping member companies in touch with legislative matters in general, and I bespeak for the report your careful consideration. The report also shows the trend of public opinion toward the regulation of electric railway companies and corporations in general.

The report of the committee on public relations somewhat similarly treats of the situation as it applies to State regulations and is, therefore, equally valuable. Future plans of the committee on public relations include the publication of a digest of the laws of the different States relating to electric railway companies. The committee hopes to have this compilation completed and in the hands of member companies about the first of the coming year.

The report of the committee on insurance is a development which has been given most careful consideration by the committee members and covers a matter which has also been discussed at length by your executive committee at three of the four meetings held during the present year. Undoubtedly, there is a way of handling insurance matters in which the association can be of no real tangible value to its members, and this report should be the means of guiding us aright in the selection of a proper plan. I bespeak careful attention to the reading of the report and trust that it will bring forth discussions that will set forth the views of the members and lead to the inauguration of a method which will save to the railway companies an exceedingly large proportion of the money they now pay out in insurance premiums.

With regard to the report of the committee on compensation for carrying United States mail, I might say that the present year was not an opportune time to expect definite results; therefore, your committee has used its re-

sources by attempting to gather detailed information of conditions throughout the country. The committee has secured data that I think will demonstrate beyond question the reasonableness of our claim that our compensation for this service is not adequate. Your president has personally investigated this matter at Washington and is satisfied that your committee has followed the proper course. The committee is now ready to take some definite action, having in its hands the necessary material to justify the position taken.

Another pleasing feature of the work of the committees of all associations this year has been the more general use of the association headquarters as a meeting place, a practice which I think we should encourage in so far as it may be consistent with the geographical location of the committee membership.

CONVENTION LOCATION

Atlantic City was selected for the meeting place this year because it seemed to possess more advantages in the way of hotels, meeting places and exhibit hall than any other available city in the East, and we trust that the choice of the executive committee will meet with your approbation. We have again been favored with a most elaborate and instructive exhibit by our allied association, the Manufacturers' Association, to which we are under great obligations not only for the exhibit and for the entertainment which it has provided here, but also for many courtesies extended during the past year.

During the past year the association has been the recipient of a proposal, with the details of which I presume you are acquainted, from the Chamber of Commerce of Saratoga Springs, N. Y. Briefly, it contemplated the erection in that city of a large hall to be designed and built under the direction and supervision of the association, to which we were to receive title at the end of five years in consideration of meeting in that city for three years of these five years. The subject was very carefully considered by your executive committee and their report to be presented at this meeting will bring the matter before the convention for discussion.

RECORDS OF CONVENTION BENEFITS

I should also like to call attention to a suggestion sent to member companies by which they might increase the benefits from the attendance of their representatives at the convention, by securing from each representative, after the convention, an outline of the new ideas obtained by him during the sessions, or from talks with other delegates outside the meeting halls, or from an examination of the exhibits of electric railway appliances. At least one company has followed this plan for two years with very satisfactory results to itself. I believe that the plan should be generally followed and that a digest of the main features of these reports should be sent to the headquarters of the association. It would then be possible to compile these reports in a confidential bulletin which would be issued to the member companies and would undoubtedly contain much information of great value to them. The data would also be useful in another way as indicating the subjects in which those in attendance at the convention are most interested and would aid considerably in the preparation of the programs for the future association meetings.

WORK OF THE HEADQUARTERS

At the Denver convention I described at some length the work carried on by the association headquarters, and without going into details again this year, I desire to state that, extensive as the work was in 1909, it has been greatly increased during the year just closed, and, as is to be expected, the additional demands have resulted in a marked increase in efficiency even though the force employed is slightly reduced from that of 1909. It must be apparent to us all that the greater the number of requests which we make for useful information, the greater will be the resources of the headquarters and the more promptly will it be possible to provide the data asked by member companies. The fund of information is rapidly growing and it is now possible in many cases to respond immediately to requests which come by mail, telegraph and telephone. This availability of material is due, of course, in a great measure to the coöperation of member companies in supplying data called for from time to time. The inclination to do this even at the expense of considerable time and effort has been thoroughly evident in the past year and is an indication that the member companies are alert to the value of a central organization for the collection and dissemination of information in connection with electric railway operation. Heretofore your aid has been asked by the association in responding to requests of this nature, and I wish again to impress upon you the importance of giving it, and would also suggest that equal importance attaches to your assuming the initiative in calling for investigations of various kinds. Doubtless, good results have been obtained by our member companies in the interchange of information between themselves, but it must be obvious that far better results will be obtained if all inquiries of this kind are directed to the central office, which may have the information on file, or, if not, can quickly obtain it through communication with the members at large, and probably in many instances save these companies the trouble of responding to duplicate calls.

There is another matter which I think merits your consideration, and that is the need of permitting some latitude in the use of the information furnished. This is daily becoming more necessary, and it would serve a splendid purpose if the use of data heretofore furnished as strictly confidential information could, to some considerable extent, be left to the judgment of the officers of the association or its headquarters. My personal attention has been directed to the need of this in several instances this year, in view of which I have thought it desirable to call the matter to your attention. In the past twelve months various compilations prepared by the association have been required for use in arbitration proceedings, in hearings before public service commissions, before city councils and legislative bodies, and in many other ways, some of which require more or less publicity. In many cases the immediate receipt of the information by the member company is essential, and if the association is given a certain amount of freedom in utilizing the material in hand, I am confident that a considerable increase in valuable results would accrue.

WORK OF AFFILIATED ASSOCIATIONS

I desire to call attention to the splendid programs arranged by our affiliated associations, and, without going into details, mention some of the important work accomplished during the past year.

ACCOUNTANTS' ASSOCIATION

The arrangement to which I referred last year by which our Accountants' Association considers, in connection with the Interstate Commerce Commission, questions arising under the classification remains a most important and valuable feature of the work of our affiliated association. The results of this have been distributed to member companies in the form of Accounting Bulletin No. 5. Another splendid development of the year is the report of the committee on shop accounting, the details of which fill a want of member companies, as shown by many requests for information along this particular line. This report, as you

know, is the joint product of the Accountants' and Engineering Associations, and is a tribute to the harmonious spirit evident throughout the various branches of our business.

ENGINEERING ASSOCIATION

As in former years, the work of the Engineering Association has been carried on entirely by committees, the number of which has been increased by the addition of the committee on buildings and structures, a branch not heretofore given special consideration, and the committee on heavy electric traction, the personnel of which includes prominent officials of steam railroad companies. The formation of this committee is in line with the broadening of the scope of the association to include the operation of the electrified sections of steam railroads and, undoubtedly, is a field of effort from which splendid results may be expected.

Standardization, of course, remains one of the fundamental objects of our Engineering Association, the officers of which I think are to be complimented upon the careful manner in which they are taking up the question of the adoption of definite standards or recommended practices. It is unnecessary for me to speak at any length upon the valuable work performed along this line. Standardization means tangible benefits to our companies and is a matter to which every one of us should give increasing thoughtful consideration.

CLAIM AGENTS' ASSOCIATION

I have heretofore spoken of the installation of the service of the Information Bureau for the use of the members of the Claim Agents' Association. I think that this is undoubtedly the most important work accomplished by this affiliated association during the present year. The officers have, as in former years, been most active in their efforts to reduce to a minimum the losses due to the claims of accident fakers, and, in addition, have considered many subjects of general interest and value which should bring about effective remedies and results.

TRANSPORTATION AND TRAFFIC ASSOCIATION

Another program of particular excellence is that provided by our newest association. The field of investigation and the opportunity for specific lines of work are especially inviting in the operating department, a fact well exemplified in the committee reports and papers this year. One important feature should have your earnest attention; that is, the report of the newly formed committee on the construction of schedules and timetables, a line of investigation suggested by one of the prominent members of our association in January last. The continued excellent work of the other committees is noteworthy and its value must be clearly apparent.

CONDITION OF THE INDUSTRY

No one who has not been intimately acquainted with the painstaking work during the year of our association and its affiliated associations, both at the main office and through committees, can realize the importance which this organization has upon the sound development of the industry.

The increase in the gross business of the electric railway companies of this country, mentioned in my address of last year, has continued during the twelve months which have just passed. This condition, although gratifying so far as it goes, has been accompanied proportionately by a still greater general increase in the cost of materials and labor. This fact emphasizes the most serious aspect of our business, namely, the gradual but sure decline on many of our properties of the margin between the income from operation and the operating expenses per passenger carried. The recognition of this condition is no novelty to those engaged in electric railway work, but its full import and significance do not yet seem to be realized by the public. Personally, I can see no escape from one of the three remedial measures suggested last year—viz., higher fares, or reduced transportation for the present fare, or relief from some of the present forms of taxation—if the electric railways of the country are to fulfil the due measure of service which is demanded of them by the public.

Concurrently with these conditions there has been a gradual cessation of activity in the electric railway field so far as new construction is concerned. Capital will not engage in unprofitable enterprises and the public cannot expect a change in this attitude under the present condition of affairs.

REMEDIAL MEASURES

In my address in January I spoke of the most practicable means of securing the adoption of these remedial measures, namely, to make the public acquainted with the real conditions of railway operation. The general trend in both national and State governments is toward a closer supervision of the financial operations of corporations than ever before and toward the collection and publication of the returns so secured. This is one way by which the public will be informed of the real situation of affairs. Knowledge of the conditions of electric railway operation on the part of the public should be welcomed. The more thoroughly it is acquainted with the financial facts surrounding our properties, as well as with our problems of operation, with the difficulties confronting us in taking care of rush-hour traffic and with the increase in the cost of our labor and the materials which we have to buy, the better for us and for the public. I am confident that when the public understands these real conditions opposition to the introduction of some remedial measure or measures will disappear. We have suffered in the past from public ignorance of these facts, an ignorance for which we ourselves are to blame perhaps as much as, if not more than, the public. In too many cases, perhaps, we have shown a disposition to remain silent when incorrect statements have been made concerning our own properties or concerning electric railway properties in general. It is time now not only to be ready to give the facts when asked, but to take the initiative and do our part in making them public, so that misapprehension as to the correct condition of affairs will decrease.

There are two other methods of reaching the public to which I wish to refer in this connection. One is through the newspapers and periodicals. The other is through individual effort. I have sufficient confidence in the integrity of the press to believe that the newspapers and periodicals will treat us fairly if they know the facts, and these we should be willing at all times to give. They are the molders of public opinion, and if some of them have not always treated both sides of questions relating to electric railways in the way in which we think they might have done, it may have been because they did not have at their disposal the facts which we could have given them. There remains the medium of individual effort. We have both in the holders of our securities and in our employees two large bodies of individuals whose influence should go far in assisting this missionary work, and both of them ought to be vitally interested in the prosperity of our companies. Possibly too little attention has been paid in the past to making all of those who are financially interested in our companies acquainted with the interests of the companies themselves and to securing their coöperation in promoting the general welfare. So far as our employees are concerned, we have an intelligent body of men who should be capable of understanding the seriousness of the problems which confront us in earning sufficient revenue to maintain our properties in good condition. Each com-

pany needs an esprit de corps animating its entire organization. This can be gained in many ways and the manager of each property should do his best to create it.

Still another valuable agency which can be utilized in this work is our associate membership. We now have 1,108 associate members, but this membership should be markedly increased when we consider the number of those directly and indirectly identified with electric transportation. It should include representatives of every business allied with our industry, and should provide an element of great strength in a movement which, if successful, must work to the advantage of all.

Undoubtedly, a considerable period of time will be required to obtain the results sought. There must be active and persistent application on the part of the leaders of our business and a constant study of the condition of the public mind to know along what lines false ideas have been or are developing and to take the necessary corrective measure. The greater part of this publicity work must necessarily be carried on by individual members of the association so that conditions affecting local interests may be properly set forth. But the association should take up the question in its broad or general sense and, as a foundation for its task, I recommend that committees be appointed to investigate the subjects of a scientific basis for rates and fares and of equitable methods of taxation.

CONCLUSION

Speaking somewhat personally, perhaps, this convention marks the twentieth year that I have been privileged to be connected with the work of the association. You have honored me with election as an officer of the association during six of the past seven years, and for the past two years you have chosen to elect me as your executive head. I am glad to turn over the responsibilities of the office to the gentleman who is to succeed me, with the association strong in membership and strong financially and with the assurance to him of my hearty coöperation in the future.

LADIES' PROGRESSIVE EUCHRE

While the gentlemen were rooting at the world's championship baseball game on the Convention Pier last night the ladies were enjoying a progressive euchre in the ballroom of the Marlborough-Blenheim Hotel. The affair was in charge of a committee of ladies who volunteered to relieve the entertainment committee of all responsibility, so that the members of that committee could devote their efforts to policing the bleachers in Marine Hall. The ladies' reception committee was headed by Mrs. A. L. Whipple and she was assisted by Mrs. C. Loomis Allen, Mrs. H. H. Adams, Miss May Hedley, Mrs. R. E. Danforth, Mrs. J. H. Pardee, Mrs. E. F. Fassett, Mrs. W. B. Rockwell, Mrs. T. C. Cherry, Mrs. D. A. Hegarty, Mrs. W. H. Heulings, Jr., Mrs. Joseph R. Ellicott, Mrs. H. C. Evans, Mrs. William Wampler, Mrs. W. G. Gove, Mrs. George Keegan, Mrs. E. M. Williams, Mrs. H. C. Donecker, Mrs. C. J. Pizzini, Mrs. W. S. Bartholomew and Mrs. W. K. Archbold

About 60 tables were made up and a number of handsome prizes were awarded to the ladies who finished the evening's play with the highest score.

The Tramways Committee of Keighley, England, has recommended the construction of a trackless trolley system 23 miles long, connecting that town with Stockbridge. The cost is estimated at from $6,000 to $7,500 a mile. At the present time a motor bus is operating over this route, and from April 1 to Sept. 15 its earnings were at the rate of 24 cents per car mile. The operating expenses were 18 cents per car mile, and it is believed that the operating expenses with the trackless trolley can be reduced to 12 cents per car mile.

THE BASEBALL GAME AND SMOKER

When the rival indoor baseball teams trotted out on the field last night arrayed in their athletic accoutrements they were greeted with prolonged applause. The supply men had all the advantage of weight, but the superior speed of the railway men was apparent. The teams lined up as follows:

RAILWAY MEN	SUPPLY MEN
Shorty Shaw, captain	Pop Ellicott, captain
Buggs Brady	Honus Hawley
Lifty Harries	Crab Hequembourg
Griff Allen	Buster Sisson
Cy Hedley	Birdie Peirce
Oats Wood	Hook Williams
Mutt Brush	Admiral Evans
Mattie Shannahan	Olaf Conwell
Heinie Pardee	Chief Partridge
SUBSTITUTES	SUBSTITUTES
Three-finger Page	Muggsy McGraw
Topsy Todd	Prince Castle
Peerless Donecker	Mike Heulings

Water Boy
Joie Cunningham

LATER

At the hour of going to press the baseball game between the A. S. & I. R. A. and the A. S. & I. R. M. A. teams has the appearance of a free fight, with the umpire in the sea lion's cage. As soon as the coroner and police force are obtainable a full account of the match will be printed. The official score was 10 to 7 in favor of the railway men's team.

Later inquiries at the Methodist Hospital elicited the information that Umpire Hank Fassett and Admiral Evans, the right fielder of the supply men's team, were expected to recover.

The world-renowned Eureka Quartet rendered a number of song-and-dance specialties, and W. T. Stanton, of the General Electric Company, gave a finished exhibition of buck-and-wing dancing. There were free smokes for everybody before, during and after the festivities.

MEETING OF ILLUMINATING ENGINEERING SOCIETY

The next annual convention of the Illuminating Engineering Society will be held in Baltimore Oct. 24 and 25, and will be followed by a course of lectures on illuminating subjects to be given at Johns Hopkins University. These lectures will be 36 in number and will be delivered by men prominent in the line of work upon which they will lecture. The lectures will be completed between the dates of Oct. 26 and Nov. 8. Arrangements have also been made for complete demonstrations at the lectures and for experimental laboratory work at the university upon the subjects treated. A fee will be charged for admission to the course of lectures and for the laboratory instruction.

This is the first convention for a number of years which A. H. Classen, president of the Oklahoma Railway, has missed. Mr. Classen has just returned from a trip abroad of two months or more, and had been absent from Oklahoma City so long that he felt that his presence there was necessary. His company, however, has several representatives in attendance at Atlantic City. In a recent interview with Mr. Classen, after his return from Europe, he said that the Oklahoma Railway had a number of important improvements under way, including a large office building, which will also include a waiting room and will be one of the largest and handsomest structures in the city. It will also be entirely fireproof. Mr. Classen believes that the association should meet in St. Louis or in some other city in or near the Southwest before long.

FIRST MEETING OF THE AMERICAN ASSOCIATION

The first meeting of the American Street & Interurban Railway Association was held yesterday afternoon at the Greek Temple. President Shaw called the meeting to order at 2:30 and read his annual address. It is published elsewhere in this issue. On motion of Gen. Harries the association voted that a committee consider the suggestions contained in the report. The president appointed D. A. Hegarty, C. C. Smith, J. H. Pardee, H. W. Fuller and F. A. Healy to act on such committee.

President Shaw next called for the report of the secretary and treasurer. It is published in abstract elsewhere in this issue.

The report of the committee on compensation for carrying United States mail was then presented by Mr. Fassett.

The report of the committee on the Brill prize was then read by the secretary. It was signed by W. H. House, of Baltimore, and said:

"The notices covering the offer of The J. G. Brill Company for a prize essay on the 'Design of an Electric Car for City Service' were forwarded by the Brill Company to the various colleges in December, 1909, but as no responses were received up to July 1, 1910, the time indicated in the notices when these were required to be submitted, the natural assumption is:

"1. That the offer did not arouse sufficient interest on the part of students.

"2. That notices were forwarded so late after the opening of the scholastic year that students were engaged in other work, or had already selected subjects for their graduation theses.

"3. That it was felt that the subject had been so fully treated by contestants in the previous years that there was practically nothing further left open for discussion.

"I am informed by the Brill Company that it proposes this year to offer the same prizezs as heretofore and is now in communication with President Shaw with a view to determining subject for theses for 1911 and 1912. This should afford ample time to contestants who may decide to compete to prepare their essays. The action of the Brill Company in this matter is very commendable and should receive the support of the association, as we all realize how difficult it is to obtain capable men who have been educated along technical lines, to fill positions of responsibility. I am informed that some of the railway companies have instituted apprenticeship systems, the object being to train young men for future positions with their companies. These positions are filled largely, I understand, by graduates from the different schools and colleges. The Brill Company has, however, gone a step further, as its plan has in view the interesting of students in corporation work and methods prior to their graduation. The offering of these prizes should act as a stimulus to useful thought, as well as encourage young men to make a scientific study of what is best adapted to railway requirements in the way of rolling stock."

DISCUSSION ON RATE REGULATION

Frank R. Ford then read his paper on rate regulation. This paper is printed on page 752.

William J. Clark, General Electric Company, thought that Mr. Ford's paper emphasized the importance of having a committee of the association investigate the subject of the establishment of a scientific basis for fares.

R. P. Stevens said that the most important factor in the question of fares was whether there was any competition. Assuming that there was none, he believed, from his experience, that a fare of 2 cents a mile for single tickets and 1¾ cents per mile for round-trip tickets produced the best results. He had raised fares on certain lines where the fare was lower than this.

M. C. Brush, Boston, said that the company with which he had formerly been connected in Massachusetts had had its property appraised, and that the appraisal came within 2¼ per cent of the book value. The company then commenced the campaign of education or enlightenment through the communities served. This was continued for several months. A table of the history of the property was prepared, giving capitalization, fixed charges, number of cars, cost per mile operated, etc., by companies and also for the entire property. This history was carried back some 18 or 20 years to the horse car period. Copies were printed, and one was sent to every taxpayer in the community. In the territories directly served it was published in the suburban papers. The company also announced that its books were open to inspection to any reputable representative of clubs or associations, or to any reputable attorney. The company did not endeavor to say what it considered a reasonable return, but did maintain that 2 to 4 per cent was not a reasonable return. This policy was continued from 4 to 5 months. At the end of this time, the company increased its unit of fare on all of its properties, except one, from 5 to 6 cents. On that property, it was felt that the position of the company was not sufficiently strong to justify changing the unit of fare; hence, 1 cent was charged for transfers. This additional 1 cent amounted to about $8,000 a year, although the property is not a large one. At first, some inconvenience was experienced by the conductors in being obliged to supply change, but soon the passengers learned to assist the company in tendering the exact amount of fare. Under the laws of the State, the Railroad Commission had to pass upon the reasonableness of fare. The authority for the increase was granted by the Commission for one year, but since that time the fare has again been approved by the Commission.

C. Loomis Allen, Utica, asked Mr. Ford whether, during the consideration of the Coney Island fare case, any rate was named as being a fair return on the valuation.

Mr. Ford replied that his recollection was that in none of the opinions on the Brooklyn fare cases did any of the commissioners suggest a higher rate than 6 per cent on the value of the physical property after deducting depreciation. This included three opinions on the Brooklyn Rapid Transit case, as well as that on the Coney Island & Brooklyn case.

Mr. Sergeant, Boston, said he did not suppose there was any one present who had not had the experience of building a line through sparse territory where the operation for a number of years was conducted at a loss. This fact should be considered in a valuation. He did not think that a physical valuation of a road should be considered in determining the rates of fare, except where the issues of securities had been made without legal regulation. He thought that the State should concern itself only with service rendered. He did not see how it had any right to alter rates specified in the charter. He did not see why people who put their money into a public service corporation lose their rights and that the city should decide subsequently what the valuation of the property should be considered to be. The risks in electric railroading are considerable and there should be enough profit to cover the risks. Now a government risk has been piled onto the ordinary property risks, yet many claim that the company is entitled only to a bare 6 per cent or slightly more. He knew of no decision in Massachusetts that 6 per cent was all which investors in railway properties were entitled.

T. H. McCarter, Newark, thought that if properties were to be limited to earning 6 per cent to be arrived at by any method of valuation there would be no justification for railway investments. There was little inducement for a company to build extensions and develop somebody's else real estate and operate at a loss for several years or earn only 1 or 2 per cent, and then when the line earned 6 per cent to have the law automatically stop any further profit. There was no corresponding condition in mercantile business. He considered the decision in the Knoxville Water Company case as being confiscatory.

He thought that 10 per cent profit was not too much for any company to earn. If a company earned 10 per cent one year it did not mean that it would earn 10 per cent the next year.

A. W. Brady, Anderson, commended particularly the portion of Mr. Ford's paper which dealt with the methods of raising the valuation of a company. He thought that the situation was more serious in the case of the electric roads than with steam roads, because the latter carried both freight and passengers, whereas the electric roads carried principally passengers; that is, one class of traffic. It might be more plausible to make an argument in favor of lowering the rates for electric roads upon some valuation than in case of the steam roads. That at least seemed to be the tendency of the Interstate Commerce Commission and the State commissions. Mr. Ford's valuation seemed to have been worked out with a great deal of care. A recent decision by the Supreme Court in the case of the Omaha Water Company threw additional light upon the legal status of valuations, which up to that time had largely been fixed by the cases of the Consolidated Gas Company and the Knoxville Water Company. In the Omaha case the city had the right to take over the water works, and agreed to do so at an appraised valuation. The arbitrators were appointed in the regular manner and made their valuation, which was largely in excess of what the city was ready to pay for the plant. The city thereupon refused to carry out its bargain. The company brought suit to compel the city to live up to its contract, and finally won in the United States Supreme Court. One of the chief objections made by the city of Omaha to the valuation which the arbitrators had placed on the property was that the arbitrators had put a value upon the concern as a growing concern. But the Supreme Court said that this was something different from good will, and that it was properly included by the arbitrators and refused to interfere with the award made on that account. This decision, he thought, very largely modified that previously implied in the Consolidated Gas and other cases and justified the class of expense to which Mr. Sergeant referred, i. e., the development of a line in sparsely settled territory.

John I. Beggs, Milwaukee, believed that the principle of physical valuation should be considered as a contingency which every railway company should be prepared to meet. On some of the properties with which he was connected physical valuations had been made. The speaker believed that properties should be permitted to earn not only on what appeared to be their physical valuation to-day, but upon what was expended to create the condition that exists to-day. For instance, his company had been put to a great expense to contest the efforts of the city of Milwaukee to reduce a 4-cent city rate of fare to 3 cents. There had been a great deal of expense also in the development of many of the lines. Capital would not invest in railway enterprises if the rate of earnings were to be limited to 6 per cent. Companies should be permitted to earn from 8 per cent up. Physical valuations had their place as factors in determining the value of properties. The Wisconsin State Commission had conscientiously set itself to study the situation in that State carefully and intelligently, and the speaker had great faith in the result. He believed that the commission would act as a buffer or intermediary between the unreasoning public and the public utility corporations. His own company was not attempting to etxend any of its lines for obvious reasons. The interurban fare question was simple compared to the city fare question. It was generally admitted that the electric road was entitled to earn as much per mile for carrying passengers as a steam road. But in the city business a company was expected to carry people in on a suburban line 5, 6 or 7 miles, then possibly through the city and out on another line for a 5 or 4-cent fare.

Mr. Brush said that the Massachusetts commission was composed of men who were not only broadminded but had had long experience. In the valuation previously referred to, the engineers had included in the appraisal the value of all property which the company could prove had ever been in existence and had cost real money. Such an appraisal value, of course, far exceeded the present value of the property.

Mr. Ford in closing the discussion pointed out how he had built up the income account of the Coney Island-Brooklyn Railroad during all the years of its existence from 1862 to 1909. After deducting operating expenses and taxes, interest paid, funded and floating debt and dividends on capital stock represented by actual value in the property at the rate of 8 per cent from 1862 to 1884, and 6 per cent from 1884 to 1909, the result was a deficit for each year. Figuring accumulated interest on the deficit each year, the total deficit, with interest, for the period from 1862 to 1909 came to the enormous total of $7,600,000 on a total capitalization of $8,600,000.

The president appointed as a committee on resolutions Frank Hedley, R. E. Danforth, D. H. Lovell, R. P. Stevens and H. J. Crowley. This committee will report on Thursday afternoon.

The meeting then adjourned.

JOINT MEETING OF ENGINEERING AND ACCOUNTANTS' ASSOCIATIONS

The joint meeting of the Engineering and Accountants' Associations on shop accounting was held yesterday afternoon at Aquarium Court Hall. Acting-President Harvie, of the Engineering Association, presided. The report was presented by P. S. Young, Public Service Railway. This report is published elsewhere in this issue.

W. F. Ham, Washington, quoted the recommendation on the first page of the committee report that "The committee recognizes that it is not within its function to present classification of accounts and recommends that after the suggestions outlined here have been discussed by both associations, this part of its report be referred to the standard classification committee of the Accountants' Association." Mr. Ham said that as chairman of the committee named, and without consulting the other members of the committee, he would say that the report had better not be referred as suggested. The standard classification dealt only with primary accounts. He believed better results would be accomplished if the subdivisions of those primary accounts were acted upon by a joint committee of the Engineering and Accountants' Associations than if this work was turned over to the standard classification committee.

Secretary Corning then read a letter from James D. Andrew, superintendent of power stations, Boston Elevated Railway, in which he said that he agreed with Mr. Hewitt's recommendations in general, but thought some slight changes in the subaccounts would be of advantage. Mr. Hewitt had suggested that account 3004 cover all auxiliaries, including coal and ash elevators. He could find no provision elsewhere for coal and ash handling machinery and recommended that this be given a sub-account number rather than be included with the auxiliaries.

H. G. Stott, New York, said that he saw nothing about an account for obsolescence. Depreciation in modern accounting seemed to be taken care of under maintenance, but this did not cover obsolescence.

Mr. Forse, Anderson, said the paper under discussion was not an attempt to get a complete story of power costs because it omitted several things such as insurance on the plant itself. He thought the subdivisions of accounts was one largely influenced by home conditions.

Professor R. B. Rifenberick suggested that a committee be appointed to report on obsolescence.

J. H. Neal, Boston, said that what was wanted was the knowledge whether a man was running a station economically. This had nothing to do with obsolescence or the investment. The subdivision of operating expenses should be such that the engineers would know whether they were doing a job right or not. The subdivision recommended was a normal one.

H. G. Stott, New York, said there was more to the subject than simply maintaining the plant. When capital charges of

depreciation or obsolescence were ignored, one lost sight of the most important part of the expenses. Operating charges could be taken care of by supervision; capital charges could not. He suggested that against the operating expenses there should be charged every year a portion of the obsolescence. The latter really was an operating expense as ultimately it would be charged against the company. Of course, a sinking fund could be established but the most obvious way was first to establish the probable life of the apparatus, then the probable scrap value when thrown out. The difference between these two must be charged in the per annum account against the plant.

Mr. Neal said he did not intend to convey the idea that obsolescence and depreciation should not be considered. He meant that operating expenses had nothing to do with them, and that they should be considered separately. Naturally, the man at the head of the engineering department would consider the items Mr. Stott had enumerated, but it was not the function of the auditor or the engineer to take care of the depreciation in that way.

C. O. Mailloux, New York, did not want the discussion to be closed with the impression that depreciation was a matter entirely outside the engineer's province. The enginer must understand all items of expense connected with the plant. What should be considered in the operation of a plant were not only the receipts and expenses and the difference between the two, but the ratio of that difference to the total capital investment.

P. S. Young, Newark, said he had been asked to close the discussion for Mr. Hewitt. He thought the meeting had gotten a little off the question under discussion when it turned to obsolescence and depreciation. The committee understood that these questions could be considered as part of the cost in determining the cost of power, but this report was one on the expenses for operating the power plant. Certain accounts were presented simply for the best feasible sub-divisions without endeavoring to include all items that go to make up the cost of power. Referring to Mr. Andrew's point about account No. 3004, Mr. Hewitt had called his attention to the fact that coal machinery was mentioned under his table No. 1 on Page 8 where it is shown as a percentage of the total maintenance of the various sub-accounts.

Terrance Scullin, Rochester, said he did not see any account for damage cases. This was a very important point as the mechanical end of the car equipment has no control over the expense of damage cases. In order to make that clear, some separate account should be set aside for damage cases and for other cases other than ordinary upkeep.

Irwin Fullerton, Detroit, said they had just put into effect an accounting system that indicated the ratio that the injuries and damages on account of the equipment bear to the total expense. This strongly reminded the operating department what it was costing the company in that respect.

H. H. Adams, New York, said he had been using sub-divisions of accounts for equipments for about two years. They were of great value, particularly in comparing the repairs of one class of equipment with another either on a car-mile or ton mile basis. Such a method can be made as broad or as narrow as the conditions on the property demand. The committee had in mind that a large system would want to use all sub-divisions while a small system would use a portion. N. E. Stubbs, Baltimore, agreed with Mr. Adams as to the value of these sub-divisions and said they were also of great importance to the auditing department.

Mr. Fullerton said that he had started to keep an account of the different classes of motors, studying the expense of armatures fields, bearings, commutators, etc., to find out whether some of the equipments were really obsolete and fit for the scrap pile.

President Swift then asked for a discussion of the forms. In response to a question by C. H. Lehr, M. R. Boylan, Newark, said that their time tickets were made out by the employees in the shops, checked by the foreman and rechecked with the time clock.

H. H. Adams said that the time card system was flexible enough to have it made out by the time clerk, providing that the latter transfers it around to the workmen and obtains the distributions from the individual workmen. There were two time cards, one a detailed card, to be used with or without a clerk, and another a weekly time card, to be used in conjunction with the time card. He called attention to the fact that these forms were practically the same as those adopted by the joint convention of the Accountants and Engineering Associations except for some slight changes to bring them up to date.

Mr. Brown, referring to Form 4, asked whether the committee had found it practicable to have these store order slips signed by four different individuals, as the blank provides. In his experience it was fortunate if the signature of one shop clerk could be secured.

Mr. Neal, Boston, said that in the shops of his company, employing 250 to 400 men, they abstract all the time cards by shop numbers and get them back to the shop every two days, and thus they have every job they are working on in the auditor's office up to within two days.

M. J. French, Utica, thought that Forms 4 and 5 could be combined. His company had the body almost identical, the only difference being in the transfer. When the second form for selling the scrap comes up to the general manager for approval, it seemed to him it would be a great deal better to know that all the subordinates in charge of the work have approved the sale of the material. A good deal of the clerical work in the office could be saved if the two could be combined in that way.

W. F. Ham, Washington, said that in the shops and contract department of his company the scrap was valued at the time it was scrapped and the estimated value was credited directly to the proper operating account, job work or shop order affected. The credit was charged to the scrap account. When the sale was made later on, there might be a little over or little less on that account, but this method brought the credit at the proper time into the proper account at very nearly the proper amount.

W. H. McAloney, Denver, said he used credit slips for all scrap material recovered, and these credits are taken into the material and stores account at the time it is received, daily or weekly. To take care of the market variations in copper, the scrap value is charged at two cents below the market value, making the material stores account safe. All scrap, as a general rule, is cleaned up very rapidly, and when sold, if sold at an advance, a further credit slip is made out to take care of the advance.

P. J. Honold said his contract for the sale of scrap is made for one year with a local scrap iron concern. The price on which the contract is made is taken from the "Iron Age," which gives quotations of the value of scrap materials. If copper is 14 cents at the time the contract is made, the price is fixed at 13 cents.

President Harvie said he would like to hear from Mr. Boylan in closing the discussion.

M. R. Boylan, Newark, said it was the intention of the committee that Form 4 would be used by the different departments, track, line, overhead, etc., to send in reports to the manager's office, and the items would be taken from these individual reports and entered on Form 5. Bids would be received and the amounts entered.

Chairman Swift thought they had now closed what had been a very interesting discussion; it seemed to him and also to Mr. Harvie that this work should be continued, and it could no doubt be best continued by continuing a committee; and it was now in order for someone to make a motion to that effect.

H. E. Weeks, Davenport, moved that it be the sense of the meeting that a committee be continued on the ques-

tion of form of reports and that this report be accepted. The motion was carried.

President Harvie wanted to express the appreciation of the Engineering Association for the very valuable discussion they had had that afternoon on the paper which had been presented, and expressed the hope that the two associations would continue to coöperate in matters of this kind.

POWER GENERATION

H. G. Stott, New York, presented the report of the committee on power generation, which will be found elsewhere. At the conclusion of its presentation, he said that, with bituminous coal and forced draft, there was no difficulty in getting 225 per cent. rating on old furnaces. Better evaporations with forced draft have been obtained than before. The explanation seemed to be that the flame is shorter with forced draft, and the combustion takes place on the surface of the coal. The long-tongued flames do not shoot up through the tubes and get chilled. The natural draft of air infiltration through the brick setting of the boiler is a very serious item, but with forced draft a balance condition exists in the furnace.

B. F. Wood, Pennsylvania Railroad, thought the fixed charges on the boilers should be placed at 15 per cent., instead of 11 per cent. A good lesson could be drawn from steam locomotives, which burn from 100 lb. to 150 lb. of coal per square foot of grate area of 50,000 lb. per hour. Some stoker arrangement that will admit rapid firing was essential for stationary boilers.

G. H. Kelsay, Anderson, Indiana, discussed flue gas analysis. He did not want to give the impression that he recommended making the schedule of pay of the firemen on the basis of CO_2 in the flue gas. He knew of some plants that pay a bonus on CO_2 records. Great progress has been made in the last two or three years in applying flue gas analyzers, and engineers of power stations should not be discouraged because the devices now in use were not altogether satisfactory. The speaker had recently received a letter from a company manufacturing flue gas analysis apparatus, in which it was stated that a high percentage of CO_2 did not necessarily indicate high efficiency. This being the case, it would be very dangerous to establish a bonus system whereby the firemen obtained a higher rate for high percentage of CO_2.

Charles Hewitt, Philadelphia, said that he had had two flue gas analyzers in almost continuous operation for three years, and that they were still working and giving good service.

Mr. Reynolds, Newark, N. J., said that it was necessary to pay for draft in the furnace in some form or another. It might be paid for out of the products of combustion that go up the chimney, or it could be paid for by expending energy to create the draft by means of a mechanical fan. He thought the day of big chimneys was fast passing away. The proper way to supply air to a boiler was by the combination of suction and pressure. The point brought out in the committee report concerning the stirring effect of air under pressure, as it passes through the fuel bed, on increasing efficiency, is a very important one. Most boiler makers ignore the fact that the rate at which the gases come into contact with the boiler tubes, and pass out through the stack have much to do with the efficiency of the boier. The rate of transfer of heat through the walls of the tube is not a linear function. There is an infinitesimally thin surface, less than one-thousandth of an inch thick, through which there is a fall of temperature of 1500 deg. In order to get the highest efficiency from a boiler, the gases must be moved as quickly as possible over the heating surface.

Owing to the lateness of the hour, the meeting then adjourned, and the discussion of the report was continued as the first order of business for the session of Wednesday morning.

REPORT OF THE SECRETARY-TREASURER AMERICAN ASSOCIATION.

The report of the secretary and treasurer for the fiscal year ended Sept. 30, 1910, consisted practically of the treasurer's report. It contained a list of the members and associate members of the association and a list of those with dues unpaid during the year. According to the report, there are now 1079 associate members in good standing, as compared with 817 Oct. 1, 1909. During the year 24 associate members resigned, 3 died and 62 were dropped for non-payment of dues. Three hundred and forty-seven new associate members were enrolled. The list of member companies of the association shows that there are now 350 members in good standing as compared with 315 on Oct. 1, 1909. Four member companies resigned during the year, three were lost by consolidation and six were dropped for non-payment of dues. Forty-eight new companies applied in the year for admission and have paid their dues.

The report of the treasurer shows:

Cash on hand, Oct. 1, 1909	$10,565.11
Receipts during fiscal year ended Sept. 30, 1910	40,281.34
Total cash	$50,846.45
Expenditures during fiscal year ended Sept. 30, 1910.	35,983.72
Balance on hand, Sept. 30, 1910	$14,862.73

The secretary explains that the increase in expenses over 1909 was due largely to the following increases:

Additional cost for printing and distributing annual proceedings, due to increased number of pages of printed matter and greater number of volumes required for added membership	$2,666.53
Added expenses due to newly inaugurated plan of midyear meeting	389.02
Added expenses of American and affiliated associations due to location of 1909 convention	364.31
Installation of Index Bureau Service	500.00
Added postage, due to increased distribution of printed matter, particularly to associate members	331.46
Added expenses, due to increased number of committees, committee members, etc	728.87
Expenses incurred in 1908-1909, but paid in 1909-1910	594.55
Total	$5,574.74

The Great Northern & City Railway of London has been using metallic filament incandescent lamps for train lighting during the past two years. The average life is 2,000 hours, which compares favorably with 800 hours of useful life obtained from carbon filament lamps. The lamps are connected five in a series on a 550-volt circuit, but each lamp is rated for 120 volts, and the long life obtained is believed to be due to this provision against excess voltage. The fluctuations in voltage are said not to be so noticeable with metallic filament lamps as with carbon filament lamps. In cold weather the metallic filaments in the lamps are more liable to break than at the normal temperatures.

It is seldom that an electric railway is the plaintiff in an accident case. The Liverpool Corporation Tramways, however, recently won a novel suit for damages against the owner of a traction engine. The traction engine had disputed the right of way with a tramway car, with the result that the car was damaged to the extent of $85, and three weeks were required to repair the damages. The corporation sued for the actual damages to the car and also for $200 damages on account of loss of earnings from the car. The court decided in favor of the tramways company as regards the actual damage to the car, but the amount claimed on account of loss of earnings is still in dispute.

MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The second meeting of the American Street & Interurban Railway Transportation & Traffic Association was held at the Greek Temple yesterday morning. As announced at the close of the meeting Monday afternoon, a roll call was taken. At its close, Mr. MacAfee suggested that at later meetings each delegate should hand his card, with his name and the name of the company which he represented, to an attendant at the door, and this plan should be substituted for the roll call.

INTERURBAN RULES.

President Todd then called for the report of the committee on interurban rules, which was read by C. D. Emmons, Fort Wayne.

J. D. Wardle, Cedar Rapids & Iowa City Railway & Light Company, thought the association and the committee should be congratulated for the thoroughness with which this question had been considered, and hoped that the committee would be continued and make complete report and recommendations along the lines of their present report, as the interurban rules should agree, as nearly as possible, with the standard code of the American Railway Association. These rules had always been in force on his road from the very beginning. Where orders are transmitted through agents or operators, he saw no reason why orders conferring rights should not be given by Form 19. It was generally conceded that time orders are not the best form of orders to give, but under some conditions they are practical and may be used. If interurbans are not operating under a headway less than 30 minutes. superiority by direction is essential to operation where freight service is handled over the same tracks as passenger service.

J. N. Shannahan, Washington, Baltimore & Annapolis Electric Railway, took issue with the recommendations of the committee. While it was undoubtedly true that the primary object of the rule book of a railroad is to promote the safety of the traveling public and the employees, he did not believe the changes recommended by the committee would do so. It is not many years since the same code of rules was in use on both street and interurban lines. Before long the men operating the interurban lines found many situations arising which were inadequately covered by the city rules. To meet this condition the interurban code was formulated. As time went on, the operating methods of the interurban lines each year approached nearer to those of the steam roads until within the past two years it has been believed by a number of managers that the standard code of rules of the American Railway Association should be adopted by the Transportation & Traffic Association. In advocating such a step these men deliberately ignored the fact that the conditions governing the operation of an interurban line differ radically and in many respects from those governing the operation of a steam railroad. They differ fully as much as do the interurbans and the city lines. The code of the American Railway Association fully meets the demands and needs of the steam roads, but it could hardly be argued that the framers of this code had at any time had in mind any interurban operating conditions and it is folly to say that these rules will fit interurban needs in the best possible manner, simply because they fit the steam road conditions.

In no one respect is the difference between interurban and steam roads so striking as in the training and experience required before a man is given charge of a train. On a steam road he must fire an engine or brake a train from 6 to 10 years before he gets an engine or train to run. How many interurban lines require their men to post for more than four weeks? Is it reasonable to suppose that a man can be as familiar with the theory and practice of railroad operation in one case as in the other? Is it reasonable to attempt to govern a comparatively green man with the same code of rules as the man who has had years of experience? One gentleman in discussing the code adopted at Denver said there were rules incorporated in it that were an insult to the intelligence of a trainman. Is it wiser to strike out the rules that he referred to, for fear of insulting the intelligence of some trainman, or retain them for the guidance of some man who after a few paltry weeks of posting is entrusted with the safety of human lives? Mr. Shannahan thought interurban managers have had too many recent object lessons to make such a mistake. An experienced man would hardly feel insulted by such rules when he knew that it might help a less skilled trainman to avoid an accident.

There are rules in the recommended A. R. A. code obscure in their wording and so difficult to correctly follow that many an old steam road man has gone wrong in his interpretation of them. The association when it places its stamp of approval on a code of rules should know that each and every rule is right, safe and in all ways the best for the conditions to be met.

Not only was he opposed to the suggested code in creating superiority by direction, and to many of the other changes made to have it conform to the American Railway Association, but he advocated going a step further, and requiring all meeting points to be positively fixed either by time table or train order. His own experience has impressed upon him the necessity for this step, and he has been making positive meeting points for more than two years.

The reasons given for the renumbering of the rules did not seem impressive to the speaker. That a conductor would fail to properly protect his train because the rule requiring him so to do was numbered 219 rather than 99 seemed unlikely. The renumbering will necessitate the entire reprinting of the rule book on all roads that have already used the Denver code as a basis, and at no inconsiderable cost.

W. B. Rockwell, Eastern Pennsylvania Railway, suggested that the association get up a complete set of rules, and then let each general manager be governed more or less by his local conditions, and adopt such rules as he thought absolutely necessary for his own protection. He described at length a marker signal to be put on each corner of a car, both front and rear, which by a very simple device makes it possible to show three colors, white, green and red. They are made with a Frensel glass or marine lens in a half circle, so that the bull's-eye shows from any angle. Even with a car turning a short radius curve in a street, the red light can be seen from the side.

The secretary read a letter from J. A. DuBois, chief dispatcher of the Cedar Rapids & Iowa City Railway & Light Company, commenting on the rules submitted by the committee. The writer thought rule No. 81 was superfluous in a time card or rule book. If a trainman has a watch that will not keep the right time, the watch inspector should know it and inform the superintendent, who should require him to get a watch that will keep time.

He could not understand why the committee was opposed to "right by direction." On large interurban roads it would often save trouble and is as safe a practice as any. In rule No. 83 the words "without a clearance" are entirely wrong and misleading; a clearance card does not tell a train crew that all opposing trains have arrived or left and gives them no right to proceed whatever until they have an order from the dispatcher saying that opposing trains past due at that place are clear. If trains are to get a clearance card at a specified station the rules should so state.

He believed the interurban rule in regard to trains proceeding under a flag, when unable to get a dispatcher, was wrong. If the time card is right, it is entirely unnecessary for trains to proceed under flag and to call the dispatcher at each office until they can reach him. This could

be avoided entirely by giving trains in one direction the right of track, and keeping them moving.

Rule 107, he thought, was entirely wrong, and rule 114 was unnecessary, if the time card prescribes right by direction, as it should. The rule regarding how to obtain orders was entirely too long, and requires too much valuable time to put an order out. When orders are given through an operator, the safe way and the quickest way is to use the A. R. A. rule.

C. Loomis Allen made the suggestion that Rules A to Z, proposed by the committee, be changed to conform more closely to the text of the Denver Code.

J. H. Pardee, J. G. White & Co., did not believe that the association should adopt the A. R. A. code verbatim. In commenting on the reasons given by the committee for proposing what is substantially the A. R. A. code, he said that there is not one single-track steam road operated under the standard code that begins to handle the traffic that 75 per cent. of the interurban electric railroads handle. The steam railroad men that have prepared the A. R. A. rules have never been confronted with the conditions that are met in the operation of the average interurban road. He did not think the re-lettering and the re-numbering was particularly important, as long as the contents of the rules are in the employee's mind. Examinations of trainmen are not conducted on the basis of their ability to tell the number of the rules in the book.

During the past six months some very bad accidents have occurred on interurban railways which are stirring up the whole country.

He thought the time was coming, very soon, when legislative action will be taken, in regard to accidents, and he urged the Association to be just a little ahead of the legislatures in recommending safe methods of operation.

Mr. Shannahan did not think that rules 20A and 21A had any place in the code.

T. C. Cherry, Utica & Mohawk Valley Railway, asked what was the object of having green flags in addition to green lights at night.

I. H. McEwen, Oneida Railway, explained that at dusk and dawn there was apt to be someone who could not distinguish the lights distinctly, and the display of flags in addition would give further assurance.

In reply to a question, C. D. Emmons, Fort Wayne & Wabash Valley Traction Company, chairman of the committee on interurban rules, said that a mistake had been made in the cuts of classification and marker signals on pages 34 and 35 of the report. The hand lamp shown in the centre of the end of the car should be indicated as a headlight.

C. E. Morgan, Indianapolis, Crawfordsville & Western, criticized the practice of mounting both the classification lamps and flags and the markers at the height of the letter board. He thought the classification lights should be mounted on brackets, placed on the corner posts below the belt rail, and that the classification lights or flags should be mounted at the height of the letter board.

D. A. Hegarty, Little Rock Railway & Light Company, said that he had changed from white flags to orange flags for the reason that it was very difficult to distinguish a white flag when it became dirty.

I. H. McEwen, Oneida Railway, thought that superiority by direction was largely a matter of local conditions, and that it should be recommended as optional. He had not found it practical on interurban roads and he preferred to give opposing trains equal rights at meeting points. The latter method required a less number of train orders to be issued in case of delays to trains.

J. P. Maloney, Albany Southern Railroad, said that he had found it to be a good practice to confine the meeting points to three or four sidings only, even at the expense of incurring slightly longer delays. If the meeting points are always at the same place, the trainmen are not so liable to forget them.

Mr. Shannahan thought that Rule 82 should be omitted, as it conflicted with Rule 114. He also asked the reason for omitting the rules providing for the issuance of "19" and "31" train orders.

Mr. Emmons replied that, acting under instructions given at the Denver convention, the form of train order proposed by the committee was one that could be used either as a "31" order or a "19" order.

Mr. Pardee made a motion that the question of amending the Denver code be referred back to the committee on interurban rules for further consideration, and that the committee be instructed to confer with the committee on city rules, and report next year.

Mr. Allen suggested that the motion be amended so as to instruct the committee to confer with the rules committee of the American Railway Association, with a view of reconciling any differences which now exist. The motion, as amended, was unanimously carried.

EXPRESS AND FREIGHT TRAFFIC

Edgar H. Hyman, Electric Package Agency, Cleveland, read the report of the committee on express and freight traffic, which will be found elsewhere.

F. W. Watts, Utica & Mohawk Valley Railway, in recommending the adoption of the report submitted by the committee, pointed out that the classification of expenses chargeable to the express and freight department, was both just and necessary. It was just because every department of a railway should pay its share of the operating expenses, and participate correspondingly in the earnings. The classification was necessary because, in the complete analysis of the figures outlined by the committee, every weak spot in the department is revealed. If the department shows a loss in net income for any month, the head of the department who lumps all items of expense in one miscellaneous sum is totally at a loss to find the cause. The Utica & Mohawk Valley Railway has long maintained a system such as is outlined by the committee, and the result is that the monthly reports are intelligent, beneficial and invaluable records of the business.

There was no further discussion, and the meeting then adjourned.

The interests of W. N. Matthews & Bro., St. Louis, Mo., are being looked after at the convention by W. N. Matthews. While the company is making no exhibit this year, several of the devices manufactured at its plant are displayed by exhibitors who handle these products. Mr. Matthews is also president and treasurer of the Davis Expansion Boring Tool Company, which is making a display at booth 615, Building No. 2.

The Leeds (England) Corporation Tramways are planning to handle heavy freight over the tramway system. Tests have been made in handling construction material for improvements and extension of the tracks and this suggested the idea of regularly handling heavy freight for revenue. Several freight cars are to be built. An experimental contract, covering a period of six months, has been made to move about 30,000 tons of sand and gravel 4 miles for use in filter beds. The sand will be brought to the tramway depot in barges and loaded on the cars by electric cranes. The cars to be built will have two hoppers and will carry about 8 tons. They will be equipped with standard motors and brakes so that they can be operated on passenger-car schedules. This is believed to be the first serious attempt in England to utilize the street-car tracks for handling heavy freight.

THEORY OF RAIL JOINTS*

BY REGIERUNGSBAUMEISTER FELIX LANGE, OF ESSEN, GERMANY

It is generally agreed that the life of the rail is dependent upon the life of the joint. It is, therefore, natural that the engineer should look to the continuous rail for the solution of this problem. Recent developments in Europe prove that we are gradually approaching the final goal in this matter.

The chief cause of wear at the joint is a difference in height of the sections. The momentary load when the wheel strikes an inequality in the rail (see Fig. 1) is $P = \frac{MV^2}{R}$.

In this formula R = the radius of the wheel, V = practically Vt, M = the load not supported by springs.

It will be seen that P is much greater than the nominal wheel load. Lateral shifting of the rails, causing a momentary lateral sliding of the wheel flange and consequent wear on the surface of the rail, produces similar results. Even rail joints which have been ground perfectly true will show cupping in course of time. What is the cause?

First may be mentioned the inequalities in the rail sections and angle plates due to wear of the rolls. All angle plates cannot fit closely on all rails, and where there is a poor fit the bending moment is not transferred across the joint by the plates and different heights are produced in the rails when the cars pass the joint. Another cause is the direct compression of the metal of the rail by the wheel load. When a load is applied at a point (Fig. 2) the rail assumes a form shown in exaggeration in the diagram. As this pressure must be transmitted from the wheel to the foundation, the pressure per square inch in the web and therefore its relative deflection will be greater than in the head or foot of the rail. When the rail is cut in two just in front of the load as in Fig. 3 a difference in heights must result. If the cut extends only to the foot of the rail (or if the base is welded) the conditions are not materially changed, although the difference in heights is not quite so great as in the first instance. If the cut extends only through the head, the difference in heights will usually be negligible.

Still another cause for pounding is that the deformation of the rail under load does not remain constant across the joint. On account of the elasticity of the material there is an elevation of the metal of the rail before the wheel, and this elevation advances as the wheel advances. When the wheel comes to a joint, however, there is a sudden change. (See Fig. 4.)

Cold flowing of metal is also the cause for a difference in height of rail sections at joints. It has been shown that a very fine cut made in the head of a sound rail fills up within a comparatively short time and a depression will be formed at the point.

It is also obvious that in transferring the bending moment across the joint by means of plates the vertical fibers of the web of the rail will be lengthened, as the plates act as levers to spread the head and foot of the rail apart. This will cause a difference in height.

Finally—a change in the elastic curve due to any marked change of section at the joint will cause the wheel to leave the rail.

None of the numberless types of mechanical joints now in use is capable of meeting all the conditions which the foregoing remarks prove to be necessary requirements.

Among the welded rail joints only two can be considered absolutely ideal, viz., the Elihu Thomson and Dr. Goldschmidt types of pure butt welding joints, in which the entire surface of the cross sections of the rails are welded. But the difficulties encountered in the practical application of both of these types have proved so serious that neither of them can as yet be considered of practical importance. In America butt joint welding is impracticable on account of the high percentage of carbon used. In Europe butt joint welding, such as conceived by Dr. Goldschmidt, has been replaced by a combined process of cast welding and butt joint welding, as a number of causes for ultimate defects are avoided in this combined process. On the other hand, the combined process requires only from 4 to 6 kg (9 lb. to 13 lb.) of cast metal on the rail end. An experience of over 11 years has demonstrated that this mass is too small perceptibly to disturb the elastic curve of the rail during its lifetime.

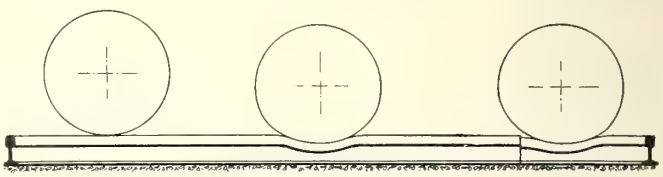


Fig. 4—Rail Joints.

The foregoing remarks prove that a welded track must meet at least two important requirements, viz., that the elastic curve must be disturbed as little as possible and that the tension in the longitudinal fibers of the rail caused by the load of the rolling stock must be transmitted from one rail section to the other.

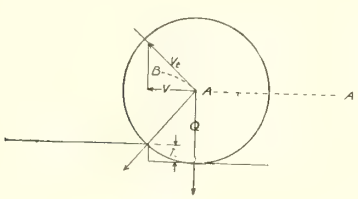


Fig. 1—Rail Joints

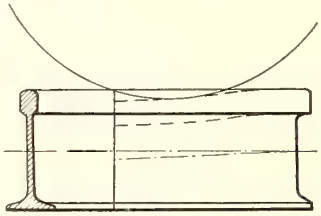


Fig. 2—Rail Joints

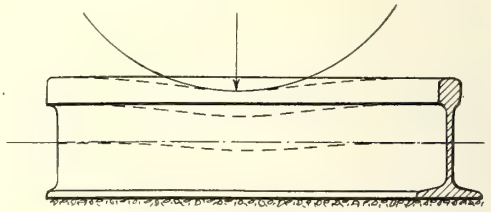


Fig. 3—Rail Joints

Stresses resulting from variations in temperature may be determined with greater accuracy. Extensive experiments to determine the effect of temperature on the rail were first carried out in the United States in 1892 and further experiments were made by me in Essen in 1904-1906 which are better for our purpose, as the temperature of the rail itself was directly measured instead of that of the earth surrounding the rail. Holes measuring 6 mm (¼ in.) in diameter were drilled to different depths exactly in the center of the rail webs. In these holes thermometers were inserted. The tubes of these thermometers, which were of different lengths, were endorsed in a second glass tube, providing an air jacket between the mercury tube and the rail walls. (See Fig. 5.) The result showed that, as a rule, the maximum temperature of the rail is always not less than 9 deg. Fahr. above that of the air, and proved that the climate plays an important rôle in producing stresses in the rail, the more important of which can be calculated.

While there is no accurate mathematical method for investigating long columns under stress by pressure, it is possible to prove that no danger from lateral warping exists. The pressure which must be laterally taken up by the pavement,

*Abstract of paper read before the American Street & Interurban Railway Association, Atlantic City, N. J., Oct. 10-14, 1910.

assuming the case of an L. S. Co. 80-335 rail subjected to a temperature increase of 55 deg. Fahr., figures approximately 35 lb. per running inch. A further question arises as to whether gaps of dangerous widths can be produced by the breaking of rails during the winter season. On the basis of my personal experience I can answer this question in the negative. The widest gap I have ever seen was 1¾ in. and was in track which had been set in the pavement at the hottest time of summer. The joint broke when the temperature was 5 deg. Fahr. The track had been laid without ties but with tie rods merely on rock ballast and embedded in ordinary stone pavement. It is safe to assume that gaps measuring more than ½ in. in width will scarcely be liable to occur in track laid in concrete on ties and with tie rods, because the resistance of such construction is considerably greater than under the conditions mentioned above, nor will it warp under these conditions.

In addition to the tension due to the changes in temperature the rails are also subject to those which result from the cooling of welded joints. These tensions can only be determined by practical tests, and as they depend upon the various systems used I shall refrain from a further discussion of them.

A further matter is the extent to which welded joints will resist wear. That the wearing qualities of the rail are not changed in systems in which the head of the rail is heated during the welding or casting operation is proven by more than ten years' experience in Europe.

Engineers will be able to apply the foregoing to the various systems of rail welding now being used, and I will confine my remarks to a system which has come under my notice. This system provides for welding a collar of steel about the web and flange of the rails so that only about 50 per cent of the rail is united.

Assume the following unfavorable conditions: minimum local temperature 20 deg. Fahr. below zero, temperature at the time of welding 80 deg. Fahr., rail section L. S. Co. 80-335. Under these conditions the tension resulting from changes in temperature will be 19,500 lb. per square inch for the full section of the rail, or 39,000 lb. in the cross section welded. To this must be added the stresses from bending moments. The negative bending moment is the dangerous one, as we have to base our figures on a section modulus of about 11.5, and for the moment as figured earlier we get a stress of about 900 lb. per square inch. To this calculated stress must also be added stresses due to the bending moment produced by the change of section at the joint owing to the fact that the head is not welded and the stress due to the difference of temperature in various parts of the rail at the same time. These would add about 15,000 lb., making an aggregate of 55,000 lb. per square inch, which is greater than the average elastic limit of rail steel and far greater than any permissible strain under the conditions of alternate loading to which a rail is subjected.

Under favorable conditions, especially as to climate, such as exist in some of the cities on your Pacific coast, there can be no objection to the use of such a system, and I understand that many thousands of joints of this description have given perfect satisfaction.

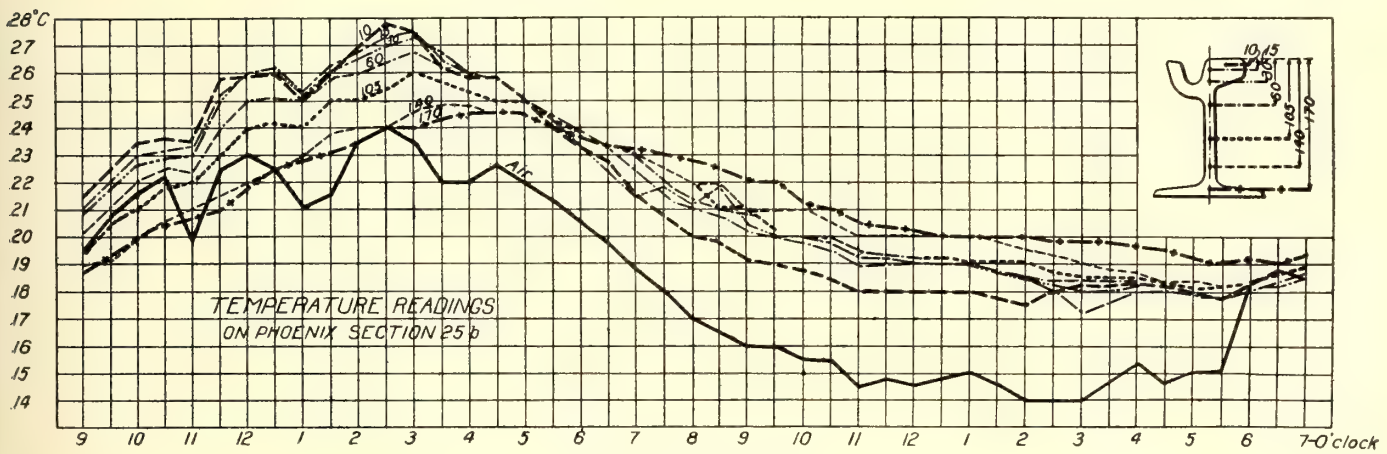


Fig. 5—Rail Joints

BRILL COMPANY ON THE BOARDWALK

The most conspicuous exhibit this year is certainly the semi-convertible car on the Boardwalk which is richly arrayed in bright autumnal colors, orange and gold, with deep cream. The lettering on the convex panel is "Brill Semi-Convertible Car" and the letter panel bears the legend "Brill Plain Arch Roof." This latter feature is probably getting the most attention just at this time when the outlook for this style of roof is rather promising. It is astonishing how quickly one becomes accustomed to the novel appearance of the simple roof lines and realizes the excellent proportions. The long P-A-Y-E platforms do not appear to be so long as with the monitor, and, as the side windows are considerably higher than with the regular roof, an effect of lightness is produced which properly belongs to the car, for it is primarily a light-weight design. The body, less electrical equipment, weighs 15,000 lb. This with one or two exceptions is the lowest weight for its size of any car ever built. The length over the corner posts is 30 ft. 8 in.; over the platforms, 42 ft. 8 in.. platforms, 6 ft.; width over sills, 7 ft. 10½ in.; over posts, 8 ft. 2 in.; centers of posts, 2 ft. 8 in.; height from track over trolley boards, 11 ft. 7½ in. The seating capacity as arranged for this exhibition car is 41.

Various forms of ventilation are possible with this roof, but in this instance the Vacuum Car Ventilating Company's device is used. This consists of a motor-driven fan located under the hood against the end of the body with eight registers along the headlining. It is asserted that the air is changed completely every 3½ min.

The Brill semi-convertible window system is better adapted to the new roof than to the monitor type because of the longer curve in the roof. It has the additional advantage of larger sashes, both being of equal height with the window opening about 5 in. higher than usual. A new style of window lock is used and with continuous series of stops enables the sashes to be held with absolute safety at any height. The car is mounted on the latest type of Brill No. 39E single-motor trucks, which recently demonstrated their superior traction on the lines of the Virginia Railway & Power Company in Richmond by hauling two trailers up a 5 per cent grade, starting with ease on any part of the grade.

MEETING OF THE ACCOUNTANTS' ASSOCIATION

The first session of the convention of the American Street & Interurban Railway Accountants' Association was called to order yesterday morning at 10:30 by President H. S. Swift, who delivered the annual presidential address. This document appears elsewhere in this issue.

REPORT OF EXECUTIVE COMMITTEE

The report of the executive committee which was approved for record contained a résumé of the work of the committee for the year. Considerable attention was devoted to the report made to the executive committee at its meeting in January last by the committee on construction and operating expenses of electric railways, as submitted to the National Association of Railway Commissioners and adopted by that body. The folowing is from this report:

"There was prepared about a year ago a system of accounts which was adopted by the Interstate Commerce Commission, and by the two public service commissions of the State of New York, with certain modifications. The system adopted by the Wisconsin Railroad Commission is similar to a considerable degree. A number of private corporations, operating electric railways which are not under the jurisdiction of the Interstate Commerce Commission or the commissions of New York and Wisconsin, have also put into effect, voluntarily, this uniform system. There seemed to be a general feeling that as the systems adopted by the Interstate Commerce Commission and the commissions of New York and Wisconsin have been in operation less than a year, it would be unwise at this time to recommend any specific system of accounts. Your committee does not recommend at this time, therefore, the adoption or approval of any system, but does recommend that any State which is intending to adopt any system of accounts, in whole or in part, should adopt a plan which harmonizes or is in substantial agreement with the system in force under the jurisdiction of the Interstate Commerce Commission and in the States of New York and Wisconsin.

"Your committee appreciates that, even though a single system may ultimately be adopted by all of the States, it will be necessary to provide some means by which questions of interpretation may be decided similarly by the various State commissions. It is impossible, as experience has shown, to cover every point which may arise in a system of accounts, even though the instructions and definitions are carefully prepared and in great detail. In actual operation, questions are bound to arise which are susceptible of various answers, and it has even been found that the fundamental principle involved is not so clear or so important but that different persons or different commissions might, with equal propriety, answer the questions differently. As the principal object of uniform accounting is to enable such comparisons to be made, the primary purpose of uniformity will not be attained unless there is a substantial agreement as to the interpretation of the various rules, definitions, and instructions which are a part of an adequate system of uniform accounting. Although your committee has given some consideration to the method whereby this result may be brought about, we are not prepared at this time to recommend a plan. Indeed, a plan is not necessary until a uniform system has been recommended for approval.

"Apparently there was referred to this committee only a part of a uniform system of accounts, namely, construction and operating expenses. Your committee believes that better results can be obtained if the scope of the committee's work for the closing year is somewhat enlarged so as to include all accounts and statistics for electric railways. Before any intelligent action can be taken upon construction and operating expenses, one must know what the other features of the accounting system are to be and whether the system as a whole is logical and whether each part is in harmony with every other part. We recommend that the chairman of the committee upon railroad statistics for the coming year be made a member of the committee upon accounts and statistics of electric railways. We also recommend that the committee upon this subject for the coming year be composed of a representative from the Interstate Commerce Commission, the Public Service Commission for the Second District of New York, the Wisconsin, Railway Commission, the Massachusetts Railroad Commission, the American Street & Interurban Railway Accountants' Association, and such other commissions as are likely to adopt or are giving consideration to uniform accounting for electric railways."

The committee making this report was composed of M. S. R. Maltbie, chairman; Wm. F. Ham, Wm. Kilpatrick, Halford Erickson, F. C. Cockrell.

The report of the executive committee closed with the statement that at a meeting held in Atlantic City on Monday, the 10th inst., the committee unanimously approved the proposal to change the name of the association to the "Electric Railway Accountants' Association."

The report of the secretary and treasurer was submitted and approved. It showed that the total expenditures for the year had been $1,883.91.

FREIGHT AND EXPRESS ACCOUNTING

The paper on "Freight and Express Accounting," by L. T. Hixson, auditor of the Terre Haute, Indianapolis & Eastern Traction Company, was read by the author. This paper is printed in another column of this issue.

The discussion of Mr. Hixson's paper was not protracted. Walter Shroyer, Anderson, Ind., said that he believed that the items of expense that properly could be charged directly should be so charged, and that the most of the expenses should be prorated on the basis of earnings, instead of on the basis of car-mileage.

W. H. Forse, Jr., Anderson, Ind., disagreed with Mr. Hixson. He did not believe that the car mile can safely be used for apportioning the cost of all the express and freight business. Certain general expense does not depend entirely, or at all, upon the mileage made by either passenger or freight cars. He believed there are some charges, such as the maintenance of cars particularly and the wages of the car men, that should be charged direct to certain accounts. There are other items of expense, such as maintenance of track, that can be prorated upon the basis of mileage, and there are still other items that can be prorated according to the amount of revenue received. Mr. Forse referred to the fact that in the meeting of the Transportation & Traffic Association they were going to receive a report from their committee on freight and express traffic. He was surprised to see a report of that kind presented at that meeting. In other words, that is an accountants' report or a report on a system of accounting for freight and express traffic.

Secretary Weeks said that in the report before the Transportation & Traffic Association they suggest that the details of this work be worked out by a joint committee of the two associations.

C. L. S. Tingley, Philadelphia, said that Mr. Hixson's paper and the point raised as to the allocation of the expenses raised a question which is common to more things than the express and freight business, and he believed fully that for their own information at least they should make an effort to allocate the various items of expenses to the business which causes that expense. It is a common occurrence, or was a few years ago, to have electric railway managers tell them that all the money they got for handling United States mail was velvet. He never believed it was. The same thing is true of all business aside from the passenger business. There are certain expenses which are met in common with the passenger business, and which they should attempt to allocate. Many of those can be divided, and should be divided on the car-mile basis. Others should be properly divided on the car-

hour basis. Again, there are others which possibly should go on the kilowatt hour per car mile basis, but as far as possible, there should be charged directly all expenses which can be so charged. The maintenance of the bodies and trucks of freight should be charged direct. The companies, for their own information, should try to find out as nearly as possible the true cost of doing that particular branch of the business.

Irwin Fullerton, Detroit, said that there are so many items of expense that it is very hard to determine how much is caused by the passenger and how much by freight handling. To illustrate, he cited a case where a passenger car ran over a stretch 70 miles in length on a schedule of two hours. It may take from six to ten hours to get a freight car over the same line, and it is a question whether or not that difference should not be not only prorated, regarding motormen and conductors' wages, but whether that should not be carried on down through all the expenses that go to make up the handling of that railroad, and it is quite a problem to know just how to handle those things. He alluded to the problem of apportioning the fixed charges relatively, and inquired as to whether they should be divided on a car mileage basis or on a basis of earnings or on the basis of the amount of equipment of each kind.

On motion of W. B. Brockway, the president was requested to confer with the president of the Transportation & Traffic Association, and if concurrent action by that association could be obtained, to appoint a committee to act with a like committee from the Transportation & Traffic Association to consider and report upon the whole question of the accounting for freight and express business.

C. E. Thompson, Chicago, felt that it would not be fair to the freight and express department to charge to it certain items on the basis suggested by Mr. Hixson. One of these items was terminal charges. Some companies pay terminal charges in cities, and pay for their passenger business on the basis of passengers carried, while on their freight and express business they pay on the basis of car mileage. It seemed to him that it is much more fair to the freight and express departments to charge direct all such items as can be charged direct. In the handling of express business under contract with some express companies he knew of some companies that have contracts with the United States Express Company where the express company furnishes a messenger on the car who acts as conductor. This man is paid entirely by the express company, so that the transportation company pays only the motorman's wages.

The system of dividing the expense on the Chicago & Milwaukee Electric Railway has been to charge direct to the freight and express departments the train wages, the maintenance of the equipment and the terminal charges, and the cost of power has been charged on a kilowatt hour per car mile basis, which figure has been arrived at by tests made by electrical engineers. The freight business is entirely carload business, all baggage and express matter being handled by the United States Express Company.

Owing to the delay in the arrival of Mr. W. M. Stewart, his place on the program was assigned to the paper by N. E. Stubbs on "Payrolls and Invoices." This paper is printed on another page.

PAYROLLS AND INVOICES

The discussion on this subject was opened by H. L. Wilson, Boston, who said that after fifteen years they had never had the slightest trouble with the standard bill form. Mr. Wilson read a letter from Mr. Charles S. Clark, the sales agent of the Pennsylvania Steel Company for New England, who inquired if it would not be possible for the American Street & Interurban Railway Accountants' Association, at its convention next week, to take some action with a view of perfecting a form that can be standard for the electric railways, the steam railways and the manufacturers. The letter stated that Mr. G. Smith, controller of the Pennsylvania Steel Company, expected to attend the convention, and that he is well qualified to speak for the manufacturers.

Further discussion on this feature was put over until Mr. Smith could be present.

C. N. Lahr, Akron was asked about the use of the check system on his road. He said that recently the bank raised the question of having all payroll checks made out to bearer instead of to order. They claim to have a great deal of trouble with foreigners not being able to get anybody to identify them. The bank wanted to be relieved of the responsibility of paying the money to the right party. The company agreed to relieve the bank on this score, because they deemed it a great favor on the part of the bank to handle their payroll checks. They employ 1,200 men, who are all paid by check, and they would not care to go back to the old way of handling the cash.

MISCELLANEOUS

Under the head of new business, President Swift said: "I suppose that you are all aware that the parent association proposes to change the name of the association to the American Electric Railway Association, and it was requested that the other affiliated associations change their names provided the thing would go through in the American Association, and also to make a change in the by-laws in so far as they will be affected by this change in name and by the admission to membership of these steam railroads which have a portion of their property operated by electricity. At the same time the secretary of the American Association stated that they desired to accept associate members from such companies, and I wrote him and told him that we as an association had always been opposed to associate membership, and that the question had come up a great many times, and that it had always been thought inadvisable for us to have associate members. They have remitted that part of it so far as our association is concerned; but it would be proper now for somebody to make a motion to change our by-laws and the name of our association."

C. L. S. Tingley, Philadelphia, moved that the amendment be adopted. The motion was seconded by Mr. Stubbs and carried.

The president called upon Mr. Sweeney, of the Interstate Commerce Commission, who responded briefly and expressed his pleasure at being present at the convention.

W. H. Forse, Jr., stated that the committee on interline accounting had no report to make because at the meeting last year the committee presented a report which was an outline of the plan adopted in following interstate passenger accounting. Since the report was rendered there had been no new developments in this connection. The matter is still as it was then, and for that reason the committee had not found it possible to prepare any report either of progress or new development.

The president announced the appointment of the following committees:

Nominating committee, Messrs. Tingley, Lahr, Hixson, Thompson and Thorpe.

Convention committee, Messrs. Brockway, Fullerton and Cavanaugh.

Just before the noon adjournment general dissatisfaction with the meeting room was expressed, and the officers were instructed to arrange if possible for better quarters.

O. M. Edwards Company, Syracuse, N. Y., has spaces 832-834, Building No. 3, where it is showing extension platform steel doors, window fixtures, locks and metal window sash in which the glass is held in place without the aid of screws. This company has recently begun to make metal furniture for office and filing purposes. Its exhibit includes a steel desk and some steel bond boxes finished in perfect imitation of mahogany and other woods. The exhibit is in charge of O. M. Edwards, E. F. Chaffee, C. H. Rockwell, W. C. Bradbury, T. P O'Brian.

REPORT OF COMMITTEE ON WAY MATTERS*

BY E. O. ACKERMAN, CHAIRMAN; MARTIN SCHREIBER, M. J. FRENCH, J. M. LARNED, C. L. CRABBS, GEORGE WESTON

Your committee in accordance with instructions herewith submits a report on each of the following articles: (1) Specification for open-hearth steel rails, (2) standardization of girder rails, (3) gage of track on curves, (4) rail joints, and (5) economical maintenance.

With reference to the subjects of (1) specifications for manganese steel rails, (2) rail corrugation, and, (3) clearance between street surface and the rolling equipment, sufficient data were not obtained to warrant a report and the committee requests that it be continued for another year.

The subjects were divided among the committee members for primary treatment; circular letters were sent out and a summary statement of the answers received is given in Appendix C, hereto attached.

The subjects here reported upon were assigned to and received treatment from committee members, as follows: 1, J. M. Larned; 2, E. O. Ackerman; 3, M. J. French; 4, George Weston, and, 5, Martin Schreiber. From the data thus secured this report has been written with but few amendments.

SPECIFICATIONS FOR OPEN-HEARTH STEEL RAILS

Owing to the rapidly increasing use of open-hearth steel for high T and girder rails it has been considered that the adoption of a uniform specification for the manufacture of such rails would be of mutual benefit to the users and the manufacturers of steel rails for electric railway service. A specification was drafted by J. M. Larned, engineer maintenance of way, Pittsburg Railways Company. From said specification and with the valued assistance of the representatives of the manufacturers and inspection bureaus, the committee formulated the following specifications, which it recommends be followed until such time as experience will warrant their adoption as standard.

SPECIFICATION FOR THE MANUFACTURE OF OPEN-HEARTH GIRDER AND HIGH T-RAILS

I. General:

The entire process of manufacture and testing shall be in accordance with the best standard practice, and special attention shall be given to the following specifications:

II. Ingots:

(a) A test ingot shall be cast, while each heat is being poured, from steel going into the middle of the heat.

(b) "Bled" ingots. No ingot shall be used from the interior of which the liquid steel has been permitted to escape.

(c) Badly teemed heats. No ingot shall be used from a heat poured without the control of the operator.

(d) Ingots shall be kept in a vertical position until ready to be rolled, or until the metal in the interior has had time to solidify.

(e) Care shall be taken to avoid the burning of the steel while in the soaking pits and in reheating of the cold ingots. The ingots or blooms shall be discarded when the effects of injurious treatment show when rolled.

III. Analyses:

(a) The maker shall furnish the railway inspector daily with the chemical analysis for each heat, covering the elements specified under Section IV hereof.

(b) Each analysis shall be made from drillings taken from the test ingot at not less than ¼ in. beneath the surface thereof.

(c) These analyses may be checked from time to time by the railway company's chemist, and the maker shall furnish, on request of the inspector, a portion of the test ingot or drillings therefrom for check analysis.

IV. Chemical Composition:

The steel of which the rails are rolled shall conform to the following limits in chemical composition:

	Lower Limit	*Desired Composition*	*Upper Limit*
Carbon	0.60 per cent.	0.68 per cent.	0.75 per cent.
Manganese	0.60	0.80	0.90
Silicon (not to exceed)	....	....	0.20
Phosphorus (not to exceed)	....	....	0.04

Note: An increase of 0.035 per cent carbon above the upper limit of this specification will be permitted for a decrease of each 0.01 per cent of phosphorus below 0.04 per cent.

V. Discard:

(a) Sufficient material shall be discarded from the top of the ingot to insure sound rails.

(b) All metal from the top of the ingot, whether cut from bloom or rail, is the top discard.

VI. Rolling:

(a) The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass the temperature of the head of the rails shall not exceed the following as measured on the Fahrenheit scale:

For rails weighing 100 lb. and upwards, 1900 deg.

For rails weighing less than 100 lb., 1700 deg.

(b) The bars shall not be held for the purpose of reducing their temperatures, nor shall any artificial means of cooling them be used between the leading and finishing passes, nor after they leave the finishing pass.

VII. Branding:

The name of the maker, the letters "O. H.," the weight of the rail, the section number and the month and year of manufacture shall be rolled in raised letters and figures on the side of the web, and the heat number shall be plainly shown on each rail where it will not be covered subsequently by the splice bars.

VIII. Straightening:

(a) Rails on the hot beds shall be protected from water or snow, and shall be carefully manipulated to minimize cold straightening.

(b) The distance between the rail supports in the cold-straightening presses shall not be less than 42 in. The gag shall have rounded corners to avoid injury to the rail.

(c) Any rail injured in cold straightening, or showing gag marks therefrom, shall be rejected.

(d) "Lumpy"—that is, short kinked or wavy—rails shall be rejected.

IX. Finish:

(a) Rails must be free from mechanical defects and flaws. They shall be smooth on the head, straight in line and surface without any twists, waves or kinks, particular attention being given to having the ends without kinks or drop. They shall have the ends square laterally and vertically, but the base may be undercut 1/32 in.

(b) All burrs or flow caused by drilling or sawing must be carefully removed.

X. Drilling and Punching:

Circular holes for splice bars and bonds shall be drilled and for tie rods punched, to conform accurately in every respect to the drawing and dimensions furnished by the purchaser.

XI. Section:

(a) The section shall be.....as shown in detail upon the attached plan and the cold templet of the manufacturer must accurately conform to the specified section, and must at all times be maintained perfect.

(b) The section of the rail must conform as accurately as possible with the templet and any variation therefrom shall be within the following limits:

*Abstract of report read before the American Street & Interurban Railway Engineering Association, Atlantic City, N. J., Oct. 10 to 14.

Height, 1/64 in. over, 1/32 in. under.

Overall width of head and tram, 1/8 in. under or over, provided that said variation will not affect the gage line by more than 1/32 in.

Width of base, 1/8 in. under or over.

(c) No variation will be allowed in the dimensions affecting the fit of the splice bars.

(d) The base of the rail shall be rolled to a true plane, at right angles to the web, a convexity of the base of 1/32 in. being permitted.

XII. Weight:

(a) The weight of the rails per yard as specified in the order shall be maintained as nearly as possible after complying with Section XI, and the aggregate of the order shall not vary more than 0.5 per cent from the specified weight.

(b) Actual weights will be paid for.

XIII. Length:

(a) The lengths of rails at a temperature of 60 deg. Fahr. shall be 60 ft. and 62 ft. for those sections in which the weight per yard will permit.

(b) Ten per cent of the entire order will be accepted in shorter lengths, varying by even feet down to 40 ft., and shall be paired as to lengths before shipment.

(c) A maximum variation of 1/4 in. over or under the specified lengths will be allowed.

XIV. Drop-Testing Machine:

The drop-testing machine shall be of the type that is recommended by the American Railway Engineering & Maintenance of Way Association.

XV. Drop Tests:

(a) Three test pieces shall be selected by the inspector from each heat, and they shall be in each case taken from the rails rolled from the top of the ingot and selected at approximately equal intervals from the heat as poured. They shall not be less than 4 ft. nor more than 6 ft. in length.

(b) The test rails shall be placed head upwards on the support and shall be subjected to an impact test under a free falling weight of 2000 lb.

Height of drop for rails weighing 100 lb. per yard and upward, 14 ft.

Height of drop for rails weighing less than 100 lb. per yard, 13 ft.

(c) The temperature of the test pieces, when tested, shall not be less than 60 deg. Fahr. or greater than 120 deg. Fahr.

(d) The testing shall proceed concurrently with the operation of the mill.

(e) Rails under drop test shall be considered as having failed when fractured or showing indications of the same.

(f) Two drop tests shall be made of the test rails from each heat. Should both rails withstand the test all the rails from the heat which they represent shall be accepted. Should one of the two test rails fail under the test the third rail selected shall be tested, and if two of three rails fail all rails from the heat which they represent shall be rejected.

(g) The report of the drop test should state the atmospheric temperature at the time the tests were made.

XVI. No. 1 Rails:

No. 1 rails shall be free from defects and flaws of all kinds.

XVII. No. 2 Rails:

(a) Rails which by reason of surface or other imperfections are not classed as No. 1 rails will be considered No. 2 rails, providing they do not in the judgment of the inspector contain imperfections in such number and of such character in any individual rail as to render such rail unfit for recognized No. 2 uses, and providing such rails comply with the requirements of Section XI of this specification.

(b) Rails shall not be accepted as No. 2 rails having flaws of more than 1/4 in. in depth in the head or more than 1/2 in. in depth in the base.

(c) No. 2 rails will be accepted to the extent of 10 per cent by weight of the entire order.

XVIII. Distinguishing Marks:

No. 1 rails (short length)—Both ends of all short-length No. 1 rails shall be painted green.

No. 2 rails (all lengths)—Both ends of all No. 2 rails shall be painted white and shall have two heavy center punch marks on the web of the rail at such a distance from both ends that they will not be covered by the joint plates.

XIX. Handling and Loading:

(a) All rails must be loaded in the presence of the inspector, and shall be handled in such a manner as not to bruise their flanges or cause other injuries.

(b) Rails of each class must be placed together in loading.

(c) Due notice must be given the inspectors of the time of loading so they may be present.

XX. Inspection:

(a) The inspectors, representing the purchaser, shall have free access to the works of the manufacturer at all times during the execution of any contract under this specification, and shall have all reasonable facilities afforded to satisfy themselves that the rails are being made in accordance with this specification.

(b) All tests and inspections shall be made at the place of manufacture prior to shipment, and shall be so conducted as not to interfere unnecessarily with the operation of the mill.

(c) The inspector shall have authority to reject rails from heats, the test pieces of which have failed, or from rails not in accordance with Section XI, or from badly poured heats, or from "bled" ingots or any other causes not in accordance with good mill practice.

Rails from insufficiently sheared blooms shall be accepted if they are not shorter than the minimum lengths, when properly cut, and otherwise conform to this specification.

Rails which show "pipes" should be cut to the shortest permissible length, and if "pipe" is not visible they shall be accepted as No. 2 rails.

All lumpy rails shall be rejected.

Rails shall be rejected if imperfectly drilled, chipped or filed, but shall be accepted if properly refinished.

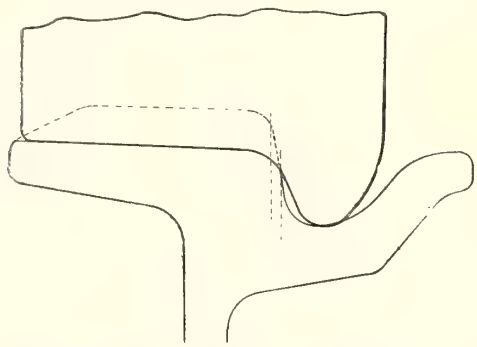
STANDARDIZATION OF GIRDER RAILS

The use of a multitude of rail sections in a street railway system unquestionably increases the expenditure and requires a large stock of material to be held for maintenance purposes. The Way Committees of 1907 and 1909 recommended rail sections of merit, and this committee desires to approve the principles upon which said sections were designed.

While this committee recognizes the superior merits of the T-rail for railway purposes, there is a demand by many of our member companies for a grooved rail to fulfill certain requirements in heavily traveled paved streets which must be met, and your committee wishes to again call attention to the 7-in. and 9-in. grooved-rail sections recommended by the Committee on Way Matters of the American Street & Interurban Railway Engineering Association of 1907, and shown in Fig. 1, page 122, and Fig. 2, page 123, of its 1907 report. In these sections a minimum amount of rail movement is secured. No criticism of any of the features of the above rail sections has been offered excepting that of heavy weight and consequent high first cost, and in order to obviate this objection your committee proposes the 7-in. section weighing 106 lb. per yd., as shown herewith, also the 9-in. section weighing 120 lb. per yd., shown herewith. The amount that safely

may be worn from the head of a rail of the proposed cross section is graphically shown. For track special work your committee proposes the 7-in. guard section weighing 122 lb. per yd., as shown herewith, and the 9-in. guard section weighing 141 lb. per yd., also shown.

The fits for both 7-in. sections and both 9-in. sections,



Way Matters—Possible Wear on Head of Proposed Standard Grooved Rails

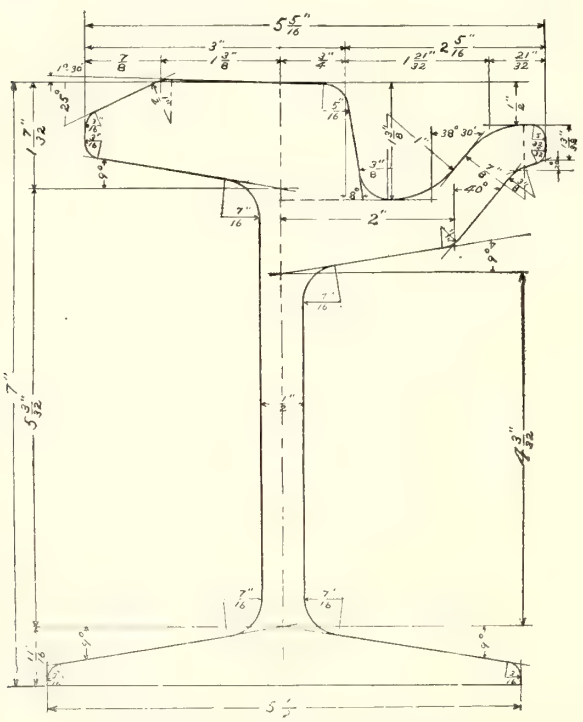
respectively, are made the same, so that compromise joints at special work may be eliminated.

RULES FOR DETERMINING GAGE AND FLANGEWAYS IN CURVES

Your committee recommends the following as standard practice:

Condition. Wheel gage is assumed to be standard, namely, 4 ft. 8¼ in., between fillets of flanges, ¼ in. below treads; track gage, 4 ft. 8½ in.

Rule 1: For A. S. & I. R. E. A. standard wheel flanges and one wheel base use standard track gage and determine the minimum flangeways required by graphical platting of



Way Matters—Proposed Standard 7-in., 106-lb. Grooved Rail for Use in Paved Streets Where Vehicular Traffic Is Extremely Heavy on the Railway Strip

groove, cross-section of wheel flanges, wheel base, and radius of curve, as described by Mr. C. W. L. Filkins in the report of the Way Committee on page 73 and illustrated by Fig. 1 and Fig. 2, opposite page 74, of the printed proceedings of this association for 1909, allowing ⅛ in. extra width in outer flangeway for irregularities in wheel setting and special work.

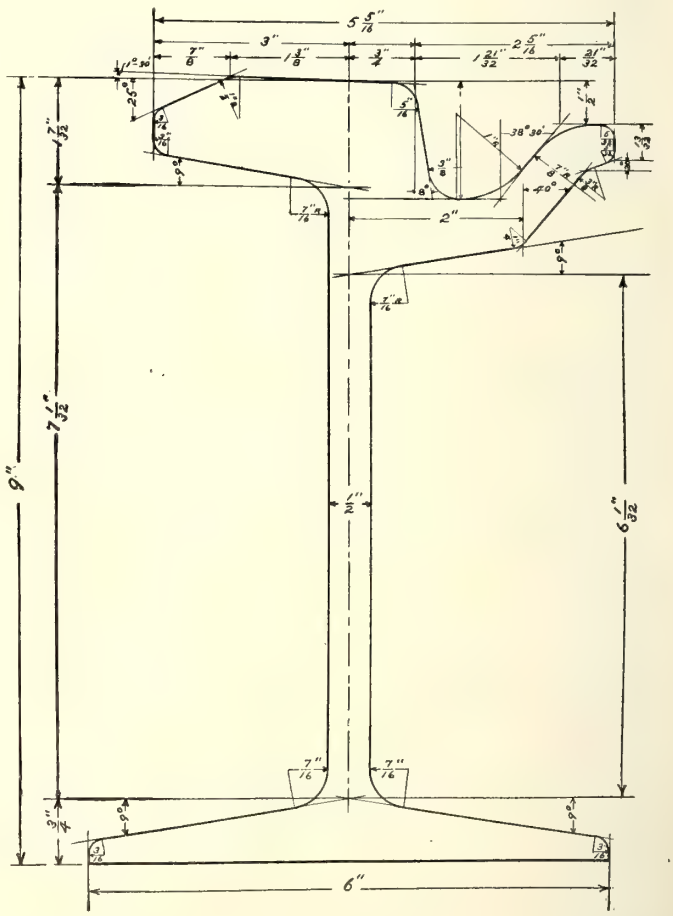
Rule 2: If various types of wheel flanges or various lengths of wheel bases are operated, determine, by graphical platting, the inner flangeways required for both the maximum and minimum conditions. Use inner flangeway to suit maximum conditions and widen gage by the difference between the maximum and minimum width of flangeways as above determined. Make outer flangeway ⅛ in. wider than minimum outer flangeway for maximum conditions plus the amount of the widening of the gage.

Rule 3: Rolled guard rails having too narrow flangeways should be planed on gage side of inner rail and on guard side of outer rail to obtain required width.

Rule 4: If inside flangeway be too wide increase the gage the difference between the width of flangeway and the narrowest groove required. Make the width of outside flangeway equal to that required by the maximum conditions of outside radius, wheel flanges and wheel bases, increased by the widening of gage and also by ⅛ in. to be allowed for any irregularities in wheel setting and in special track work.

Rule 5: In expressing specification for gages and flangeways measure gage on a plane ¼ in. below the head of rail at fillet, except that when steam railroad wheels are to be used give distance on plane ⅝ in. below the head of rail, making special notation thereof.

Rule 6: Measure flangeways horizontally from gage line



Way Matters—Proposed Standard 9-in., 120-lb. Grooved Rail for Use in Paved Streets Where Vehicular Traffic Is Extremely Heavy on the Railway Strip

opposite head of rail. Give vertical slope of guard if rails are to be modified.

ELEMENTS OF A PERFECT RAIL JOINT

1. The joint should prevent independent motion of rail ends during the life of the rail.

2. The joint should be mechanically strong and should be

such that the rail at the joint will be equal in strength and stiffness to the rail itself.

3. In the application of any joint it is essential that the top surfaces of the abutting rails lie in the same plane.

BOLTED JOINTS

The standard rail joint plate for the present girder rail construction is a development of the early strap or fish-plate. Channel bars are of a similar type for all sections of girder rails, and by the wedging action a simple form of a joint is made, which may for a short time after its application fulfill the requirements.

Joint plates, particularly those that are provided with two rows of drilling, tend to buckle under the load applied by the drawing up of the track bolts, and to thus assume an arc, which is convex towards the web of the rail. This buckling will change the contacts between the bars and rails from surfaces to lines. The plates will, therefore, offer a comparatively small resistance to the wheel loads, and the life of the joint will accordingly be diminished.

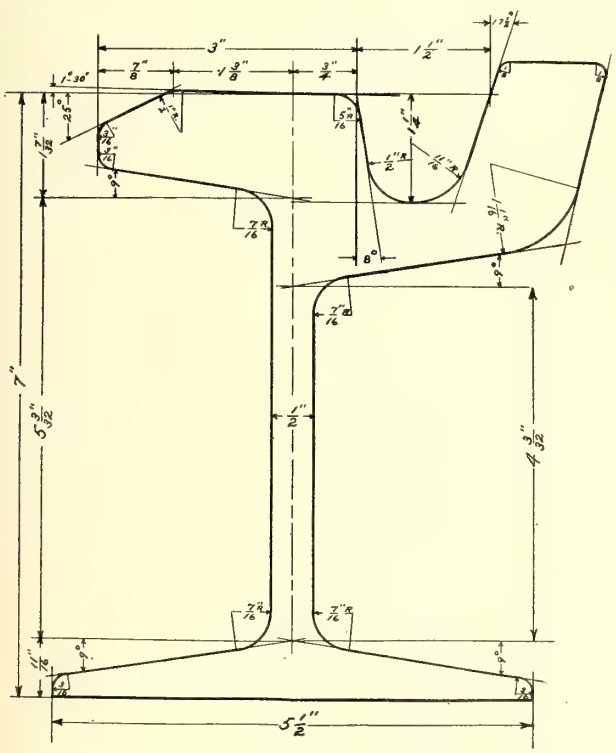
It would, therefore, seem desirable to consider a change from the usual design of the deeper plates, so that the vertical center lines of the plates when applied, instead of being straight and parallel with the rail web, will be slightly curved and will present a concave face to the rail web. In certain sections of rails and plates it may be desirable to consider rolling the fishing surfaces of the plates at angles that will be slightly different from the angles of the top of the base and the under side of the head, to which the plate will be applied, so that when the plate has been properly set and the convexity diminished a full surface contact in place of the original line contact, due to the variations in the angles of the bearing surfaces, may be obtained.

The joint which presents the smallest number of wearing surfaces consistent with strength and stiffness will produce the most satisfactory results, as the tendency to work loose under traffic is minimized. Efforts which were directed to produce a joint that would conform to the above-stated requirement resulted in a class of joints which offered support to the bases of the rails. This is instanced by the Weber, the Atlas and the Continuous joints. The Weber joint offers a base support by means of an additional joint member, while the Atlas and the Continuous joints offer a support as a part of the bar. This support is reinforced in the Atlas joints by bolts under the rail base. Of these three joints the Continuous, being of fewer parts, carries, for that reason, an additional merit, which, however, is offset, to a certain extent, for the reason that it is impossible to roll either the rails or bars to their own identical templates. This variation from the true template, however small, is a considerable factor in the determination of the longevity of the joint.

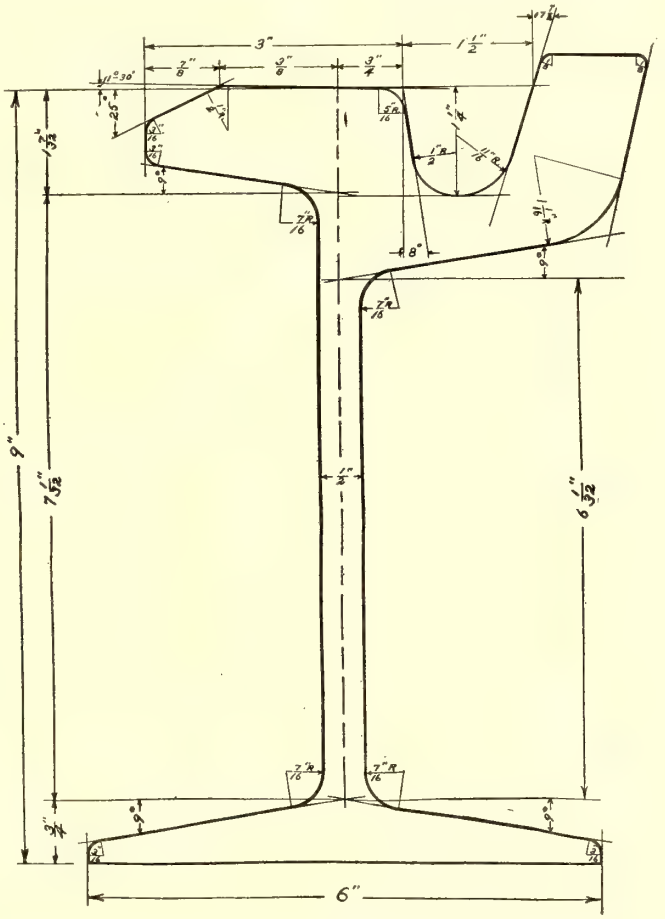
The Carnegie joint, like the Bonzano joint, is a modification of the early angle bar. These joints, by reason of the special section of the bar at the joint, offer additional stiffness, and, further, the difficulties which result from variation in rolling are lessened, when compared with the joints that grasp the rail base in its entirety.

In view of the fact that the loading per wheel on various traction lines is less than 10 tons, it would appear that a careful determination of the deflection curves for various joints should be made, with particular reference to the lighter loads, so that a more careful study may be made of the comparative value of the various joints with reference to the value of the initial set.

The former practice of laying rails in the streets required an open space between rail ends to permit the variation in rail lengths for changes in temperature. Experience has proven that this spacing of the rails is unnecessary. In the earlier practice it was customary to drill the bolt holes ¼ in. larger than bolts. We recommended that the joint holes in the rails shall not exceed the diameter of the bolt by more than 1/16 in.



Way Matters—Proposed Standard 7-in., 122-lb. Guard Rail for Use with Proposed Standard 7-in. Grooved Rail



Way Matters—Proposed Standard 9-in., 141-lb. Guard Rail for Use with Proposed Standard 9-in. Grooved Rail

In order to obviate the loosening of joints due to the wear on the under sides of the head of the bolt and of the nut, as well as that which occurs through the stretch of the bolt, riveted joints have been tried. The design of the riveted joint, which contemplates the absolute fixing of the rail ends, was completed through a consideration of the stresses brought about by the contraction of the rails due to temperature changes, and the stresses introduced by the moving wheel loads were not considered.

Examination of these joints, after a reasonable period of service, is likely to disclose a weakness in the receiving rail head, depending upon the design of the rail on which the joint is used, and it therefore appears desirable that the riveted plate should offer some support to the rail head on these sections.

A further modification of the ordinary simple bolted joint has been brought about by the use of the machine-fitted bolts. The advantage of this joint over the riveted joint lies in the fact that standard splice bars are used which support the rail heads, instead of flat-rolled plates; while, on the other hand, it is probable that the strength of the grip of the machine bolts is not as great as that of the rivets.

CAST WELDING

In certain cities cast welding has been very successful, while on other railways the results have been unsatisfactory. Investigation, however, shows that a fair percentage of the failures may be attributed, first, to the section of the rail welded and its chemical composition; second, to an improperly designed mode and the consequent distribution of the metal; and third, to indifferent workmanship on individual joints.

ELECTRIC WELDS

The process of welding by electricity is too well known in detail to be described here. Failures of this type of welding occur through the fracturing of the rail, which takes place usually at the end of the welded bar. Several instances have been noted where the bars themselves have been fractured at the joint. This method of welding depends principally upon two items for a successful joint, first, the insertion of the "dutchmen" between the rail ends in such a manner that the pieces inserted cannot work loose, and, second, that the grinding of the finished joint, together with the removal of a slight hump that occurs in welding certain sections, be accurately done.

The thermit weld has not been in use a sufficient length of time, compared with the other methods of welding, to make a complete comparative statement, and while it has certain advantages we feel assured that it should only be applied by competent and skilled workmen.

MAINTENANCE DISADVANTAGES

The life of welded tracks is not determined by the life of the rail, but by the rate of joint failures per annum. It is desirable to be able to repair imperfect joints by additional joints of the same type. This can be done by either the cast weld or thermit weld process, but it is impracticable to do so by the electric process on account of patents, excessive cost of equipments, etc.

ELECTRICAL CONDUCTIVITY OF JOINTS

Where cars are operated by electricity and the tracks are used as a return circuit, the question of relative conductivity of the rail at the joint becomes more and more involved in the design of an economic joint.

In consideration of the track as a return circuit, joints may be divided into the following classes in accordance with their conductivity compared with that of the rail: (1) Welded joints, (2) riveted or machine-fitted bolted joints with a bond of thermit steel, (3) the simple riveted joint, (4) the various general types of bolted joints, without bonds.

The engineers on traction lines, through experience, have concluded that the spacing of rails with open joints is unnecessary in paved streets and have ascertained by practice that the damage to the rail end, due to the impact of the wheels, is in direct ratio with the width of the opening between rail ends.

Therefore, the Committee on Way Matters has recommended, in its proposed specifications, that "the rails may be undercut 1/32 in."

OPPOSITE VERSUS STAGGERED JOINTS

It is a known fact that if staggered joint track construction is placed under heavy traffic conditions the failure of a joint will damage the center of the rail lying opposite to such an extent that the rail will not be fit for further service. It, therefore, appears that tracks in paved streets should be laid with opposite joints.

RECOMMENDATIONS

In conclusion the writers would call particular attention to certain points which, in their opinion, are often neglected. These points are:

(1) Because the life of the joint is practically dependent upon the initial set, we believe it is necessary to insist upon a thorough cleansing by means of wire brushes, files, etc., or, better, with a sand blast, to obtain this end.

(2) It is recommended that sledging be reduced to a minimum and that the foreman should assure himself that the bolts when fully drawn up are not overstrained.

(3) The maximum variation from the templet height of rails as permitted by nearly all girder rail specifications is 3/64 in. This amount of variation is undesirable from the point of view of the purchaser, but is now required by the manufacturer. The proposed specification now recommended by the Committee on Way Matters permits the above variation but also requires that there shall be no variation in the fishing dimensions. In view of the prime importance of these two points we recommend that a rigid inspection be insisted upon by all purchasers.

We recommend that grinding, or some other means, be adopted to eliminate imperfectly surfaced joints.

Joint depreciation is one of the greatest factors in producing high maintenance costs with excessive renewals, and if additional money be spent when tracks are constructed to carry out the above recommendations the resulting benefits will greatly reduce the amount of depreciation.

Inasmuch as the life of the track is largely determined by the life of the joints, and as the joints form but a small proportion of the total cost of track construction, the additional expenditures recommended for labor and inspection will be justified.

ECONOMICAL MAINTENANCE

The subject of economical maintenance is of such vital importance to street railway operation that the committee has decided to publish a paper on that subject prepared by Martin Schreiber, engineer maintenance of way of the Public Service Railway Company, Newark, N. J. The subjects of standardization of layouts for special track work and rail corrugation have been included in Mr. Schreiber's paper, which is made a part of this report.

The committee recommends:

1. (a) Standard switch for special work as shown by Mr. Schreiber;

(b) or modify the standard proposed by the special work manufacturers by simply breaking the joint at the end of the switch so that the connections could be easily and better made.

2. Standard symbols similar to those proposed by Mr. Schreiber.

3. That next year's committee include set of rules governing the way department.

4. That next year's committee make report on shop work as it particularly applies to the track department.

APPENDIX C—SUMMARY OF 40 REPLIES TO DATA SHEET

(1) Do you use standard switches or mates?

Nineteen companies use standard tongue switches and mates with radii varying from 75 ft. to 200 ft., and 10 use switches and mates of 100 ft. radius.

(2) Do you use a standard cross-over or standard steam trolley crossing?

Twenty-two companies use standard cross-overs with radii from 20 ft. to 200 ft., of which 8 companies use 100 ft. radius switches. Three-rail type steel trolley crossings are used by nearly all companies, and a few use solid manganese crossings.

(3) What advantage, if any, has spiral switch over one with a straight 100-ft. radius?

Twelve companies favor and 17 companies do not favor spiral switch pieces.

(4) Which is the most economical, solid manganese or hardened center switches, mates or frogs?

Twelve companies favor hard center special track work, three companies favor solid manganese; two companies favor solid manganese switches and mates and hard center frogs, and one company favors solid manganese switches and hard center mates and frogs.

(5) Is it your custom to place a switch with movable tongue on inside or outside of curve? Is it advantageous or not?

Twenty-six companies favor placing the switch tongue on the inside rail of curve, two companies favor placing it on the outside rail, except in some special cases.

(6) Do you think it advisable to grind all rail at joints?

Fourteen companies grind or file rail joints when made, and 15 companies do not.

(7) Minimum clearance between street surface and underside of truck and motor equipment?

Answers indicate clearances from 2 in. to 5 in.

(8) Give quantity of rail laid during the last year (with specification), open hearth, Bessemer and manganese (outside of specials)?

The 40 companies report 23,632 tons of open-hearth steel rail used last year as against 9910 tons of Bessemer steel rails and 66 tons of manganese steel rail used during the same period. About half of the open-hearth rail was high carbon, ranging in carbon from 0.70 per cent to 0.85 per cent, the mean of the limits specified in any case being either 0.75 per cent or 0.80 per cent carbon.

CONCLUSION

Your committee wishes to thank Victor Angerer, of Wm. Wharton, Jr., & Company; H. C. Stiff, of the Lorain Steel Company; F. D. Carney and C. A. Alden, of the Pennsylvania Steel Company; C. W. Gennet, Jr., of Robert W. Hunt & Company; Walter Jackson, of the ELECTRIC RAILWAY JOURNAL; R. F. Kelker, division engineer, track and roadway, Board of Supervising Engineers, Chicago Traction, and other engineers who have co-operated with the committee.

The Nachod Signal Company, Philadelphia, is showing its signal system in operation, using a track plan of a typical block and turnout with miniature cars running over it to set and clear the signals. By thus preserving the scale and the relative location of parts, hardly any explanation is required and the demonstration becomes of immediate interest. In the system shown, which is for single track, the contractors have a sense of direction, a car passing one way setting the signals and releasing them when going the other way. Separate night and day indications, which are independent, are given at all times. Represented by C. P. Nachod, general manager, F. W. Kulicke, engineer.

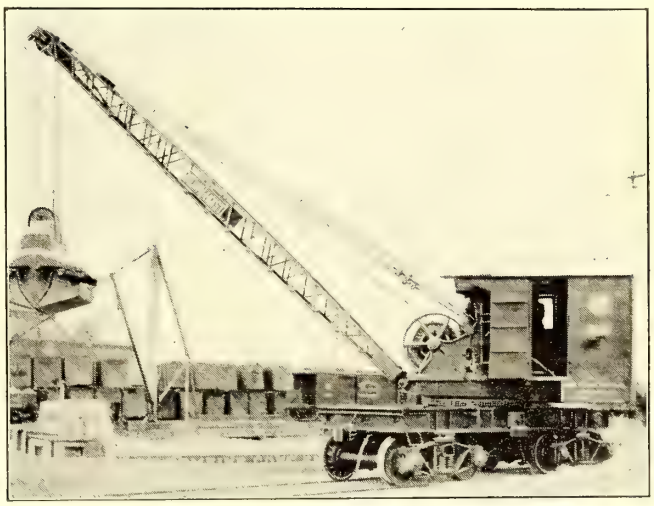
THE ECONOMICAL MAINTENANCE OF TRACKS AND ROADWAYS*

BY MARTIN SCHREIBER, ENGINEER MAINTENANCE OF WAY, PUBLIC SERVICE RAILWAY COMPANY, NEWARK, N. J.

Probably no department of the street railway industry offers more possibilities for improvement in maintenance and construction than that of the track and roadway, and the fact is now just becoming thoroughly appreciated by managements. It is well known that the resources of trackmen have been in great part in the past supplied from the odds, ends and scrap of the other departments. This results in track equipment of shocking inefficiency, and it is not surprising that it is reflected in the cost of the upkeep when extended over a term of years. The writer appreciates that this subject is too broad to be covered entirely in a single paper, but it is proposed to bring out only some of the most important features.

HEADQUARTERS

On account of the rough and heavy nature of the material used in the execution of the work for tracks and paving, adequate yard room should be provided for the way department. Suitable space is necessary for a neat and orderly storeroom, shop space for ties, rails, special work, paving material, and other accessories, so that they may be



Economical Track Maintenance—Locomotive Crane

properly stored, or racked up and spaced, in order that the material may be economically handled and intelligently checked. The way department should have quarters large enough to allow of purchasing material in quantities and storing it in advance. Such an arrangement is the only guard against delays. It insures the advantage of getting proper supplies and gives time to buy them under correct specifications and careful inspection, thereby obtaining the benefit of honest competition and of getting the best for the least outlay. The location of the yard should be convenient to the center of distribution for the system, at the same time providing a steam road siding. Extra hauling charges would soon pay the interest on an investment for a location of a proper size, to say nothing of the inconvenience and loss of time. Size and fitness may only be determined by the amount of work to be done.

YARD MACHINERY

Few street railway companies can afford to be without some power machinery for unloading heavy material from the steam cars and loading it again on the work cars. The

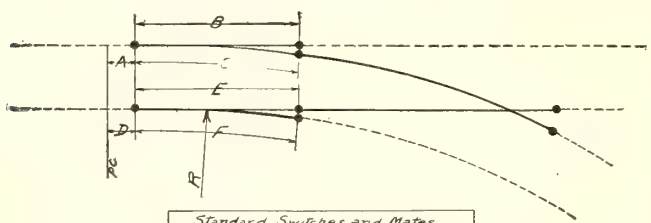
*Abstract of paper presented as Appendix B of Report of Committee on Way Matters, American Street & Interurban Railway Engineering Association, Atlantic City, N. J., Oct. 10 to 14, 1910.

first step in this direction is the use of a stationary derrick. A good design has a 45-ft. boom, a 50-ft. mast and handles 4-ton loads with boom fully extended. The operating engine is driven by a 40-hp, 500-volt d. c. motor, and has four main drums that provide for boom, load, revolving line and extra drum for closing line in case a clam-shell bucket is required. Such a machine is entirely under the control of one man, and costs installed complete approximately $2,500.

The locomotive crane illustrated represents the highest type of machine for loading and unloading material. It is not only speedy and substantial for handling the supplies, but on its own power operates over the tracks and at the same time may be used to push steam or flat cars. The purchaser of such a crane for yard work should be careful to get one with a boom of such a length that the machine may operate through a radius of at least 35 ft., and the requisite number of drums should be provided for taking care of the possibilities of equipping the machine with a bucket or a clam-shell for handling coal, sand or crushed stone.

WORK-CAR EQUIPMENT

The cost of repairs to the tracks and roadway is very materially reduced by hauling all supplies by work cars or trains. Instead of a discarded passenger car, which seems to have been the standard in the past for the track engineer, the most substantial car and equipment that can be obtained are recommended. Motor work cars equipped with power cranes are exceptionally economical for gathering up scrap, rail and special work; handling bridge timbers and other heavy pieces which would otherwise require a large number of men; also they serve the purpose of the work cars, as material may be carried on them to and from the yards, as well as be conveniently and cheaply handled on and off the work. The ordinary railway would, in a comparatively



Standard Switches and Mates

Stated Radius	R for all Gages	Dimensions A	B & C	D	E & F
50' Lateral	47'7½"	-6"	10'0"	-6"	10'0"
75' "	72'7½"	0"	12'0"	0"	12'0"
100' "	97'7½"	0	12'0"	0"	12'0"
150' "	147'7½"	12"	14'0"	12"	14'0"
200' "	197'7½"	18"	15'0"	18"	15'0"
100' Wye	97'7½"	-6"	10'0"	-6"	10'0"
150' "	147'7½"	0"	12'0"	0"	12'0"
200' "	197'7½"	0"	12'0"	0"	12'0"
350' "	347'7½"	12"	15'0"	12"	15'0"

NOTE— It is recommended that the 100 foot Radius Lateral and 200 foot Radius Wye, shall be used wherever Practicable. It will rarely be found necessary to use others.

Economical Track Maintenance—Table of Proposed Standard Switches of Different Radii

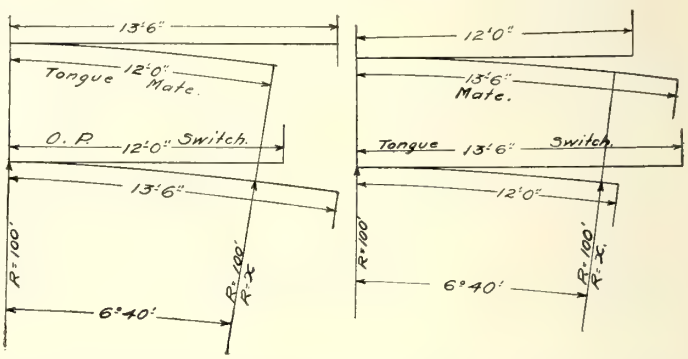
short time, save the investment required for a proper crane-car. For the smaller road the crane-car could do all the lifting work in the yards as well as out on the tracks. In selecting a crane-car precaution should be observed to get the hoisting apparatus from a recognized company making a specialty of this class of machinery. Some home-made cranes, mounted on a scrapped passenger car, take so many men to work the apparatus, and lose so much time doing it, that the outfit is often little in advance of the hand method.

SHOPS

Only the largest roads require special shops for the track department, except a smithing shop to take care of the tools, make temporary plates, bend rail, and the like. Other work, such as making split switches and frogs, may be taken care of by the mechanical department, an arrangement that is fairly satisfactory if there is proper co-operation. For urban properties, the large use of manganese for specials has minimized the local shop work to a large degree. Some companies bend a large proportion of their own track curves. An hydraulic railbender is a fair substitute for a powerbender.

STANDARDS

The adoption of standards to meet particular conditions is strongly recommended because of the importance not only of keeping the stores and stocks down to a minimum, but of increasing the general efficiency of the work executed. Laborers, skilled or unskilled, after handling the same type of rail, special work and accessories naturally become more proficient in making repairs, and not only is



Economical Track Maintenance—100-ft. Inside Radius Switch Pieces with Broken Joints

the work done better and more quickly, and, therefore, more cheaply, but also without requiring the strict supervision and inspection that would otherwise be necessary. Moreover, there is a material saving to be effected by being able to make proper repairs promptly.

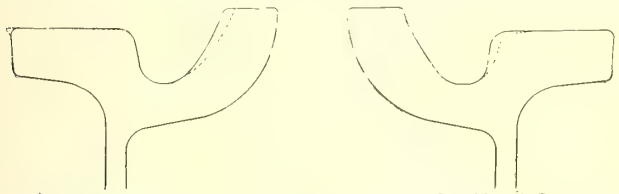
It might be well to briefly consider special work. The maintenance of track and roadway for urban roads amounts to as much as $600 per mile per year. One hundred and fifty dollars, or 25 per cent of this, would be a fair average for special work, including the installation and paving. Hence the importance of a close study of this item. Guard rails should be standard to fish with the regular rail section, without compromise joints. Little may be accomplished in getting standard frogs, except for cross-overs or turnouts, but it is well to have standard switch pieces, standard at least as to lengths and radii. It would not be very practicable to standardize the details of design. A standard switch makes it convenient in replacement for any location. The switches may be shifted around without cutting in and out the straight rail. Also, with a few switches in stock, renewals may be made at any time, which is no small item when special work exists with switches of varying lengths and radii. It appears that a 100-ft. radius switch is satisfactory for many urban roads and its possibilities are illustrated by one lay-out, in which, under many conditions, 186 standard switches and mates were utilized.

Accompanying sketches show 100-ft. inside radius switch pieces with joints broken, and a table gives dimensions of the proposed standard switches of different radii that were recommended by the special work manufacturers, consisting of the Wharton Steel Company, Lorain Steel Company, Pennsylvania Steel Company, New York Switch & Crossing Company, Cleveland Frog & Crossing Company, Buda Company and Barbour-Stockwell Company. Another table, on the following page, gives a list of proposed standard frogs, designating the frogs by numbers, following steam road practice, which is to be commended.

One illustration shows a 100-ft. radius switch applied to make up a standard cross-over. In the cross-over for a distance between tracks of more than 4 ft. 10 in. two jump frogs may be used; otherwise one jump frog. Open-point switches, or switches on the outside curve, should be utilized where the cross-over is seldom used, as in this case the mate will last longer than the switch in the main-line track.

It was interesting to note that from the records of one of the large manufacturers it was shown that over half of all the switches ordered were of 100-ft. radius; also that very few data sheets showed that any of the street railway companies favored spiral switches.

The use of solid manganese for switches, mates, frogs and curves is steadily increasing. There is no doubt that



Economical Track Maintenance—Cross Sections of Cast Manganese Guard Rails Showing Wear

in the case of any curve of 75-ft. radius or less for permanent street work money is eventually saved by using the solid manganese rail.

Illustrations show cast manganese steel guard rails that have been in service since February, 1908. The old curve was Bessemer, and if renewed with same material it would now be ready for replacement for the second time. From the experience of the Interborough Rapid Transit Company of New York there seems little doubt that the open-hearth rail of 0.75 per cent carbon is very superior to the present market Bessemer steel.

For city traffic the solid manganese switch is gaining favor. It means an additional cost of probably one-third to one-half, yet the advantage of a one-piece casting, with manganese arms, as well as other wearing parts, appeals to the ordinary engineer, as the switch pieces of the hardened center type often batter down and fail at the arms if the joints are not first class. Another point in favor of solid work is that those who have used the special work speak favorably of it and are still ordering. This is not true, however, for the solid manganese frogs. Undoubtedly, since the frog wears away at the point, it seems rather extravagant to scrap the whole piece of material whose first cost is 10 times as much as it is worth in scrap. Therefore, the solid frog is not recommended at this time in preference to the hardened center one. Of course, the frogs referred to above are understood to be those found in turn-outs and branch-offs rather than crossing frogs with the larger angles. For crossing frogs at intersection of two trolley roads, in case of severe traffic, solid manganese construction is preferable.

CORRUGATIONS

Few maintenance troubles have attracted so much attention and study as corrugations in rails. We are having more corrugations than ever before, and the problem is to get rid of what we have in the large quantity of rail that is now in service and to do it in the most efficient and inexpensive way. One of the simpler methods of removing corrugation is by means of an ordinary file or emery block set in a frame and operated by hand. The Twin City Rapid Transit Company, Minneapolis, Minn., uses a device which consists of a holder for carborundum blocks which are rubbed back and forth over the rail by a car to which the device is attached. Power-operated grinders also are used by some roads.

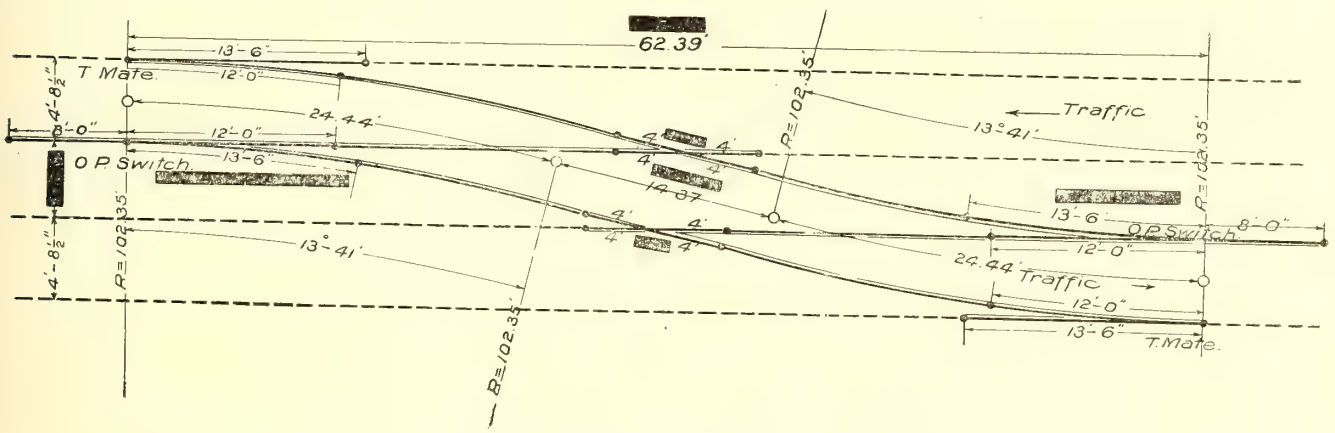


No. of Frog	Angle	Arm Length G	Arm Length H
#4	14°16'	4'-0"	4'-0"
#5	11°25'	4'-6"	4'-6"
#6	9°32'	5'-0"	5'-0"
#8	7°9'	5'-6"	5'-6"

Economical Track Maintenance—Table of Proposed Standard Frogs for Turnouts and Cross-overs

The Detroit United Railway Company is using a rail grinder devised by John Kerwin, superintendent of tracks. Two emery wheels are attached to a swinging frame, projecting out from the car and over each rail. The frame is kept in adjustment by means of a screw arrangement and a flat shoe that rests and slides along the rail, so that the emery wheel cuts level. The car is also equipped with regular propelling motors.

The cost of removing corrugations in rails varies from a few cents to 50 cents per foot of rail, depending on the depth of the waves. Even at the latter price it pays, as the only other remedy is to renew the rail. Luckily, once the corrugations are removed they are not likely to return, so it is important to attend to their removal as soon as the indentations appear, as at that time their elimination is easily and readily effected.



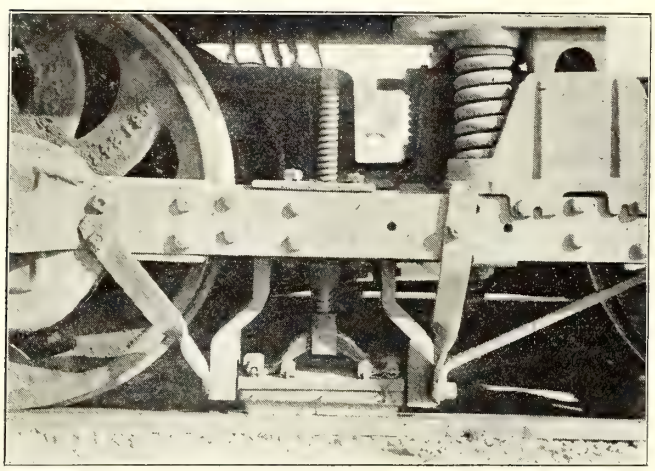
Economical Track Maintenance—Application of 100-ft. Radius Switch to Standard Crossover

It is now held by a large number of way engineers that all joints should be ground when first installed. There is no question that a joint should not be left if there is any variation whatsoever between the running surfaces of abutting rail ends. Once the wheels have an opportunity of pounding the rail the receiving side will rapidly cup out and the track will fail. Rail could have its life considerably extended if, as soon as the joints began to pound, the plates were pulled up and the rail so ground that the abutting rail ends were a true, level surface. Such practice should be resorted to instead of neglecting the joints to such an extent that nothing can be done except lose the rail or apply some expensive method in reclaiming it.

The practice of making home-made offset or compromise joints should be discouraged. It is not practicable for the ordinary smith to make compromise plates for rail that are fit to use.

TIES AND STRUCTURAL TIMBER

In no material has a greater waste been permitted than in structural wood for railways. Even without preservative treatment a good deal may be accomplished by purchasing under proper specifications and intelligent inspection. In crossing planks it is often the practice to purchase "merchantable" yellow pine, regardless of what is the cause of renewals, whether due to traffic wear or natural deterioration. If the repairs are rendered necessary by street traffic, which is common, good red oak timber will not only stand up under vehicular traffic twice as long, but is considerably cheaper than the yellow pine. Again, if "merchantable" timber be purchased, it is the duty of the engineer to see that he gets "merchantable" and not "standard" or some inferior grade. There should be someone in the way department trained for timber inspection. The best place to inspect the timber is at the mills or point of shipment. Few dealers will object as much to having 50 per cent of the proposed order cancelled at the yards as they will to have 10 per cent rejected at delivery point.



Economical Track Maintenance—Rail Grinding Device, Twin City Rapid Transit Company

It is now generally conceded that it pays to treat timber with some accepted preservative, especially when the cheaper woods may be used. The pressure method is no doubt the most reliable, but unfortunately it costs the most, and the work must be done outside, as few railroad companies can afford to own a treating plant. Trestles, bridges, ties and the like have their life extended by even a simple dipping treatment in a hot bath of coal tar distillate.

When a thoroughly seasoned tie is immersed for 20 minutes in a hot preservative at 220 deg. Fahr. the liquid fills all the crevices, and creates an antiseptic fungi-resisting zone around the stick; also gives a penetration of at least 3/16 in. in the solid sap wood. A deeper penetration may be obtained by placing the tie in a cold bath of creosote or a solution of zinc chloride after it is removed from the hot bath. Indeed, it is possible by this method to obtain complete penetration of the sap wood in such woods as the pines and the gums. It is well to use sound and square-edge yellow pine ties for treating, and if any commercial creosote is used, to specify coal tar creosote, after the specification of the American Railway Engineering & Maintenance of Way Association. If the dipping process is resorted to, a high distillate of coal tar should be used. Ties and all lumber should be thoroughly seasoned before being used. A tie treated by pressure with 10 lb. of coal tar creosote per cubic foot of timber is increased in price 40 to 45 cents; treated by open tank to 8 lb. per cubic foot, about 30 cents; and treated by dipping in hot coal tar distillate, about 25 cents. If sound and square yellow pine tie were bought at 45 cents, the total cost of the tie with the above treatment would be approximately 85, 75 and 70 cents respectively.

CRUSHED STONE

On account of the extensive use of crushed stone or gravel in some form as ballast, paving foundation and paving, any of the large companies could show a saving in maintenance by acquiring a gravel-producing plant or a stone quarry.

One company has a stone crusher mounted on a work car. This may be moved about the road crushing up old paving block and the like on the street, and will show a saving in its proper field. About 50 yd. of 1½-in. stone may be made for a day's work out of old paving blocks at a cost of approximately 40 cents per cubic yard. A jaw crusher is mounted on an old car and driven with a G.E. 1200 railway motor, rewound as a shunt motor.

PAVING

Paving comprises one-third of all the maintenance costs of track and roadway. As the work requires skilled labor it offers the best field for piece work. Some companies contract the paving, it being a very good plan to anticipate the important repairs at the beginning of the season, and then to take figures for the various paving from different contractors on a unit or yardage basis. When asphalt is required, creosote wood block should be substituted, if possible, or at least a block header or binder course should be used just adjacent to the rail. It should be kept in mind that a cheap pavement, such as macadam, when under heavy traffic, is a great deal more expensive to maintain than a permanent block pavement.

In removing old granite or stone block pavement it may be reclipped and when used again makes a first-class pavement at a considerably smaller cost than if new block were used.

Job No 74 Account No. 101A Auth No.

Department Maintenance of Way July 29 191 0

ESTIMATE for Repairing and paving on Broad St. Elizabeth from Arch to West Jersey St.

8 60 ft. 116-434 Rails	66	3 1 6 80
240 6x8x8 Creosoted Ties	84	2 0 1 60
240 7" Rail Braces	25	6 0 00
3 kegs 5/16x5 Spikes	3 60	1 0 80
8 pairs Continuous Joint Plates	4 00	3 2 00
16 36" 4/0 Copper Bonds	75	1 2 00
50 yards 1½ Stone	1 00	50 00
50 bbl Cement	1 35	6 7 50
25 yds Sand	50	1 2 50
Labor, Hauling etc		2 0 0 00
Paving		5 0 0 00
		$1463 —

This Job Order to be closed into Permanent Job Order No 117-

Total Estimate

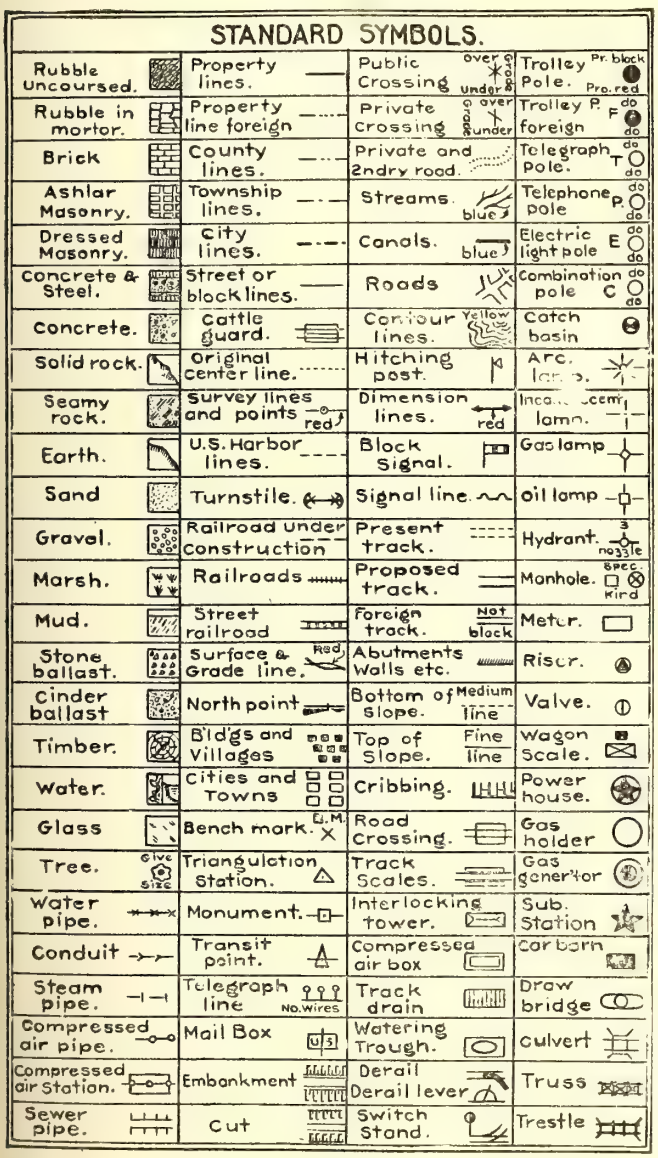
Approved

Gen'l Manager Head of Dep't

Economical Track Maintenance—Form of Estimate of Cost of Track Repairs

Of all the block pavements the granite is to be preferred, on account of having best wearing qualities. It is of interest to note that in New York it was found that the cost of repairs with large blocks on streets under heavy traffic was much less than with the smaller block paving; also that the costs of the various pavements per square yard per year were as follows: Sheet asphalt, 55 cents; wood block, 45 cents, and granite, 27 cents. Grouted joints with brick or stone block make the paving less susceptible to economical repairs. For this reason many prefer the sand or gravel and tar joints.

Minimum maintenance may only be effected by careful study through an efficient and systematic method of accounting. Records should be intelligently and conveniently kept and in sufficient detail to allow a most thorough analysis. Probably the job order system represents the most advanced practice. With this arrangement, whenever the roadmaster, or whoever has responsible charge of the particular piece of trackage, thinks it is necessary to make repairs, he makes out an estimate, as shown, and it is forwarded to the engineer, or the head of the department. If the engineer approves the expenditure, the job order is sent to the general manager or next responsible officer,



Economical Track Maintenance—Standard Symbols Suggested for Use of Way Department

and if the work is thought to be desirable it is authorized. A copy of this job order is sent to the storekeeper, the chief timekeeper and the auditor. At the end of the year it is possible to add all the job orders and account for the entire expenditure on definite sections of trackage, and so by analysis be able to tell whether or not the expenditure is justifiable.

The stores account requires intelligent supervision, the special work, rails, ties, paving stones, being as carefully accounted for as all the smaller supplies. Until this is done accurately, no accounting system will be effective. The engineering office records should be complete. Accurate records should be kept of each special piece for comparison and for study in making renewals. On large roads it is certainly desirable to have a proper index system, so that the drawings and all records may be speedily produced. Standard survey notes should be easy, readable and systematic. One illustration shows a suggested list of symbols that are applicable to an electric railway.

CONCLUSIONS

I. Proper organization and ample headquarters for the way department, including proper facilities for shipping material, storing supplies, a shop and offices, are necessary.

II. Suitable unloading and loading machinery is desirable; a stationary derrick or locomotive crane may often be economically utilized.

III. Eliminate teaming and trucking as far as possible and use work cars.

IV. (a) Provide proper equipment. The motor work cars to be built preferably with steel body framing, especially heavy trucks, motors and independent air brakes.

(b) A motor car with an electrically operated crane is recommended where the scope of the work will permit, crane car to be used either in yards or on the street. It may also include clam-shell bucket to handle sand or crushed stone.

V. (a) Standardize where possible and consistent with conditions; use standard switch pieces in special work.

VI. (a) Grind the rail at all joints where there is not a true running surface of abutting rail ends.

(b) Compromise joints should always be avoided where possible. Home-made compromise joints should not be used.

(c) Grind out corrugations as soon as the indentations appear.

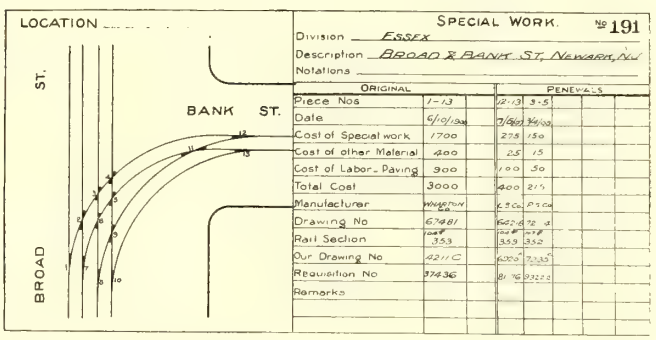
VII. (a) Purchase supplies, including lumber, under a proper specification and inspection.

(b) Treat ties and structural timber for permanent work with an accepted method and preservative.

VIII. Consider owning a gravel or crushed stone producing plant.

IX. (a) Consider doing own paving or any other work where practicable by the piece-work system.

(b) Also consider contracting paving on a unit basis.



Economical Track Maintenance—Index Card for Engineering Department Files

X. Adopt a proper accounting system for convenience and thorough auditing and analysis to obtain a minimum maintenance cost—use the job order system or its equivalent.

XI. (a) Compile accurate, convenient and complete engineering records, including a physical survey of the tracks and roadway.

(b) Make standard drawings, properly indexed and filed.

(c) Surveys and reports should be made intelligent and complete and systematized with standard signs and symbols.

ADDRESS OF PRESIDENT SWIFT TO THE ACCOUNTANTS' ASSOCIATION

The primary reason for an address from the president is, I presume, to afford him an opportunity to outline a policy for the future, and it is usual for him to make some general remarks about greater efficiency, high standards, scientific accounting, and lifting our work to a higher plane. These ideals, have, however, been frequently voiced in well chosen words, and I shall not attempt to add to them, for we can see that auditors are advancing the efficiency of their departments to keep pace with the improved methods of conducting this great business of transportation, which have given to our passengers increased speed with greater safety and comfort. And I believe they are striving to make each year's work better and more valuable to their companies and to their profession.

The history of the association for the past year has not recorded any startling events. We were apprehensive that the requirements of the corporation tax law would conflict with present accounting methods, but the interpretation of the act was so liberal as to require no material change. It is possible that the organized action of the accountants throughout the country, in pointing out the hardship which would follow an attempt to insist upon a literal interpretation of its provisions by the federal government, had great influence in bringing about this satisfactory result.

The first undertaking of the association, that of perfecting a uniform system of accounts, has been accomplished, and we will now turn our attention in a large measure toward more advanced problems. But while doing this, we must not forget that there are many details in reference to our work which are always interesting to our members, and, notwithstanding past discussions, these subjects from time to time will again be presented for our consideration.

Some years ago the association made a collection of blanks which were a source of great interest and an education for its members. This year the collection has been revised and books containing may new forms are now available for those who desire to examine them. I believe that such an educational work should be continued by the collection of data showing the practice of member companies in reference to certain important office methods.

There are many problems arising from the interchange of traffic between interurban lines which are of great interest to their representatives. In some sections local associations have taken up these questions, and because of their more frequent meetings and their immediate interest in these discussions they have, no doubt, obtained as satisfactory results as would have been possible had they waited to have such questions discussed in our association. We recognize the good work these local associations are doing, but the American Street & Interurban Railway Accountants' Association offers many benefits and advantages which local associations cannot give; and I believe that the majority of their members appreciate this. When we analyze our membership we find that many subjects must necessarily come before the association which cannot be of equal interest to all. But the comprehensive vision of an outsider is sometimes of great value. Therefore, we should be willing to give our views, although we may think we are not qualified by actual experience to offer useful suggestions.

It has been a source of gratification to all of us that in past discussions new ideas have frequently been suggested by members who would appear to have less interest in the subject than other members who have taken no part in the discussions.

In the numerous purchases and consolidations which have taken place throughout the country there is an increasing number of our members who are operating electric light plants. The accounting between these properties presents some difficult problems, and a discussion of the most logical method under such conditions would be of interest.

I believe that in a large measure the success of our association is due directly to the unselfishness of our members in giving the result of their experience, their time, and their talent for the benefit of the members of the association. The same spirit must govern us in the future if the interest of the entire membership is to be maintained.

The gradual growth of sentiment in favor of government control of public service corporations, and of the belief that their profits should be restricted to a fair return upon capital actually invested, brings into more prominence such questions as overhead charges and depreciation, which are of especial interest to those companies which must negotiate with the authorities for rates adequate to maintain their properties and pay reasonable returns, or have reached the maturity of their grants and are asked for the physical valuation of their property.

In the past our association, in considering depreciation, has traveled in a circle around the subject; but while as an association we may not have accomplished much, we are conscious that this great question stands before us, and many of us, having advanced somewhat nearer and having studied this subject, have, no doubt, formed some opinions, and shall be prepared to state them when the time comes. Meanwhile, proper data for determining the life of way and structures and of equipment are necessary, and the discussion of suitable records will prove interesting.

In some locations there is considerable agitation in favor of municipal ownership, but so far in this country there have been few attempts at municipal operation of street railways. Many of us have had some insight into the methods of accounting which are usual with municipal ownership of other enterprises, and it would seem that, with the assistance of the parent association, an investigation of the results of municipal operations, based upon proper methods of accounting, would be valuable.

Another important line of work, that of shop accounting, was commenced last year. The necessity for this work has long been recognized, and to obtain the best result it seemed advisable that a joint committee from the Engineering Association and our own be appointed to work out the details. In spite of unavoidable delays, much has been accomplished, and at this session we have an instructive report from that committee.

Comment has been made in the past upon the decreasing number of topics which can be discussed with general interest, but the constant changes and improvements will continue to bring new problems, and I believe that the future work of our association will be more instructive and more beneficial than that of the past.

The program for our meeting is of such excellence that we should all feel thankful to the executive committee which arranged it. And on behalf of the association I wish to thank the members who have willingly given so much of their time and thought in preparing these papers for our benefit. I wish also to extend my thanks to the officers of our association for their interest and support and to express to Mr. Donecker, secretary of the American Street & Interurban Railway Association, my appreciation of the interest he has shown in our work and the attention he has given to every request for information or assistance.

E. C. Faber, general manager of the Aurora, Elgin & Chicago Railway, is attending the convention. He is accompanied by Mrs. Faber.

The funeral of C. W. Reinoehl will be held this afternoon in Harrisburg, Pa., and the exhibit of the Pennsylvania Steel Company will be closed all day.

The San Antonio (Texas) Traction Company is ably represented at the convention by W. L. Hibbard, engineer, and Henry Fink, Jr. Mr. Hibbard and Mr. Fink will spend several days in New York and other Eastern cities before returning to Texas.

ADDRESS OF ACTING PRESIDENT HARVIE TO THE ENGINEERING ASSOCIATION

The American Street & Interurban Railway Association is convened again on the shores of the Atlantic, and the Engineering Association, for the eighth time in its history, assembles to discuss some of the varied problems presenting themselves daily to each and every one of its members. We, as engineers, welcome this opportunity to renew old acquaintances and make new ones at this time under such favorable conditions. We have with us associate members and guests, to both of whom we are indebted for much of the profit to be obtained from these gatherings and to whom we extend the most hearty welcome. To the allied associations, also, we owe much in the way of profit and enjoyment and to those we likewise extend a warm greeting.

Your executive committee this year has endeavored to follow to completion several matters and methods which have been before this association for some time, and I trust that we have, in part at least, accomplished the purpose. For my own part, I have endeavored to assist in carrying forward the work as originally planned, and I trust I have served you to that end.

You have noted from a perusal of the advance papers which have been in your hands for some time that our association has this year performed through its committees a very creditable amount of work and is steadily improving, increasing from year to year its value to its members.

We have felt the good effect of the work done by the committee on standards. Its field has been steadily gaining since 1907 and its value we can hardly overestimate. This committee presents to you for adoption this year three different matters and suggests for adoption as recommended practice two others. These matters have been up before, have passed their respective departmental committees and have been thoroughly considered by your committee on standards. If you adopt the report of this committee the matters will be put before the main association for final ratification, which we hope will put these standards effectively before the executive officers of our various member companies.

The American Street & Interurban Railway Association has made during the past year a very marked improvement in the matter of associate membership and has on its committee some very active members. We are proud to say that the chairmanship of this committee is held by a member of the Engineering Association, whose efforts in this direction have been untiring. This committee, composed of 36 members scattered over the entire country, has been rewarded for its efforts this year by the addition of 350 associate members, or an average of nearly 10 associate members per committee member. I am informed that the Engineering Association has done its full share in this, and I feel sure that the coming year will find our members equally active in this line.

Our standing committees have been increased since our last meeting by the appointment of the committee on buildings and structures and the committee on heavy electric traction. Both of these are new fields, the former committee taking up matters relating to terminal and car house or yard work, which has been somewhat slighted in the past, and the latter committee covering the field of fast and heavy electric interurban work, including the electrified divisions of steam roads.

You will note that our policy of broadening out so as to include the entire electric railway field has been very practically demonstrated by adding the Pennsylvania Railroad to our active membership. This is only the beginning of this advance. We extend a most hearty invitation to all of our steam railroad friends who are engaging in the electric railway industry to join our ranks, assuring them that we, as co-workers in the field, will prize their good fellowship and enjoy an exchange of ideas, and, I may say, hope to be of service to them.

One very gratifying result of our work this year has been the requests of some of our member companies for the investigation of certain specific problems. These requests involve the thorough discussion of a very general problem, but one which is of considerable importance at this time to a certain section or sections of the country. In such matters our association can be of great benefit, and if we are careful to investigate fully and study the conditions presented, our deductions will carry great weight. We should encourage to the fullest extent inquiries from member companies for investigation along specific lines. It will be productive of good results to ourselves, to our association as a whole, and to the companies by which we are employed. Requests of this kind should be in not later than January 1 of the year in which the report is desired in order to receive the proper attention.

We have this year one joint meeting—that with the Accountants' Association—on a subject which is of special interest to us all and which should develop a very profitable discussion. The report of this committee is the result of two viewpoints which are often at variance and which should more frequently be equitably reconciled.

In the matter of exhibits the Manufacturers' Association has even exceeded its usual excellence and completeness, and to it we are indebted for assisting to keep us up to date and for magnificent coöperation with our various committees. I regret that we cannot allot more than one full day to the inspection of its exhibits.

One of our former presidents has said that in order to obtain results "the interest of the individual must be aroused." This is the keynote of success in any line of work where several persons are engaged jointly and it is particularly true of the work of this association; and had our individual members not been interested in our work this association would not stand where it does to-day. I believe that our committee members under the new scheme adopted and put in force in 1908 and 1909 appreciate more fully than ever before the value of this interest in our work, both to themselves and to the association at large.

In order entirely to consummate the success of this convention and obtain from it the greatest good, let us ask you to bear in mind the following:

First—Let us all be prompt in attendance.

Second—Let us consider carefully and discuss thoroughly the questions before us, confining our remarks to the subject in hand. Let us be progressive and conservative.

Third—Let us close our discussions as promptly as possible.

Our headquarters hotel, unfortunately, is at a greater distance than usual from the convention hall, and this in itself will make it necessary for us to be particularly watchful of our time. Please assist us in this matter as much as possible.

In closing, I wish to express publicly at this time my thanks to the various members who have been called upon to do work during the past year. Some of them, unfortunately, have been called upon suddenly, but let me say that they have responded willingly to the call. I wish particularly to express my thanks to our worthy secretary, whose work this year has been especially exacting and whose actual labors for this association few of us fully realize, and also to our executive committee for its assistance to me during the time I have been called upon to serve you as acting president.

REPORT OF THE COMMITTEE ON INTERURBAN RULES*

BY C. D. EMMONS, CHAIRMAN; H. A. NICHOLL, J. W. BROWN, F. A. BOUTELLE, J. E. DUFFY, W. R. W. GRIFFIN, C. F. HANDSHY.

The committee on interurban rules has devoted much time and given very careful consideration to the subject. Several meetings have been held, but it has been impossible to carry out fully the instructions of the Denver convention, so that at this time the following is submitted as a progress report.

The report of the committee on interurban rules to the Denver convention in 1909 provoked a great deal of discussion, particularly on the part of officials of electric railways who were operating under steam railroad rules. The report as submitted, however, was finally adopted by a resolution which was carried by a vote of 41 in favor of the rules and 3 opposed to the rules. Following the adoption of the resolution approving the rules, however, a motion was unanimously carried, instructing the committee on interurban rules to confer with the committee on rules of the American Railway Association, with the idea of adjusting differences in the rules.

The committee held its first meeting in Chicago on April 25, having previously sent out a letter directed to the railway commissioners of all States as follows:

"The interurban rules committee of the American Street and Interurban Railway Association for 1910 is very anxious to keep in close touch with electric railway operation throughout the United States and to study accidents in connection therewith, to the end that we may determine whether or not the rules are specifically clear as to how to avoid such accidents, and if not, that this rules committee may make such recommendations to the 1910 convention of the American Street & Interurban Railway Association as will tend to improve the rules to the point of greatest safety.

"As chairman of this committee I would respectfully ask if we may make arrangements with you for obtaining such information concerning accidents due to the operation of electric street and interurban railways in your State as will provide us with the details of the full causes of such accidents. It is not necessary that we should know the road upon which the accidents occur.

"If you have printed bulletins to cover these points, I will be very pleased if you will place me on your mailing list.

"We believe you will fully appreciate the good which this committee may accomplish by keeping in close touch with this subject, with your assistance in the manner suggested."

To this letter replies were received from 34 States, 18 of which have no railway commissioners, or other bodies exercising jurisdiction over railroads. Sixteen have railroad commissioners, who replied signifying their willingness to aid the committee in any way they could, most of them sending copies of their reports and giving lists of accidents and investigations concerning these accidents.

The committee sent out a data sheet which elicited answers from a total number of 65 roads, representing 6,396 miles of track. But 19 roads had adopted the interurban rules as presented at the 1909 convention, although 29 of the 65 stated that they were satisfactory. Upon the question as to whether or not the interurban rules should be changed to conform to the American Railway Association rules, only 42 roads out of 65 voted, 19 signifying a desire to conform to the American Railway Association rules, and 23 signifying that they did not desire to change the rules as submitted. Your committee, however, believes the interurban rules should be revised in such manner as will make them agree as nearly as possible with the standard code of the American Railway Association. There are many reasons for this, among them being:

1. The fact that the rules committee of the American Railway Association, all men prominent in the operation of large properties, have for many years worked over these rules, revised them and reduced them to their present concise state.

2. For many years the steam roads have been operating under these rules as a basis, although we find most roads add somewhat to the rules, and you will note that your committee has likewise added different rules, although keeping the lettering and numbering identical with the lettering and numbering of the American Railway Association rules.

3. From time to time those managers who operate interurban properties hire men who have previously worked on steam roads, or men leave electric railway service to work on steam roads. A difference in rules is likely to confuse these men.

4. Some properties are operated in conjunction with steam roads, and necessarily have to use the steam road rules while doing so. It would evidently be very confusing, therefore, to use the steam road rules while operating on steam road tracks, and suddenly to change to the interurban rules after leaving the steam road tracks.

5. Every day brings us nearer to closer interchange operation with steam railroads, and as this time approaches the interurban rules should be made more nearly to conform.

A second meeting of the committee was held at Fort Wayne, Ind., and a third meeting at Cleveland, Ohio, these meetings resulting in the tentative code of rules presented herewith. [Not reprinted.—Eds.]

STEAM ROAD RULES

Correspondence was entered into with F. C. Rice, chairman of the committee on transportation of the American Railway Association, this committee being now the rules committee, in an endeavor to arrange for a meeting of the committee on interurban rules with the committee on transportation of the American Railway Association. The result was that Mr. Rice felt it would be almost impossible for the committee on transportation to give sufficient time to the interurban rules committee to go over this question properly, and suggested that a railroad commissioner, a member of the interurban rules committee and a representative of a steam railroad (who might be a competent dispatcher) meet, and with sufficient time at command, go over the subject of rules thoroughly and with care.

In view of the result of the vote developed by the data sheet and the failure of the committee to obtain harmonious action in its meetings, it was not deemed advisable to proceed with a conference in connection with the American Railway Association until after submitting this report of progress to the American Street & Interurban Railway Transportation & Traffic Association.

The committee, while of the opinion that it is highly advisable to harmonize the interurban rules with those of the American Railway Association, feels at the same time that it is of greater importance that the interurban rules should harmonize in so far as possible with the city rules, for the reason that perhaps over 90 per cent of interurban roads are operating over city divisions requiring them at that time to follow the city rules. Under such circumstances, it is evident that much confusion is likely to result if differences in the rules exist, and equally true that such differences should be avoided if this is at all possible. During the coming year the committee on interurban rules, in addition to endeavoring to harmonize its rules with the American Railway Association rules, should meet with the committee on city rules and make a great effort to have the rules of the city and interurban divisions harmonize in so far as possible.

The committee will be pleased to have a full and free discussion of the rules as submitted, and to have this discussion conclude with a vote of instructions as to the desire of the association on the subject of the continuance of its efforts to conform these rules to the American Railway Association rules.

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10 to 14.

REPORT OF COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC*

BY P. P. GRAFTS, CHAIRMAN; C. V. WOOD, E. H. HYMAN, FRANK WALSH, W. F. TOWNE, CHAS. FLOYD

Replies to the committee's data sheet were received from 62 member companies, of which only 26 contained information of value in connection with this report. With very few exceptions there seems to be no well-defined plan for segregating the operating expenses of the express and freight departments either for the purpose of analysis to ascertain whether or not these departments are profitable or for the purpose of comparison with previously stated periods or for comparison with other companies. Of the 26 companies which made reports which proved of service to your committee, 10 do not separate the expenses of the express and freight departments from those of the passenger department.

The reporting official of one company states that he makes careful calculations of the expenses at intervals and toward the end of each fiscal year. Probably, however, there are nearly as many methods of estimating such expenditures as there are companies, and, although in the case of the particular company referred to the estimates might be strictly fair and accurate, in other cases errors would creep in, perhaps from over-zealousness, and the official in charge of express and freight traffic would suddenly awaken to the fact that not only was he losing money for his company at that time, but that he had been losing it to a greater or less extent for several years. Such a situation is extremely embarrassing, but although, for reasons of economy, a company might wish to withdraw from that part of its business, as a matter of policy it could not afford to do so.

A comparison of the reports of 16 companies which maintain a separate system of accounts for their express and freight departments indicates that nearly every separately organized company has its individual classification and method of constructing the same. To illustrate a few of these differences, some of the following comparisons are made:

In answer to data sheet question No. 7, reading: "In arriving at the proportion which express and freight car mileage bears to total mileage operated, do you charge the mileage of each individual car, whether loaded or empty, and whether operated singly or in train?" of 26 companies reporting, 11 companies charge to express and freight car mileage the mileage made by each car whether loaded or empty, operated singly or in train; 2 companies do not include trailer car mileage, and 13 companies make no charge to the freight department for use of track, etc., by freight equipment.

From replies to other data sheet questions, we find that:

"Maintenance of Freight Cars and Locomotives" is generally charged directly from shop records.

"Superintendence and Solicitation of Traffic," "Advertising," and "Miscellaneous Charges to Traffic" are handled in various ways, some companies charging to these accounts on the basis of earnings, some on the basis of mileage, some making arbitrary charges, etc.

"Power" is generally charged on basis of car mileage or by meter, when charged to the freight department at all.

"Wages of Trainmen, Messengers, etc.," are charged directly from pay-rolls.

The items of "Miscellaneous Car Service Expenses," "Station Employes," "Station Expenses," "Car House Employes," "Car House Expenses," "Operation of Telephone and Telegraph Systems," "Salaries and Expenses of General Office Clerks," "General Office Supplies and Expenses," "Law Expenses," "Miscellaneous General Expenses," "Stationery and Printing" are charged also in various ways some prorated on basis of car mileage or prorated on basis of gross earnings, some charged directly, presumably because of a separation of departments, and some estimated or charged arbitrarily.

"Insurance" is handled by hardly any two companies in the same manner. Some companies place specific amounts on freight in transit and in depots, but the rule seems to be 25 per cent to 50 per cent of the estimated value so handled.

"Taxes" are seldom charged against the express and freight department covering the value of the equipment depots, etc. "Losses and Damages" are not handled by any particular method. Some companies charge off only the actual amounts paid out, neglecting to set aside a reserve in case of wreck or fire. "Interest and Depreciation" receive the least consideration of any of the expense accounts in connection with the express and freight business, only two companies indicating that any particular charges were made.

Although the Interstate Commerce Commission does not demand a separation of expenses of the passenger and freight departments, that is no reason why we should not do so for the correct information of our stockholders and operating officials.

As a preliminary step in that direction, your committee submits for your consideration the following method of developing and segregating earnings and expenses from express and freight, and, if approved, recommends that the details be worked out by a joint committee of this and the Accountants' Association.

EARNINGS

Credit to gross earnings the full revenue from express and freight traffic without deductions for terminal charges, trackage rights, etc., the gross earnings from all merchandise carried to be included in this account, excepting mail only.

EXPENSES

Account.	*Basis.*
Maintenance of Track and Roadway.	Prorate according to car mileage made by express and freight equipment.
Maintenance of Cars and Locomotives.	Charge directly from shop records.
Superintendence and Solicitation.	Prorate according to gross earnings if charge cannot be made directly.
Advertising.	Prorate according to earnings.
Miscellaneous Traffic Expenses.	Prorate according to car mileage.
Superintendence of Transportation.	Prorate according to car mileage.
Power.	By meter or prorate according to car mileage. No deductions to be made.
Freight and Express Conductors, Motormen and Trainmen, and any special train employes.	Charge directly from pay-rolls.
Miscellaneous Car Service.	Charge directly or prorate according to car mileage.
Station Employes.	Charge directly or prorate according to gross earnings.
Car House Employes.	Charge directly or prorate according to car mileage.
Car House Expense.	Charge directly or prorate according to car mileage.

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association at Atlantic City, N. J., Oct. 10 to 14.

EXPENSES (*continued*)

Account.	*Basis.*
Operation of Telephone and Telegraph Systems.	Prorate according to car mileage.
Salaries and Expenses of General Office Clerks.	Prorate according to car mileage.
General Office Supplies and Expenses.	Prorate according to car mileage.
Law Expenses.	Charge directly or prorate according to car mileage.
Miscellaneous General Expenses.	Prorate according to car mileage.
Stationery and Printing.	Charge directly.
Insurance on Equipment, Depots, etc.	Charge directly or prorate according to value of same.
Insurance on Freight in Transit and in Depots.	An amount to be carried representing from 25 to 50 per cent of the value of merchandise in the hands of a company, as determined by careful estimates.
Taxes.	Charge directly or prorate according to value of equipment, depots, etc.
Losses and Damages.	To properly cover this item a percentage of the gross earnings should be set aside which will be sufficient to cover actual expenditures and to provide a reserve fund in case of a wreck or unusual catastrophe resulting in heavy claims. This percentage must be determined by each individual company from past experience.
Rent of Tracks and Terminals.	All charges for use of tracks of other companies, payments made to municipalities, etc., should come under this head and be considered as an operating expense.
Interest on Fixed Charges.	On equipment, depots, and other property used specifically in the express and freight business should be charged directly.
	On track and roadway, shops, barns, power house, etc., used jointly by freight and passenger equipment, interest or fixed charges should be charged according to car mileage, provided full use is demanded by the passenger traffic and much additional wear and tear is imposed by freight traffic or additional facilities are required by the same.

The question whether car mileage or ton mileage should be adopted as the unit of earnings and expenses received very careful consideration, because steam railways universally use the latter unit. Inasmuch as interurban railways, with very few exceptions, have only begun to handle express and freight in a comparatively small way and the freight car mileage is only a small percentage of the total car mileage, it seems advisable to continue that unit until the earnings from freight traffic become a larger percentage of the total and permit of the office expense necessary to maintain such records and the value of the ton mile unit seems more apparent than at the present time.

It is the thought of your committee that, should its recommendations be adopted, only a comparatively short period will elapse before comprehensive analyses and comparisons can be made and the promotion of express and freight traffic on interurban railways become much more rapid and on a much more substantial basis than in the past.

ACCOUNTANTS' "GET-TOGETHER" LUNCHEON

The "get-together" luncheon of the Accountants' Association was held on Tuesday at 1 p. m. in the Chevy Chase room of the Marlborough-Blenheim. There were present a substantial number of new men in addition to many of the veterans. The diners were seated at individual tables and as usual at gatherings of this organization the members had many interesting matters to discuss with one another. A feature of the dinner was a series of extemporaneous talks by President Swift, Past-presidents Brockway, Ham, Wilson and Tingley; Messrs. Sweeney and Morrow of the Interstate Commerce Commission, and Mr. Wishart, statistician of the New York State Public Service Commission, District No. 2. P. S. Young, comptroller of the Public Service Corporation of New Jersey, was also one of the speakers. These short talks made quite a hit, so this feature is likely to be repeated at future dinners.

MEETINGS OF THE CLAIM AGENTS' ASSOCIATION

Two meetings of the Claim Agents' Association were held yesterday at the Traymore Hotel, the headquarters of the association. The morning's proceedings were opened by the presentation of the paper by James R. Pratt, assistant general manager, United Railways & Electric Company, Baltimore, postponed from Monday. The discussion on his paper was opened by L. S. Hoffman, general solicitor, Public Service Railway, Newark. Following Mr. Pratt's paper, those by John J. Reynolds, claim agent, Boston Elevated Railway; H. V. Drown, general claim agent, Public Service Railway Company, Newark, N. J., and Henry C. Page, general manager, Worcester Consolidated Street Railway, Worcester, Mass., were presented and considered.

During the afternoon session, the papers scheduled on the program by R. E. McDougall, claim agent, Utica & Mohawk Valley Railway, and W. F. Weh, claim agent, Cleveland Railway, were read. Vice-president Harrison, acting president during the absence of Mr. Carpenter, then announced that the group picture of the Claim Agents' Association had been postponed from Tuesday and would be taken at 11 o'clock this morning by the side of the Traymore Hotel. He also stated that Mr. Hooper, of the Hooper-Holmes Information Bureau, had arranged to address the association this morning, following the paper by Mr. Schneider.

Mr. Harrison then announced the following committee on nominations for officers for the ensuing year: James R. Pratt, Baltimore; John J. Reynolds, Boston; William Tichenor, Terre Haute; W. F. Weh, Cleveland, and R. E. McDougall, Utica.

After Mr. Harrison had urged all not to forget the banquet in the evening, the association adjourned.

MEETING OF THE ENGINEERING ASSOCIATION

The first meeting of the American Street & Interurban Railway Engineering Association was held yesterday morning at Aquarium Court. The acting president, W. J. Harvie, called the meeting to order at 10:30 a. m. He said that the program usually began with the address of the presiding officer, but he would suspend the program long enough to honor the memory of those members of the association who had been removed by Divine Providence—Frederick H. Lincoln and James Heywood. The committee appointed in connection with Mr. Lincoln's death consisted of H. H Adams, Paul Winsor and J. S. Doyle, and the president asked Mr. Adams to report.

H. H. Adams, Metropolitan Street Railway, said that the committee was appointed on July 12 to draw up resolutions and to take such action as it deemed necessary in connection with the death of Mr. Lincoln, and read the resolutions adopted. These resolutions were published on page 225 of the Electric Railway Journal of August 6, 1910.

On motion of Mr. Ackerman, the report of the committee was accepted

President Harvie then stated that the committee appointed to act in connection with the death of Mr. Heywood was composed of Charles Hewitt, H. A. Hovey and J. W. Corning.

Mr. Hovey presented the report. It gave a biographical sketch and concluded with the following tribute to Mr. Heywood's character:

"He was an earnest and active member of this association, and at the time of his death was chairman of the committee on power distribution. He took a very active interest in all that pertains to electric railroading, and devoted a great deal of time to the very comprehensive report of his committee which was presented to this association at Denver in 1909. His genial manner endeared him to all his friends and associates, and this association desires to express its sense of loss in the death of Mr. Heywood and to convey its sympathy to his bereaved wife and family."

Upon motion of G. W. Palmer, Jr., the report was adopted.

Mr. Harvie then presented his address as acting president of the association. This address is published elsewhere in this issue.

Secretary Corning then read reports of executive committee meetings held December 6, 1909, January 10, 1910, and October 10, 1910. Accounts of the proceedings of the first two meetings were published in the Electric Railway Journal at the time of their occurrence. The meeting held on October 10 first discussed appointing a committee on education of engineering apprentices. Acting President Harvie explained that this committee had not been appointed, because the time did not seem to be opportune. As to coöperation with the American Society for Testing Materials on standard specifications, it was moved and carried that the executive committee communicate with the secretary of the American Society for Testing Materials, stating its desire to coöperate in the adoption of specifications of service to the Engineering Association; further, that in considering future specifications the Association would be pleased to have members appointed on committees of the Testing Society that are handling subjects under consideration by the Engineering Association, if consistent with the by-laws of the society. A letter was received from E. B. Katte, suggesting that the report of the committee on heavy electric traction be presented at the Friday morning session instead of the Wednesday morning session, as he found it impossible to attend before the later date. It was decided to postpone the report accordingly. A letter from A. L. Neereamer, secretary of the Central Electric Railway Association, enclosed a copy of that body's standardization committee's report as adopted September 22 and was accompanied by a request that these standards be considered for adoption by the Engineering Association's committee on standards. This matter was referred to the incoming executive committee. A request from several Massachusetts street railways to investigate the use of car heaters other than electric, with the view of influencing the insurance companies and the State railroad commissioners to allow their use, was referred to the American Association for instructions. A resolution was also adopted that the executive committee of the main association have compiled by its secretary yearly and furnish to member companies and associate members a classified list under one cover of the subjects, reports, etc., under the various association headings.

Acting President Harvie gave a résumé of the meeting held at New York on October 8 by the committee on methods of adopting standards. After some discussion the following procedure was authorized to be proposed to the executive committee of the main association: "That the main association ratify and vote upon the standards adopted by the Engineering Association by means of letter ballot of member companies; this ballot to be taken through the secretary of the main association and be cast by the executive officer of the member companies." The standards to be ratified are to be sent direct to the secretary of the main association and upon receipt by him to be submitted by letter ballot.

The annual report of the secretary and treasurer for the year ended September 30, 1910, showed expenses of $4,722. Of this amount, the cost of publishing and distributing the 1909 proceedings was $2,768 and the balance, $1,954, was for miscellaneous expenses.

SPECIFICATIONS FOR STEEL RAILS

E. O. Ackerman, Columbus, Ohio, then presented the report of the committee on way matters. He said that it was divided into five subjects and suggested that the association first take up the specifications for steel for high T and girder rails. Mr. Ackerman read a letter from George L. Wilson, engineer maintenance of way, Twin City Rapid Transit Company, in which he said that he preferred the chemical composition of rails as first proposed and given on page 27, report No. 303. For three years rails that come near these conditions have given excellent service on his company's tracks. The change from Bessemer steel to hard open-hearth steel of high-carbon content has been amply justified by results. One report of some tests of open-hearth and Bessemer rails made by one of the transcontinental roads under very heavy traffic showed that 90-lb. Bessemer rail from three leading rail mills lost by wear an average of 14.15 per cent of the head of the rail in 13 months. During the same time and in the same track open-hearth steel rails of the same section from four mills lost an average of but 7.96 per cent. He considered comment unnecessary and thought the use of hard open-hearth steel for street railways a matter of economy. Further changes in specifications to insure rails that will fit accurately at the joints would be especially welcome.

Mr. Ackerman then said that, as explained in the report, the committee had not time in the preparation of the report to formulate recommendations. Since then, however, it had met and wished to recommend as follows:

"Specifications for open-hearth steel rails: Your committee recommends that the specification as given in this report be adopted by the association as standard for high T and girder rails."

G. C. Young thought these specifications should be adopted as a beginning and that the subject should not be dismissed from further consideration. Valuable data could

be gained and the specifications improved by continuing the committee. Possibly the first section under "General," reading, "The entire process of manufacture and testing shall be in accordance with the best standard practice," could be made more specific. The chemical composition was perhaps too expensive now but this particular specification would serve as a good starting point. He called attention, however, to the desirability, in inspection of rails, of holding the chemical composition uniform in each order. It would be unfortunate to have a wide variation, as suggested, in any one order of rails to go in any one section of track. He asked whether the committee considered it possible to specify the number of passes that might be adopted. He understood that the increased number of passes through the rolls added materially to the durability of the rails. Mr. Young also asked whether it was not desirable to indicate also specifications for standard T-rails in 33-ft. lengths. He did not see that any specific requirement was shown as to what the rail should withstand in drop tests. This was brought out more in detail in some English specifications, and possibly in the specifications of the American Railway Engineering & Maintenance of Ways Association. Under No. 2 Rails, Section (b), he noted that a flaw of ¼ inch in depth in the head was allowed. This seemed too great a variation. The No. 2 rail should require a more rigid inspection for the head of the rail, but defects in the base and other parts of the rail were not so important.

E. P. Roundey, of Syracuse, asked if rails of the chemical composition specified had ever been laid.

C. W. Gennet, Jr., of R. W. Hunt & Company, was glad to see that this specification described intelligently and carefully what constituted acceptable rails. There were, however, one or two points that would bear consideration. First of all, Section No. 6, which limited the temperature of rolling. In considering this rolling, he thought one should bear in mind the very balanced section which is being rolled as a section with a large mass of metal constituting the head, and an apparently thin and wide mass of metal constituting the base. At the same time, the committee had taken the position of nominating rails of a chemical composition which was a little bit higher than the practice of the last few years had given, except in special cases. The rolling temperature to some extent was dependent on the chemical composition. After taking into consideration the unbalanced section, it seemed desirable to him to eliminate for the present any requirement which will reduce the possible unsatisfactory result. The mills would certainly give all that was necessary in the way of a cold rolled rail. They would not spend money for unnecessary heating, and so he thought it wise to reconsider Paragraph No. 6. Section B of Paragraph 11 had a typographical error in it. The height of rails should be limited to 1/64 in. under and 1/34 in. over. Section 15, on drop tests, might be made a trifle more explicit, and give more comparable results if the words "front end" were inserted in the first sentence, making it read, "Three test pieces should be selected by the inspector from each heat, and they shall be, in each case, taken from the front end of the rails rolled from the top of the ingot." It might also be well to suggest that the supports of the drop testing machine be fixed at three feet, centre to centre.

E. O. Ackerman, Columbus, said a number of specifications sent in by various companies were higher in carbon than the committee's specifications. He knew the New York and Boston companies were specifying higher carbon; also the Twin City Rapid Transit Company. The specifications called for 75 per cent, with provision to increase; and it also gives the mill man the privilege to supply a low carbon rail down to 60 per cent.

Mr. Weston, Chicago, said that Mr. Ackerman, in referring to the chemical composition, as presented in the report, failed to mention the note immediately following the table of analyses. This note really was added to this paragraph as a substitute for composition "A," as originally presented. It reads: "An increase of 0.035 per cent. carbon above the upper limit of this specification will be permitted for a decrease of each 0.01 per cent of phosphorus below 0.04 per cent." Hence, if a purchaser desired a higher percentage of carbon than .085 it would mean that the corresponding amount of phosphorus should be 0.01. It was expected that this note, in addition to the table of analyses contained in the report, would cover the requirements for a high-carbon steel.

M. J. French, Utica, said that if the phosphorus could be reduced to 0.02 per cent, that would allow an upper limit of 0.80 per cent carbon. As he remembered, that was just the rail that the Utica & Mohawk Valley Railway has had in successful use for two years on a short stretch of track. If it were not for the note, he would be in favor of a little higher carbon than was given in the specification. He had analyzed a piece of grooved girder guard rail that showed 0.84 per cent carbon. Something decidedly better than the old Bessemer rail was wanted, but it was undesirable to go to extremes. The percentages recommended by the committee were such that they should be tried out thoroughly before going further.

Mr. Angerer, William Wharton, Jr., & Company, said that in regard to guard rails, even the upper limit now given was going to cause trouble not only to the manufacturers but also to the railways on account of the extra strains set up after the manufacturer succeeded in bending them. Furthermore, sawing high carbon rails was extremely difficult. The guard-rail specification might have to be modified, especially as to the hardness, but the straight rails seemed to be on the right track.

J. M. Larned, Pittsburg, said the specifications were not intended to be extreme in any particular, especially in the matter of very high carbon. Rails had been rolled of the chemical composition specified, so there was nothing novel about it. The manufacturers took some exception to the committee specifying the heat at which rails should be rolled; but it was thought better to cover that point in the first instance, and later, after there was secured a standard rail for which accurate specifications could be made, these specifications would always be before the association for changes.

George Weston, Chicago, agreed with Mr. Larned that in case of an objection to the temperature clause that clause could be waived. He moved that this specification be accepted and referred to the standardization committee for action. The motion was seconded and carried.

RAIL SECTIONS

Mr. Ackerman then read the recommendations of the committee in regard to T-rails. They were the same as last year. The committee was not prepared this year to make any new recommendation for standard grooved and guard girder rails; but had included in its report 7-in. and 9-in. grooved and guard rails for the consideration of the association.

Charles H. Clark, Cleveland, said that he was on the committee in 1907 that recommended the 7-in. rail referred to. Last year a rail very similar was rolled for Cleveland. It was the Lorain 103-lb. No. 426 section. Being a 7-in. rail, there was less tendency for the rail to tip over with the heavy cars than with a higher rail. The unfavorable point about it was that paving designed for a 9-in. rail would not fit it. In the devil strip he had lowered the concrete and used the old stone. He had not used any of the 9-in. section because the old 141-lb. rail was very close to the recommended standard. Mr. Clark then referred to a difficulty which had been experienced in Cleveland with a piece of special work which caught

the shoes of horses. He attributed that to the fact that the skin of the rail was soft, and the first wear on it caused a little tang to form on the gauge side of the rail. After the cars had run over the rails for a year or two this wore off, but on new special work it would often form immediately. He had suggested to the manufacturers that they plane down the gauge line of the rail for ¼ in. across the corner, so that there would be no projection to pull the shoes off horses. The Cleveland Railway at present is engaged in grinding off this projection. Otherwise, he saw no objection to this form of guard rail.

M. J. French, Utica, asked Mr. Clark why he reduced the width of the base from 6 in. to 5½ in. The 7-in. rail had a 6-in. base Mr. Clark said that he wanted to keep as near 100-lb. per yard as possible and while he decreased the base he increased the web from 7/16 in. to ½ in. The rails he had been using, though higher, had only a 5½ in. base.

C. B. Voynow, Philadelphia, thought the height of the rail should also be considered in connection with its effect on the strength of the joints. While a 7-in. rail might be all right with a permanent joint, such as an electric weld, cast weld, or riveted fish-plate joint, he thought a 7-in. section was not so good for exceptionally heavy travel; the section should be deep. In the section proposed the flange of the rail was too near the gage line. He had found that after the head had worn down somewhat the flange began to go very rapidly and his company had some 141-lb. Trilby rail where the flange was cut entirely through. He also thought that the groove should be made wider. This could be done without adding any weight. As to the width of the head of the rail, if this rail was intended for 3-in. tread it would have a flare in the back; but if the track was installed where a narrow-tread wheel would run over it for some time there was danger of a false head forming. In the T-rail section 2½ in. to 2 11/16 in. was allowed. This was primarily for fishing purposes. If the head was too narrow the fishing surface would not be sufficient. The Trilby rail had plenty of fishing surface and he thought the narrow head should be recommended for tracks when narrow wheels would be run for a considerable length of time.

A. B. Campbell, Seattle, Wash., said that he had had some experience with horses pulling off shoes in grooved rails. The trouble was remedied by planing of the lip which was formed by the head of the rail crushing over. He thought that for special work in city streets the head of the rail should be sloped more gradually into the groove. He had had as much trouble from this cause on an abandoned curve as on a curve over which the cars ran regularly.

E. C. Shaler thought that a difference in height of ½ in. between the lip and the head of a grooved rail invited vehicle traffic to follow the track. In putting down new grooved rails in Brooklyn, the lip was brought up to within ⅛ in. of the head. Such a section would be more desirable than that proposed by the committee. A rail with a wider base would be desirable. The rails which his company now used had a base 6 in. wide and gave a stable track construction.

J. M. Larned, Pittsburgh, had been experimenting with special work designed to keep the wheels of vehicles on the rails. He thought that this would save a good deal of the damage to the paving adjoining the rail. He had also experienced trouble with horses' shoes pulling off. At right angle crossings he had been using a Trilby section where no guard rail was required and the calks on the horses' shoes did not catch. Where a guard rail was used, it was planed at the intersection so that it sloped to a tangent with the calks on the horses' shoes. He had designed a steam-track crossing of this type which had proved successful in preventing horses' shoes from catching in the grooves.

C. B. Voynow, Philadelphia, did not think that from the standpoint of safety it was necessary to raise the guard as much as ½ in. above the head of the rail.

E. O. Ackerman, Columbus, Ohio, then closed the discussion. He explained that the committee recognized it to be essential that the weight on the head of the rail should be as nearly over the center of the foundation as possible. For that reason, the web was moved under the center of the head as far as the practice of the rolling mills would permit. Most of the high T and girder rails now in use had the web placed too close to the gauge line. This resulted in a twisting motion under the passage of each car which disintegrated and loosened the paving. The proposed rail sections allowed for ⅝ in. wear on the top of the rail head. The lip of the grooved rail was brought down ½ in. below the surface of the ball of the rail in order to insure a clean groove at all times. The principal objection to the Brooklyn rail section was that it did not provide for wheels with 3-in. treads.

C. H. Clark, Cleveland, replied to Mr. Ackerman by saying that he did not believe that the depth of the head of the rail was important. This year he had taken up 15 miles of track laid in 1890 with a rail that had a head only 1 in. deep. It had been worn down only ⅛ in. under a traffic which had averaged a 4-minute headway during the day and night for 20 years.

M. J. French, Utica, moved that the recommendations of the committee on way matters relating to proposed standard T-rail be referred to the committee on standards for action. The motion was seconded and carried.

GAUGE ON CURVES.

C. M. Kimball, Washington, D. C., said that where narrow-tread wheels are used the wide throat of the improved guard-rail sections does not permit setting the rails to a proper gauge for the necessary wheel bearing. If the guard rail performs its proper function there is not sufficient wheel bearing, and, on the other hand, if the gauge is widened, the outside wheel flanges are drawn over and the special work does not wear evenly. In Washington, where the underground conduit system is used and rails are carried on cast-iron yokes, not much variation in the gauge can be made.

M. J. French, Utica, explained that the rules for widening gauge on curves were submitted to the manufacturers of special work and that the rules as adopted would govern nearly all cases.

John Kerwin, Detroit, said that he believed the gauge should be widened on curves of large radius almost as much as on curves of small radius. Very often a new piece of special work will derail cars for a short time after it is first installed, but as it becomes worn, after three or four days, the trouble ceases. In making up curves and special work in his own shop he used a template designed to show that when one wheel on the truck is touching the guard the other wheel is touching the gauge line on the rail.

On motion by Mr. Schreiber the rules proposed by the committee were recommended for adoption as the standard of the Association.

R. B. Rifenberick, consulting engineer, Cleveland, then read a paper on "Rail Joints," which will be found elsewhere.

Following the reading of this paper, Felix Lange read a paper on "Theory of Rail Joints," which will also be found elsewhere.

Mr. Voynow disagreed with several points in the paper. One of them was in regard to the design of fish-plates. He said that the original fish-plate was efficient only when it was properly tightened up. But this was possible only in a laboratory. The next design was a fish-plate with a projection at the center of the well. This was designed for two reasons. The tightening of the upper and lower bolts was supposed to bend the plate inwardly and give a fishing section. Unfortunately that design was sometimes too strong for the bolts, and it would not bend, and so there was a line in a laboratory. The next design was a fish-plate with form a bridge between the under-head and foot of the rail.

In another place the report said that probably the strength of the grip of the machine bolts is not so great as that of rivets. The speaker thought they were equally strong. Whether the bolt would give or not was a different consideration, but if the nut was locked it would give as good or a better joint than can be had with a rivet.

Mr. Clark, Cleveland, said that last year he made a 1 in. joint plate, which when tightened up would come within 1/16 in. of the web of the rail. He found that his riveting machine, which produced a pressure of 100 tons on a rivet, was buckling the plate slightly, so he increased the plate thickness to 1⅛ in. For the same reason, also, he had to change the rails so that the inside edges of the plate were 1/64 in. shy of the distance between the upper and the lower flanges of the rail. He thought members lost sight of the fact that in the riveted joint they are supposing the joint acts as a stress member in a bridge. If that was the case it would be necessary to place the rivets in a joint above and below the neutral axis of the rail, otherwise the rivets would not act at all. But he had disregarded that theory and simply placed the rivets in the center line of the web of the rail to act only for temporary stresses, and afterwards to produce strength for the deflection of the rail. Finally he placed a thermit shoe on the base of the rail to prevent shear and to prevent any movement of the rail, which might create a tendency for the joint plates to work loose. He thought that he could convert anyone who would go to Cleveland in five minutes to the Clark joint.

The following communication was then read from George L. Wilson, engineer, maintenance of way, Minneapolis: "The writer wishes to add his testimony to what is said in Report 303 on the importance of having a true surface of the abutting rails at joints. The larger portion of joint failures and low joints in any system of welding the joints, as well as in the use of splices, is due approximately to the fact that the abutting rails are not perfectly surfaced. Especial importance should be paid by engineers to this point during construction and careful watch maintained afterwards to preserve the surface of the rails by grinding the rail surface with some satisfactory device. It is well said that the life of the rail and track depends on the life of the joints. If the joints are kept in condition the balance will nearly take care of itself."

The president then asked Mr. Weston, Chicago, to close the discussion. Mr. Weston said: "This paper is presented as a progress report with the expectation that we would receive a full discussion of the various points that have been mentioned in the paper, and if the time that can be allotted to its discussion is limited it is to be regretted, but I know the committee will be gratified with the discussion that has been given here today. I hardly think it is necessary to go much into discussion in answer to the criticisms that have been offered, but I expect that the suggestions contained in the discussions will be written up for the use and benefit of the committee during the coming year.

"I wish to refer to several remarks made by Mr. Voynow, of Philadelphia. He referred to the recommendations concerning the cast-welded joint. Now, this report makes no recommendations as to cast-welded joints, but simply refers to them as a type of joint. As regards the question of the percentage of broken joints, in referring to welded joints it was not intended to imply that a job of welded joints could be done without any breaks. It was stated a percentage of breaks must be expected. However, if there is time I wish to add a few remarks regarding a type of joint that was not referred to in the paper, namely, the wedge type of joint, and I can submit that as an addendum in writing, if the president prefers.

"No reference has been made to the wedge type of joint in the paper as originally presented. Specific information has been brought to my attention regarding three joints of this type since writing the paper. Two of these have been placed upon the market and in the case of the third patents have been issued, but no joints have been manufactured to my knowledge.

"The first of these joints that I will refer to is a foreign joint manufactured by Scheinig & Hoffmann in Linz, Austria. Many of these, particularly in Europe, have met with more or less success, so I am informed. It is composed of wedged clamps that grip the base and are tied to the rail by a power press. Outside of this is an overall clamp applied hot and a small wedge driven in place to complete the joint. The shrinkage of the overall clamp in cooling is used to perfect the grip of the joint with the rail base. One fault that can be pointed out in this joint, as shown in the model, particularly when used on high 'T' or girder rail, is the absence of any support to the top of the rail. I am informed, however, that splice bars are to be added to the joint to overcome this objection. I have spoken at some length about this joint for the reason that none are used in this country and it exemplifies one form of the wedge joint.

"My attention has also been called by Mr. Whitman, of Seattle, Wash., to a wedge type of joint for which patents have been applied for and possibly have been issued, which is designed to take care of the inequality in the top surface of the rails at the joint by means of two wedges, one each side of the joint, which wedges are susceptible to independent movement by which it is proposed to bring the top surfaces of each rail to a uniform height. None of these joints have been placed in service to my knowledge. This joint has been referred to because it is the only bolted joint to my knowledge that is used specifically with a variation in the height of rails.

"A third joint of the wedge type of bolted joints has recently been put upon the market, named the '20th Century joint.' This joint is of the 3-point contact type, and instead of depending upon the accuracy of the rolled plates to make the 3-point contact, wedges are placed on the under side of the base of the rail that are susceptible to adjustment in order to perfect the third point of contact."

Upon motion of Mr. Ackerman, the subject of rail joints was continued to next year.

OTHER STANDARDS

Mr. Ackerman then asked that the committee's recommendations on standard layouts for track switches, mates and frogs and standard symbols shown be adopted by the association as recommended practice, and that the subject of economical maintenance as applied to track and roadway be continued by the 1911 committee, with instructions to draft a set of rules for the government of the Way Department and report on shop work as it particularly applied to the track department.

E. P. Roundey, Syracuse, asked whether any of the engineers present using concrete ballast put the concrete in dry or wet, and what precautions were taken, if any, to know that every tie was properly tamped.

R. F. Kelker, Chicago, said that the practice in Chicago was to use wet concrete. The only means of knowing that the ties are properly tamped was by careful supervision of the work. He did not know of any other way by which the fact could be determined. Speaking then of the conclusions under discussion, he said that the standard switch pieces appealed to him particularly from the Chicago point of view. At the outset of the Chicago work they designed two switches, one 80-ft. center radius, and another 160-ft. center radius. The former was used on the outside curves, and the latter on the inside curves. The difference in the two radii was made necessary to give proper clearances, and by the use of these two switches a clearance can be had at every intersection in the city of Chicago, between the cars passing on either the curves or on straight track. To be able to make rapid replacement, without cutting the rail or switch pieces, the specifications for special work contained a limitation for the variation from the length as shown in the board's drawings, and its inspectors who were employed at the various special work manufacturers' headquarters checked these measurements accurately, so that the engineers can put one switch piece in where they have taken out another. In addition to that, one type of pin-fastening

is used for all switches, so that there is a practical interchangeability of pin fasteners, of tongues and of switch pieces, made by any manufacturer who furnishes work for use in Chicago. After a year's work, the Board extended its standardization to the frogs in the cross-overs and on broken main line frogs and to the frogs of the inside curves, and the limitation for length was also made identical, so they can be interchanged at any time.

In the car-house work in Chicago it was found necessary to adopt 50-foot switches, which then became a third member of the standard, and as that switch is 7 in. high, it was impossible to use the street standard of 9 in. Hence the section of the switch at the pin was deepened to 9 in. to give opportunity to use the Board's standard pin fasteners, which were, therefore, interchangeable with the other switches. Last year they added a fourth and probably the last member of the standard switch piece. They put in a 200-ft. radius switch, which they found economical in order to obtain satisfactory car clearances, at elevated columns and other obstructions, which it would be extremely expensive to remove. As the result of their experience in three years, they suggested to all engineers to carefully consider what could be done in regard to getting standard switch pieces, and also to carefully consider the design of standard curves. Car-house work in Chicago had also been designed on the system of standards. It is possible to interchange any bay with a like bay in the same house, either front or back hand, as the case may be, provided the "hand" is the same, and this he thought would save considerable expense, in maintenance and subsequent renewals. Finally, he said, they had issued over 1000 surveys for special work alone, and had used the loose-leaf system of data book, so that the men could have a field book into which they could insert leaves for their notes. These leaves may be returned to the draughting room, and by that method they never had the occasion arise when work could not be done because the book was out. These loose leaves were filed and indexed by proper number and location, and gave an immediate and current check on any surveys which have been made during the progress of the work.

John Kerwin, Detroit, said that in 1905 and 1906 about 120 miles of track were built in Detroit on the Citizens lines and on the Detroit Railway. The Detroit Railway laid a bed of concrete on the sub-grade, 6 in. thick. The ties were then laid on the concrete and the concrete was allowed to set for about eight or 10 days. They then spiked the rail to the ties, and tamped up on 1-in. of sand. Finally they put in the remainder of the concrete to go to the bottom of the paving. The Citizens Company blocked up the track and put the concrete in one bed. The experience with the Detroit Railway construction was much better than the Citizens construction. It had been continued as the standard, putting 8 in. of concrete on the sub-grade, allowing that to set for eight or 10 days, laying the ties on it, spiking the rail, raising it, and lining it with 1-in. of sand and then putting on the rest of the concrete.

C. H. Clark, Cleveland, said that in 1903 the Cleveland City Railway followed that form of construction, when it laid some track on Lorain Street. This had proved to be some of the worst track in the city. Mr. Kirwin said that the construction was put in by another man.

C. H. Clark, said this year he put in 7 in. of broken stone under the ties, and tamped the ties for ordinary broken stone construction. After tamping and lining the surface, he grouted the whole work. He found this made as good concrete as possible. Then the concrete was put in between the ties and under the rail.

C. B. Voynow, Philadelphia, speaking about labor, quoted the following sentence from page 25 of the report under the head of Economical Maintenance: "Let the railway companies consider their own paving or any other work where practicable, by the piece work system." Day labor was not satisfactory with the class of men the railroads had to employ. The time of the year when the work was generally done, the summer months, was not conducive to getting a fair day's work out of the men. If the general foreman or way engineer was a fair-minded man, piece work was a good thing for both sides. Unfortunately, the matter of cost came in all the time and in the long run the piece work system was made very hard for the men. There was a possibility of maintaining the day work method with the addition of the task system as a stimulant. Basing an estimate on experience of what a foreman with a gang was able to do, with different classes of work, it might be possible to apportion a certain amount of work for such a gang, and when the men had completed their work, they could stop for the day.

Mr. Kirwin, Detroit, said he had done much track construction by piece work in this way. The concrete gang received a certain amount per yard of concrete laid. Each one of the gang has a certain daily wage rate, for instance, the foreman of the gang may receive $3.00 a day. The rest of the men vary in the daily rate. Each man, then, has a certain equity in each yard of concrete laid; it might be one cent, 2 cents or some other figure. When the day's work is done, each man knows how much money he has made that day. If there are any shirkers, the men will see that they are dismissed. This scheme had worked out well. Much grading and the tearing up of track was done on the piece work system.

George Weston, Chicago, moved the acceptance of this portion of the report as recommended by the committee. The motion was carried. Upon Mr. Weston's additional motion, the report was accepted as a whole and the committee continued. The meeting was then adjourned until 2:30 P. M.

TADPOLE SWITCHES

Lorain Steel Company, Johnstown, Pa., is finding that delegates are taking a great interest in the Lorain "Tadpole" tongue switch for street railway service. This switch contains the greatest area for support against the direct blow or load at exactly the point where it receives the blow. This, of course, is at the heel, where trouble from loose tongues begins and rapidly grows worse. While in the tongue of an ordinary switch the bearing back of the pin center is rarely over 3 sq. in., that of the "Tadpole" switch is 30 sq. in. Old-style switches depend on a pin for centering their radial movement, whereas the "Tadpole" centers itself from the outside of the heel, which is 9½ in. in diameter. It has, therefore, nearly four times the bearing of the ordinary tongue pin, so that the shock from a moving car is absorbed with much less wear. The point of the tongue is reinforced against bending. Set screws to jam against the tongue pin for taking up wear have been replaced by a lever with screw adjustment, capable of exerting a force of 1 lb. to 2 tons, in order to give the tongue heel the exact pressure desired on the tongue bed. A lug is provided on the underside of the tongue for the attachment of any throwing mechanism. The first "Tadpole" switches were put out about six years ago and over 2,000 have been installed since.

A continuous demonstration of its hot air forced ventilation heater is being made by the Peter Smith Heater Company at spaces No. 672-673, Building No. 2. Since this heater was first shown at Denver last year upward of 800 heaters have been sold for use on cars throughout the United States. The heater is manufactured in three sizes and is recommended for use on both city and interurban cars. The exhibit is under the supervision of Daniel W. Smith, president, Elmer J. Smith, secretary-treasurer, H. S. Williams, chief engineer, W. E. Hinman, Western sales manager, and Reginald M. Campbell, Western sales representative.

COLLECTION OF DATA CONCERNING PAY-ROLLS AND INVOICES*

BY N. E. STUBBS, AUDITOR, UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE.

At the midwinter meeting of your executive committee, held in New York on Jan. 27, 1910, it was thought that inasmuch as the fundamental principles of our system of accounting had been brought to such a high and generally accepted standard, a study of some of the most vital of our routine operating methods would be found profitable as well, in order that their importance might be kept before us, and our desire for a standard of excellence be improved upon, wherever possible, without in any way placing restrictions upon individual ideas or attempting to influence change in methods made necessary by certain local conditions. With this thought in mind the methods of handling pay-rolls and invoices appealed to us as being the most desirable subject for study. With the approval of President Swift, a letter and questions were sent by the writer to 24 member companies, located in every section of this country and Canada, ranging from the smaller companies to the largest in size, which I knew from personal knowledge were greatly interested in the work of this association.

The analysis and classification of these answers show the following results:

SUBJECT NO. 1.—PAY-ROLLS.

Question No. 1. How frequently are employees paid?

In nearly every instance officers, heads of departments and clerical forces are paid monthly. Two companies pay motormen and conductors daily. Five companies pay entire roll weekly, and five, part weekly, especially labor gangs. Two companies are compelled by State law to pay weekly. Eleven companies pay entire roll twice a month, and five, part twice a month. One company pays entire roll each 10 days, and two, part of roll each 10 days. The 11 companies paying their rolls twice a month have about 23,500 employees, or 38 per cent of the total number of employees mentioned by the 24 companies replying to this question, while the five companies paying their rolls weekly have about 19,750 employees, or 32 per cent of the total.

Question No. 2. Number of employees on roll?

The number of employees on rolls of companies answering this question varies from 400 to 8500, making a total for the 24 companies of 62,000.

Question No. 3. Paid by check or cash?

Three companies pay by both cash and check, six by check only, and 15 entirely by cash, except officials and clerical forces. Of the 15 companies paying entirely by cash, the employees number 47,165, or 76 per cent of the total of 62,000. Were we to add to this number the employees of the three companies which pay partly by cash the percentage would be greatly increased owing to the fact that all of these companies pay cash to trainmen, who represent by far the majority of employees.

Question No. 4. If by cash, is envelope system used?

Of the 15 roads that pay entire roll by cash, 10 use the envelope system, and five do not, but this does not mean that the majority of employees are paid by envelope system, as the following percentages based on estimates of the 62,000 employees represented by the 24 companies replying to these questions will show: Paid by check, 11 per cent; paid by cash in envelopes, 42 per cent; paid by cash not in envelopes, 47 per cent.

Question No. 5. Do employees receipt for money by signing pay-roll book, pay-roll sheets or time tickets?

The methods of obtaining evidence of payment are various, but the plan of having employees sign pay-roll book or pay-roll sheets seems the most popular, as 11 companies report that plan. Four companies use signed time tickets. Four accept indorsements on pay checks. Many companies identify their labor gangs by brass checks.

Question No. 6. If no signatures are taken, are second claims ever made?

Only two companies reported that no signatures were taken, and further stated that no trouble had been experienced regarding second claims.

Question No. 7. If mechanical devices are used in connection with the pay-roll work, state what kind, and your opinion of them.

Thirteen companies use mechanical devices of some kind; six use the Addressograph; four the Burroughs Adding Machine; one the Comptometer; several mention wage tables, scales and charts. The general opinion is that where they can be used these devices give good results.

Question No. 8. Should a member company be interested in your system, would you object to the name of your company being given it for further inquiry and collection of data?

Not one objection was made in answer to this question; most of the replies were to the effect that it would be a pleasure to give any assistance or information to a member company wherever possible.

Question No. 9. Are employees other than platform men paid in company's time or their own?

In nearly every instance employees are paid in the company's time, the main exception being labor gangs, which are in some instances paid after work hours. The question of time in paying off is worthy of serious consideration, in order that the result may be the least possible loss of employees' time belonging to the company, and the least amount of inconvenience to the employee.

SUBJECT NO. 2.—INVOICES.

Question No. 1. Do you use a standard bill form or accept billhead of firm from which goods are purchased?

Only three companies use a standard bill form; the other 21 accept bill of firm from which goods are purchased.

Question No. 2. If standard bill form is used, do you find it altogether satisfactory?

Of the three companies which use a standard bill form, the Boston Elevated Railway states: "We use our own standard bill form, and, so far as we are aware, we were the first railway company to adopt this. We have been using it for something like 15 years. The fact that we have used it so long is an affirmative answer to this question." The Washington Railway & Electric Company replies: "Standard bill form is entirely satisfactory." The United Railways & Electric Company of Baltimore answered: "Standard bill form has been given a test for more than a year, and has been found most satisfactory. Regret it was not adopted earlier."

Question No. 3. Is the purchasing agent or storekeeper responsible for the correctness of invoices, and does he approve as to prices, quantity and quality?

In nearly every instance the purchasing agent is responsible for and approves bills as to prices, the storekeeper as to quantity and quality, and the accounting department as to extensions and general correctness.

Question No. 4. How often are invoices paid—monthly?

There seem to be but one or two exceptions to the usual monthly method of paying bills, except in cases where discounts figure.

Question No. 5. Do you use voucher check in payment or voucher and check separate?

Thirteen companies use the voucher check, and 11 voucher and check separate.

Question No. 6. Should a member company be interested

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14, 1910.

in your system, would you object to the name of your company being given it for further inquiry and collection of data?

Not one objection was stated.

Question No. 7. Give history of invoice or voucher from time of coming into office (or originating) to its final filing.

The general system of handling invoices and vouchers is as follows:

Consecutively numbered orders are drawn frequently in duplicate, triplicate or more if desired, the original being sent to firm from whom goods are purchased, and copies to the various departments interested. Invoices are received by the purchasing agent, who approves as to prices, and where the storekeeper is a separate official he passes as to quantity and quality. The accounting department checks extensions, and is finally responsible for the necessary signatures of approval, extensions and correctness in detail. Just previous to the usual time for making the monthly payments of invoices, they are properly arranged and attached to voucher, entered in voucher record, and passed to the treasurer for payment, to be paid either by voucher check or check and voucher separate. The vouchers or voucher forms are usually numbered consecutively, and filed with all the evidence of their payment, which in some cases is the receipted voucher, voucher check properly receipted and endorsed and returned by the bank, or the endorsed separate check.

The plan of sending a copy of every order for material purchased to the accounting department is worthy of special mention, as it keeps that department in close touch with the purchasing agent and storekeeper, and if he compares each invoice with the copy sent him, any difference is quickly noted, explained, corrected, or adjusted as the case may be. It also makes duplicating of invoices practically impossible, and is of further assistance in conferences between the purchasing and accounting departments regarding "unchecked orders" as to reasons why certain bills have not been passed, etc.

The plan of insisting on a monthly statement from firms from which goods are ordered is also a good one, as it assists very materially in locating differences and errors and keeping in correct balance with firms.

RAIL JOINTS*

BY R. B. RIFFENBERICK, CONSULTING ENGINEER, CLEVELAND, OHIO

The perfect rail joint is at present purely theoretical, and it will continue to be so, as long as wheel meets joint in the fight for supremacy. A perfect rail joint is a joint of few parts, in which none of the parts could ever be worked loose or worn under the loads applied on the joint. Such a joint should be easily and simply connected to the rail, and as easily disconnected when the rail has worn out. It should be capable of being applied to the second and succeeding new rails, and have such strength that it will hold the rail ends as rigid as the balance of the rail. This joint in elastic track construction must be rigid enough vertically to prevent any deflection of the joint beyond the limit of elasticity of the metal, and in a rigid or non-elastic track construction it must be rigid enough vertically to prevent any deflection, either temporary or permanent. In other words, this rail fastening must hold the rail ends so that there will be no bending upward or downward at the joint. It should require no special form of rail, requiring no increase in the cost of the rail itself. Present practice, based on past experience, is a long way from the perfect joint.

*Abstract of paper read before the American Street & Interurban Railway Engineering Association, Atlantic City, N. J. October 10-14, 1910.

An ideal practical joint is a joint embodying such of the elements of the previously described perfect joint as are at present practical, to the extent that this joint will equal the life of the rail, and, it might be added, materially prolong the life of the rail without any further attention to the joint itself. The joint should require no maintenance during the life of the rails which it connects and supplements. With such a joint applied to the rail ends there would be no tearing up of paving or paving concrete during the life of the rail, for the purpose of making any repairs to or replacing the joint.

The third element necessary to attain a perfect joint, which is cited in the report of the committee, puts a burden on the joints that properly belongs to the rail itself. No two strips of rails rolled will, when cut up into rail lengths, and the rail cut from one strip butted to the rail cut from the other, have exactly the same cross section and be of exactly the same depth. It is this difference in the plane of the heads of the two abutting rails that causes the cupping of the receiving rail, and it is to prevent this condition arising and to remedy this defect, having once arisen, that resort has been made to grinding the heads of the rail. On a new track, every joint, no matter of what form, should be ground to a perfectly plane surface before the track is given over for the operation of cars, or if this is not possible at the time, it should be done before cars have operated over the joint long enough to start the cup in the receiving rail. No bolted splice plate in use to-day will comply with this specification for an ideal practical rail joint, for as yet there has been no means of absolutely preventing the bolts from working loose under traffic. The development of the splice plate has been toward a combination of the splice plate and rail base support. The three most prominent joints of this character are mentioned in the report of the committee. Experience with these combination fastenings has shown that while they are a great improvement over the simple splice plate, they require more or less maintenance, and to make them more efficient they should be capable of being stepped, so that whenever a cup appears at the joint the fastenings can be stepped and replaced and the cup ground out of the joint. Of the joints now in service the forms that come nearest to this ideal practical joint are the cast welded, electric welded and the Clark joints. Mr. Clark has had great success with his joint, as has Mr. Kerwin with his cast-weld joint, for the welding of which he has designed and uses a water jacket to prevent the heating of the heads of the rail. In the tracks of the Detroit United Railway, some 32 kinds of joints are used on 27 different sections of rail, ranging from the 18-in. 4-hole 4-lb. strap plate to the 108-lb. 30-in. 8-hole continuous rail joint and the cast-welded joint. Most of these joints were inherited by the company from the several independent companies acquired by purchase or lease. Mr. Kerwin has been experimenting in an endeavor to attain an ideal practical joint, to maintain and add to the life of these joints and the rails to which they are connected. In conclusion, attention is called to a very exhaustive report by F. C. Schmitz to the Pennsylvania Railroad. This report appeared in a serial article in the Railroad Gazette of 1900 under the title "Some Notes on Rail Joint Fastenings." It treats at length of the same problems which are being encountered to-day.

The display of overhead line material made by the Electric Railway Equipment Company in space 462, Aquarium Court, is complete. One of the new equipments shown is the universal hanger which is manufactured for single and double curve and straight line service. This is a one-piece hanger and can be used with any length ear as the stud is free to revolve; its construction is such as to insure the ear being locked securely in position against the shoulder. Where this hanger is to be used the line ear can be soldered or clinched to the trolley wire before it is connected to the hanger. Among the other supplies shown are two iron lamp posts of the boulevard type.

REPORT OF THE JOINT COMMITTEE ON SHOP ACCOUNTING*

BY P. S. YOUNG, CO-CHAIRMAN; A. D. MCWHORTER, CO-CHAIRMAN; N. E. STUBBS, CHARLES HEWITT, F. B. LASHER AND JOHN LINDALL

The appointment of this committee was an expression on the part of your associations of the desirability of a closer working relation between them. The two associations frequently have matters of technical interest before them, but it has been shown that whenever a subject affecting both associations has been brought up it arouses greater interest than does a subject that affects but one association.

This committee in its work this year has had the benefit of the preliminary work performed in 1909 under the direction of W. G. Gove, chairman. No report having been made to the 1909 convention because of the illness of Mr. Gove, the committee has not felt that any limitation has been put upon the scope of its inquiry, but, in order to accomplish some definite result, it was found necessary to restrict its labors.

The committee, in response to the desire expressed by members of the Engineering Association, has endeavored to determine what information is desirable in relation to the cost of operation of the way and structures department, equipment department and power plant department of an electric railway and presents to the associations, for their consideration, tentative lists of sub-accounts which, it believes, will prove suggestive.

The committee recognizes that it is not within its function to present classifications of accounts and recommends that, after the suggestions outlined have been discussed by both associations, this part of its report be referred to the standard classification committee of the Accountants' Association.

REPORT ON SUBDIVISION OF OPERATING EXPENSE ACCOUNTS FOR ELECTRIC RAILWAY CAR MAINTENANCE SHOPS

BY JOHN LINDALL, SUPERINTENDENT OF ROLLING STOCK AND SHOPS, BOSTON ELEVATED RAILWAY

ACCOUNT NO. 32, PASSENGER AND COMBINATION CARS

Elevated, Subway and Interurban Cars Weighing Over 28 Tons (Without Load).

3201 Bodies: Painting, decorating and varnishing.
3202 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3203 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3204 Truck repairs: Including brake rigging.
3205 Truck bearings.
3206 Brake shoes.
3207 Air brake equipment.

Prepayment and Semi-Convertible Cars.

3210 Bodies: Painting, decorating and varnishing.
3211 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3212 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3213 Truck repairs: Including brake rigging.
3214 Truck bearings.
3215 Brake shoes.
3216 Air brake equipment.

Closed Cars (Double Truck) Other than Those Classified Above.

3220 Bodies: Painting, decorating and varnishing.
3221 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3222 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3223 Truck repairs: Including brake rigging.
3224 Truck bearings.
3225 Brake shoes.
3226 Air brake equipment.

Closed Cars (Single Truck).

3230 Bodies: Painting, decorating and varnishing.
3231 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3232 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3233 Truck repairs.
3234 Truck bearings.
3235 Brake shoes.

Open Cars (Double Truck).

3240 Bodies: Painting, decorating and varnishing.
3241 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3242 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3243 Truck repairs.
3244 Truck bearings.
3245 Brake shoes.
3246 Air brake equipment.

Open Cars (Single Truck).

3250 Bodies: Painting, decorating and varnishing.
3251 Body fittings: Including registers, sand boxes, sash, doors, glass, interior trimmings and upholstering.
3252 Bodies: Wood, iron and steel work, including foundation brake rigging, drawbars, etc.
3253 Truck repairs.
3254 Truck bearings.
3255 Brake shoes.

Miscellaneous.

3260 Fenders: All types of passenger and combination cars.
3261 Signs: All types of passenger and combination cars.
3262 Transfer of trucks for purposes other than repairs, all types of passenger and combination cars.
3265 Wheels and axles: Elevated, subway and interurban cars weighing over 28 tons.
3266 Wheels and axles: Prepayment and semi-convertible cars.
3267 Wheels and axles: Other cars.

ACCOUNT NO. 33, FREIGHT, EXPRESS AND MAIL CARS

3301 Bodies, trucks and brakes, including painting.
3302 Shifting trucks for purposes other than repairs.

ACCOUNT NO. 34, LOCOMOTIVES

3401 Electric locomotive bodies, trucks and brakes, including painting.
3402 Steam locomotives.
3403 Shifting trucks for purposes other than repairs.

ACCOUNT NO. 35, SERVICE CARS

3501 Service car bodies, trucks and brakes, including painting.
3502 Shifting trucks for purposes other than repairs.

ACCOUNT NO. 36, ELECTRICAL EQUIPMENT OF CARS

3601 Elevated, subway and interurban cars weighing over 28 tons: Control and electrical equipment, exclusive of motors.
3602 Prepayment and semi-convertible cars: Control and electrical equipment, exclusive of motors.
3603 Closed cars and open cars (double truck): Control and electrical equipment, exclusive of motors.
3604 Box cars and open cars (single truck): Control and electrical equipment, exclusive of motors.

*Abstract of report read before the American Street & Interurban Railway Accountants' and Engineering Associations, Atlantic City, N. J., Oct. 10-14.

3605 Freight, express and mail cars: Control and electrical equipment, exclusive of motors.
3606 Service cars: Control and electrical equipment, exclusive of motors.
3607 Shifting electric equipment for purposes other than repairs.
3610 Motors (subdivided by types).

ACCOUNT NO. 37, ELECTRICAL EQUIPMENT OF LOCOMOTIVES

3701 Control and electrical equipment: Exclusive of motors.
3702 Motors (subdivided by types).
3703 Shifting electric equipment for purposes other than repairs.

ACCOUNT NO. 38, SHOP MACHINERY AND TOOLS

3801 Power drive: Including steam equipment, motors, shafting, belting, etc
3802 Machines: Including lathes, drill presses, planers, wheel presses, grinders.
3803 Miscellaneous equipment: Including fire protection, cranes, telphers, etc.

ACCOUNT NO. 39, SHOP EXPENSES

3901 Heating expense.
3902 Lighting expense.
3903 Miscellaneous supplies and expenses: Including small hand tools.

ACCOUNT NO. 40, HORSES AND VEHICLES

4001 Horse vehicles: Repairs and painting.
4002 Automobiles: Repairs and painting.
4003 Automobile supplies.

ACCOUNT NO. 63, MISCELLANEOUS CAR SERVICE SUPPLIES

6301 Lamps, waste and miscellaneous car supplies.
6302 Lubricants.
6303 Carbon brushes for motors.
6304 Miscellaneous supplies and expenses.

ACCOUNT NO. 66, CAR HOUSE EMPLOYEES

6601 Elevated, subway and interurban cars weighing over 28 tons: Car cleaning.
6602 Elevated, subway and interurban cars weighing over 28 tons: Inspection and oiling.
6603 Prepayment and semi-convertible cars: Car cleaning.
6604 Prepayment and semi-convertible cars: Inspection and oiling.
6605 Closed cars, other than classified above: Car cleaning.
6606 Closed cars, other than classified above: Inspection and oiling.
6607 Open cars: Car cleaning.
6608 Open cars: Inspection and oiling.
6609 Miscellaneous car house expense (not included in above).

ACCOUNT NO. 67, CAR HOUSE EXPENSES

6701 Heating.
6702 Lighting.
6703 Miscellaneous expense, including water, fuel, etc.

REPORT ON SUBDIVISION OF OPERATING EXPENSE ACCOUNTS FOR ELECTRIC RAILWAY POWER PLANTS

BY CHARLES HEWITT, SUPERINTENDENT OF MOTIVE POWER, PHILADELPHIA RAPID TRANSIT COMPANY

In considering the subdivision of the power house accounts I have carefully gone over the annual reports of the Accountants' Association for the years 1905, 1906, 1907 and 1908, also the full discussions, and I am satisfied it would not be advisable for the committee to recommend any change in the primary accounts, although these accounts as recommended seem somewhat illogical.

I find that the accounts referring to the cost of power are included under three different heads, viz.: Account No. 25, under maintenance of way and structure; accounts Nos. 30 and 31, under maintenance of equipment, and accounts Nos. 49 to 59, inclusive, under transportation expenses. It is regrettable that the schedules do not provide for a more compact statement of the cost of power.

In account No. 25 I have recommended subdivisions Nos. 2501 to 2508, in accordance with the general plan of numbering subdivided accounts, as suggested at our committee meeting.

Account No. 30 I have subdivided into accounts Nos. 3001 to 3006, inclusive, as from my own experience these subdivisions have proved to be sufficient to give me all the information necessary, and I believe that they will cover the needs of the great majority of plants, although possibly some of the larger companies will subdivide these accounts somewhat more in detail. In justification of this subdivision I submit table No. 1, showing the ratio of cost of each of these subdivisions and the total cost of maintenance of power plants, as shown by the accounts of the Philadelphia Rapid Transit Company. As these accounts comprise the cost of maintaining 14 generating stations of widely varying capacities and designs, I believe the indication is a good one.

TABLE NO. 1

Sub Accounts.	P. C. of Total Maint.
3001—Maintenance of engines, turbines and pumps...	21.0
3002— " " boilers, including furnaces, stokers and boiler setting.....	20.8
3003— " " pipe system, including steam, exhaust, oil, air and gas pipes	12.4
3004— " " auxiliaries, including economizers, condensers, heaters, ash and coal machinery, cooling towers, etc.	8.1
3005— " " electric plants	21.1
3006— " " miscellaneous, including steam gages, steam meters, water meters, feed water controllers, damper regulators and similar devices	16.6
	100.0

Account No. 31—Maintenance of substation equipment: I recommend that this be subdivided into accounts Nos. 3101 and 3102; No. 3101 covers the cost of maintaining the electric plant in the substation and No. 3102 has been added because in our substations, and I presume in most substations, there are installed such devices as cranes, air compressors, fan blowers, vacuum cleaners and other non-electrical devices.

The sequence and arrangement of accounts Nos. 49, 50, 51, 52 and 53 seem to me illogical, first, because naturally the items of the most importance should come first, and second, because some of the items are too small to be accorded a primary account, and I submit the following in the hope that the standard classification committee of the Accountants' Association will give the matter consideration.

In all steam-operated stations (and most of the stations operated by the member companies are steam-driven) the cost of coal is pre-eminently the largest item. For the year 1909 this item for the Philadelphia Rapid Transit Company was 59.3 per cent of the entire cost of power. In a station which I recently visited, where soft coal is used costing $3.20 per ton, the cost of fuel is 80 per cent of the entire cost of power. In some localities where coal is cheap it is possible the cost may fall as low as 50 per cent, but I doubt if it is much below that in any steam-operated station. Therefore, it would seem to me that fuel should be the first item in the cost of operating.

The next item of greatest operating expense is labor. On the Philadelphia Rapid Transit Company in 1909 the cost of operating labor was 20.4 per cent of the total cost of power.

The cost of lubricants was only 0.9 per cent of the entire cost of power, and for this reason it seems to me that this item is too small to be given a primary account, but should rather be a subdivision of account No. 54.

To make this clear I submit table No. 2, showing the percentage of these various items of the total operating cost and also the percentage of the total cost of power.

TABLE NO. 2

	Per Cent of Operating Cost P.R.T.Co.	Per Cent of Total Cost P.R.T.Co.
Fuel	71.3	59.3
Employes	24.5	20.4
Water	1.5	1.2
Lubricants for power houses	1.1	0.9
Miscellaneous power house supplies and expenses	1.6	1.2
	100.0	83.0

I have recommended that account No. 49 be subdivided into accounts Nos. 4901 to 4904, inclusive. Electrical labor has been omitted intentionally. While some companies maintain a sharp distinction between the electric labor and other labor in the power stations, a great majority, including ourselves, do not. In most stations there is no distinctive electric labor, in others the switchboard men and generator men act as oilers. In any case the electric labor may well be included under engine-room labor and I believe this item is sufficiently comprehensive.

Account No. 51 is subdivided into three accounts, Nos. 5101 to 5103, while the other accounts need no subdivision.

STANDARD CLASSIFICATION	SUB-ACCOUNTS RECOMMENDED
Account 25—Buildings and Structures.	Account 2501—Power plants. 2502—Substations. 2503—Car houses. 2504—Shops. 2505—General offices. 2506—Stations, waiting rooms and platforms. 2507—Docks and wharfs. 2508—Miscellaneous buildings and structures.
Account 30—Maintenance of power plant equipment.	3001—Maintenance of engines, turbines and pumps. 3002—Maintenance of boilers, including furnaces, stokers and setting. 3003—Maintenance of pipe system, including steam, exhaust, oil, air and gas pipes, all fittings, valves and coverings.
Account 30—(continued)	3004—Maintenance of auxiliaries, including economizers, condensers, cooling towers, ash and coal elevators, other elevators, etc. 3005—Maintenance of electric plant. 3006—Miscellaneous, including such items as steam gages, steam and water meters, feed water controllers, damper regulators.
Account 31—Maintenance of substation equipment.	3101—Maintenance of electric plant. 3102—Miscellaneous maintenance.
Account 49—Power plant employes.	4901—Power plant superintendence and care. 4902—Engine-room labor. 4903—Boiler-room labor. 4904—Producer room labor.
Account 50—Substation employes.	No sub-account.
Account 51—Fuel.	5101—Coal. 5102—Natural gas. 5103—Fuel oil.
Account 52—Water for power.	No sub-account.
Account 53—Lubricants for power.	No sub-account.
Account 54—Miscellaneous power plant supplies and expenses.	No sub-account.
Account 55—Substation supplies and expenses.	No sub-account.
Account 56—Power purchased.	No sub-account.
Account 57—Power exchanged, balance.	No sub-account.
Account 58—Other operations, Dr.	No sub-account.
Account 59—Other operations, Cr.	No sub-account.

SUBDIVISION OF EXPENSE ACCOUNTS FOR WAY AND STRUCTURES

In regard to the subdivision of expense accounts of the standard classification for way and structures the committee has no suggestions to make.

COST ACCOUNTING

The subject of cost accounting is one which will allow great variety of treatment, and the committee, in accepting the report of the sub-committee and recommending it to the association, has felt that a practical system, at this time, was of chief importance, and has had in mind that, while the particular system recommended might not apply in its entirety to many electric railway organizations, the principle and the ideas exemplified would surely prove to be useful to an electric railway desiring to install a practical cost system.

REPORT OF SUB-COMMITTEE ON COST ACCOUNTING

BY M. R. BOYLAN, H. H. ADAMS AND F. B. LASHER

The sub-committee appointed to formulate a system of cost accounting applicable to electric railway car repair shops begs to report as follows:

Reports of earlier committees contain information of permanent value, and the forms presented there are just as adaptable for use at the present time as they were when the reports were made, not because of their universal use, but because of the comprehensive system outlined, your sub-committee has come to the conclusion that an attempt to outline a system of cost accounting for electric railway car repair shops concretely would probably prove of value without attempt to co-ordinate the system with the reports previously presented to the convention.

There are three elements of cost to be considered, viz.: Labor, material and expense. It is unusual in street rail-

.....*Company*

.....Daily Time Ticket

.....191.. *Name*..... *No*.....

Description of Work	Car No.	Class	Car House	Order No.	Hours	Rates	Amt.

Total hours for week.		
Amt. due for week...		*Approved*.....*Foreman*

Daily Time Ticket—Size of Original 5 by 8 in.

way shop accounting to apportion in detail the so-called "overhead expense," which leaves it necessary to treat of labor and material only. The forms submitted are as follows:

1. Daily time ticket.
2. Daily clock card.
2a. Weekly clock card.
3. Weekly pay roll sheet.
3a. " " " individual receipt.
4. Stores order (in duplicate).
5. Return stores credit slip (in duplicate).
6. Shop order card.
7. Car tag.
8. Shop order report upon completion of work.
9. Shop order filing envelope.

Every employee in the department should be required to fill out a daily time ticket each night, giving the car number, order number, description of work, classification and the time on each particular item. This information should be checked by the foreman and checked where the time clock is used with the time clock cards. These daily time tickets are then ready to be forwarded to the timekeeper, who posts the time on weekly pay roll sheets and prepares a distribution sheet for posting purposes.

Material should only be drawn from the storeroom upon a regular stores order properly approved. This order should not be filled by the storekeeper unless the car number, classification, shop or manufacturing order number is shown.

Where material has been drawn that is not used on the order or car number for which it was intended, it should be returned to the storeroom. To further insure correct classification of labor and material, bulletins should be

.....*COMPANY*

RETURN STORES CREDIT SLIP

No.....

To the Storekeeper: *Date*..... .....*19*....

I herewith return by.....*for credit on Car No*.....

of.....*Dept. Class*.....*Order No*.....

Quantity Received	Article	Lot No.	Quantity Returned	Unit	Unit Cost	Amt.	Check

Received.....*19*.. *By*..... *Signed*.....

Ent. Stores Rec..... *Distrib*..... *Approved*.....

Ent. Cost Sheets..... *Summary*..... *Returned by*.....

Return Stores Credit Slip—Size of Original 8 by 5 in.

prepared and posted throughout the shops showing the subdivisions of primary accounts that may be in use and classification kept by any particular company.

The shop order card may be used for work done by all departments; in the car shops it is used for car painting, repairing cars damaged by collision, annual overhauling and for any special work on cars. Work performed in the car shops for any other department should also be kept on these shop orders. Labor and material used on work of this description should be directly charged against each particular shop order number which, in turn, is closed into the proper account. When a car is received in the shops it is tagged with card showing the work necessary to be done thereupon; job order in duplicate is immediately issued with a serial number. The original, after being approved by the manager, should be forwarded to the auditing department and the duplicate returned to the shops. This card calls for an estimate divided between labor and material for each division of the work. The charges against the shop order are made weekly on the reverse side of the card. When the order is completed a notification is sent to the accounting department by the mechanical department on form, "shop order report upon completion of work."

MANUFACTURING ORDERS—ADDITIONAL FORMS TO BE USED IN CONNECTION WITH MANUFACTURING ORDERS

10. Storekeepers' requisition for material to be manufactured (triplicate).
11. Manufacturing order (triplicate).
12. Delivery slip.
13. Report of manufactured material put in stock (duplicate).

The "manufacturing order" is prepared whenever a requisition is received in triplicate from the storekeeper for material to be manufactured in the shop and the procedure is similar to that followed in the case of the "shop order," except that all charges are classified to an open account on the general ledger.

The manufactured material, when work upon it is complete, is delivered to the general storekeeper, together with a delivery slip; a report (in duplicate) showing the cost is prepared, "report of manufactured material put in stock." The storekeeper makes a charge for this material on his records, and an entry is made on the general books crediting the "material in process of manufacture" account and charging "material and supplies" account.

The function of the shop order in the system outlined is supplemental only. In electrical railway shop accounting it is not desirable that it be made the controlling factor in the shop's operation, as would be the case in factory operation. Its advantages are especially apparent when used by a large company. It enables the manager to analyze his costs, and, by giving each job a permanent

.....*COMPANY*

Date .....19.....
Car No. .....
From .....,Car House

SENT IN FOR

Field .....
Motors .....
Armature .....
Wiring .....
Wheel .....
Collision .....
Painting or Varnishing .....
Trucks .....
Brakes .....
.....
Signed .....
Car House Foreman.

(Reverse Side)

O. K.....*Truck & Motor Foreman*
O. K.....*Wiring Foreman*
O. K.....*Pipe Foreman*
O. K.....*Carpenter Foreman*
O. K.....*Paint Foreman*
O. K.....*Inspector*
Remarks .....

NOTE HERE ANY CHANGE IN EQUIPMENT

.....
Sent to.....*Car House*
Date.....19.....

Car Tag—Size of Original, 4 by 8 in.

individuality, presents an excellent basis for comparison. It locates responsibility for the cost of each particular job and furnishes a basis for estimate of work yet to be done. The system outlined can be easily carried out and will bring the organization of the work under the immediate control of the man in charge.

REPORT ON SYSTEM FOR HANDLING SCRAP MATERIAL

TRACK, ROADWAY AND OVERHEAD DEPARTMENTS

Roadmasters should be required to collect all material which is to be scrapped and place in their respective yards. On the last day of each month, in case they have any material for sale, a manifest should be made out in triplicate, stating actual or estimated weight of each kind of scrap material on hand for sale; one copy to be sent to the head of department, one to the storekeeper and the other to be kept on file.

Line foremen should be required to collect all material which is to be scrapped and place in their respective depots. On the last day of each month, in case they have any material for sale, a manifest should be made out in triplicate, stating actual or estimated weight of each kind of material on hand for sale; one copy to be sent to the head of department, one to the storekeeper and the other kept for file.

ROLLING EQUIPMENT DEPARTMENT

Where there are a number of car houses operated by a company all scrap material at local car house shops should be collected daily and placed in receptacles provided for that purpose and forwarded to general storekeeper by supply cars as frequently as may be directed by superintendent of shops or general foreman. A manifest, executed in triplicate, should be made out by the shop foreman for each shipment of scrap, and should contain a description and actual or estimated weight of each kind of material; one copy should be kept by the shop foreman and the original and another copy should be sent with each shipment. The general storekeeper should be required to keep separate each kind of material and report actual weight of material received. The foreman in charge of the respective shops should sign the duplicate manifests accompanying each shipment of scrap from the different car houses—one copy should be returned to the car house foreman and the other forwarded to the office of superintendent of rolling equipment.

The department heads, viz., superintendent of rolling equipment, superintendent maintenance of way and the superintendent of overhead line, should, on the last day of each month, fill out proper blanks in quadruplicate stating the total weight of the different kinds of scrap material on hand at the several storage places; one blank should be forwarded to the manager, one to the auditor, one to the purchasing agent and the other kept for file. The manager should request the purchasing agent to advertise for bids for the purchase of this material, which should be forwarded to the executive committee, sealed, within a week after the bids have been requested. After the manager has been notified of the acceptance of a bid or bids he will accordingly notify the auditor, the purchasing agent and the respective superintendents. The auditor will credit the proper accounts with the value of scrap material for the operation of the month previous; the purchasing agent will notify the party or parties of the acceptance of bid or bids, and the respective superintendents will permit the party or parties whose bid or bids have been accepted to remove the material from the premises. All material before being removed must be weighed on the premises, if scales are available, otherwise at a standard scale, and a report should be made out in quadruplicate, signed by the superintendent, purchaser, and, if on a foreign scale, by the authorized representative of same. One copy to be forwarded to manager, one to auditor, one to purchasing agent and the other for file.

All other department heads will be governed in like manner in case they have any scrap material for sale.

When bids have been accepted (and scrap recommendation has been duly approved) scrap order in quadruplicate is prepared. The original is forwarded to the party or parties whose bid or bids have been accepted, the duplicate to the superintendent; the triplicate is held by the weighmaster and the quadruplicate is filed at the office of the auditor. If any changes are made on order which has been forwarded, a "change in order" form is issued.

ASCERTAINING MILEAGE FOR PURCHASE OF SUPPLIES ON A MILEAGE BASIS

The individual car mileage itself, or the car number, or the number of trips made by car, should be furnished by the transportation department to the interested department, preferably the mechanical department. This mileage should include both

revenue and non-revenue mileage, the latter item embracing all kinds of runs, such as getting the car in and out of service, shopping the car for repairs, etc. The mileage of the car should be entered in some permanent form, as the ledger or loose-leaf book. The method giving the greatest advantage is one wherein a single sheet or page allotted to each car is ruled for each month and each day, the arrangement of the monthly columns being vertical so as to give a ready means of obtaining totals.

The purchase of wheels, brake shoes, trolley wheels, lubricant, etc., on a mileage basis then becomes a simple proposition on the summation of the total number of car miles for which the material in question has been used. This, at the contract price, gives readily the cost of the item.

The mechanical department often desires and needs other information concerning the performance of material besides the mileage. Different locations differ in these respects, and for their separate purposes forms meeting these special demands have been developed.

FREIGHT AND EXPRESS ACCOUNTING*

BY L. T. HIXSON, AUDITOR, TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, INDIANAPOLIS, IND.

In order that a company may be prepared at any time to prove its right to charge certain rates for express and freight, if called upon to do so, and in order that it may be able to choose the most profitable business, and stop leaks in operating, it is very essential that the officials of the company should have complete knowledge of the business.

In the consideration of this subject I have been governed by conditions on the lines of the company with which I am connected. The practice is to transport freight principally in motor cars, trail cars being used only occasionally. Express shipments are handled exclusively on passenger cars, these express shipments being delivered to the forwarding station by the shipper and called for at destination by consignee.

While it is absolutely necessary that such a system of accounting should be used as will enable the company to get everything which is due, the system should be so arranged that the management may also have correct information as to the amount and kind of business done at various locations and other details of the business. The head of the traffic department should have full information as to the volume of business between the different stations and the revenue derived therefrom in order that the efforts of his department in the way of soliciting, etc., may be expended in the right direction. If some stations are forwarding all the freight or express that the company's equipment can handle, while the inbound shipments are very light, the traffic department should have this information to enable it to concentrate its efforts upon soliciting business for the return trip of the company's cars. If the volume of business is as great as the equipment can handle, the traffic representatives can then devote their time to securing shipments of a compact nature or taking the higher freight rates, and pass by the especially bulky or low-class freight. When the proper information of this nature is furnished, the transportation and traffic departments will be able to arrange the train schedules in such a manner as will best take care of the business with the equipment available, and at a minimum of expense for train crews, etc.

It would not be practical, even if it were possible, to keep separate account of passenger, freight or express expenses. To get the best results in the way of making comparisons, a uniform plan should be adopted by the various companies. Very few companies are operating under the same conditions; therefore, it becomes necessary to accept some plan which all lines may use as a basis.

I find that some roads are attempting to segregate, in detail, the expenses for freight, express and passenger business. There are only a few items of expense that can be directly charged to either branch of operating expense, it being necessary to use some estimated basis for the greater portion of the expense items. Therefore, the better plan would be to show the cost of operating for the entire business and apportion the expense to freight account on some agreed basis.

It appears that the most practical plan would be the car-mile basis, but in order to get the correct comparative figures, the mileage of all cars of approximately the same empty weight should be computed in one group and the total mileage of the various classes reduced to a uniform basis. The total mileage should be used. The car houses of one line may be at a considerable distance from the point at which the trains are scheduled to start, while the dead mileage of another line may be a very small percentage of the total. This would show the comparative operating costs on the same basis; the line having the greater percentage of dead mileage, however, would show less revenue per car mile on account of such dead mileage. This non-revenue mileage is one of the adverse conditions under which the road is operating and must be taken account of in the same manner as any other deficiency.

All companies could use this basis, and if a 40-ton car were accepted as the standard, the company operating 30-ton cars, with a total car mileage of 600,000 for the month, would reduce this mileage to 450,000, thus being enabled to make intelligent comparison with the road using 40-ton cars. While the freight business might be charged too much for some accounts, it would be charged less than the actual expense in other instances, and the net result obtained would be practically correct.

After the total cost of handling freight business is ascertained, the ton-mile cost may be arrived at if a record of the tonnage between stations is kept. The revenue per ton mile between stations, as well as the ton-mile revenue for the entire road, can also be worked up, provided the gross revenue is shown between stations. However, the preparation of statistics of this nature requires a great deal of labor.

The express revenue is practically clear, inasmuch as this business is handled in the baggage compartments of the regular passenger cars. Because the actual expense for taking care of the express business is small it does not follow that the tariff should be reduced to a very low figure, but the company should be entitled to a rate that would allow a fair profit if the entire business consisted of express, plus an extra allowance for special service.

Freight and express accounting also has its place in the preparation of tariffs. In making either freight or express tariffs, the mere fact that some other traction line or a steam road charges certain rates should not govern the rate to be charged, if such rate will not give sufficient returns to pay expenses, unless there are some other good reasons.

In arriving at a basis for the tariff rates, the average cost per 100-pound mile should be used. If the haul is 70 miles, the operating and fixed charges being $0.0025 per 100 pounds per mile, the rate between these points must necessarily be in excess of 17½ cents to allow any profit. This rate would be the average, and the various classes would be more or less, based on whether the class were high or low. Express rates should be about double the maximum tariff rates, on account of extra service.

In order to get the best results for the company, the officials in charge of tariff and transportation and the auditor should work together in ascertaining just what information is most necessary. To this end, I would recommend that conferences be held between representatives of the Accountants' Association and members of the Transportation & Traffic Association, and that a uniform basis for use in apportioning the operating expenses of freight and express be agreed upon, thereby making possible the intelligent comparison of the accounts of one road with those of other companies.

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

MIDVALE WHEELS AND AXLES

Midvale Steel Company, Philadelphia, Pa., has a reception booth in the lobby, spaces 400-402, ornamented with solid rolled-steel wheels and with built-up wheels. A notable feature is a high-carbon steel, heat-treated interurban axle, entirely finished and polished, and then bent cold double on itself under a 10,000-ton pressure. This hard treatment is possible only with properly heat-treated materials, which in this case exhibit the following properties: Tensile strength, 92,000 lb.; elastic limit, 56,500 lb.; extension, 26 per cent; contraction, 58.9 per cent. Represented by W. B. Barba, Ernest Harrah, Charles F. Tietze, T. W. Illingworth, Thomas Price, James Thompson, W. S. Edger. The company has a stenographer at the service of the delegates.

THE NEW THERMIT WELD

The discussion on rail joints at the meeting of the Engineering Association has led to considerable interest in the character of the new method of rail welding developed by the Goldschmidt Thermit Company. Previous methods of welding used in the United States by this company have comprised a weld of only the base and the web of the rail. This plan has been found successful in climates where the temperature changes are not extreme, as on the Pacific Coast, but in the cities farther east the company considers that an absolutely solid rail, that is, one in which the head also is welded, is desirable. The new method has been tried on a section of track in Harrisburg. Briefly the system is as follows:

The track is first prepared by providing a space ¾ in. between the ends of the rail at the joint. The rails are then accurately lined up, thoroughly cleaned and surrounded by a mold which allows space for a collar of Thermit steel to be poured around the rail ends. Provision is also made for a pouring gate and heating gate, and also for a riser directly over the top of the rail. In practice the rail ends are preheated to a good red heat by means of a gasoline compressed air torch directed into the preheating hole at the bottom of the mold. As soon as they have been brought to a sufficient temperature the torch is withdrawn. The preheating opening is then closed by means of a dry sand core and the Thermit charge is ignited in the crucible. At the conclusion of the reaction the Thermit steel is tapped into the mold, where it flows around the rail ends and amalgamates with them to form a single homogeneous mass when cool. An excess of Thermit steel is always provided in the welding portion, so that not only is the entire rail surrounded by steel, but enough is forced into the riser over the top of the rail to insure a thorough weld of the head and good metal on the running surface.

At the conclusion of the operation it is necessary, of course, to remove all superfluous metal from the head of the rail and to grind it to proper shape. This is accomplished by means of a grinder designed by G. E. Pellisier, superintendent of the Goldschmidt company. The body of the grinder is a channel-iron frame mounted on two pairs of 20-in. car wheels and carrying a cross rail fitted with two grinder brackets, one for each rail. Each bracket supports an emery wheel belted direct to a 5-hp d.c. motor, which has flexible connections to a resistance box and a line switch. The bracket is mounted on a saddle which slides upon the cross rail and an up-and-down feed is obtained by means of a screw. The motor is also fixed upon the grinder bracket in such a manner that by turning a screw the belt may be tightened as desired. The backward and forward motion of the emery wheel on the rail is obtained by moving the entire truck by a worm and worm gear operated by hand. This worm gear also acts as a brake and gives a positive motion to the truck. The grinder is equipped with alundum wheels 14 in. in diameter and 2½ in. face for grinding the surface of the rail and with special alundum wheels for grinding the groove. This machine is adapted not only to grinding joints but also to grinding out corrugations.

AROUND THE WORLD WITH THE ACKLEY RBAKE

G. S. Ackley, proprietor of the Ackley Brake Company of New York, exporter of the Ackley adjustable brake, and the British Ackley Brake Company of London, who is in attendance at the convention, has just returned from a trip around the world. He started on March 2 of this year and traveled eastward via London and Paris to Switzerland, where the Ackley brake has been adopted as standard on the lines of Geneva, Basle and other cities. He then visited his agency at Brussels, where he made arrangements for an extensive exhibit at the International Exposition in that city. During his visit in Berlin he appointed Eugen Eichel as consulting engineer of the brake company. They then visited Budapest and Vienna, where the Ackley brakes have been specified on 150 new cars.

Mr. Ackley then crossed into Russia, where his brakes are in extensive use, and traveled by rail to Vladivostok. Then he crossed to Yokohama, Japan, where the Ackley brakes have been adopted as standard and are now in use on all of the cars of that city. While in Japan he visited Sale & Frazer, of Yokohama and Tokio, as agents for his company in Japan, Korea and Manchuria. He then visited all of the important cities in that country. He appointed Shanghai, where he is represented by the China General Engineering Company.

From Shanghai he went to Hong Kong, then to Manila, where Frank S. Strong was appointed agent and where an order was received for brakes from the Manila Electric Railroad & Light Company. Australia was next on the tour, and among the cities visited were Brisbane, Sydney, Melbourne and Adelaide. All of the principal Australian roads are testing or have adopted the Ackley brake, which is represented in Australia and New Zealand by R. W. Cameron & Company. Accompanied by the Wellington representative of this firm, Mr. Ackley visited the principal cities in New Zealand, where the brake is now in service on several lines. On Aug. 3 he sailed from Auckland, New Zealand, to Vancouver, B. C., via Honolulu, arriving in Vancouver on Aug. 24. The trip covered six months, in which Mr. Ackley traveled over 36,000 miles. He experienced two winters and two summers and saw two Tuesdays in one week.

Mr. Ackley enjoyed this trip immensely from a business and pleasure standpoint, and is firmly convinced that if American manufacturers would get in touch with the electric railway situation outside of the United States they would discover great possibilities for the extension of their trade. Incidentally, Mr. Ackley stated that he found the Electric Railway Journal in the offices of all of the principal tramway companies during his trip.

One of the attractive exhibits on the pier is that of the Dearborn Drug & Chemical Works, which is located near the main entrance on the east side of the reception hall. The booth is arranged as a reception room. The floors are covered with oriental rugs, and artistic Japanese furniture. Potted plants and ferns are arranged attractively about the exhibit. The representatives in attendance who are looking after the company's interests are George R. Carr, Grant A. Spear and H. G. McConnaughy.

The display made by the Star Brass Works in space 820, Building No. 2, consists of standard trolley wheels and harps. O. P. Johnson, representative, is showing a new harp designed for mine locomotives.

WESTINGHOUSE BRAKE EXHIBIT

The principal exhibit of the Westinghouse Traction Brake Company is an exhibition rack representing the complete equipment of a 10-car subway or elevated train of motor and trailer cars, furnished with the latest electro-pneumatic brake system and Westinghouse governor synchronizing system for distributing the labor of supplying the compressed air equally among all compressors in the train. The electric control of the brakes is so superimposed upon the pneumatic apparatus that, while the brakes are being operated electrically, the pneumatic brake proper remains fully charged and ready for immediate application should power go off the line or other accident cause the electric control to become inoperative. This feature has been characteristic of all electro-pneumatic brake systems to a greater or less degree, but in the electro-pneumatic equipment now on exhibition the electric control has also been extended to the emergency features of the brake, so that an emergency application originating at the brake valve or at any other point in the train is transmitted electrically, therefore the brakes on each car apply instantly and to full pressure. At the same time, the pneumatic emergency features are kept equal in efficiency to the most advanced type of purely pneumatic emergency brake. The demonstration rack is accompanied by two illuminated charts showing curves of stops as actually made with the old-style pneumatic brake of 10 years ago and the stops now made with the new electro-pneumatic brake. Another demonstration equipment represents the complete equipment of a five-car train fitted with the company's type "AMM" automatic brake equipment for interurban service operating either in single cars or trains.

There is also an exhibit including a panel of six electric pump governors for services ranging from ordinary city car service to high-voltage heavy-duty installations like the New York, New Haven & Hartford and the St. Clair tunnel electric locomotives. Other exhibits include the Westinghouse automatic car and air coupler and the American automatic brake slack adjuster made by the American Brake Company, St. Louis, Mo.

THE HALE & KILBURN EXHIBIT

The unique exhibit of the Hale & Kilburn Manufacturing Company in Building No 3 is a departure from those presented in former conventions. The company's new line of pressed-steel car equipment is shown for the first time at a street railway convention. All-steel car doors, steel sash frames, steel interior finish and paneling, together with all-steel car seats, form a large portion of the present exhibit. A full-size 7-ft. section of the interior of a Harriman all-steel passenger coach is presented with its steel-framed Empire windows, handsome panelings and other accessories. A line of steel panels is shown with the highest type of finished effects in various colors and blends, presenting wonderful possibilities in the surface finish of steel to rival the finest productions in wood. "Walkover" car seats in numerous coverings are also in evidence, among which is the new Southern Pacific interurban steel seat, now being installed in 125 all-steel cars. The new pressed-steel "Walkover seat" for the United Railways & Electric Company of Baltimore, and for the Capitol Traction Company of Washington, D. C., is shown with the very latest improvements, together with the seat for the new lot of 100 cars of the Los Angeles Railway. The Hale & Kilburn design is saving 25 lb. or more per seat over the ordinary metal frames, which lessens the weight of an average car to a very appreciable extent. The permanence of a steel seat is self-evident compared with the breakages incident to cast metal.

W. Frank Carr, of the Falk Company, Milwaukee, Wis., is attending the convention in the interests of his company.

WONHAM, SANGER & BATES EXHIBIT

Through error, the exhibit of Wonham, Sanger & Bates, New York, was stated to be in Building No. 3. The exhibit is in Building No. 1, space 405, adjoining the headquarters of the Electric Railway Journal. This company is showing the H. B. life guard, American automatic switch, Tripartite steel pole, White foundry equipment and Hayes run fire brick. The Third Avenue Railroad's storage battery car on the Boardwalk, near the Pier, is also equipped with H. B. life guards. R. Sanger, F. Wonham, H. A. Goode and R. V. Collins are representing the interests of the company.

ALLIS-CHALMERS COMPANY'S LARGE EXHIBIT

The exhibit of the Allis-Chalmers Company is located in the main building. It comprises about 3,500 sq. ft. and has been attractively decorated and furnished. The display comprises operating exhibits of quick-action automatic motor and trail car air brake equipments, with high pressure pipeless triple valves, and straight air emergency motor and trail car air brake equipments with semi-automatic features; types 301 and 302 40 hp. and 55 hp. railway motors; type S4 railway controller; air brake parts; portable air compressors of varying capacities; type "C" 200 amp. 35,000 volt electrically operated oil switch with remote control; type "A" 200 amp. 3,300 volt non-automatic, and type "A" 200 amp. 3,300 volt automatic oil switches with switchboard mounting; alternating and direct current motors and static transformers.

In addition to the foregoing, the company is showing a sectional model of its steam turbine. This is one of the finest and most interesting exhibits on the Pier, and clearly indicates the details of construction of this prime mover. While it would seem that the exhibit of material should be of first importance, the Allis-Chalmers Company seems to have given the comfort of visitors greater consideration, as a large space on the main aisle has been given up to a reception and rest room and spacious aisles have been provided about every piece of apparatus shown. The company is also using a novel scheme for attracting attention to its exhibit in the form of twenty colored pennants bearing the initials of the company. These flags are blown by air from a 35 cu. ft. type "C-5" compressor. These flags are first blown alternately, and after a short rest all are blown together, creating a very pleasing and attractive decoration.

The McConway & Torley Company, Pittsburgh, Pa., is distributing a booklet describing and illustrating the McConway wheel, which is steel tired of the built-up type; the wheel center is a steel casting, the hub is cast iron and the tire is of the usual rolled steel type. There is no machine work on the tire except such "rough turning" as may be necessary to bring it to a round; and only a small amount of grinding and "rough turning" is required for the wheel centers. There are no bolts, and as the tire is neither fused nor shrunk on, it cannot come off from expansion and will not turn on the center. Separation of the two members for the renewal of the tire is effected by cutting the tire in two places, whereupon the structure falls apart, leaving the center ready for the new tire. The new tire can be applied by unskilled labor and without special machinery; a foundry cupola and lifting appliances adequate to handle units of the full weight of a car wheel are the only appliances required, so that any ordinarily equipped foundry affords the required facilities for the work.

Railway Materials Company, of Chicago, has no exhibit this year, but its representatives, George F. Allen, E. C. Folsom and H. T. Mercur, are here calling attention to the special features of the steel back brake shoes and the Rymco automatic trolley switch for interurban service which are manuafctured by the company.

THE THEORY OF STREET RAILWAY RATE REGULATION AS DEVELOPED IN THE CONEY ISLAND FARE CASE*

BY FRANK R. FORD, FORD, BACON & DAVIS, NEW YORK

The Coney Island fare case is of interest on account of the number of points brought out that were of importance to the general subject of rate regulation of public utility corporations. It is also more simple and easily understood that many of these rate cases, especially as regards the Coney Island & Brooklyn Railroad Company's case as distinguished from that of the Brooklyn Rapid Transit Company.

THE PROBLEM

Here was a company of moderate size ($1,491,000 of gross earnings from 53 miles of track) which began business in 1861 and has continued since then under its original charter, its only corporate consolidation being in 1898 with the Brooklyn City & Newtown Railroad Company, which also began operation in 1861. As this consolidation was by lease, the records of both companies have been kept largely intact since the beginning. These, together with the annual reports made to the State Engineers from 1862 to 1882, and subsequently to the State Board of Railroad Commissioners until 1906, and then to the Public Service Commission, represent for 50 years a statistical history of the street railway business which is probably unique.

The Coney Island & Brooklyn Railroad Company operates three principal lines, two of which, the Smith Street and Franklin Avenue lines, run from Manhattan Borough across the Brooklyn and Williamsburgh Bridges over the East River, and thence through Brooklyn Borough direct to Coney Island in the summer, distances of 11.28 and 12.38 miles respectively. The third line, the DeKalb Avenue Line, which runs from Manhattan Borough across the Brooklyn Bridge and through Brooklyn to Ridgewood, transfers to the direct Coney Island lines, and on days of large summer traffic operates some of its cars over the other lines direct to Coney Island.

The Coney Island fare problem reduces itself to the proposition: Is 10 cents a reasonable rate for the 12-mile ride from Manhattan Borough to Coney Island with the business largely from terminal to terminal, where over 85 per cent of the traffic is carried during the five months from June to September and most of this on Saturdays, Sundays and holidays in the months of July and August? During the remainder of the year, with fixed charges continuing to accrue, a service has to be operated for the few winter residents which barely pays the platform expenses. It is one of the most accentuated peak load traffics known to the street railway industry, both as to requirements for equipment and car operatives.

THE UNPROFITABLE NATURE OF THE CONEY ISLAND BUSINESS PER SE

In presenting the technical case for the company, we introduced a proof of the unprofitable nature of this business based on its reduction to the passenger mile unit. This showed that the 10-cent fare for the 11.28 miles from Manhattan Borough to Coney Island represented gross earnings of 0.89 cent per passenger mile. We proved that the average ride per passenger on the entire system was between 3 and 4 miles. Knowing the number of passengers and the operating expenses, interest and taxes for the year of 10-cent fares to Aug. 1, 1909, we obtained the cost of carrying the business as 0.90 cent per passenger mile if the average ride was 4 miles and 1.20 cents per passenger mile if the average ride was 3 miles. This showed for this traffic a deficit for capital stock and reserves of between 0.01 cent and 0.31 cent per passenger mile. Corresponding figures for this business at a 5-cent fare from Manhattan to Coney Island showed a much larger deficit as the gross earnings were reduced to 0.44 cent per passenger mile.

Therefore the Manhattan Borough to Coney Island business showed a small loss at a 10-cent fare and a large loss at 5 cents. In other words, even at the present 10-cent fare this business is not so profitable as the remaining business of the company, and would probably not pay the company to undertake if it had not already made the investment.

THE COMPANY'S BUSINESS AS A WHOLE NOT UNREASONABLY PROFITABLE

With regard to the company's business as a whole, it would not seem that the remainder of its traffic is of such a highly profitable nature as to justify a losing rate to Coney Island. While in the early period of its electric operation it had begun the payment of dividends on its capital stock, which increased gradually from 4 per cent in 1895 to 16 per cent for the three years 1902, 1903 and 1904, it was found that with the eventual wearing out of the physical property and the increased competition of other street railway and elevated lines the company was unable to maintain this dividend on its $2,000,000 of stock. In February, 1907, it was compelled to discontinue dividends entirely, and at the same time ask its stockholders to subscribe for $1,000,000 of additional stock at par, which money was required for the rehabilitation of its power system and other improvements. Since that time no dividends have been paid on the $3,000,000 of stock, practically all of the surplus earnings being required for renewals.

From 1861 to 1890, under horse power operation the company's stock had paid an average dividend of 1.2 per cent. From 1891 to 1894, during the transition from horse to electric traction, the average dividend was 3.7 per cent, and from 1895 to 1909, during electric operation, the average dividend has been 8.6 per cent. For the entire 49 years the average dividend was 5.9 per cent, this being not only less than the usual rates of interest, but much lower than the current rates of return upon other kinds of business during the 49-year period.

It should be borne in mind in connection with the above statements that this company's bonded indebtedness and stock capitalization was testified to as representing cash or its equivalent invested in the property, these issues having been passed upon and approved by the State Boards of Railroad Commissioners and their successors, the Public Service Commission, under definite powers of approval from the State. In other words, this company's capitalization has never passed through the same process of stock "watering" as many other street railway companies in this vicinity.

As an evidence of this it should be noted that the total amount of par value outstanding of stock and bonds of this company is $8,641,962, which is equivalent to 5.8 times the gross earnings, while the usual amount of total stock and bond capitalization of street railway companies is from seven to ten times the gross earnings.

THE HISTORY OF THE CASE

The history of the Coney Island rate case is practically coextensive with the existence of the Public Service Commission. The force of public opinion which created the demand for the Public Service Commissions law was brought largely through the desire to secure a 5-cent rate to Coney Island.

The Public Service Comission came into office July 1, 1907. Upon complaint of certain newspaper reporters made in February, 1908, actions were begun before the Public Service Commission to reduce the fare on the Brooklyn Rapid Transit system from 10 cents to 5 cents, and to reduce the fare on the Coney Island & Brooklyn Railroad from 10 cents to 5 cents on Saturdays, Sundays and holidays, this company having a 5-cent fare in force on other weekdays.

After numerous hearings, a decision in the Brooklyn Rapid Transit case was rendered March 8, 1910 dismissing the complaint. On July 2 1909, the complaint against the Coney Island & Brooklyn Railroad Company had also been dismissed. In the meantime, however, the company had, in the preparation of its case, proved to itself that it was losing money in carrying the New York to Coney Island passengers for 5 cents on days other than Saturdays, Sundays and holidays, and on Aug.

*Paper presented at meeting of American Street & Railway Association, Oct. 10-14, 1910.

31, 1908, raised the rate to 10 cents. The commissioner in rendering his decision intimated that he would consider a complaint against this raised fare on weekdays. This was taken advantage of promptly by the complainant and a new case started on Sept. 15, 1909. Numerous hearings were given, considerable evidence introduced and the hearings closed on April 13, 1910. Since then the decision of the commission has been reserved.

Some of the interesting points which were developed in this case are as follows:

NO ALLOWANCE FOR FRANCHISE VALUE

This is believed to be the first noted case in the street railway industry in which no attempt was made by the public authority to value the franchises of the company. This is due possibly to the provision of the Public Service Commissions Law which, referring to the approval of the issue of securities, states that the commission shall have no power to authorize capitalization of any franchise.

Heretofore, in such cases as the Detroit, Chicago and Cleveland street railway valuations, the city authorities added to the value of the physical property the value of the unexpired terms of the franchises, based on their earning power. In this case it was suggested by the commission's experts that as the franchises are perpetual they are for all practical purposes simply permits for the use of the streets and hence have no special value.

COMPREHENSIVE STUDY OF VALUATION

As experts for the company we valued this property not only by the principal methods which had been previously used in the valuation of railroads and other quasi-public enterprises, but we also developed a new plan of valuation especially applicable to this class of property.

Noted writers upon the rate regulation of railroads, the fairest European treatment of the problem, even the semi-political statements of men such as Presidents Roosevelt and Taft agree that subjects such as capitalization tested by the laws in existence at the time of issue, market prices of securities, earning power, original cost, location, character of management, value of the commodity, should, in addition to a physical valuation, be considered in the regulation of rates, yet apparently in none of the preceding street railway valuations have these items been carefully valued or in most cases even considered, and in this one they were presented only by the company's experts.

The five methods of valuation and corresponding values as estimated by us, are as follows:

Commercial Valuations.

	Estimated Value.
1. Earning Power	$8,584,245
2. Market Value of Securities	7,868,162

Valuations Based on Investment.

3. Approved Capitalization Issued	8,641,962
4. Cash Investment	8,941,227
5. Cost of Reproduction New	9,299,898

VALUATION OF EARNING POWER

The value of the earning power is one of the methods of commercial valuation or valuation from a business standpoint. The net earning power through a series of years is in the final analysis the factor which determines in the business world the value of any industry. In this case, in order to cover the period of prosperous years as well as the lean years, the average of the net earnings for 10 years was taken. From this was deducted interest on the present fixed debt of the company at actual rates, the remaining net earnings being applicable to the stock equity. The value of this equity was then capitalized on a 6 per cent basis and this capitalization added to the fixed debt, gives the total value of the earning power. Various modifications of this method have been adopted generally in the Swiss, French and other European laws of appropriation of railroad property for national ownership.

This is also practically the method used by Prof. H. C. Adams in his railroad appraisals for the Michigan Board of Tax Commissioners. It was also in its result the method used by the City of Chicago in the valuation of the Chicago street railway systems by B. J. Arnold in 1906. In the Chicago cases, franchise value was estimated as the present discounted principal value of the estimated net earnings for the remaining life of the franchises, capitalized at 5 per cent, less the present value of the physical property. To this franchise value was then added the present value of the physical property to obtain the total present value of the property. In other words, we have the formulas.

Total Present Value=Present Value of Franchises+Present Value of Physical Property.

but if

Present Value of Franchises=Present Value of Earning Power — Present Value of Physical Property,

then

Total Present Value=Present Value of Earning Power.

In other words, the Chicago method of valuation when applied to a property operating under long term or perpetual franchises results simply in a capitalized value of the earning power.

MARKET VALUE OF SECURITIES

The market value of securities is the method which was used by Professor Adams in his commercial valuation of railway operating property in 1904.

In this case this value was taken as the average market price of the stock and bonds issued for the previous six months. Due to the fact that the company had entirely discontinued dividends the year before and had called upon its stockholders for practically a 50 per cent assessment, the market prices of its securities were considerably impaired, and it would therefore seem that this method is not such a fair one for the company as some of the others offered. It will be seen that the value of this basis is less than any of the other values.

APPROVED CAPITALIZATION ISSUED

Coming to valuations based on investment, which basis apparently has the most weight with our governmental regulating bodies, the first method is that of approved capitalization issued. By this is meant the amount of bonds and stock the issue of which the State has, through its agent, expressly approved. In the case of the Coney Island & Brooklyn Railroad Company, it was brought out in the evidence that the State of New York, through the Board of Railroad Commissioners (and latterly through the Public Service Commission for minor issues), has, after formal investigation, approved all of its bond and stock issues. It has been said that the approval of our public utility commissions upon the issue of securities practically gives them the guarantee of the government, and in this respect should make them of greater value to investors. The Public Service Commission, however, in the opinion already rendered in this case does not appear to have given any weight to the approval of its predecessor, the State Board of Railroad Commissioners.

The suggestion of the Commission's experts in this case that the depreciation of the physical property be deducted from the value on which a return is allowed also in effect would discredit a large portion of the securities outstanding of probably every public utility corporation in the State, even if such securities, when issued, had been approved by State authority, through the Public Service Commission or its predecessor.

In fixing reasonable rates for a monopoly, the actual cash investment must also be considered. This cash investment

represents, as does the approved capitalization issued, the cost of production of the property through its period of development, including the cost of promotion, the organization of the corporation, the acquirement of public rights often under conditions of competition, the cost of development of the company's business and physical property, the cost of financing the company's overhead charges upon construction, the contractor's overhead charges and profit, the cost of real estate, the cost of construction and equipment, the working capital, reserve funds, investments, etc.

The cash investment will be evidenced by the cost of property on the books, if they have been properly kept. From the records of the company and its State reports we were able to go back to its first construction and to check largely the book entries during the early period from the amount of property on hand, and later through the actual construction entries, and in this manner to prove the cash investment to represent reasonably the book cost of the property over a period of 49 years. While these figures include the cost, to an extent, of the superseded horse system and, to a less extent, the supersession of some of the early electric equipment, all of which was so charged with the approval of the State Board of Railroad Commissioners, it is submitted that this cash investment should receive the same measure of protection from the present governmental authorities as should be accorded on the other hand to the rights of the traveling public.

It is a nice question whether a company such as the Coney Island & Brooklyn Railroad, which sustains severe competition from the surface, elevated and subway lines of its powerful neighbors, should be properly subject to regulation of rates at all, provided they are not greater than the maximum rates allowed by law. In this case it is in evidence that the rates charged are less than the maximum legal rates.

In dealing with the cash investment in the property it was brougth out in this case that the General Railroad Act of 1850, which was claimed to be still in force, promised a 10 per cent maximum return to all companies organized under its provisions. The Legislature reserved the right to reduce fares, and I quote from the law: "but the same [fares] shall not, without the consent of the corporation, be so reduced as to produce with said profits less than 10 per cent per annum on the *capital actually expended.*" The theory of rate regulation in the State of New York for the past 60 years has therefore been based on cash investment.

VALUATION BASED ON COST OF REPRODUCTION NEW

The usual method of determining the cost of reproduction has been to make a careful inventory of the physical property, to which was applied market prices of machinery, materials and labor. Percentages were then added for engineering and superintendence, interest during construction, incidentals, &c. The total was called the cost of reproduction of the physical property. This was then generally depreciated to secure its present value, and to this was added the estimated value of the franchises.

While this might be proper for some purposes, it does not seem to be a logicalmethod for ascertaining the cost of reproduction for use in a rate case. It would appear that for this purpose there should be determined the cost of founding and developing a new enterprise co-extensive with the present one. In other words, let us assume that the streets are clear of tracks, and then ascertain the cost of reproduction from the inception of the line in the mind of the promoter, through the period of securing rights and of financing to the completion of the construction, our plans and specifications being the actual design of the present line. Let the present cost include not only the market price of real estate, rails, machinery and labor, but also the current fee for services of promoters, lawyers, financiers, engineers and administrators. This is the basis upon which a competitive enterprise must enter the field and its rates be fixed.

Nor should the cost of reproduction now be reduced by the depreciation of physical property in order to arrive at the rate fixing value. The value of the commodity, which is the service rendered, does not depend on the age of power house, car barns, feed wire, or even of tracks, or cars if they are in reliable operating condition and in good repair.

The value of electricity conducted through a wire, or of water through a pipe, will be just as much if the wire or the pipe be 5 years old or 15 years old.

A proper reliability of service and condition of maintenance can be compelled by the commission, but the replacement of the article, due to age will not occur until it is obsolete. In other words, every property is partly worn out from the day it begins operation, and it would be an economic waste to provide a larger fund than is necessary for the renewals as they take place, except and to such an extent as such a fund should provide for unforeseen contingencies. Securities of the company are not retired as property depreciates, because the larger part of the depreciation fund accumulated from income is by current practice, with the approval of the commission, expended at once for accruing renewals.

The more the property depreciates from the condition of newness the greater the necessity for the maintenance of thee original rate, so that the company can provide for its upkeep. This principle has been recognized in decisons of the Railroad Commission of Wisconsin. The Public Service Commission's expert in this Coney Island case agreed that the depreciation should not be deducted from the valuation if the company had accumulated a depreciation fund to provide for current renewals, or if the security holders were liable for the replacement of the property, which is the case at present of the stockholders of this company.

In estimating the cost of development of the Coney Island & Brooklyn Railroad an inventory was prepared covering the work and expense items for the reproduction of the rights of the present company to construct and operate its railroad. This inventory, stated briefly, comprises the cost of time and expenses of all departments of the organization of the promoter and of the company, first during the promotion period, which is the time of obtaining rights and capital, and then during the construction period, covering the time of expenditure of capital to the completion of construction. There is separately estimated this cost for the promoter's organization, the legal department and the technical department, through the preliminary development of the idea, the formation of the promoter's syndicate, the securing of the corporation's charter and the obtaining of its franchise from the municipal body and of its certificates from the Public Service Commission, together with the property owners' consents and those required from the minor city departments and other corporations. The time spent in connection with financing the enterprise is largely coextensive with that of obtaining rights and comprises the various steps of underwriting and negotiating the sale of securities. After the franchises and capital are obtained the construction period begins by the organization of the permanent working force of the company, and continues through the general administration of the construction work by this executive organization.

In order to determine the time spent on each part of this work and the contemporaneous nature of a large part of it, there was prepared a chart of estimated time of reproduction sub-divided as between these departments. The estimated time taken for each part of the work was based upon the actual time which has recently been required to secure similar rights in New York City under the present legal restrictions. It was estimated that 3½ years would be required from the inception of the project to the time that capital and rights would be obtained. The construction period was estimated from instances of recent construction work, to require 2 years and 10 months additional, making a total of 6 years and 4 months, although the beginning of partial operation was assumed to take place one year before the end of construction.

The number of men in each department and their rate of pay were then assumed, giving, when allowance had been made for general expense items, the total expenditure in each department and for each part of the work. All of this was, as far as possible, based upon actual work and expenditure in other corporations and was accompanied by a considerable amount of supporting detail.

The total cost of promoter's organization, legal department and technical department during the promotion period was thus estimated at $421,200, the property owners' consents at $278,500 and the time and expenses of the permanent organization during the construction period at $195,640, making a total of $895,340 as the cost of development and administration of the enterprise until it was placed in operation.

Coming to the appraisal of the physical property, the company accepted the estimate of the experts of the Public Service Commission. This estimate was on the basis of subcontracts and amounted to a total of $4,615,838, to which we added $276,460 for incidentals based on detailed estimates, $108,864 for inventoried stock, tools and fixtures, 10 per cent for general contractors' overhead charges and profit, 5 per cent for engineering, and $561,345 for interest and taxes during the construction, the last two items being the result of detailed estimates. The resulting cost of construction and equipment was $6,320,813.

The real estate of the company was appraised by experts and to this appraisal was added 10 per cent for the cost of acquiring land, such as brokerage, legal services, title insurance, value of buildings removed, etc. To the assessed value of the private right of way owned by the company on Coney Island Avenue was added 150 per cent for additional sales value and cost of acquiring, this being the value of the "contiguity factor" adopted by the experts of the Railroad Commission of Minnesota from a careful study of the value of right of way real estate. The total cost of thus reproducing the real estate was $1,224,500. To these figures was added $250,000 as the estimated amount of working capital required by this corporation, and $609,245 as the estimated cost of additions and betterments necessary to produce an adequate modern system. The resulting total cost of reproduction new at August 31, 1909, was $9,299,898. This we stated as our estimate of the least cost of reproduction of this property, as under any but the most favorable conditions it would reach a considerably larger amount.

ITEMS NOT INCLUDED IN ESTIMATE

This estimate did not include any allowance for the profits of promotion, for discounts and commissions on sale of securities, for the value of features of the present franchises that cannot be reproduced to the present legal restrictions, for the cost of development of the business or the deficiency below a reasonable return in the early operation of this property, and for the cost of development of technical standards comprising obsolescense of the horse system and of the early electric system. It was our contention that, strictly speaking, many of these items were not items of value and that ordinarily they should be allowed for in the rate of return applied to the valuation of the property. If, however, the rate of return is fixed at the legal rate of interest, a capital valuation should be given to them.

It will be noted that the total value of the property upon the basis of cost of reproduction new, is the highest of the five valuations which we made, and would, therefore, in a sense seem to warrant the other four valuations.

Applying only a 6 per cent rate of return to this valuation we have the equivalent allowable net income of $557,994. Inasmuch as the actual net income of the company amounted only to $364,975 for the year ending Aug. 31, 1909, during which 10-cent Coney Island fares were charged, it would appear that even with the Coney Island 10-cent fare in force this company was earning much less than a reasonable return on this basis of valuation, and the same result is apparent if any of the other four estimated values are taken.

EXHIBIT NOTES

Rufus L. McDuffie, vice-president of the Pay-as-you-Enter Car Corporation, has just arrived at the convention to swell the forces of the officials of this well known company.

* * *

Dr. J. M. Griffin is in attendance at the booth of the Wheel Truing Brakeshoe Company. The company's exhibit consists of several types of electric railway brake shoes.

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Alexander Milburn Company, Baltimore, Md., is showing in space 634, Building No. 2, its various sizes and types of Millburn emergency acetylene gas lights. Represented by C. R. Pollard and I. E. Stanbury.

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Eureka Tempered Copper Works, North East, Pa., has space 670, Building No. 2, where it is exhibiting line material, commutators, trolley wheels and bearings. The representatives in attendance are C. Schimmelteng, Fred. Rundell, T. E. Lynn, John Risbridger.

* * *

Walter J. Cummings and William H. Stevenson, of the McGuire-Cummings Manufacturing Company, are holding a continuous reception at booths No. 664-665. Incidentally they are distributing literature descriptive of the company's cars, trucks, snow sweepers, plows and sprinkling cars.

* * *

Cooper Heater Company, Carlisle, Pa., is located at space 657, Building No. 2, where it is exhibiting the well-known pressed steel hot water car heaters. This heater is very low in construction and occupies about one-third less floor space and weighs two-thirds less. All the tubing and parts are welded with the oxygen acetylene process to make an absolutely seamless product. Represented by W. L. Blackwell, general manager, and W. R. Crawford, Western sales manager.

* * *

If you want information as to train schedules, or desire to have Pullman reservation made, go to the Travelers' Railway Guide, Booth No. 404. This accommodation is for members and guests of all associations in attendance at this meeting The booth is in charge of Geo. E. Armstrong, business manager of the American Railway Guide Company, publishers of the Travelers' Railway Guide, 315 Dearborn Street, Chicago. This guide is one of the best mediums for interurban railway timetables.

* * *

Johnson Fare Box Company, New York, is showing in spaces 659-661, Building No. 2, several models of registering fare boxes. Among them is a box designed for operation without having a register inside of the car. This box has a gong, totalizer and trip register for registering passengers, in addition to a totalizer registering the coins deposited. Another box, counting coins only, is designed for operation in conjunction with a register inside of car; and still another is adapted to lines having three-cent fares. All boxes count either in dollars and cents or in fares. These fare boxes are inventions of J. M. Johnson, inventor of the Johnson coin counters, and are as substantial in construction as those successful machines. Practically all parts are of steel made from dies and with parts interchangeable throughout. They are remarkable for the way they handle mutilated coins and their safeguards for insuring an accurate count. The results of a long practical test on the One Hundred and Twenty-fifth Street crosstown line of the Third Avenue Railroad, New York, were presented in the Electric Railway Journal of Oct. 1. This test was so satisfactory that the company placed an order for 300 boxes to be operated without any register inside of the car. These boxes are to be delivered by Nov. 1. Represented by C. H. Birdsall, W. P. Butler, S. F. Champion, Jr.

Among the Exhibits

F. X. Cleary, advertising manager of the Western Electric Company, is present at the convention in the interest of his department in that company.

* * *

Atlas Railway Supply Company, Chicago, Ill., is using space 814, Building No. 3, for a rail joint, tie plate and rail brace exhibit. Represented by D. E. Thomson, Eastern representative.

* * *

Speer Carbon Company, St. Mary's, Pa., has on view in spaces 618-620, Building No. 2, many high-grade motor and generator brushes. Represented by John S. Speer, president; George P. Freyling, secretary; Alfred Mullhaupt, Jr.

* * *

Electric Railway Improvement Company, Cleveland, Ohio, is giving demonstrations with one of its welding and brazing cars of the brazing of copper bands to steel rails in space 864, Building No. 3. Represented by George Long, Mark Stanton, Albert Blakely.

* * *

The National Car Advertising Company of America, Chicago, Ill., has spaces 842-844, Building No. 3, where the Auto-Scope advertising device for electric cars is being shown in working order. This device is now being used by five railway companies in the United States, and contracts have been made with others.

* * *

Cleveland Frog & Crossing Company, Cleveland, Ohio, has an extensive exhibit in space 575-576, Machinery Hall, of sample hard-service manganese special work, C. C. locking devices for tongue switches, mates, frogs, crossings, rail braces, metal foot guards, spring switches, Porter derailing switches and section of crossing switch with flangeway planed out to prevent horses from catching their hoofs. The exhibit is located across the south end of Machinery Hall and is in charge of George Stanton, L. G. Parker, George Arnold, Jr., George A. Peabody, Jr., William Schmidt.

* * *

An object lesson in the economy of using properly treated cast manganese steel rails for curves subject to extremely severe traffic is forcibly demonstrated in the exhibit of Wm. Wharton, Jr., & Company, Inc., Philadelphia, spaces 208-216-304. Here is shown a rail taken from the first curve ever made of manganese steel rails cast to a 9-in. girder section. This rail has been in use almost seven years in a curve where Bessemer rails formerly were entirely worn out in about two years under much less traffic. The manganese rail is not worn out and was only removed on account of a change in routing which necessitated the abandonment of the curve.

* * *

Railway Roller Bearing Company, Syracuse, N. Y., is showing in spaces 528-530, a Brill 39-E maximum traction truck equipped with roller-bearing journal boxes. This truck was detached from car No. 1967 operated by the Philadelphia Rapid Transit Company on its Seventeenth and Nineteenth Street line from March, 1909, to October, 1910—approximately 19 months. During this time the car traveled 72,000 miles. Another journal box on exhibition was also operated in Philadelphia on car No. 2130 equipped with Brill 27-G trucks. As an extreme test these bearings were in use for several months without any lubrication whatever. The company is also exhibiting six of its latest types of journal boxes which have oil-reservoir capacity for one year's lubrication. Represented by James N. Vandegrift, Raymond H. Carhart.

Dossert & Company, New York, have space 813, Building No. 3. Among the new devices is a third-rail jumper connector of compact and simple design. Service can be quickly and efficiently restored in accidents or in any case where a jump is desirable by clamping one of these connectors on each side of any break in the third-rail circuit and connecting them with a cable These connectors are used by the New York Central lines. Other new Dossert types are three styles of cable anchors for splicing, anchoring and taking branches off cables, and a new insulated cover for Dossert cable tap joints. The last device is used in place of the tapped joint commonly employed. The covers will accommodate taps on cables ranging from No. 6 to 300,000 cir. mil, and are especially desirable for switchboard work. Represented by H. B. Logan, S. A. Jenkins.

* * *

The Pennsylvania Steel Company's exhibit, in the lobby, contains a number of new track devices, including a pinless switch, solid Manard steel frog and involved solid Manard steel crossings. The "Never-turn" split bolt and the "Never-slip" switch plate, with adjustable rail brace, are also shown. Various types of switch stands, especially adapted for interurban railways, are mounted in one end of the booth. The Q. & C.-Bonzano compromise rail joint and 64 live rail sections, both T and girder, rolled by the company in its mills at Steelton, are attracting attention. On a table in the centre of the booth are some interesting samples of Y steel, a new product made from Mayari ore. This steel is being used for automobile work and other purposes where high tensile strength is required. The largest piece of special work in the exhibit is a diamond of a solid Manard steel double-gage crossing for the Vera Cruz (Mex.) Terminal Company.

* * *

Harold P. Brown, New York, has spaces 570-572 in Machinery Hall. Mr. Brown is exhibiting the well-known electrical contact alloys used in the plastic rail bond. A complete testing outfit has been installed to show that current passing through a rail joint bonded with the plastic alloy has no more resistance than when passing through the rail itself. Samples are also presented of joints that have been in the ground six years with no evidence of deterioration. An interesting part of the exhibit is a lead-surfaced motor pinion. The steel of the pinion is treated with an alloy which makes it self-lubricating, noiseless and tough. An electric-pneumatic bond chisel, for use in the application of the plastic bond, is also exhibited, as well as the "Stay-there" track bolt, "O. K." nut lock and the Brown motor-car mirror. Other interesting exhibits are economical substitutes for linseed oil and for turpentine. Represented by Harold P. Brown, J. Maxwell, Coote W. Temple, Albert Temple.

* * *

Yale & Towne Manufacturing Company, New York, occupies space 544 in Machinery Hall to show electric hoists overhead carrying trolleys and triplex chain hoists ranging from ½ ton to 20 tons capacity. A feature of special interest consists of test pieces of its new electric-welded steel pitch chain and the old-fashioned welded chain, showing comparisons in accuracy of pitch, elastic limit and breaking limits. This new chain is being used on all the company's products, increasing the safety factor 30 per cent and the working life of the chain nearly 40 per cent over hand-welded chains. The hoists shown in operation illustrate the high mechanical efficiency resulting from the balanced gear train and low gear-tooth pressure, combined with accuracy of fit in the steel sheave pockets. A large model of the "Yale" lock is also shown operating automatically, to illustrate the action of the paracentric key in effecting the release of the interior mechanism so that the door bolt may be shot. The company is represented by R. T. Hodgkins, H. C. Spaulding, C. W. Beaver.

Parsil Metal Company, Lansdale, Pa., is exhibiting in space 630, Building No. 2, its new Flower brush holder, pivot journal bearings, grease guns, oil guns and air pumps. Represented by David B. Flower, Charles W. Wade, F. W. Roth.

* * *

The Adams Bagnall Electric Company, Cleveland, has a well-planned exhibit of regenerative flaming arc lamps in spaces 554-556, Machinery Hall. These lamps, from the standpoint of economy of current and efficiency, are particularly well adapted for lighting streets, car houses, shops, yards, power houses, stations and parks. A new lamp for making blue points is also being shown. The exhibit is in charge of G. A. Thomson, R. C. Campbell and A. J. Mitchell.

* * *

Standard Steel Works Company, Philadelphia, Pa., is exhibiting in spaces 565-571, Machinery Hall, wheels for the heavy trucks built for the Alameda electrification of the Southern Pacific Railroad Company. These wheels are of the No. 1 type, 36½ in. in diameter with steel tires 5½ in. wide by 2¾ in. thick. It also shows the wheels for the light trucks built for the Shore Line Electric Company. These are of the solid rolled steel type No. 108, 34 in. in diameter, with rim 3 11/16 in. wide by 2½ in. thick; Standard solid forged steel gear blanks in the exhibit of R. D. Nuttall & Company; also iron and steel axles, coil and elliptic springs for steam and electric service, iron and steel castings and forgings. Represented by H. DeH. Bright, C. F. Dodson, C. H. Peterson, J. Green, H. W. Sheldon, F. W. Wiston, George F. Jones, C. S. Lewis.

* * *

Carnegie Steel Company, Pittsburgh, Pa., has a prominent location in spaces 860-871. The exhibit consists of 30-foot sections of track laid with steel ties in concrete; Duquesne splice bars; nine steel wheels for various types of service; two pairs of steel wheels, mounted on axles, showing wear; steel sheet piling and steel hoops for nailing spike kegs. In addition, there are specimens of vanadium steel showing tests and bends, 24 cases showing representative sections rolled in its mills, and special tests in soft welding steel. Represented by Samuel A. Benner, W. P. Siebert, John C. Neale, C. L. Wood, John W. Dix, Lee Bowman, W. A. Bostwick, C. G. Bacon, Jr.; N. D. Trist, N. M. Hench, J. C. C. Holding, J. P. Noonan, W. H. Scanlon, all of the general office at Pittsburgh; W. E. Berry and V. S. Varnell, New York; Robert Coe, Philadelphia; F. C. Bruncke, Buffalo; K. V. Porter, Cincinnati; F. E. Spencer, Pittsburgh district office, and L. P. Lincoln, of the Homestead Works.

* * *

Pyrene Manufacturing Company, New York, shows its fire extinguishers in space 817, Building No. 3. The exhibit consists of a squirt gun 14 in. long and 3 in. in diameter which contains "Pyrene," a deadly enemy to fire. The squirt gun holds about a quart of liquid which, when squirted from the gun, generates in contact with the air about 3750 cu. ft. gas. This gas at a temperature of 200 deg. or over is converted into a heavy gas blanket which envelopes an incipient fire and completely suffocates the flame. The gas is a non-conductor of electricity, its dielectric strength being 300,000 volts per in. With the squirt gun "Pyrene" can be directed to put out an incipient flame between commutator and brushes, the armatures and fields of a moving rotary, etc. It is asserted that "Pyrene" will break and completely extinguish any arc. It will not freeze at a temperature of 100 deg. below zero and needs no attention from the time it is put into the squirt gun until used. Demonstrations of its efficacy are given at the booth. Among users are the Interborough Rapid Transit Company, New York; United States Government, Chicago City Railway and the Western Union and Postal Telegraph Companies. Represented by Edward M. Davidson, George H. Peterson, Thomas Areson.

Stromberg-Carlson Telephone Manufacturing Company has spaces 843-845, Building No. 3. It is showing a complete railway dispatcher's system in operation and exhibiting acid, dust and waterproof telephones for mine, police and fire systems; hand-ringing waterproof extension bells for railway and mine use; linemen's test sets; connecting poles; jack boxes; flush and non-flush wall and desk type automatic intercommunicating telephones for factory, office and residence systems, and a new compact type private branch exchange switchboard. Represented by H. C. Slemin, sales and advertising manager; C. P. Button, railway representative; H. W. Lucia, assistant chief engineer; J. O. Oliver, territorial representative; E. P. Ellis, assistant advertising manager.

* * *

Electric Storage Battery Company, Philadelphia, Pa., occupies spaces 666 and 668, where it is exhibiting a new oil insulator, for supporting battery tanks. This insulator consists of a glass body, provided with a circular trough, which is partially filled with oil and covered by a cap of lead alloy. This insulator maintains an exceedingly high degree of insulation for a long time without attention. It has now been in service for several years under extremely severe conditions, without a single case of electrolytic action. The company also exhibits a railway panel for battery service; battery plates of the "chloride accumulator" type, and the latest type of battery tank. Represented by Charles Blizard, second vice president; E. T. Reynolds, G. H. Atkin, Mr. Say, C. H. Bristol.

* * *

Automatic Ventilator Company, New York, has a unique exhibit in space 621 of Building No. 2, of interest to all concerned with problems of ventilation. The booth contains a full-sized model, representing a section of the clerestory of a car, with two sets of automatic ventilators in the deck sash. An electric fan at one end of the model throws air along the side of the car to simulate conditions in a moving car, and shows the intake and exhaust principle of this automatic ventilator. Tests and demonstrations with an anemometer, lighted tapers, pieces of paper, silk, etc., also are made inside of the model, to illustrate the coöperating principles. Several miniature models prove the ability of the ventilator to keep the air in a smoking car clear and pure. It is worth mention that this company's automatic ventilator is installed in the "Round Top" Beach-Edison battery car to be operated at the convention. Represented by George H. Ford, Leonard J. Hibbard, William J. Fleming, Jr.

* * *

Lorain Steel Company, Johnstown, Pa., in spaces 850-859, Building No. 3, calls attention to the value of its manganese steel track work. Manganese steel may have 2 per cent of manganese, or it may have 20 per cent, but only great experience in manufacture and use makes it possible so to proportion the mixture that there will be secured the desired triple combination of hardness, ductility and elastic strength. The Lorain Steel Company has recognized the fact that it would be dangerous to have a manganese steel which will suddenly tear apart under tension, or break under shock without the warning that comes from a ductile metal under stress. The company's aim is to produce a railway structure which has the minimum number of parts and the maximum endurance. The solid manganese steam railroad crossing exhibited is offered as an example. This design is intended to minimize the abrasion or pounding down of the metal at the intersecting points of the track. So long as this end is accomplished, no concern need be felt about the quality of the metal between the intersections, as it is known that the latter is all right for frictional contact and will outlast the intersections which are subject to the direct blows of fast moving wheels carrying heavy loads.

Union Electric Company, Pittsburgh, Pa., has no exhibition this year, but has its representatives, George W. Provost, R. M. Kerschner and T. M. Cluley, looking after its interests.

* * *

National Tube Company, Pittsburgh, Pa., is exhibiting in space 653, Building No. 2, Shelby seamless cold-drawn trolley poles and welded tubular trolley poles. Represented by J. G. Bateman, W. S. Bitting.

* * *

Home Rubber Company, Trenton, N. J., in booth 683, is showing N.B.O. sheet packing; automobile tires; steam and air-brake hose, and a complete line of mechanical rubber goods. Represented by A. R. Foley.

* * *

Elliott Company, Pittsburgh, Pa., has recently purchased the entire business of the Pittsburgh Feed Water Heater Company. It can furnish heaters from 100-hp. to 30,000-hp. The company has recently enlarged its Pittsburgh plant.

* * *

Standard Coupler Company, New York, has taken space 828, Building No. 3, for a working exhibit of the shim slack adjuster with model brake rigging and shoes. Represented by Col. George A. Post, E. H. Walker, W. H. Sauvage, C. D. Jenks.

* * *

Sterling Varnish Company, Pittsburgh, Pa., is exhibiting in spaces 810-812, Building No. 3, a water-sealed dipping tank for painting car fenders. The company has a special paint for use with this device. Represented by Henry C. Todd, Alvin S. King, W. F. Hebard, W. V. Whitfield.

* * *

John A. Roebling's Sons Company, Trenton, N. J., in spaces 614-616, Building No. 2, shows a full line of wire rope and fittings; insulated wire and cables; also car cables. Represented by W. P. Bowman, U. G. Tingley, G. M. Swan, W. L. Doyle, Mr. Clarkson, A. V. Erickson, M. R. Cockey.

* * *

The representatives of the Standard Paint Company, New York and Chicago, are quite busy, as usual, discussing the subject of the P & B goods, as well as the newer lines of varnishes. Messrs. Lavelle and Inwood, who represent the company in the street railway field, are welcoming many old friends.

* * *

Jones & Laughlin Steel Company, Pittsburgh, Pa., is exhibiting in spaces 564-566, Machinery Hall, specimens of cold-rolled steel axles, chains, spikes, cold-rolled steel, cold-twisted bars for reinforced concrete, structural sections, steel sheet piling, pulleys, hangers and couplers; also two tested axles. Represented by E. D. Batchelor, Frank S. Slocum, George H. Mitchell, C. G. Fogwell.

* * *

H. B. Underwood & Company, Philadelphia, are showing in space 521, Machinery Hall, their portable crank-pin turning machine and portable cylinder boring-bar. The crank-pin machine is mounted on a dummy crank and illustrates how the machine is used when turning off a crank pin on a side-crank engine. The portable boring-car is set up in a small cylinder to show its practical application. Represented by D. W. Pedrick, second.

* * *

Best Manufacturing Company, Pittsburgh, Pa., in booth 632, Building No. 2, exhibits brass and iron valves of different types; cast-steel adjustable disk-gate valves for high pressures and superheat; brass cast-iron and steel-flanged fittings; Myers' blow-off valves; exhaust relief valves; expansion joints; pipe bends; cocks; unions; flexible joints, etc. The articles are arranged and sectioned to show the mechanical construction and distribution of the metal. Represented by J. D. Hiles, C. K. Thomas.

The Eclipse Railway Supply Company, Cleveland, Ohio, is exhibiting its well-known "Eclipse" life guard in space 669. The new "Eclipse" destination sign, recently placed on the market, is also shown. This sign is of the illuminated type, and is legible at a considerable distance. Its simple construction, without springs or cogs, is a feature. Both the sign and the life guard are shown in working position on a full-size car front. Represented by Ross Forward.

* * *

Nelson Valve Company, Philadelphia, Pa., has space 550, Machinery Hall. The special features of the exhibit comprise a 12-in. electrically driven valve in full operation, steel and model superheated steam valves; seatless blow-off valves, all specially demonstrated and opened and sectioned in full sizes; globe and gate types in bronze, steel and iron for all services, pressures and temperatures. Represented by Carlisle Mason, W. J. Spencer, R. E. Thomas, LeRoy Gordon.

* * *

Standard Underground Cable Company, Pittsburgh, Pa., is exhibiting in spaces 688-689, Building No. 2, lead-covered and armored cables; all forms of bare and insulated wires; Colonial copper-clad wire; trolley wire; cable terminals of Davis station and Davis open-air types; various forms of subway junction boxes; cable-jointing materials, including "Ozite" insulating compound; paper tubes and copper sleeves. Represented by C. J. Marsh, G. L. Wiley, H. P. Kimball, R. S. Hopkins, T. E. Hughes, R. M. Hirst, S. S. Warner, J. H. Lytle, J. R. Wiley, E. J. Pietzcker, R. B. Wilcox and C. A. Brown.

* * *

National Lock Washer Company, Newark, N. J., exhibits in spaces 650 and 652, Building No. 2, its cam (non-creeping) curtain fixture made of steel tubing with bronze heads and finger pieces. It cannot be drawn out of grooves by rough handling, is readily adjusted and composed of few parts. A strong tension can be put on the roller to make the curtain sit smoothly, to ensure quick action when the curtain is raised, and to hold it firmly when the wind is blowing. This fixture prevents "creeping" by eccentric grip rather than the old-time friction hold and accomplishes release by direct action on the eccentric, the heads remaining stationary in the grooves.

* * *

Rail Joint Company, New York, is occupying space 464, Aquarium Court, with a fine exhibit of all types of rail joints. Sections of base-supporting continuous Weber and Wolhaupter joints are shown; also step joints connecting girder and T-rails. All joints are made to accommodate any standard, as to length, bolt spacing and slotting. The base-supported rail joint eliminates the pounding of the rail ends, insures correct surface and alignment, and permits a continuous wave motion of the rail. Over 50,000 miles of track are now equipped with this company's joints. Represented by L. F. Braine, W. A. Chapman, E. A. Condit, P. Holbrook, G. W. Smith, W. E. Clark, H. O. Halloway, Mr. McCaskey.

* * *

Ohio Brass Company, Mansfield, Ohio, has a comprehensive exhibit in spaces 601-603. This includes line materials, hangers, rail bonds and many types of "O. B." porcelain high-potential insulators. Foremost among the latter is the suspension disk type, which though a comparatively recent development is meeting with great success. The M.C.B. coupler shown complies in every detail with the recent specifications of the Central Electric Railway Association. Leakless diaphragm sanders, whistle valves, and electric tail-light systems are also included in the display. Represented by C. K. King, A. L. Wilkinson, E. F. Wickwire, W. H. Bloss, G. E. Willis, C. H. Tomlinson, M. M. Garland, J. E. Slimp, F. V. Cook, R. J. Deneen, C. T. Anderson, N. Shute, E. C. Brown, A. L. Price.

THE GRIFFIN CAR WHEEL

After some forty odd years of continuous manufacture of wheels for freight, passenger, engine tender and interurban service, we have, by the most careful attention to manufacturing methods and the maintenance of elaborate records, developed a wheel having the essential qualities for economical service.

Iron, in some form or other, is at present the only satisfactory material commercially available for making car wheels.

Pure iron is soft, ductile, and of comparatively low tensile strength, hence entirely unsuited for the requirements of wheels for modern steam or electric railway service unless properly alloyed with some other element to give it the necessary wearing qualities.

When iron is combined with a small amount of carbon, the acquired properties are remarkable, and make possible the production of a material which satisfactorily meets all service requirements.

When melted at a high temperature, iron has a strong affinity for carbon, and takes up 4 or 5 per cent from the fuel,

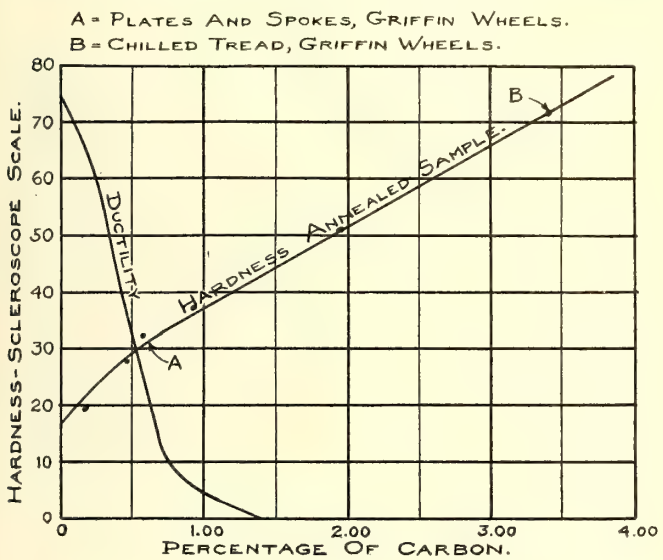


Fig. 1

forming a chemical combination; but after solidification and cooling the carbon may exist in either of two conditions, according to the percentage of carbon present and the rate at which the metal is cooled.

COMBINED CARBON—Fe_3C

First—The carbon may be chemically combined with the iron, in which condition the entire fracture of the metal is always white and the commercial name of "Steel" is given the product, and the name "white or chilled iron" is given to the metal when the percentage of carbon is high (from 2 to 4 per cent).

GRAPHITE, OR PURE CARBON

Second—If the total carbon is sufficiently high and the cooling sufficiently slow, the carbon may separate out as graphite, or pure carbon, being uniformly distributed in the form of small flakes, which give a dark or black fracture to the metal when broken, because the fracture necessarily occurs through the flakes of carbon, which have no strength. If the graphite is formed without reheating the material is called "Cast Iron," but when specially annealed by reheating the name "Malleable Iron" is applied.

It will be noted that as the carbon increases, the hardness increases, but a very small amount of carbon reduces the ductility very rapidly, showing that hardness and ductility are opposed to one another and cannot be produced at the same time in the same metal.

In the car wheel the desirable qualities to be obtained are:

(1) A hard wearing surface for the flange and tread.

(2) A strong soft background to resist all service shocks, loads and stresses, insuring a hub that can be easily machined.

Experience has shown that if the metal in the body of a wheel has more than 0.8 to 1.0 per cent combined carbon the wheel will be brittle and likely to be undesirable, but the hardness of the tread is insufficient unless more than this amount of carbon is present.

The original source of iron is from the blast furnace, which produces a product called "Pig Iron," in which state there is about 4 per cent of carbon. In order to secure the required strength for important service it is necessary to reduce the carbon to a point which will produce the desired quality.

There are two methods by which combined carbon can be reduced to meet the severe requirements of wheel service:

First—The Steel Method.

Second—The Griffin Method.

The Steel Method: Carbon may be removed by the ordinary methods employed in producing a material that is homogenous throughout, and, therefore, of uniform hardness, and if used for wheels the hardness of the tread is sacrificed to obtain the necessary low amount of carbon to satisfy the conditions required in the plate of the wheels.

The Griffin Method: In the Griffin method the combined carbon is reduced through the agency of heat treatment in the metal while in a pastry condition prior to solidification. If the metal is cooled quickly (in a few seconds) the carbon will remain combined. If cooled slowly (in a few minutes) the carbon will separate out as graphite. This affords a means of producing different degrees of hardness in the same piece of metal, as in a car wheel, where it is desirable to have the tread and flange of a hard, smooth material, and the balance soft and easily machined.

THE GRIFFIN WHEEL

The above briefly described method of reducing the carbon from the surface of the tread to the hub of the wheel is used in the manufacture of the Griffin wheel, by means of which a composite structure is secured in which the wearing surfaces are composed of a metal harder than the hardest steel, containing about 3.5 per cent carbon, while the plates or spokes and hub are soft on account of the combined carbon being

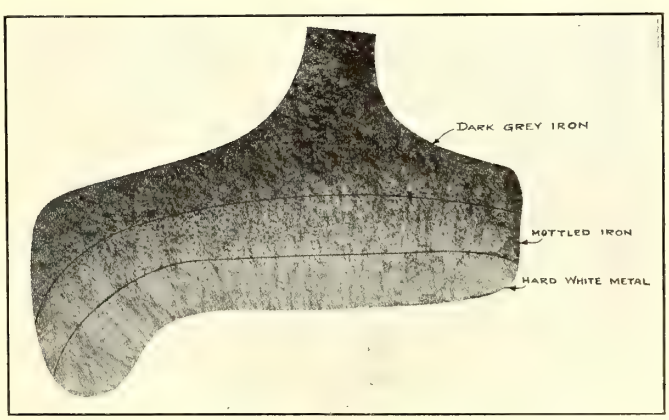


Fig. 2

reduced to about 0.75 per cent and the balance of the carbon, 2.75 per cent by weight or about 10 per cent by volume, is in the form of graphite distributed through the metal.

To accomplish this result, the part of the mold against which the tread and flange are cast is made of high grade cast iron,

known as the "chiller," which has a much higher relative heat conductively than the balance of the mold which is made of sand.

The surface of flange and tread, therefore, solidify almost instantaneously, while the portions farther removed cool much more slowly, giving time for the reaction by which the combined carbon separates into graphite, leaving the interior of the wheel of low combined carbon, and having the required strength to resist all service strains.

These widely varying conditions are plainly visible in Fig. 2, which is the flange and tread section of a double-plate wheel for use in railroad and interurban service. Note the hard white metal forming the wearing surface which gradually is transformed into a metal having a dark fracture showing the presence of quantities of graphite or pure carbon.

The Griffin wheel is what is known as a "one-wear wheel;" that is to say, after having made a mileage of from 40,000 to 150,000 miles according to service conditions and the wheel is unfit for further service, it is removed and returned to the wheelmaker to be re-cast, thus entirely eliminating the cost of placing it in an expensive lathe for restoring it to its original contour at a very considerable reduction in diameter.

show that the metal is of proper composition for the wheel to be poured. It must be remembered that the different degrees of hardness of the metal in different parts of the wheel is secured by the different rates of cooling. It is evident that the same metal in a heavy wheel will give less depth of hard chilled metal than in a light wheel, because the heavy wheel requires a longer time to cool, and this allows a longer time for the carbon to separate out as graphite, and a wheel of thin section cools so rapidly that it will be composed of white metal all the way through unless special precautions are taken.

It is self-evident that the same conditions of metal cannot be used for all classes of wheels, but through practical experience it is learned that the composition of the iron for any given wheel is correct when it gives a certain depth of chill on the test piece.

The regulation of the chill on the test pieces shown in Fig. 3 is obtained by varying the combination of the various elements entering into the metal.

The amount of hard white chill in each test piece is represented by the figures under the test pieces.

Heavy wheels are poured from the mixture represented by the test piece having the high amount of chill, and those of

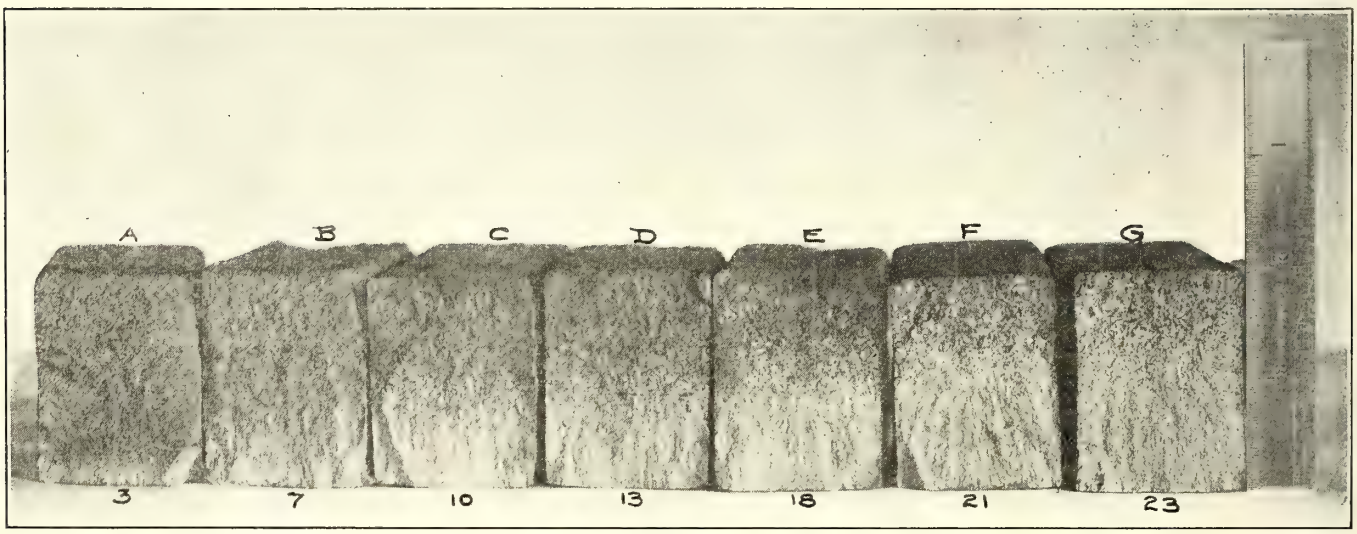


Fig. 3

In the manufacture of these wheels the surface of the tread and flange to a depth of ¾ inch is made of a material corresponding to glass-hard 3.5 per cent carbon steel, beneath which the material rapidly changes to one of low combined carbon with the graphite interspersed.

All of this is clearly shown in Fig. 2. The white portion near the surface of tread is the hard steel or white iron, below which is the mottled iron by which it is united to the dark gray iron of the plates.

The method of manufacture requires careful study and extreme attention in order that the required amount of hard metal may be secured, for if the whole section of the wheel were made of this material it would not have sufficient resistance to shocks and would break in service, and if not deep enough, while the wheel will be thoroughly safe, it will be deficient in wearing qualities, and there will be a corresponding reduction in the mileage service rendered.

In the Griffin wheel there is just enough hard metal to allow for the maximum amount of wear, say ½ inch, making the total reduction in diameter of the wheel one inch.

The method by which the depth of white chilled tempered metal at the surface of the tread of the wheel is assured is shown in Fig. 3, which represents test pieces for showing the depth of chill which are taken prior to casting the wheel to

thin section are poured from a mixture in which the test piece has an intermediate chill.

The rapidity with which combined carbon separates out as graphite is influenced by a good many conditons in the mixture. Some elements hasten the reaction, others retard it. High temperature applied to silicon, manganese and titanium tend to hasten the change or soften the iron, whereas low temperatures, and certain alloys tend to retard the reaction, resulting in a hardening of the material.

It is, therefore, possible to make any desired combination to give the exact amount of hard chill for any condition of wheel service. The above outline is sufficient to illustrate the absolute control in producing any desired depth of 3.5 per cent hard white iron at the surface of any wheel of any weight.

On account of the hard surface of the tread, and soft plates and hub insuring a high factor of safety, it necessarily follows that the amount of mileage secured will be greater than from other types of wheels having the same hardness in both tread and hub.

Because of the absence of ductility and greater hardness in the tread of the Griffin wheel there is no change of form or flowing of metal at the rim of the wheel, regardless of the load carried or the amount of pounding the wheel may receive,

and therefore the wheel maintains its absolute roundness and will not wear flat unless braking conditions cause the wheel to slide, which causes slid flat spots.

DIAMETERS.

On account of the slow wearing away of the metal, and the fact that the wheels are one-wear wheels, there is very little difference in the diameters of the old and new wheels, which is a considerable advantage in keeping proper adjustment between the working of the different motors on the same car, as in the case of unequal diameters the motors which drive the axles of the large wheels are likely to do more than their share of the work and burn out quickly, while the motors driving the small wheels, which originate very excessive wearing down of the tread and turning in the machine shop, will be running idle and shirking their full duty. This is a very important item with respect to motor repairs.

Where the diameters do not vary the car is maintained at a constant elevation, so there is no danger of the motors striking the pavement on account of reduced diameters.

FRICTION.

The hard wearing service of the tread and flange of the Griffin wheel becomes highly polished, and offers the least possible resistance to motion, and the friction between the tread, flange and rail is small; consequently there is a minimum wearing away of the wheel, rail and brake shoes without interfering with the retardation of the car when the brake shoes are applied.

SAFETY.

The factor of safety of the Griffin wheel can be made as great as desired, providing our recommendations, which are based on extended experience and records, are followed.

The percentage of failures is exceedingly small, and if the work required of the wheel is considered, and the metal proportioned accordingly, there will be no broken wheels. Owing to the small amount of flange wear there is always an adequate factor of safety in the flange, and a broken flange is of very rare occurrence if the proper design is used.

Under modern, high-speed cars, of heavy weight, the amount of heat developed when retarding the car, either for making stops or on descending grades, is an item which must be thoroughly considered. It is plainly evident that when the tread of the wheel becomes hot and the plates of the wheel remain cold there is an unequal expansion, which produces an intense tension in the plate of the wheel. Our experience shows just how much metal is required to safely resist this tension and make the wheel absolutely safe.

The tendency is to overlook this item in wheel design and to demand a light wheel on account of supposed economy, leaving out of consideration all manufacturing considerations and the work which the wheel is called upon to perform.

The reliability of the Griffin wheel is best shown by the results of 10,000,000 wheels in freight, engine and passenger service and 600,000 wheels in street and interurban railway service, and as the process is continually being made more perfect by more care exercised in manufacture and inspections, the element of safety is as nearly perfect as can be made.

NOISE.

Th smooth, hard, polished surface of the tread eliminates all rubbing, squealing and other disagreeable noises, hence in cases where the amount of noise made by the car wheel is an object to be avoided the Griffin wheels will be found most satisfactory.

The spoke and double plate patterns are well adapted for breaking up such noises as do originate, and whatever noise is made is of a low pitch and carries but a very small distance.

MILEAGE.

The life of the Griffin wheel, in miles, depends upon the amount of work which the tread of the wheel has to perform. In dense city service, where the number of stops is large and a high average speed is maintained, it is necessary to have powerful motors to produce rapid acceleration, the entire work of which is transmitted to the metal in contact between wheel and rail, and the equally rapid retardation represents an equal amount of work between the brake shoe and the tread of the wheel. These two items are practically independent of mileage and are important factors in the service rendered by the wheel. Under severe conditions the average mileage of the wheel may drop as low as 30,000 or 40,000 miles.

In interurban service, where the stops are less frequent, and therefore less brake service, the mileage ranges from 60,000 to 120,000 miles.

It is not at all uncommon in steam railroad service for wheels to run from 150,000 to 200,000 miles under passenger equipment.

Hence, the life of the wheel is entirely dependent upon the amount of work performed, and may be taken broadly as 45,000 to 50,000 miles for city service, 60,000 miles for interurban service and 100,000 miles for steam railway passenger service.

COST

The Griffin process of regulating the amount of combined carbon in the tread, as compared with the body of the wheel, is far more simple than any other possible method or process for obtaining a high percentage of carbon in the tread and low percentage of combined carbon in the plates and hub which, coupled with the availability of the materials and the fact of operating nine plants from Boston, Mass., to Tacoma, Wash., requiring short shipping distances to most street and interurban railways, insures the customer against a high wheel cost.

TYPES OF WHEELS

Under heavy modern electric cars, equipped with powerful motors, especially where speeds are high, or where heavy grades exist requiring severe brake applications to control the speed of the car, an adequate relation between the metal in the wheel and the work which it accomplishes must be carefully considered.

Our experience and records demonstrate that there is no economy in reducing the weight of the wheel to the lowest minimum, because of the impossibility of regulating the depth of hard chill at the surface of the tread, at the same time making the spokes or plates of proper quality.

A heavy body of wheel is always a good investment, as it insures the maximum amount of safety, and permits also of the maximum wearing value.

To demonstrate what has been accomplished in this line, a street railway using 400 lb. spoke wheels, against our recommendation, had a great many broken rims and broken wheels, with an average mileage below 38,000. After changing to our 500 lb. double plate wheel all their wheel troubles immediately disappeared, and the average mileage was easily raised to 50,000 miles.

Another example of what our heavy design chilled iron wheel can accomplish is demonstrated by an interurban railway running out of Chicago, which is equipped with 36-in., 800-lb.

Griffin wheels. The best of satisfaction is being obtained, and the wheels now in service have reached 60,000 miles.

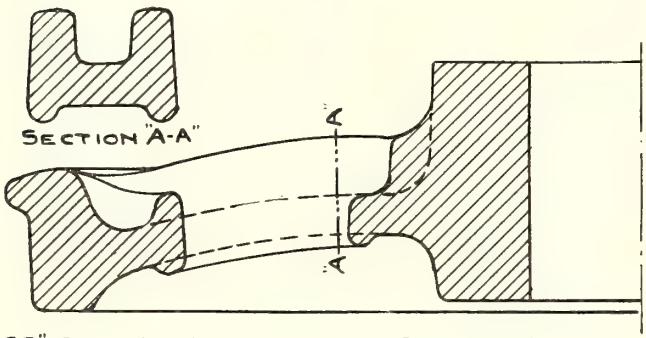
STANDARDS

Under light cars, in city service, the spoke type of wheel will give the greatest service with the least amount of metal; but as cars approach the weight of 40,000 lbs. the double plate will give the greatest strength and wearing value with the least amount of metal. These heavy wheels, on account of our design, are stronger structurally, and can be worn to the limit without fear of breaking.

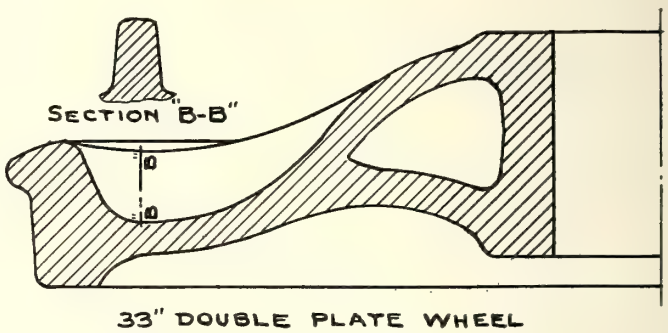
In order to get the best results from wheels, operating conditions must be closely observed, wheels and brakes specially harmonized, and more attention given to the relation of wheels to track, especially since the introduction of manganese-steel crossings, frogs, etc.

The only effect on the Griffin wheel is chipping the flange, and where this occurs it is always an indication of improper gauges, or obstructions in the flangeway, for the track should be laid in such a manner that the flanges will pass through without striking.

The guard rails should always be in such a position that the flange is carried through frogs without striking the bottom of



33" CURVED ARM CHANNEL SPOKE WHEEL



33" DOUBLE PLATE WHEEL

WEIGHT OF CAR	CITY SERVICE 2½" TREAD		INTERURBAN SERV. MED. SPEED 3" TREAD		INTERURBAN SERV. FAST SPEED 3½ TREAD		INTERURBAN SERV. FAST SPEED M.C.B. FLG. & TREAD			
	SPOKE	DBL. PL.	SPOKE	DBL. PL.	SPOKE	DBL. PL.	SPOKE	DBL. PL.		
32000	440	⊗	490	⊗						
36000	460	⊗	510	⊗						
40000	480	⊗	530	510	⊕	560	⊕	590		
44000	500	480	550	530	⊕	580	⊕	610		
48000	520	500	570	550	⊕	600	⊕	630		
52000	540	520	590	570	⊕	620	⊕	650		
56000	560	540	610	590	⊕	640	⊕	670		
60000	580	560	⊕	610	⊕	660	⊕	690		
64000	600	580	⊕	630	⊕	680	⊕	710		
68000	620	600	⊕	650	⊕	700	⊕	730		

⊗ DOUBLE PLATE WHEEL NOT RECOMMENDED.
⊕ SPOKE WHEEL NOT RECOMMENDED.

Fig. 4—Recommended Weights of 33-in. Griffin Wheels for Street Car and Interurban Service

Fig. 4 shows a section of the spoke type of wheel, and also the double plate, with the approximate weight for various widths of tread for each design for various classes of service; for any particular service it is necessary to consider the special requirements and design accordingly.

As yet, there is no such thing as standardization of street and interurban railway wheels. A great variety of dimensions are required, in height and thickness of flange, width of tread, length and diameter of hub and position of hub with reference to the gauge line.

The Griffin wheel of necessity adapts itself to these various conditions, as patterns are made with loose rims, flanges, and hubs, so that the desired width of tread, height of flange and size and position of hub can be produced without extra cost for manufacture.

the flange-way or the point of the frog, and if these recommendations are carefully observed chipping of flanges will be almost entirely avoided.

The problem of securing the greatest economy in wheel service must be worked out by a close coöperation between the user and the maker. Neither alone can accomplish the best results.

A careful study of all the conditions entering into the car operating cost, such as power consumption, both for driving the cars and for shop purposes, motor repairs, track renewals, wheel and brake shoe renewals, machine shop cost, etc., cannot fail to show that the Griffin wheel will produce the very lowest operating cost per mile, and the highest factor of safety.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Street & Interurban Railway Association and Its Affiliated Associations

VOL. XXXVI NEW YORK—OCTOBER 13, 1910.—ATLANTIC CITY No. 15C

PUBLISHED DAILY BY

McGraw Publishing Company

James H. McGraw, President. H. M. Wilson, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

HENRY W. BLAKE, Editor.
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NEW YORK, 239 WEST THIRTY-NINTH STREET.
ATLANTIC CITY, MILLION-DOLLAR PIER.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

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TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9500 *copies are printed.*

PROGRAM FOR TO-DAY

9.30 a.m.	Chalfonte Hotel, Meeting of the Accountants' Association.
9.30 a.m.	Greek Temple, Convention Pier, Meeting of Transportation & Traffic Association.
9.30 a.m.	Atlantic City Country Club—ASIRMA Golf Tournament—18-Hole Competition—Tournament Round may be played any time during the day (prizes).
2.00 p.m.	Greek Temple, Convention Pier, Meeting of the American Association (Executive Session).
3.00 p.m.	Marlborough-Blenheim, Japanese Tea for Ladies.
9.00 p.m.	Lobby, Convention Pier, Promenade Concert and Ball.

City Rules

The action of the Transportation & Traffic Association this morning on city rules was to ratify three of the changes recommended in the code by the rules committee this year, and in four cases not to adopt them. It was noticeable that in each one of the latter instances the majority opinion as expressed at the meeting was exactly contrary to the majority opinion as expressed in the replies received by the committee earlier in the year. In no case, however, was the total number of votes so large, either at the meeting or in the letter canvass, as to carry very much meaning. The largest number of votes given in the convention hall was 50, and the largest number of replies received by the committee as to any one question was 75—numbers which constitute only 14 and 21 per cent respectively of the entire number of 350 members of the association. This result emphasizes the point made by Mr. Hegarty, as one of the members of the committee, that unless greater interest was shown by member companies in expressing their wishes in the matter of the rules the committee would have no means of learning the consensus of opinion of the members. Under the circumstances the designation of the code adopted at the meeting yesterday morning as the Official Code for 1910 was the wisest thing to do, but the conditions disclosed suggest the advisability of the adoption, in future, of some method, like a letter ballot, of learning the ideas of the majority of members in the association.

A Word for Lighter Equipments

One of the most interesting portions of the report of the committee on equipment presented Wednesday before the Engineering Association is that which deals with the weights of the electrical parts. The history of electric railway equipments has been a curious one, beginning with converted horse cars and 7.5 hp motors. Weights of rolling stock have steadily increased up to the huge and powerful interurban cars of to-day, admirably suited for high-speed work, but altogether too heavy for street service under ordinary conditions. In the same way the call for high speed and consequently very great variation of speed where terminals were to be considered has brought in the use of heavy, intricate and costly motor equipments, capital for their own special purposes, but troublesome under many and perhaps most conditions. The change has come about partly in response to real needs and partly as a result of what comes very near to being pure fashion. It obviously is not true that every street railway must be equipped with 60-passenger cars adapted for a speed of 40 m.p.h. and fitted for the highest possible acceleration attainable without positive danger to the passengers. There are roads requiring this heavy equipment, but for each one of these there are a dozen roads which do not need it and there is now a most encouraging tendency toward more reasonable equipments.

The committee report, in considering the two and four-motor equipments, deals particularly with the saving in weight, which appears to be, in the case of ordinary requirements, not less than 25 per cent in favor of the two-motor outfit. This of itself is a matter well worth considering at a time when inventive genius is being taxed to reduce the weight of every article which goes into a car. But there is no doubt also, from the experience of the past decade, that when used within their proper sphere of action the two-motor equipments are more efficient than the four-motor, cost less per car to keep up and finally involve a smaller investment and depreciation charge. Incidentally, of course, the lighter equipment gives suitable op-

portunity for lightening the trucks, which still further increases its advantage. The obvious moral is that for conditions of speed and acceleration that do not require four motors the simpler equipment possesses advantages so considerable as to make its use highly desirable.

Fear has occasionally been expressed lest lightening the equipment, and particularly lessening the weight of the whole rolling stock, might tend to make cars ride less easily and perform less smoothly. On the other hand, as the committee indicates, the lighter equipment sometimes does better than the heavier in these respects and certainly is likely to produce less damage to the track, which is no inconsiderable advantage. On the face of the returns, therefore, it seems altogether desirable to retreat from the extreme position of the last few years and work toward rolling stock and motor equipment cheaper to buy and operate by reason of its less weight and equally well suited for the purpose of its use in most situations. There will always be necessity for heavy interurban cars where great speeds are to be attempted, but the introduction of these extreme types on most roads is, we believe, a mistake which should be corrected for the advantage of all parties concerned.

Specifications for Insulation

The report of the committee on power distribution deals fundamentally with the matter of specifications for cables. It has been only very gradually that experience enough has been gained with cables to make it possible to work out the proper specifications. It is perhaps even yet doubtful whether the specifications for so-called rubber-covered cables can be standardized in any satisfactory way. The suggestions for the high-tension paper cables made by the committee seem sound and conservative. There is this to be said for the paper cable, that when carefully manufactured and installed with rigorous attention to the character of the joints it stands up remarkably well. Thorough inspection of the sheath is the most necessary precaution in dealing with this kind of conductor. Deficiency in thickness is very properly penalized in the specifications. Variations in thickness should, we think, be dealt with even more severely. These fortunately do not occur often in serious degree, but now and then they appear and are liable to lead to trouble. The committee's guarantee for paper cables certainly sounds rigorous enough, but we are inclined to think it will be extremely hard in the future, as it has been in the past, to pin down the manufacturer to the responsibility after any considerable time has elapsed since the installation.

As to the rubber compound question the committee has made the best of a rather troublesome situation. To be perfectly frank, rubber compounds at the present time are difficult to subject to an effective specification. The best of them are very good indeed and the worst of them singularly bad, while it is very doubtful whether any physical, chemical or electrical tests not applied by one with a large practical knowledge of rubber manufacture can lead to anything like definite results. The thing to be feared in rubber cable is not complete and sudden breakdown due to a definite injury, as is commonly the case with paper cables, but slow deterioration under the influence of time and heat. Rubber itself varies considerably in quality and the treatment to which it is subjected produces still greater variations. These variations account for the phrase in the second clause of the new specification which provides that the inspector shall not be privileged to learn what mineral ingredients form a part of the rubber compound. In a sense these are trade secrets, but if there is going to be any physical and chemical specification it is certainly instructive to know what 70 per cent of the material paid for is made of, not with a view of prying into the manufacturer's business, but to find out the relations of this 70 per cent to the after history of the cable.

Electrical tests are satisfactory enough initially, but bear little direct relation to subsequent electrical conditions. After all, in the matter of rubber-covered cables, as in many other matters, the character of the manufacturing company for honesty and reliability goes further than any formal tests. One can specify a percentage of rubber and ascertain it. He can specify the thickness of the installation and the way in which it shall be put on, and can make initial tests of the completed cable, but the experienced rubber manufacturer can, if so disposed, evade any specification sufficiently simple to be practically applied, so that in a last resort reliability of the product is a question of honesty. Considering the present temptations to scamp rubber compounds the generally good results obtained from first-class commercial cable speak well for the sense of responsibility on the part of the manufacturers.

Advertising the Service

This is an age of advertising, and our convention issue this year is devoted largely to an exposition of the methods used by a large number of electric railways in advertising what they have to sell to the traveling public—that is, transportation. The summary in our convention issue shows that the electric railways as a whole have not overlooked the possibilities of advertising their service, but it is also true that some companies are not making the most of their opportunities in this direction. Perhaps this backwardness is due to forced economies in every department, or it may be due to indifferent success in the past which has discouraged further efforts. It is easy to discern the effect of successful advertising, but it is sometimes very difficult to locate the cause of failure of an advertising campaign which does not bring results. Undoubtedly the right kind of advertising pays handsomely, provided always that the service given is up to the standard claimed for it in the advertisements.

Advertising is not salesmanship, and it constitutes only one phase of the promotion of traffic. The purpose of advertising is merely to create interest in the thing advertised, or, in other words, the desire to buy. The next step is to offer the opportunity to buy. As applied to electric railways this means comfortable and attractive stations and adequate accommodations on the cars. Personal solicitation plays an important part in the creation of traffic. The time to sell is when the attention of the buyer has been secured through advertising. A circular letter is a helpful introduction for the solicitor, but personal salesmanship is the most satisfactory medium for closing a contract for a large excursion or special-car party.

Finally, the service given and the fares charged must be so attractive that a new patron secured through advertising becomes a regular traveler by the electric road, because the pleasant recollection of the first journey remains with him. Periodical advertising of a different kind from that required to create new traffic serves to keep fresh this recollection. Some managers believe that the features of the service they offer—frequent and comfortable cars, fast schedules and convenient terminals—are sufficient advertisement of the road. They may serve to hold regular patrons, but they create little new traffic. The occasional traveler and the stranger in a strange land bring in the extra revenue above operating expenses out of which dividends are paid, and it is to them that advertising should appeal. The ways of reaching them through paper and ink are legion.

Conventionalities

Who took "Billikin" for a ride in a wheel chair?

The members of the two convention ball teams were a stiff lot yesterday.

J. A. Lemon, of McCord & Company, made a flying trip from New York to look the convention over.

S. M. Curwen, of the J. G. Brill Company, arrived on Tuesday afternoon. He at once began circulating among his friends, and has been circulating ever since.

R. C. Cram, assistant engineer of the Connecticut Company, is attending the convention for the eighth consecutive year.

The installation weather was rather moist for exhibitors, but the weather man is evidently doing his best to rttrieve his good name.

William T. Dougan, engineer maintenance of way, Metropolitan Street Railway, is at the convtntion. "Bill" has promised to be good. There is a reason.

Carl P. Dennett, the local manager at Boston of the Griffin Wheel Company, is attending the convention for the first time. He has confided to his friends that he likes the experience.

J. J. Sullivan, president of the American Railways Company, came down from Philadelphia yesterday. Mr. Sullivan is a citizen of Atlantic City, as he spends about six months of the year here.

Mrs. J. R. Ellicott, wife of the president of the Manufacturers' Association, bears her official responsibilities with lightness and grace. She is a decided acquisition to the social side of the convention.

Ralph Sanger is present at the convention after a sojourn in Europe of four months. He reports the universal adoption and use of the "H. B." life guard, over 40,000 being in service in Europe and foreign countries.

One of the uncomfortable thoughts about these conventions is that there is no way to adequately express the appreciation which everyone feels for the work done by the officers and the committeemen of all the associations.

At the mysterious hour of 6.30 a.m. the lone, silent but majestic figure of Charles Banghart, superintendent of the New York & Queens County Railway, was observed in a buzz-wagon hastening through the deserted streets of this fair city.

The mechanical bird shown in the booth of the Dearborn Drug & Chemical Works is said to be of a chemically unknown type, and is reported to be the personal property of George R. Carr, one of the company's representatives.

Daniel M. Brady, president of the Brady Brass Company and ex-president of the Manufacturers' Association, is at the convention. Mr. Brady says he is too busy building a new plant to make an exhibit this year.

At the booth of the Massachusetts Chemical Company delegates have a chance of winning $500 by smoking a cigar handed out by Mr. Furbush. There is a number under the band. Get the lucky number and the money is yours.

His Excellency R. Nakakoji, vice-minister of the Department of Communication of Japan accompanied by two secretaries, will inspect the exhibits at the convention on Friday. His excellency will be accompanied by E. H. Mays, of the E. G. Long Company.

Wednesday, being Columbus Day and a holiday in New York City, gave many busy men an opportunity of visiting the convention at Atlantic City. Among others taking advantage of this opportunity was Charles C. Cluff, manager of sales, New York office, Carnegie Steel Company.

J. Alexander Brown, ex-secretary of several railway supply manufacturers' organizations, vice-president of the Pocket List of Railway Officials, government delegate to the recent International Railway Congress at Berne, is in our midst. He speaks with a foreign accent that is decidedly noticeable.

Whether it is the apparatus exhibited, the official family, or both, of the Railway Improvement Company, we notice that the booth is always crowded with delegates. Frank Hedley, president, R. L. MacDuffie, vice-president, James S. Doyle, treasurer, and Andrtw J. Pizzini, general manager, are all present at the convention.

John G. Buehler, Mrs. Buehler, Miss Buehler and John Kress, Jr., arrived from New York by automobile on Wednesday morning. It is rumored that the trip was successful, although they were on the lookout for "Bill" McGowan once or twice. It will be remembered that "Bill" towed Buehler into Atlantic City two years ago.

No face at the convention is more familiar or meets with a more hearty welcome than that of F. A. Estep, of the R. D. Nuttall Company, of Pittsburgh. This is the eighteenth convention that Mr. Estep has attended, and therefore the only delegates who do not know him are the younger men attending their first convention.

George Keegan gave a lifelike imitation of the five foolish virgins just before the baseball game Tuesday. He stole two A. & W. marker lamps and a gallon of Galena signal oil, and by so doing enabled the Yama Yamas to emerge from the dressing room with their hats on straight. The green light was reflected for hours by Hank Fassett's uniform.

Thomas W. Casey, of the Pay-As-You-Enter Car Corpotion, has just returned from Europe, after attending the Brussels Exposition and visiting a number of European railways in the interest of the P-A-Y-E cars. He reports a great deal of interest in this type of car in Europe. Of a number of new cars now being built by the Paris Tramways 10 cars will be the P-A-Y-E type.

The meeting hall provided on the pier for the Engineering Association was severely criticised after the meeting on Tuesday afternoon. In the midst of an interesting discussion on the report of the committee on power generation the meeting had to adjourn because no lights had been provided and the room became so dark that the stenographer could not see to take notes. The acoustic properties of the room were very poor and it was difficult to hear most of the speakers.

A prominent supply man is authority for the statement that you can buy anything on the Boardwalk except suspenders. He tried it Monday evening when he came to dress for the reception on the Pier. He found a full complement of glad rags minus the one most important piece of his wearing apparel. A belt failed to hold up his essentially masculine attire, and he was compelled to disappoint several ladies with whom he had engaged dances.

John S. Speer, of the Speer Carbon Company, as usual, is planning his annual moose hunt in the Maine woods. It is said that his room at the Marlborough-Blenheim resembles somewhat a National Guard armory. When he is not in his booth he is cleaning his magazine gun, with the hope of getting a shot. We would suggest that if George Fryling, Mr. Speer's brother-in-law, would stay away from his family a little more he would be able to keep Mr. Speer in the booth.

One of the busiest men at the convention is Secretary Donecker. Besides his actual work as secretary of the American and Transportation & Traffic Associations, he has general charge of the publications of all the associations and of the registration and official lists, besides being the final resort for all kinds of information about the associations This is not a vacation for Mr. Donecker. He is accompanied to the convention by Mrs. Donecker. This is the first convention she has attended, but it is to be hoped that it is not the last.

Arthur Warren, of the New York "Tribune," who is widely and favorably known in the electrical industry, came down from New York yesterday to visit old friends at the convention.

George H. Sanford and Homer Godfrey, of the David B. Crockett Varnish Company, Bridgeport, Conn., are present at the convention in the interest of the company.

W. J. Mulholland, purchasing agent of the American Railways, arrived in town Tuesday. It is rumored that so far he has not been able to "buck the line" and get into convention hall.

The Gulick-Henderson Company, engineer, of Pittsburgh, Pa., is represented at the convention by Henry Gulick, president of the company, who is a member of the engineering Association.

Robert W. Hunt & Co., Pittsburgh, Pa,. inspection engineers, are issuing a booklet containing the rail specifications of the Lorain and Pennsylvania Steel Companies, together with miscellaneous data on rails. A booklet containing the proposed rail specifications of the American Street & Interurban Railway Association will be issued as soon as they are adopted.

Edwin Hammett, superintendent of the Sheboygan (Wis.) Railway & Light Company, is present as the accredited representative of Ernest Gonzenbach, general manager, who is unable to attend the convention this year. Until a few months ago Mr. Hammett was the Pittsburgh representative of the Electric Service Supplies Company.

The Cambria Steel Company, Johnstown, Pa., has no exhibit this year, but it has on hand a large and enthusiastic delegation of representatives who are busy talking axles. In additon to J. Leonard Replogle, assistant to the president, the following local agents are in Atlantic City: C. J. Ellis, Chicago agent; William McLain, Pittsburgh agent; A. Morrison, Pittsburgh agent; H. L. Waterman, New York agent; W. S. Ottinger, Phiadelphia agent; H. P. Hubbell, St. Louis agent.

PRIZE WINNERS AT LADIES' EUCHRE

The names of the ladies who won prizes at the progressive euchre given on Tuesday evening at the Marlborough-Blenheim Hotel were received too late for insertion in Wednesday morning's paper. The following is a list of the prize winners, in the order of their scores: Mrs. W. P. Weaver, Mrs. F. W. Bacon, Mrs. Thomas Bell, Mrs. T. C. Cherry, Mrs. E. M. Hedley, Mrs. A. B. Conover, Mrs. W. E. Harrington, Mrs. J. C. Glair, Mrs. C. H. Thomas, Mrs. William F. Bifting, Mrs. A. L. Whipple, Mrs. B. M. Lathrop, Miss M. D. Campion, Mrs. S. F. Hazelrigg, Mrs. T. F. Grover, The prizes were handsome lamps, china and cut glass. John I. Beggs acted as judge of the scores, but he had no occasion to settle any disputes between the contestants.

AIRSHIP "AMERICA" TO BEGIN FLIGHT TO EUROPE TO-DAY

Walter Wellman, projector of the Atlantic City-Europe airship flight, states that the dirigible airship "America" is now practically ready for its long voyage. He hopes to make a trial trip to-day if the weather is propitious. The airship is housed in a hangar located at the Inlet, about 2½ miles from the Million Dollar Pier. This place can be reached by trolley line on Atlantic Avenue, and it has been inspected by many of the conventioneers.

The dirigible has a gas bag 228 ft. in length and the car is 156 ft. long. It is estimated that the trip to Europe will take about eight days, providing conditions are favorable, but the airship carries a store of provisions for a 30-day flight and emergency rations for 30 days more.

COMMITTEE ON PUBLIC RELATIONS

The committee on public relations of the American Association met and formulated its report on Tuesday, October 11. It also took up the question of work for the coming year. Various suggestions were made, and it was decided finally to appoint a subcommittee which will confer with the executive committee of the American Association after the close of the Thursday session. The subcommittee consists of E. C. Foster, New York; C. C. Smith, Milwaukee, Wis.; R. P. Stevens, Allentown, Pa.

AMATEUR VAUDEVILLE PERFORMANCE

The supply men's sixth annual amateur vaudeville and theatrical performance was given last night at the Apollo Theater before a large and enthusiastic audience. The production, which was staged by R. M. Campbell, of the entertainment committee, was an excellent one. The program follows:

Overture.

At the ASIRMA Club Smoker.....A few warm members

Convention Nonsense.....E. F. Wickwire

"He Must Feel Funny Inside."

(Through courtesy of the Ohio Brass Company.)

"THE BIRDMAN,"

A musical, nonsensical piece of fooling, written expressly for G. L. Emmons and A. L. Atkinson by William Gill.

Scene—A room in a hotel in Atlantic City.

CAST OF CHARACTERS.

Hawleybourg McGraw Roshayes Ellicastle, Esq..G. L. Emmons
Chairman of the executive committee of the A. S. I. R. M. A.

Pete Anthony Johnson, the Birdman.....A. L. Atkinson

(Through courtesy of the General Electric Company.)

Reuben Haskins from Skowhegan.....Ernest Wright

(Through courtesy of the Pantasote Company.)

SKETCH.

James S. Devlin and Miss Mae Ellwood presenting that "Taking Sketch,"

"THE GIRL FROM YONKERS,"

By Fred J. Beaman.

CAST OF CHARACTERS.

Augustive Butler, a wise city boy.....J. S. Devlin

Daisy Bennington, a simple country lass....Miss M. Ellwood

Place—Butler's apartment, New York City.

(Through courtesy of Westinghouse Electric & Manufacturing Company.)

"A Little Music".....Herbert A. Clark

Also a few Personal Hits. (Be ready to dodge.)

(Through courtesy of Allis-Chalmers Company.)

ASIRMA Quartet.

A few minutes of Grand Opera,

Miss E. Virginia Root, Soprano
Miss Alice L. Mertens, Contralto
John H. Thomas, Tenor
R. J. Owens, Bass

(Through courtesy of Standard Paint Company and Whipple Supply Company.)

In the year ended March 31, 1910, the London County Council Tramways carried 451,000,000 passengers as against 314,000,000 passengers in 1909.

WEDNESDAY MEETING OF ACCOUNTANTS' ASSOCIATION

The Wednesday morning session of the Accountants' Association was called to order by President Swift at the Hotel Chalfonte. The first speaker was W. M. Steuart, chief statistician for manufactures, United States Census Bureau, who discussed the last census of electric railways. A rising vote of thanks was extended to Mr. Steuart for his paper. The association will publish the paper in pamphlet form in order that the information presented may be available.

W. B. Brockway asked Mr. Steuart if it had been found that more companies were using the standard classification in 1907 than in 1902.

Mr. Steuart replied that more companies were using the standard system in the later year, and that in many cases where the full classification had not been adopted sufficient details had been used to permit the preparation of statistics in a satisfactory manner.

J. H. Neal, general auditor, Boston Elevated Railway, then read a paper on "Detailed Records — Their Use and Value."

Mr. Brockway, in discussing the paper, said that a good deal of his work consisted of the examination of properties. Sometimes the examination occurred years after the transactions had been reported in the records of the company, and it was frequently practically impossible to obtain any connected and intelligent information from the records as retained. The records of some one department were usually in pretty good shape; this department might be the accounting, the purchasing or some other department for which an enthusiastic electrical engineer or other official was directly responsible. The operating men who gathered the information did not digest it, and in only one of the numerous companies in regard to which Mr. Brockway had intimate knowledge had the reports and information gathered by the different departments been collected in one place. Perhaps the difficulty was due to the fact that each department stood more or less on its own feet, and struggled with its own problems without attempt to work together with a unified established plan for the whole property.

P. S. Young, Public Service Corporation of New Jersey, said that Mr. Neal had brought out the importance of simplicity in records of this character. All cost accounting appeared to be tending toward simplicity. Cost accounting seemed at first to be very complex, but as it was developed the tendency was to simplify records.

Mr. Steuart stated in answer to a question that the agents of the Census Bureau found that many important companies did not keep records from which they could secure the information desired for the census.

N. E. Stubbs, United Railways & Electric Company of Baltimore, asked Mr. Neal how he filed the statements in his office.

Mr. Neal said that each department sent in a time card. Abstracts of these cards were made on little slips, with a separate slip for each account. The same plan was followed with the material used sheets and with anything that affected the expenditures. When these were filed together they gave fine details of the accounts and summaries were made of the totals. The summaries were added on an adding machine. After the account had gone through the journal a trial balance was taken from the ledger. There was no special way of filing except that all the slips were of the same size and they were filed by accounts.

W. F. Ham, Washington Railway & Electric Company, asked how the shop employees or other employees were informed as to the assignment of their shop orders and whether they could keep account of these assignments readily.

Mr. Neal said that no work was done in the shop except on written order to the superintendent of the shop, who numbered the order and handed it to the foreman. The foreman called a man and gave him a time card and described the work wanted. The man stamped the card in a time clock when he commenced the job and again when he completed the work and reported to the foreman. When this plan was started it was found that the foreman had great difficulty in giving out new jobs so as to avoid loss of time between the completion of one job and the commencement of another. A memorandum was sent to the foreman each week showing the amount of time lost by men owing to the fact that the completion of jobs was not anticipated and delays in commencement of new jobs obviated, and by this means more careful arrangements were made so that there is now but a few minutes intervening between jobs.

Joseph A. McGowan, Indianapolis Traction & Terminal Company, asked who had access to the files and memoranda and what record Mr. Neal had in case the memoranda were taken.

Mr. Neal said that the original record in the auditor's office was the slip that contained the total of the summaries. The time card was returned to the shop, as the auditor would not require the detailed information which it showed. All the papers in the auditor's office were bound with wire stitches.

H. L. Wilson, Boston Elevated Railway, asked how many shop numbers there were.

Mr. Neal said that there were about 60 for all departments last year, but that was easier than if the 88 operating accounts had been followed.

Henry J. Davies, secretary, Cleveland Railway, read a paper on "Accounting Features of the Cleveland Street Railway Franchise."

ANNUAL MEETING OF THE MANUFACTURERS' ASSOCIATION

The annual meeting of the American Street & Interurban Railway Manufacturers' Association was held in the Greek Temple of Young's Million Dollar Pier, at 5:30 P. M. last evening, with President Ellicott in the chair. President James F. Shaw, of the parent association, made a few remarks, briefly expressing the appreciation which all of the associations entertained toward the work done by the Manufacturers' Association. President Ellicott and Vice-President Hequembourg explained some of the difficulties under which the executive committee had been compelled to labor preparing the booths for the exhibits and in other respects, all of which was received with approval by the many association members present. The report of Secretary-Treasurer Keegan showed that the association was flourishing financially, with a balance of upward of $7,000 on hand.

On motion of William Marshall, of the Anglo-American Varnish Company, seconded by D. M. Brady, of the Brady Brass Company, the meeting, by a rising vote, expressed its approval of the work of the executive committee and its officers during the past year.

The president appointed a nominating committee, consisting of A. H. Sisson, K. D. Hequembourg, S. H. Blewett, S. K. Colby and Edward Besuden.

The candidates reported by the nominating committee to succeed the retiring members of the executive committee were C. C. Castle, of the U. S. Metal & Manufacturing Company, to succeed himself for the unexpired year of the term of the office to which he was appointed subsequent to the last election; E. H. Baker, of the Galena Signal Oil Company, to succeed Otis H. Cutler; H. F. Martin, Pennsylvania Steel Company; W. H. Heulings, Jr., J. G. Brill Company; E. M. Williams, Sherwin-Williams Company, each to succeed himself; E. H. Bluett, of the American Car & Foundry Company, to succeed A. F. Partridge, of the A. F. Partridge Company, St. Louis.

After some complimentary remarks by D. M. Brady, who seconded a motion by H. Humphrey, of the Westinghouse Air Brake Company, that the secretary be instructed by a rising vote to cast the ballot of the meeting for the nominees, the election was confirmed, and the meeting adjourned.

MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The first action taken at the meeting of the Transportation & Traffic Association was the appointment of a committee on nominations. President Todd appointed C. Loomis Allen, N. W. Bolen and C. A. Silvester. He then called for the report of the committee on city rules. it was read by Mr. Hegarty.

CITY RULES

H. C. Page, Worcester, thought that while the changes suggested in the rules might be a little better than last year, it was inadvisable to make changes too frequently. The employees knew the rules as they existed, and it would take some time for them to get familiar with the changes. His company had adopted the old book. If it should adopt the new rules, the present books would have to be changed He was not a standpatter, but he thought that the association should go very carefully in making these changes.

Mr. Duffy, Syracuse, was largely of the same opinion as Mr. Page. As he understood the rule on responsibility, it made the motorman only responsible for running the car according to the schedule, but did not hold anyone particularly responsible for starting the car. On his own road, the motorman and the conductor were held responsible jointly for starting open cars and long pay-as-you-enter cars. With such cars, it was sometimes easy for the conductor, with a crowd, to get confused and not see a person at or near the front end of the car getting off.

On motion of Mr. Allen, a vote was taken on changing Rule 2 as recommended. The vote was 13 yeas and 25 noes. The association then voted to refer Rule 2 back to the committee for further consideration.

Mr. Hegarty thought little progress would be made by referring rules back to the committee. Last year, the committee sent out frequent requests for suggestions and opinions, but from 355 companies the committee got only 75 replies. It was useless to expect it to formulate a set of rules to apply to every road and cover every condition.

Rule 10 on bell signals was then considered.

Mr. Duffy, Syracuse, said his objection to Rule 10 was that his company was operating a considerable number of single-end cars. These cars are compelled to wye at the end of the line, and the only way that the motorman can possibly handle them under these circumstances is by backing and it is impossible to comply with the 10-ft. rule. Many times the lines are tied up and the cars have to back for a mile. He realized that it was impossible to suit all local conditions, but he himself would be unable to use Rule 10.

Mr. Page thought that the words "10 ft." would not mean much to many motormen.

Mr. Allen, Utica, saw no objection to referring rules back to the committee. In other words, he thought any rules committee should be a continuous committee and should not think it had concluded its work in 1910 and then think there was nothing to do until 1915. The rules would probably have to be considered every year.

Mr. Hegarty thought that if that was the case the member companies ought to reply more promptly to letters and circulars sent to them by the committee.

On vote, the adoption of the suggested change in Rule 10 was lost by a vote of 7 yeas and 27 nays.

The president then said the association would take up Rule 21, "Standing on steps." The new rule was adopted unanimously by 50 votes.

The president then said that they would take up "Rule 4—new rule—"Provide change;" under Car House Rules. This rule was adopted unanimously by 43 votes.

The next change considered was Rule 101, "Position on Car." C. E. Learned, Boston, asked whether the rule applied to center-entrance cars.

W. M. Casey, Denver, said his company operated side-entrance cars and that conductors had to be at the entrance at all times when not engaged in the collection of fares. He thought that the old rule was more desirable.

T. C. Cherry, Utica, said that with 15-bench open cars the conductor often had to ride on the running board.

L. H. Palmer, New York, said that the change from the old rule had been adopted by the committee because its idea was that the rules should be general. As comparatively few cars have center side entrances the committee thought it wise to eliminate any reference to such a design. Individual companies could cover such a situation with an additional rule or amendment. The question of standing on the running board of open cars was also considered, but the committee thought that that also might be covered by a special rule and it need not be put into the general code for the adoption of all.

The suggested change in rule 101 was lost on a vote of 9 yeas and 31 nays.

The president then said that the committee would take up rule 116 on change. On vote, the change was adopted by unanimous vote of 43.

The next rule considered was rule 213, "Power off line."

H. L. Patterson, Youngstown, thought it was necessary in this rule to differentiate between day and night operation.

Mr. Page, Worcester, was in favor of the rule as it now stood in the code. Mr. Emmons and Mr. Brush agreed with Mr. Page. The latter said that he had been trying the experiment of equipping the dispatcher's office and power station with a bell system so that in case the dispatcher gave an erroneous order and realized the fact, all the power switches could be thrown. This system would not be effective if coasting was allowed.

On vote, the association voted not to accept the amendment by a vote of 37 to 0.

Mr. Emmons, Fort Wayne, asked that the city rules committee be instructed to confer with the interurban rules committee to endeavor to harmonize the two sets of rules.

Mr. Duffy, Syracuse, suggested that the committee should also take into consideration the general adoption of pay-as-you-enter, especially so far as Rule 2 on responsibility of motorman and conductor was concerned. He had found it very practicable to hold the motorman responsible to some extent for safety of people in getting off and on the car instead of placing all the responsibility on the conductor.

The association then voted that the code of city rules as amended at the meeting should be the standard code of city rules for 1910; and that this code should be referred back to the city rules committee for further consideration and that it should also be instructed to communicate and act with the interurban rules committee with a view of harmonizing the rules for city and interurban service.

TRANSFERS AND TRANSFER INFORMATION

M. R. Boylan, Newark, then read the report on "Transfers and Transfer Information." This is published elsewhere in this issue.

L. S. Hoffman then read his paper entitled "Transfer Laws and Suggested Changes." An abstract of this paper is also printed in this issue.

At the conclusion of his paper Mr. Hoffman stated that he understood that the law in Connecticut enabled prosecutions to be brought against people who abused the use of transfers.

A. N. Brady, Anderson, stated that while his own road was an interurban road and hence had little occasion to issue transfers, it was a subject which interested him greatly. He thought that the abuse should be reached first by the establishment of local prohibition under the sanction of legal punishment, and, second by a vigorous campaign of prosecution under this law. The Interstate Commerce law and the most recent railroad legislation had declared distinctly against free transportation, and the former law made it a criminal offense for any person to accept free transportation either for persons

or property. Hence, if the transfer privilege is abused and the company carries a person free whom it does not intend to carry free, the offender is attempting to do by fraud an act condemned by the spirit of modern railroad legislation. For this reason he did not see why there should be difficulty in proving the validity of any proper legal prohibition founded on the lines of the act suggested by Mr. Hoffman to prevent transfer abuses.

Mr. Hegarty, Little Rock, said that the franchises of that company required it to pay a percentage of its gross receipts to the city. This made the city interested in stopping the abuse of transfers. On the Little Rock road the conductors deposit transfers every half trip. The transfers are enclosed in an envelope and the box into which the envelope is dropped has an automatic time stamp inside the box, so that any delay in depositing the envelope will be known when the envelopes are examined after the box is opened.

Mr. Casey, Denver, said that his company had issued a pamphlet of instructions to conductors on the subject of transfers. The standard time limit allowed in Denver is 10 minutes, but on some interurban lines a longer time has to be permitted and this pamphlet educates the conductors as to the time limit. In Denver the transfers are deposited in boxes every trip and the boxes are emptied every hour.

A delegate from a Southern city said that the envelopes containing transfers on his line were deposited in a locked box, carried on the side of the car. This box is emptied at the end of the day. By means of serial numbers it is possible to determine whether the transfers were deposited promptly. Separate registers are used for cash fares and transfers. Many of the courts in the Southern States pay little attention to prosecutions brought against people for abusing transfers, looking upon the offense as too trivial to warrant serious consideration.

C. E. Learned, Boston, said that some years ago the Massachusetts Legislature added the words "give away" to the law on transfers, so as to make it a misdemeanor for a person to give away a transfer. It was found that places known as exchanges would be established in bar rooms. They consisted of a box with a slot. A passenger on a car would ask for a transfer, and if he did not use it would throw it in this box, and pick out one that he did wish to use. To make a case clear the company put a number of inspectors on the cars. The conductors were forewarned, and when they took a transfer from a passenger under suspicion, the conductor, instead of putting the transfer in his left hand, would keep it in plain view until he reached the inspector who was in the rear of the car, and show him the number of the transfer. Both of them then took a note of the number of the transfer. When a passenger who was receiving a transfer under suspicion left the car the inspector followed him and saw him give his transfer away. He would then follow the man who took it to his car, where the conductor would repeat the procedure of holding the transfer in his right hand, so that it could be identified by both the conductor and the inspector. Evidence was secured in this way against six prominent merchants. All pleaded guilty, and were fined from $18 to $20 each. There was a good deal of newspaper notoriety about it. The company has had very little trouble since.

Mr. Hibbard, Toronto, said there was no special law in that city on the subject, but the company has not waited for any law to be passed. Some years ago the conductors would take almost anything that a passenger would offer. About three years ago, however, the company took up the subject seriously. A transfer was prepared in which the conductor punches out the time and also the number of the car. The city was divided into sections, and these are also punched, so that it is now possible to tell the route that each passenger travels. The transfers are checked, and the conductors are graded as to the number of defective transfers which they accept, and the results are posted on a bulletin board. Articles have been published in the daily papers saying that conductors had no power to adjust questions of fares, and urging any passenger who had a grievance, or thought that he had been given a defective transfer, not to take it up with the receiving conductor, but directly with the company. The company did not eject for defective transfers, but took the name and address of the passenger, and had him summoned to the police court. If the magistrate saw any element of fraud in the case the offender was fined.

On motion of Mr. Page, the report was accepted, and the subject was laid on the table, to be taken up again next year. The paper by George L. Radcliffe, on the use of metal tickets, was postponed until this morning. The meeting then adjourned.

CLAIM AGENTS' ASSOCIATION—CLOSING SESSION

The closing session of the Claim Agents' Association was opened with the reading of the paper entitled "Criminal Negligence of Employees; What is the Best Policy to Pursue in Such Cases?" by E. F. Schneider, general manager and claim agent of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.

C. B. Hardin read the paper in the absence of Mr. Schneider. The reading of this paper was followed with a written discussion by W. O. Stout, general claim agent, Minneapolis division Twin City Rapid Transit Company, Minneapolis, Minn. Several of the members also engaged in a discussion of this subject. Mr. Hooper, of the Hooper-Holmes Bureau, then addressed the association relative to the index bureau, as follows:

"I apprehend there are quite a number of you here who have not yet been able to grasp the full scope of this work that we are carrying on. This work was inaugurated in May last, and since that time we have received reports from 34 out of the 350 companies. Ten per cent practically of the street railway companies of this organization have availed themselves of the use of this bureau. During those five and a half months we have received from the various street railway companies notices of 2,874 claims, and in 175 cases we have been able to give them back information of simultaneous or previous claim records of some kind, many of which, at least, would be of use to them, but of these 2,874, 2,467 have been contributed by three companies, and the balance of 407 have been contributed by the other 31 companies, a very small average. Besides that, the companies which have been reporting freely have out of the 175 cases which we have given them back again, received 125, and the 31 companies reporting 407 claims have received items of more or less interest from us in 50 cases, over 12 per cent of the number of cases they have reported to us; while the three companies giving the large number of reports have received fully 7 per cent of what they reported. I give these figures to indicate how much the service of the bureau has been utilized up to the present time.

"There seems to be a general idea that this work is protection against fraud, but that is not all of it. There are about 7,000,000 insurance policies in force in the United States to-day. Now it is very natural for a man who has sprained his ankle getting on or off a street car, if he has an accident policy, to make application for benefits under that policy. He must, under his contract—that policy is a contract—do certain things. He must give immediate notice of the injury to the company; he must fill out blanks detailing the nature of the accident, the nature of the injuries, the witnesses who can bear him out; and he must produce a statement, made by his own physician, and signed by the physician and under oath, as to the nature of the injuries and the amount of disability.

"Now to make his claim valid, under his contract or pol-

icy, the beneficiary under the policy must do the things which I stated and one or two others, but if that same man has received his injury on a street car he does not perhaps report immediately. Sometimes three or six months or a year would elapse before any claim is made by him—too late for the company to make a proper and thorough investigation. This is particularly true of the unjust and unfounded claims. If, however, the railroad company is in possession of the absolute statements, many times sworn to by the same man who has made a claim for the same accident against a casualty company, and he can get the possession of those papers and of that record, you can see how immensely it would help the street railway claim agent to settle that man's claim on a just and equitable basis.

"The insurance company also has the right to send its medical examiners as often as it desires to examine the person and the body of a claimant to determine the justness of his claim. In many, if not all of the States, the railroad company cannot do that. Hrere is where coöperation between the two lines of organizations is so valuable. Within the last two or three years we have had 100 or 150 cases where the insurance company has been only too glad to coöperate with a railroad subscriber to the bureau in making such examinations, always giving any information that it has.

"We have been at this work since February, 1895. Our experience has been that the transportation companies are really getting more benefit from this work than the casualty companies are, in proportion to what it costs them and in proportion to the number of claims they have. The report of the bureau for the past year—the year ending the 1st day ot July—shows that we had 229,664 disabilities reported to us by the different subscribers, and we found either simultaneous or previous records against these various parties in 92,842 cases, 40.4 per cent of the claims reported to us. During the same period, the railroad companies, who only report filed claims, received from us 22 per cent of what we call duplicates; that is, two or more records on the same man. I think you will realize how valuable it is to you to receive on an average information of other claims in, say, 7 per cent of your cases. If you receive but one out of 100 you are going, at least, to get information of much benefit. It only costs five cents to report a case.

"I imagine from the reports that we have received that most of you have been reporting only the cases which you have thought were fraudulent or in suit. It is wisdom for you to spend five cents when a man is injured on your road in order that you may be prepared for his claim in case it should come in. I do not mean to say that you would get information in every case that you report to us, but you are going to get at least 7 per cent and in a little while about 22 per cent, I think.

"We have at the present time 55 large active casualty insurance companies and 48 of the largest steam railroads in the country coöperating in this work, reporting about 250,000 claims a year to us, in addition to the 354 members of this organization, most of whom are not reporting at all. Now there are 456 corporations which each and every one of you can coöperate with in this work. In no other way can you do it except through this bureau with such a number as that. The price you pay, then, is, under our contract, first, five cents for every name you report to us. The other price you pay is loyalty and good faith to the other subscribers, and a small amount of labor. You are all supplied with blanks upon which to report. We have never yet had a case of bad faith upon the part of our subscribers."

REMARKS

The amendments to the constitution and by-laws of the association providing for a change in the name of the association to "American Electric Railway Claim Agents' Association," and the admission of associate members who are officers of member companies, were adopted.

ELECTION OF OFFICERS

The nominating committee presented the names of the following gentlemen who were unanimously elected to serve as officers of the association for the ensuing year:

President, H. V. Drown, general claim agent, Public Service Railway, Newark, N. J.

First vice-president, H. K. Bennett, claim agent, Fitchburg & Leominster Street Railway, Fitchburg, Mass.

Second vice-president, C. A. Avant, claim agent, Birmingham Railway, Light & Power Company, Birmingham, Ala.

Third vice-president, Walter S. Heaton, claim agent, Los Angeles-Pacific Company, Los Angeles, Cal.

Secretary and treasurer, B. B. Davis, claim agent, Columbus Railway & Light Company, Columbus, Ohio.

APPOINTMENT OF COMMITTEE

The following members were appointed by President Drown to serve on the executive committee for the following year:

James R. Pratt, assistant general manager, United Railways & Electric Company, Baltimore, Md.

John S. Reynolds, Boston, Mass.

J. H. Handlon, claim agent, United Railroads, San Francisco, Cal.

W. Tichenor, claim agent, Terre Haute, Indianapolis & Eastern Traction Company.

The committee on employment consists of the following members:

R. H. Schoenen, claim agent, Lehigh Valley Transit Company, Allentown, Pa.

C. J. McLeer, claim agent, Schenectady Railway, Schenectady, N. Y.

Thomas A. Cole, claim agent, Los Angeles Railway, Los Angeles, Cal.

The committee on ways and means for 1911 includes:

T. B. Donnelly, claim agent, West Penn Railways, Pittsburgh, Pa.

Charles B. Brunner, claim agent, Easton Transit Company, Easton, Pa.

C. B. Proctor, claim agent, Memphis Street Railway, Memphis, Tenn.

C. H. Mathews, claim agent, Georgia Railway & Electric Company, Atlanta, Ga.

Upon the index committee appointed for 1911 are the following gentlemen:

H. R. Goshorn, general claim agent, Philadelphia Rapid Transit Company, Philadelphia, Pa.

B. B. Davis, claim agent, Columbus Railway & Light Company, Columbus, Ohio.

Cecil G. Rice, claim agent, Pittsburgh Railways, Pittsburgh, Pa.

William F. Weh, claim agent, Cleveland Railway, Cleveland, Ohio.

R. E. McDougall, claim agent, Utica & Mohawk Valley Railway.

A vote of thanks was given to the retiring officers, to the members of the banquet committee, and to the management of the Traymore Hotel for the courteous treatment which it had accorded the association. A vote of regret was passed on the absence of H. R. Goshorn, past-president, who is ill.

A motion was made and carried that E. C. Carpenter should be elected an ex-officio member of the executive committee.

The meeting then adjourned.

A model of the Wellman airship up at the Inlet is on exhibition at the booth of the Consolidated Car Heating Company. "Pegleg" Farmer is making ascensions every hour. A thermostatic control of electric heaters is hatching chickens every little while.

WEDNESDAY MEETING OF THE ENGINEERING ASSOCIATION

President Harvie called the meeting to order at 9:40 a. m., and the first order of business was the continuation of the discussion on the report of the committee on power generation.

C. O. Mailloux, New York, referred to the statement made in connection with the subject of forced draft that the "problem of handling forced-draft systems efficiently in railway power plant service comes back to getting firemen to fire well at the varying rates which are required by the varying loads." It is much easier, he said, just to meet the demand for steam when the load is steady than when it varies widely, and that is one reason why the CO_2 recorder is more valuable in a station carrying a lighting load than in a railway station. Constant steam pressure has an important bearing on the economy of compound engines and there is also a particular pressure which gives the best economy in steam turbines. When the steam pressure in the boiler starts to fall, the usual practice is to open the damper and put on more coal. Very often this results in holes in the fire which reduce the efficiency and do not increase the output. When the pressure gets too high, the first thing which is done is to close the dampers and this leaves an insufficient supply of air for the combustion of the coal already in the furnace. Consequently the gases contain a larger proportion of CO_2. Under practical operating conditions, the speaker believed that the percentage of CO_2 was far from being a fair index of boiler efficiency. Efficiency, after all, was a secondary consideration in boiler operation. The primary function of the boilers is to supply the amount of steam necessary. Sometimes the efforts of the firemen to obtain high efficiency are worse than useless, because in the attempt to attain a high efficiency the proper operation of the plant is interfered with. Improper control of the dampers is responsible for more loss of efficiency than any other detail of operation of boilers. Automatic damper control devices are not very satisfactory. The best method is to have a system of signals connecting the boiler room with the switchboard so that the firemen can control the dampers under instructions from the switchboard operator who sees the load fluctuations. The boiler room is entitled to receive as much attention in this respect as the engine room. Damper control should not be regulated solely with reference to the CO_2 in the flue gases. The first thing which the dampers should control is the steam pressure and the second essential in their manipulation is to control the volume of steam produced in the boiler. Because a satisfactory steam flow meter has not yet been developed, it is practically impossible to determine accurately the amount of steam which is being generated by the boiler. The quantity of feed water is not an accurate index. Mr. Scott had told the speaker of instances in which two boilers of 1500 hp each had been found to be operating at very different rates of production, one giving 500 hp and the other 2,000 hp. Boiler efficiency was the most important element in a boiler plant. Every increase in the efficiency of the boiler is multiplied at the switchboard in the ratio of the efficiency of the entire plant.

William Roberts, Akron, Ohio, said that exhaust steam turbines were like the first storage batteries. Unfortunately, some of them had been put in places where they did not produce the results expected. Referring to the development of steam meters, he did not see that any great progress had been made during the past three years. Progress was being made in the development of reliable and accurate flue gas analyzers.

On motion the report of the committee was accepted.

President Harvie then announced that it was with much regret that he had to present to the association the following letter of resignation from John W. Corning, the secretary and treasurer of the association.

"Oct. 10, 1910.

"To the Acting President and Members of the American Street & Interurban Railway Engineering Association.

"Gentlemen:—Owing to increase in my duties with the company with which I am connected, I feel it incumbent upon me to tender you my resignation as secretary-treasurer.

(Signed) "John W. Corning, Secretary-Treasurer."

REPORT OF COMMITTEE ON EQUIPMENT

John Lindall, Boston, presented the report of the committee on equipment. He said that in taking up the subject of car-body design it had been suggested that the committee undertake the design of a car giving consideration only to weight and strength, but it was early concluded that this would be of no practical value, as cars must be designed primarily to be safe, comfortable and convenient. Weight was important, but a secondary consideration. He believed that still further improvement could be made in reducing the weight of cars by better design, better material and a closer check of the weights of all parts of the car and its equipment. Referring to the recommendations on steel wheels, he said that, on account of the necessity for keeping car steps as low as possible and on account of the saving in weight, the committee had recommended dropping certain sizes of steel wheels with rims 3 in. thick from the list of proposed standard sizes. The committee had been unable to make a thorough study of gears and pinions, but it was evident to everyone that the practice of considering only the mechanical strength of the teeth is insufficient. Consideration should be given to the effect of wear on the teeth and also the effect of wear in the armature and axle bearings.

M. V. Ayres, Worcester, referred to the table of weights of three cars arranged on the basis of pounds per passenger seat and pounds per square foot of floor area. He thought that the weight per square foot of floor area was a much better unit for comparison than the weight per passenger seat.

W. Thorn, Chicago, pointed out that the distance between centers of cross seats had an important bearing on the total floor area required to install any given number of seats. The distance between centers of seats varied from 29½ in. to 33 in. He thought that many cars are equipped with too much horsepower to the motors. The manufacturers of the equipments were inclined to recommend sizes a little larger than necessary in order to be on the safe side. He referred to the use of aluminum sheets for interior head linings, which have been tried on a number of cars. The principal objection to the use of aluminum was that it was almost impossible to varnish it. Considerable weight was saved by its use. He did not believe that the plain appearance of an arched roof was a valid objection to this type of construction.

W. H. McAloney, Denver, said that the use of fare boxes and other prepayment devices on the platforms of cars required the platforms to be made exceedingly heavy and strong. With regard to bolsters, he had been using cast-steel bolsters for the past three years and had saved considerable weight over the ordinary built-up bolster. The cast-steel bolsters are very rigid and no trouble is experienced with noise. He believed that the arch-roof construction was going to come into general use, but the problem of ventilation and the location of destination signs were matters to be worked out. For city cars he believed that plate glass was not only a luxury, but it was considerably heavier than ordinary window glass, and when used in drop sashes was very likely to break.

Samuel Curwen, J. G. Brill Company, said that the question of standardization in car construction was the most important problem of the day. The condition of the track over which the cars are to be operated had an important bearing on the construction of the car. On a perfect track a much lighter

car could be run without serious deterioration than on a worn-out track. With regard to the distance between seats, he thought that this could be reduced to 29 in. without inconvenience to the passengers. The relative merits of the plain arch roof and the monitor-deck roof were largely a matter of taste. By using mechanical ventilation no trouble should be experienced on this score. In India and other hot countries where it is necessary to have good ventilation in order to keep the car moderatly cool the roofs were made double and a current of air was circulated between the upper and lower layers by a mechanical device.

At the present time hardly any two cars are built alike. When this wide variation in designs is brought to the attention of a purchaser, he gets the idea at once that his conditions likewise are different from those in other cities and he wants a special design of car. The speaker did not believe that the conditions differed so very much in different cities, and thought it would be possible to come to standards in car construction which would be not merely standards of length or other detail dimensions, but would be complete standard designs. As a means of decreasing the weight of prepayment cars with long platforms Mr. Curwen suggested moving the truck centers out as far as possible so as to decrease the leverage of the overhanging ends.

H. H. Adams, New York, discussed the report of the committee on equipment at length. He thought that the items that go to make up the complete car equipment should be subdivided as to the car body, trucks, electrical equipment and air brakes. The car-body weight should be given complete without any of the other parts, but should include such items as wiring, lamp fixtures and switches, etc., together with the necessary brake levers and the brake rods. The electrical equipment should include the complete weights of motors with gears and gear cases and the balance of the electrical equipment on the car, such as controllers, resistances, cables, conduit, etc. In the installation of equipment on the cars considerable saving in weight can be made. In a recent study of this question Mr. Adams found that by combining three resistance boxes into two and by the use of a lighter end plate instead of heavy end castings a great reduction was made in the weight. The size of the hangers used to support apparatus under the car body can also be studied carefully with good results. In one instance a reduction of at least 600 lb. in the weight of the material required for the installation of the apparatus under the car was made. Lighter conduit probably could be used for the car wiring. Many air reservoirs are two or three times as heavy as they need to be for the pressure which they are required to carry. The manufacturers of car-heating apparatus can assist materially in lightening their product by the use of pressed steel instead of cast iron. With modern controllers of the K-35 type it would be possible to reduce the weight by using aluminum backs on the controller case. With older types of controllers, however, the back is used in conjunction with the magnetic circuit and consequently it cannot be made of aluminum. With regard to the recommendations of the committee as to comparisons of car weights on the basis of weight per seat and weight per square foot, Mr. Adams thought that in each case a description of the car and its equipment should accompany a statement of the weights in order to make an intelligent study of the subject.

The amount of paint that goes on a car varies with the type and size of the car, but it runs as high as 600 lb. for cars of large size. Lead paints are exceedingly heavy and their use should be limited wherever possible. The weight of the finish on the headlining is considerable. In one particular car the use of paint as against a varnished natural finish represented a difference of 27 lb. in weight. Expressed in terms of weight per square foot, a lead-paint finish weighs 1.75 oz. more than a natural varnish finish. The underside of the platform hoods on cars is usually finished with lead paint. It might be advisable to go back to the old practice of finishing these parts in the natural wood. Another small item is the weight of the signs which are printed and framed in the cars. Printed aluminum signs have an attractive appearance, are easily cleaned and effect a material reduction in the weight. He figured that the substitution of aluminum signs for glass-covered signs effected a saving per car of 40 cents per year. In the construction of car bodies considerable reduction in weight can be accomplished by using special sections of pressed or structural steel. Another place where it is possible to make some reduction is in the flooring. By grooving out the underside of the floor boards sufficient strength will still be left to meet the requirements of stiffness.

William Roberts, Akron, Ohio, said that in the cars on his road the distance between seat centers had recently been increased from 32 in. to 34 in., and that the width of the seats had been increased to 40 in. by reducing the width of the aisle from 23 in. to 19½ in. This change had been appreciated by the operating department and by the traveling public. Where a car is used for long-distance travel the spacing of the seats was most important and the width of the aisle was of secondary importance. He did not believe that any attempt should be made to reduce the weight of cars by decreasing the size of the axles.

F. R. Phillips, Pittsburgh, in reply to a question about the experience with side-rod trucks, said that the power consumption with these trucks was considerably less than the power consumed by four motors of equivalent size. The additional maintenance of the side rods was probably offset by the lower maintenance of the two-motor equipment. The side-rod cars did not ride as easily as the cars equipped with four motors. With reference to the relative merits of steel and wooden cars, he said that his company started with steel underframes and is now having cars built with steel roofs. The next development would probably be cars made entirely of metal. His experience was that the plates in the side girders had little or no part in carrying the load on the car. The side sill, the belt rail and the posts carry the load as a built-up truss. The bolsters on the new steel cars of the Pittsburg Railways were formed of pressed steel shapes; for a 45-ft. car the bolster weighs but 120 lb.

DISCUSSION ON WHEELS

C. G. Bacon, Jr., Carnegie Steel Company, submitted a written discussion on steel wheels. Assuming that the conclusions in the committee report are correct, that is that the net cost of a two-wear wheel is $21.05 and that the cost of the one-wear wheel is $17.25, he made some comparisons based on actual mileage records.

The two-wear wheel of the type under consideration weighs 515 lb. when new, and 358 lb. when scrapped after a life of 125,000 miles; it had an average operating weight of 437 lb. The one-wear wheel of the same type weighed 465 lb. when new and 384 lb. when scrapped after a life of 75,000 miles; it had an average operating weight of 425 lb. If the cost of hauling dead weight was 5 cents per lb. a year, and this was multiplied by the factor 1.88, the cost per lb. of hauling weight in the wheels was 9.4 cents. The average operating weight of the two-wear wheel multiplied by the cost of power, 9.4 cents per lb. and by the estimated life as given by the committee would show a total cost for hauling of $96.34. This added to the net cost of the wheel, made a total cost of $117.39 for 125,000 miles, or a cost of $9.39 per 10,000 miles. On the same basis, a one-wear wheel cost $9.80 per 10,000 miles, or 41 cents more than the two-wear wheel. It should not be assumed that because the one-wear wheel weighed less than the two-wear wheel there was any appreciable difference in the cost. The one-wear wheel 33 in. in diameter would cost as much if not more to manufacture than the two-wear wheel. If the two types of wheels were considered on the same basis of first cost, the difference in favor of the two-wear wheel would be even greater than 41 cents per 10,000 wheel miles.

Mr. Bacon earnestly urged that no action be taken by the association at this time with regard to endorsing one-wear wheels as more economical than two-wear wheels. The manu-

facturers of wheels had no selfish motive in recommending the two-wear wheel, as it would be to their advantage to sell twice as many one-wear wheels. The speaker felt that the best interests of all concerned required that further investigation be made before any action is taken in altering the present standard practice.

W. P. Barba, Midvale Steel Company, briefly described the method of manufacture of steel wheels and said that it was almost impossible to roll wheels with rims less than 1¾ in. thick. He suggested that experiments be made during the coming year with one-life wheels to see if they gave the service claimed for them, and also that the structure of the wheels be carefully studied. He was sure that the cost of rolling a wheel with a thin rim would be greater than the cost of a wheel with a thick rim. The cost of the weight of metal was nothing. His company had had inquiries for wheels with rims as thin as 1¼ in. He did not know where any more weight could be taken off of the present types of wheels.

N. W. Storer, Westinghouse Electric & Manufacturing Company, in speaking from the standpoint of the manufacturer of motors, thought that there would be a distinct advantage in favor of the one-wear wheels. The wheel of smaller diameter would enable a larger gear ratio to be used, and hence the power consumption would be less. He thought that a motor designed for higher speed for a given output could be used with a one-wear wheel.

C. O. Mailloux, New York, said that the energy absorbed by the wheel depended not so much upon the weight of the wheel as upon the distribution of the metal. The radius of gyration of ordinary car wheels ranged from 0.65 to 0.85 of the radius of the wheel. He took exception to the statement of the committee that weight carried in the wheel did not contribute to journal friction, but did contribute to track friction.

A. D. Campbell, Seattle, Wash., said that what was wanted was a wheel which had greater resistance to flange wear. Very few wheels were turned on account of wear of the tread. Much of the flange wear took place on straight track because of the tendency of the truck to move sidewise. He thought that some of this wear could be eliminated if better side and center bearings were employed.

M. V. Ayres, Worcester, Mass., in reply to the remarks of Mr. Barba, said that Mr. Benedict, of Albany, did intend to carry out the experimental tests with light wheels which Mr. Barba recommended, but he was unable to do so because he could not get the wheel. Referring to Mr. Mailloux's remarks about the radius of gyration, he said that it was only necessary to consider in this case the radius of gyration of the metal which would be removed from the rim. That metal would be located approximately 15 in. from the center of the wheel.

The section of the report of the committee on steel wheels was accepted and referred to the committee on standards. The section of the report relating to a mounting gage for wheels was also referred to the committee on standards, as was the section on gears and pinions and specifications for wrought-iron bars.

HEAVY ELECTRIC TRACTION—DISCUSSION ON AXLES

The report of the committee on heavy electric traction was presented by Mr. Doyle, who asked Mr. Barba to give a brief description of the heat treatment of axles.

Mr. Barba said that heat treatment was simply the process of oil tempering and cooling applied to inherently good steel of proper compostion in order to get the molecules of the metal arranged so that they would offer the greatest stiffness and resistance under the bending strains to which they were subjected in an axle under a car. Steel, as it came in the form of an ingot, was a granular substance which might be represented by a pile of bricks without mortar. The surfaces were easy to cleave apart. Heat treatment put the grains into a condition which might be illustrated by interlocking the fingers of each hand and bringing the palms together. After the steel was heated, it would not break apart. The finer the granular structure, the greater was the resistance to rupture. All that heat treatment required was intelligent use of the heat-controlling instrument. The specification recommended by the committee would absolutely insure that axles offered by the manufacturer for inspection and acceptance as heat-treated material actually had been given proper heat treatment.

W. A. Bostwick, Carnegie Steel Company, said that while he had not been in full accord with all of the specification proposed by the committee, at the same time he wished to assure all those present that the specification would result in companies obtaining the very best carbon steel axles for use in heavy service.

J. L. Replogle, Cambria Steel Company, said that since the Denver convention the various manufacturers had been in consultation with Mr. Doyle and their ideas were incorporated in this specification, with which they were in entire accord. He believed that severe electric traction service required something better for axle steel than steam railroad service, particularly because of the high gyration stressing due to the motor being attached to the axle.

Frank S. Slocum, Jones & Laughlin Steel Company, said that his company had not been invited to the conferences of the committee. Before any official action was taken in regard to hammered heat treated axles, it should be known on behalf of his company that it had been manufacturing cold rolled railway axles for several years. His company would be pleased to cooperate with the committee in any way the latter thought desirable in the effort to formulate satisfactory specifications.

J. S. Doyle said that the consideration by the association of the specifications for heat-treated axles did not debar any company from buying cold-rolled steel if they so desired. The committee was not trying to discredit in any way the use of any material now being furnished.

COMMITTEE ON NOMINATIONS

The president appointed the following committee on nominations to report at the meeting on Friday: J. W. Corning, Boston; William Roberts, Akron, Ohio; G. H. Kelsay, Anderson, Ind.; Charles Hewitt, Philadelphia; L. W. Jacques, Fort Wayne, Ind., and A. T. Clark, Baltimore.

The meeting then adjourned until the afternoon, with the understanding that the discussion on the report of the committee on heavy electric traction should be continued.

AFTERNOON SESSION

President Harvie called the meeting to order at 2:30 p. m. and the discussion of the report of the committee on heavy electric traction was resumed.

J. S. Doyle explained that E. B. Katte, New York Central & Hudson River Railroad, who wrote the section of the report referring to location of third rail, was unable to be present at the meeting on Wednesday, but that he had written asking that the recommendations concerning the location of the third rail should be laid on the table for the present, owing to the fact that the American Railway Engineering and Maintenance of Way Association did not agree with the recommendations contained in the report.

H. N. Latey, New York, criticised the wording of the definition of gage of the third rail. He said that the definition contemplated a standard rail section, but that with a rail section having a beveled edge, such as is used in the Hudson tunnels, it would be difficult to define the gage limit. He also objected to definition No. 11 of "third-rail covering," on the ground that the part defined was intended to protect the third-rail shoe. He also thought that in definition No. 13 the words "shoe incline" should be "side incline."

Mr. Doyle accepted these criticisms and explained that Mr. Katte would be in Atlantic City on Friday, and that he hoped the discussion would not be finished until

such time as Mr. Katte could be present. Referring to the specifications for heat treated axles again, he thought that in the future any committees appointed to consider metallurgical questions in connection with standards should work with a joint committee of the American Society for Testing Materials.

C. F. Adams said that such a plan would be of the greatest value to the American Society for Testing Materials, and that it would be a good plan to withhold final adoption of the specifications for heat-treated axles until a conference could be held with a committee appointed by the American Society for Testing Materials.

Mr. Bostwick outlined the methods pursued by the committees of the Society for Testing Materials. These committees consist of a joint representation of the manufacturers and consumers of material. The chairman of each committee must be either a consumer or a designing or consulting engineer. On behalf of the American Society for Testing Materials, of which he was an executive committee member, he said that the society would be glad to work in harmony with the Engineering Association in all matters of common interest.

Mr. Stevenson, said that the American Society for Testing Materials now had a sub-committee on specifications for rolled steel wheels which had been at work for nearly a year and a half. The committee expected to submit specifications next June.

H. H. Adams moved that the president of the Engineering Association be authorized to communicate with the secretary of the American Association for Testing Materials and determine the proper procedure for the appointment of a committee to work in conjunction with that society in connection with specifications for heat-treated axles, and that the president be given power to appoint such a committee. The motion was carried.

H. H. Adams, chairman of the supervising committee of the Electric Railway Dictionary, which is beng published by the McGraw Publshing Company, described briefly the purpose and arrangement of the dictionary.

POWER DISTRIBUTION

A. F. Hovey, in presenting the report of the committee on power distribution, explained that the committee had been at a disadvantage on account of the death of Mr. Heywood, chairman of the committee, and that it was able to hold only one meeting prior to the convention. Two meetings had been held at Atlantic City since the convention began to take up some of the matters referred to in the specifications for cables and the specifications for overhead crossings. The specifications for cables, as printed, are correct, with the following addition and omissions: In the specifications for high tension three-conductor paper cables, under the sub-head "Insulation," there have been added to the first paragraph the words: "with jute filling in the valleys formed by the separate conductors."

The section on "Braid" has been omitted.

The paragraph under the head "Inspection" has been omitted.

In the specifications for rubber compound, which are practically the same as have been used for some years by the Railway Signal Association, a change has been made in the second paragraph under the heading "Tests." The words "free access to the place of manufacture" have been changed to read, "the manufacturer shall give an opportunity to test at all necessary times."

Under the specifications for underground feeders, the test requirement has been reduced from 8,000 volts to 5,000 volts. The section on "Braid" has been omitted. A paragraph has been added at the end of the specification reading as follows: "No splices are to be allowed between the manholes, and but one splice per cable will be allowed in each manhole." A paragraph on "Reels" has also been added, reading as follows: "The manufacturers will be responsible [illegible] reels and flagging."

Under the section on "Protectors" the committee has omitted the word "splice." The committee has also decided to omit the last paragraph under the heading of "Bonding."

George H. Hill presented some criticisms of the specifications for paper cables which had been handed to him by Wallace Clark, General Electric Company. Mr. Clark suggested that the requirement of 98.5 per cent. conductivity was rather high. The manufacturer to meet this specification would have to make the conductivity considerably higher than 98.5 per cent in order to avoid the possibility of objection from other causes. With regard to the specification for the twisting test, Mr. Clark suggested that this be modified so that one complete twist should be made in a length of conductor equal to 25 times the diameter of the conductor. This was the usual rule in making up cable. He also suggested that the thickness of the insulation be arranged on a sliding scale, somewhat similar to the cable specifications prepared by the Power Cable Engineers' Association. The same criticism applies to the lead covering, which is ordinarily made of different thicknesses for different sizes of cable. Mr. Clark thought that the paragraph relating to the guarantee could be made more clear.

G. W. Palmer, Boston, thought that 98.5 per cent conductivity for copper which made up the cable was none too high. He thought that the paragraph relating to the taking of a sample of the lead sheath from each 2,000 ft. of the cable should be modified because cables were often bought in shorter lengths. Under the section which specified the maximum number of amperes which the cable was intended to carry, Mr. Palmer thought that it should be stated whether continuous or alternating current was to be transmited.

E. N. Lake, Chicago, said that his experience had shown that soft drawn copper wire would test from 99 to 101 per cent conductivity by the Matthiesen standard. The practice in Chicago had been to specify, for cables which were not subjected to any particular mechanical strain, a conductivity of 99 per cent. and the manufacturers had had no difficulty in making cables which conformed to this requirement. With regard to the allowable variations in the finished size of the conductors in the cable, his practice had been to permit a variation of only two per cent. above and below. In recent specifications, he had required the dies to be one per cent under size at the beginning of the drawing, and they were discarded when they exceeded the exact size by two per cent. He did not find in the specifications anything about the resistance of the insulation. In comparing the practice of a number of different companies, he had observed a wide variation with regard to the insulation of the individual conductors and the insulation between the conductors and the sheath. He thought it was practicable to specify the relation between these two elements of the insulation in a cable. In his opinion, it would be desirable to make further study of the question of protection of the cable sheaths by bonding the sheaths in the manhole, and by means of auxiliary return cables from the manholes to the power house.

Mr. Palmer thought that the contractor was the one to bond the sheaths of the cables. In his opinion all of the cable sheaths should be bonded together, thus making an even distribution of the stray currents which are carried by the cables.

Mr. Lake said that inasmuch as lead had a very much lower conductivity than copper, it was not possible to carry an excessive amount of return current through the cable sheaths alone. If any short circuit occurred, the sheaths would be burned out.

E. J. Dunne, Public Service Railway, said that it was his practice to bond all cables together within the dangerous zones. A fuse was inserted between the cables and the bond to the return track circuit.

As a rule, the cable sheaths were bonded to the track return circuit wherever there was a difference of potential. In addition, he made it a practice to run an independent copper return circuit to protect the cable.

J. W. Corning, Boston, said that his company bonded the sheaths in every manhole and also at the power stations where the cables come into the basement. A relay in the power house caused a bell to ring, in case one of the cables was grounded. Some years ago, he had made some tests which showed that about 6 amperes per sheath flowed under normal conditions. This might be increased to 8 or 10 amperes during peak loads. He did not bond the cable sheaths to the track.

G. W. Palmer, Boston, said that all of his cables were bonded at every manhole, and that at the power station a connection was made to the negative bus through a recording ammeter, which kept a constant record of the flow of current. He had known of cases in which as much as 250 amperes flowed in the sheaths of 3 cables.

A. F. Hovey, New York, said that his practice was very similar to that of Mr. Lake and Mr. Palmer.

The report of the committee was accepted with the thanks of the association.

SPECIFICATIONS FOR OVERHEAD CROSSINGS

A. F. Hovey presented the supplementary report on overhead crossings which he said was a preliminary draft of a proposed specification which had been sent him by R. D. Kunz, chairman of the committee of the American Railway Engineering & Maintenance of Way Association, which had been considering the subject. At a meeting of the committee on power distribution, the specifications were carefully gone over, and changes were suggested in almost every paragraph. The specifications had been drawn from the standpoint of the steam railroad and as presented they would entail many hardships on electric railways. Mr. Hovey asked that the Engineering Association instruct the committee to return the specification to Mr. Kuntz and to suggest any changes which the Engineering Association thought should be made.

On motion, the committee was instructed to consider the matter during the coming year.

Mr. Hovey then outlined for the benefit of those present the principal changes which the committee had in mind to suggest, in order to make the specifications more fair to the electric railways.

The president called the attention of the members to the fact that Thursday was the day set apart for the examination of the exhibits, and he expressed the wish that all of those in attendance at the convention would make the most of their opportunity to see the many new devices which were being exhibited for the first time.

The meeting then adjourned.

A TALK ON RAIL JOINTS

John Kerwin, superintendent of tracks and buildings, Detroit United Railway, has sent to the convention two joints of the 9-in. 98-lb. Lorain Steel Company rail that were put in place in the spring of 1895 in the tracks of the Detroit United Railway on Woodward Avenue. One joint was taken from the track before any repairs were made. The second joint was repaired and ground and then cut out of the track and both joints were brought to Atlantic City. They arrived too late for Mr. Kerwin to exhibit them at the time the report of the committee on way matters was discussed on Tuesday. Mr. Kerwin has had the joints placed in Aquarium Court Hall, where the meetings of the Engineering Association have been held, and this morning at 11 o'clock he will give a short talk to any engineers who may be interested in this subject, in which he will outline the saving accomplished by this method of repairs in Detroit. All engineers of maintenance of way in attendance at the convention are cordially invited by the way matters committee to be present when Mr. Kerwin tells how he was forced to develop this method of joint repairing and the saving which has been effected by its use. Mr. Kirwin will gladly show any visitor to Detroit more than 60 miles of track that have been repaired in the manner shown.

MEETING OF THE AMERICAN ASSOCIATION

The second meeting of the American Street & Interurban Railway Association was held at the Greek Temple yesterday afternoon.

President Shaw called the meeting to order at 2:30 p. m., and announced the appointment of the following gentlemen as members of the nominating committee: C. Loomis Allen, Utica; S. L. Tone, Pittsburgh; R. I. Todd, Indianapolis; W. F. Kelly, Oakland; Wilford Phillips, Winnipeg.

He next called for the report of the committee on welfare of employees. The committee reported progress.

REPORT OF THE COMMITTEE ON INTERSTATE COMMERCE COMMISSION AFFAIRS

This report was presented by General Harries. It will be printed to-morrow. The report of the committee on insurance was also presented. It is published elsewhere in this issue.

REPORT OF THE COMMITTEE ON PUBLIC RELATIONS

C. Loomis Allen, chairman of the committee on public relations, reported that it had held two meetings during the present year—one at the mid-year meeting of the executive committee, and the other in Atlantic City, during this convention period. At the first meeting it was the sense of the members present that it would be interesting and useful to the association to have an address on service work. It had not been possible, however, to bring this about at this time, but the committee hoped that at some future meeting of the association it would be possible to do so.

The mid-year meeting was also marked by the attendance of representatives of the various State, sectional and national electric railway associations, at which joint meeting the question of closer co-operation between all associations was thoroughly discussed, with the result that it was the unanimously expressed opinion that the most favorable results could be accomplished through having the presidents of all street railway associations throughout America become members of the committee on public relations, a decision which was subsequently approved by the executive committee, and the appointments afterward made.

The meeting on Tuesday, Oct. 11, was the first meeting of the complete committee. The only definite progress so far made had been the assembling in the office of the secretary of the association of the acts of State legislatures in force up to July 1, 1910, in the States and Territories. It could be readily appreciated that this was a mass of legal documents which it would not be possible to present to the members of this Association, but it had been gathered and would be held for the use of the members who may desire any information upon the subject. It was doubtful whether any library in the United States contained the complete information which the secretary of the Association had secured.

The next development proposed was a digest to be prepared by a subcommittee of the information that was now on file, which compilation would be forwarded to the member companies during the coming winter.

The committee stated that it was also its intention each year to amend and correct this library of acts concerning public service laws, keeping it up-to-date and forwarding such amended information to the member companies during each year.

H. H. Adams, superintendent of rolling stock and shops, presented the following report of progress, on behalf of the committee appointed in 1908 to supervise the publication of the Electric Railway Dictionary by the McGraw Publishing Company. The committee is composed of H. H. Adams, chairman; Paul Winsor, Boston Elevated Railway, and Richard McCulloch, United Railways of St. Louis.

REPORT OF ELECTRIC RAILWAY DICTIONARY COMMITTEE

Your committee, appointed at the 1908 convention to supervise the publication of the Electric Railway Dictionary, which is being compiled by the McGraw Publishing Company, reports great progress having been made on the book during the past year. The publishers confidently expect to have the book completed and ready for distribution by Jan. 1, 1911.

The committee submits with this report several sample page proofs which give a better idea of the form and scope of the Electric Railway Dictionary than could be given in an extended description. The definitions which have been prepared are concise, and are not intended to be descriptive. The object is to state the purpose and, in general, the location on the car of the part defined, and wherever the part is capable of illustration, a reference is given to a figure number on another page in the book, where the part defined is illustrated by a drawing or an engraving from a photograph. The definitions will occupy approximately 100 pages. They are, at the present time, all written, and it merely remains to insert the references to figure numbers and have them set in type.

All of the engravings illustrating general views and floor plans of cars and car body framing and sections have been completed. Upwards of 15 half-tone views of cars, 100 floor plans of different types of cars, and between 50 and 75 framing plans will be included in this section of the book, which will occupy approximately 125 pages. A large part of the remaining engravings, which are included under the headings of car body details, trucks, truck details, motors and control apparatus, have been made, and within a very short time after presentation of this report the editor will be able to complete the make-up of all of the illustrated pages.

The chairman of your committee has had frequent conferences with the editor of the dictionary during the past year, and has been over all of the material which has been obtained for use in the book.

Your committee desires at this time to express its appreciation of the work of Rodney Hitt, the editor of the Electric Railway Dictionary, Mr. Hitt's connection as associate editor of the Electric Railway Journal, as editor of the 1903 and 1906 editions of the Car Builders' Dictionary and as one of the editors of the Railway Signal Dictionary makes him peculiarly fitted for the position of editor of this volume, and the committee feels sure that this dictionary, when it is completed, through the arduous efforts of the editor, will be of the greatest value to all interested in the electric railway industry.

Your committee requests that it be continued until such time as the preparation of the book is entirely completed, when it will make a final report and ask to be discharged.

ADDRESSES

Patrick Calhoun, president, United Railroads of San Francisco, then presented a very interesting address on the "Public Side of Street Railroading." This address was followed by a paper by Charles O. Kruger, president, Philadelphia Rapid Transit Company, on the "Philadelphia Question." Mr. Calhoun's address is published in abstract elsewhere in this issue. At the conclusion of these addresses both gentlemen were tendered a resolution of thanks by the association.

Vice-president Brady, who was in the chair, then asked for a vote on the amendments to the constitution and by-laws of the association which had been sent out to the membership in regard to the change of the name of the association to the "American Electric Railway Association." The vote was unanimous in favor of the change.

PROPOSED PERMANENT LOCATION

Mr. Brady then referred to the proposition which had been received from Saratoga Springs in regard to the erection in that city of a permanent meeting hall for the association and asked whether the members of the association wished to discuss the matter at that time.

Upon an inquiry as to whether the executive committee had any recommendation to make in connection with the plan, General Harries stated that the executive committee had no recommendations to make either in favor or against the plan. He added, however, that personally he did not favor the acceptance of the proposition as, among other reasons, it did not give the association the flexibility of movement or choice in place of location which he thought it should have. Upon motion, the association decided to decline with thanks the offer made by Saratoga Springs.

Upon motion, the meeting then adjourned.

REPORT OF THE COMMITTEE ON CITY RULES*

BY R. E. DANFORTH, CHAIRMAN; H. H. HUNT, L. H. PALMER, D. A. HEGARTY, HARRY BULLEN AND F. I. FULLER

Your committee, after careful consideration of the code of rules as amended and adopted at the Denver convention of this association in 1909, is not satisfied that the amendments made at that time are to the best interests of member companies. Bulletins and letters were mailed to all member companies asking them whether the code as amended and adopted at the Denver convention was satisfactory to them, and also submitting to them the amendments which we hereby offer for your consideration. Sixty-six companies replied to the inquiries.

On July 11 the committee inaugurated a system of follow-up reply postals which were sent to member companies who had not acknowledged the first bulletin, asking if the city rules as adopted at the 1909 convention were satisfactory, and, if not, why not; also asking if the committee's recommendations as submitted were approved. To these 54 companies responded, 39 affirmative and 8 negative replies being received to the first question, and 18 affirmative and 2 negative replies to the second.

Thus it is seen that only 120 companies out of a membership of 350 replied to the various communications sent out by the committee. Your committee therefore concludes that the member companies are generally satisfied with the existing code of rules with the amendments herein proposed, which summarized are as follows:

RULE NO. 2—RESPONSIBILITY

The motorman is held responsible

(a) For the safe running of the car.

(b) For the proper operation of the machinery of the car.

(c) For running car according to schedule.

The conductor is in charge of the passengers on the car and is held responsible

(d) For the safety and convenience of the passengers.

(e) For the collection and proper accounting of fares.

Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor.

RULE NO. 10—BELL SIGNALS

When the car is standing and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10 to 14.

bells to signify "All is clear behind." When it becomes necessary to back a car for a greater distance than 10 ft. motorman must take handles to the opposite end of car and operate it from that end. The conductor, under these circumstances, will change his position, that is to say, he will go to the opposite platform in order to give proper signal to motorman.

RULE NO. 21—STANDING ON STEPS

Permit no person to stand or ride on the steps, buffers, dashers, fenders or roof. Passengers should be fully inside the car or safely landed on the platform before the signal is given to start.

RULE NO. 34—PROVIDE CHANGE

(New Rule Under Car House Rules)

Previous to taking charge of the car conductors will provide themselves with ———— dollars for the purpose of making change.

RULE NO. 101—POSITION ON CAR

Remain on rear platform when not collecting fares, keeping a lookout for persons desiring to board car. Keep careful watch of passengers to observe requests to stop car. When stops are made at principal streets, places of amusement, churches or at any point where a considerable number of passengers enter or leave the car, conductor should be on rear platform until such point is passed. When descending steep grades conductor will remain on rear platform.

RULE NO. 116—CHANGE

When necessary to give change, first register the fare, and immediately thereafter give change, stating the amount received and the amount returned. Should a conductor have any dispute with a passenger in regard to change he must make a report in writing to the superintendent. Conductors will make change for passengers to the amount of ———— dollars.

RULE NO. 213—POWER OFF LINE

When the power leaves the line cars must be stopped clear of all crossings or danger points. The overhead switch must then be thrown off and the light switch thrown on and the car started only when the lights burn brightly.

HOOSAC TUNNEL EQUIPMENT ORDERS

W. K. Archbold, of the Archbold-Brady Company, Syracuse, New York, is receiving many congratulations over the order which he has received for transmission and catenary towers to be used in the electrification of the Hoosac Tunnel line of the road, with which it will be connected by a high short account of this proposed undertaking was published in a recent issue of this paper. The new power station which the railroad company will erect will be 2½ miles south of the main line of the road with which it will be connected by a high tension transmission line. The Archbold-Brady Company is furnishing A frames for this line with square towers for right angle turns. It is also supplying catenary bridges for 2 or 3 miles of 2 and 3-track construction for the line branches from the portals. These bridges will be spaced 150 ft. apart and there will be 69 of them, mostly for 3-track construction. In this work, the New York, New Haven & Hartford Railroad is adopting the square type of catenary bridge somewhat similar to that which the Archbold-Brady Company has erected for the Beebe lines in Central New York State, but heavier and larger and, of course, with clearances for regular steam railroad rolling stock. The Archbold-Brady Company also has a contract with the New Haven road for the supply of 2 miles of cross catenary construction for yards. The cross spans will also be placed 150 ft. apart, and it is expected that all of this material will be ready by Dec. 1.

The Archbold-Brady Company has also received another contract in Massachusetts for transmission line work. This is in connection with the extension of the power system of the Worcester Consolidated Street Railway. This company is building a new power station at Milbury, and the transmission line will connect this station with the new sub-station being erected in Worcester, a distance of 6 miles. The transmission line towers will consist of A frames and anchor towers constructed along the New Haven road right-of-way between Worcester and Milbury, and comprise several special devices, including some 85 ft. in height where the line crosses the Boston & Albany Railroad. In this instance, the Archbold-Brady Company has been awarded the entire contract for the erection of the line except that of supplying and stringing the wire.

SPORTING EXTRA—FULL ACCOUNT OF THE BALL GAME

A crowd variously estimated at from 2000 to 3000 (the higher estimate being based on the consumption of the free cigars) gathered at Young's Million Dollar Ball Park Tuesday evening to witness what will undoubtedly go down in history as the only ball game of its kind that ever happened — a struggle for the world's championship between the Asiras and the Asirmas.

Announcer C. C. Castle reduced the bleachers to tears by declaring that it would be a game for blood and that there was to be no interference with the players. It appeared later that the reason for this ruling was that the players were quite capable of interfering with themselves.

The crowd howled with delight when the Asira team marched on the field of battle preceded by a brass band and arrayed in Bessie McCoys of black silk, tastefully trimmed with white pompons and aigrettes. (The pompon season is now open.) Gathering in a corner, the team tried to sing a song, which, fortunately, was soon drowned by the fanfare announcing the approach of the Asirmas, clad in white pajamas with black fixings.

Umpire Hank Fassett, garbed in a green kimono, followed, and after him came the water boy, Joie Cunningham, in an appropriate Kate Greenway suit of brown knickerbockers and a pink blouse.

The first fumble was marked up against the photographer, who tried to take a group picture of the two teams. In the confusion an unidentified Asira player was seen to hand the umpire $2, which may account for the final score.

THE FIGHT BY ROUNDS

First Inning—Shaw for the Asiras was first up to bat. He waited for a soft one and hit to left for one base. Brady tried hard but fanned. While Conwell, the Asirma backstop, was lighting a cigarette Shaw took an ungentlemanly advantage and pilfered two bags. Harris got on but was out on a fadeaway steal to second, Shaw scoring the first run of the game amid thunderous applause. Allen was out at first on a bunt. One run.

Pop Ellicott dropped a Texas leaguer in right but was out trying to stretch it to two bases. Honus Hawley had his lamps on that automobile and poled a homer through the back door. Hequembourg got on and made the grand tour on outs by Sisson, Porter and Williams. Two runs.

Second Inning.—Hedley flied and Wood was safe at the first sack on an error. Brush hit into a double play, Wood expiring at second. No runs.

Evans opened the Asirma's half with a toboggan slide to first, but was out. Conwell walked and was caught off second by a quick throw from Hedley. Partridge beat out a bunt and made the circuit on a wild heave to the center field fence. Ellicott smashed one into the left of Stage for three bases and Hawley sent him home, but was out at first. Hequembourg flied out. Two runs.

Third Inning.—Page walked. Shannahan smote the air thrice and was sent to the bench. Shaw cracked a liner to the Greek Temple, bringing in Page. Brady was out at first. Two runs.

Sisson made the fourth home run of the game. Porter went to third on a base hit and Williams got two bags, scoring Porter. Evans went out at first. Conwell drew a gift and scored on two passed balls. Partridge, Ellicott, Hawley and Hequembourg were out in quick succession. Five outs, three runs.

Fourth Inning.—Harries died at first, but Allen pushed a hot liner through the umpire's kimono with a sound like a six-inch shell going through a backyard full of washing. While Hank was getting out his noseguard Allen stole third. Hedley sacrificed, scoring Allen. Wood got on and scored on two passed balls. Brush, Shannahan, Pardee and Shaw made a succession of hits and all scored. Brady went out. Six runs.

After all this excitement the umpire was overcome and had to take a drink of water—the only time that this beverage was served during the game.

Conwell, Porter and Williams went out in succession. Hedley's infielding was the feature of this inning. No runs.

Fifth Inning—This was a purely hypothetical session. Nothing happened except that the scorer marked up two goose eggs and inning six began.

Sixth Inning—Page hit safely and Donecker, who had been on the bench up to this time, followed with another hit. Shaw connected for two bags, scoring Page. Brady and Harries went out and Donecker couldn't get around. One run.

Disgraceful as had been the earlier scenes of the game, they paled into insignificance when at this exciting moment the members of the two teams seized the umpire, placed him in a cage and offered him sundry indignities. Rising to the occasion, Right fielder-general President Harries pinned a pay-within sign on the cage, thus putting a finishing touch on a scene which, as an exhibit of turpitude and unrestrained passion, has had no equal during the convention. The umpire was revived by a pail of water poured upon him by Joey Cunningham, and finished the game in his cage.

Evans, Conwell, Partridge and Ellicott went to the bat and chased each other around the bases once or twice, but a disappointed supply man overturned the score board, thus putting an end to the game. The official score was as follows:

	1	2	3	4	5	6	
Asira	1	0	2	6	0	1	—10
Asirma	2	2	3	0	0	x	— 7

Anticipating the need thereof, the management had provided enough bladders to place at least two in the hands of each player. They were intended, no doubt, to be used on the umpire, but after the ambulance had borne Fassett from the field the players turned on each other and indulged in a free fight Nobody seemed to care what happened except the crowd on the bleachers. The unanimous opinion of these critics was that it served 'em right.

Grip Nut Company, Chicago, is showing, at space 674, Building No. 2, its various sizes of grip nuts for use on track and on car equipment where locking devices are required.

Templeton Kenley & Company, Ltd., booth 651, Building No. 2, are making an attractive exhibit of Simplex car and track jacks.

Berry Brothers, Ltd., Detroit, are exhibiting, at space 651, Building No. 2, several panels of various classes of wood finished with the company's celebrated varnishes.

Poole Brothers, Chicago, are showing in booth 678, Building No. 2, many samples of attractive folders, time tables and advertising booklets and tickets which they have designed and printed recently for steam and electric railways.

A POEM TO JAMES M. WAKEMAN

On June 21, 1910, a group of friends gave a farewell luncheon to James M. Wakeman, formerly vice-president of this paper, just prior to his departure to England. The day was also Mr. Wakeman's birthday, and among the letters and other communications sent to him on that occasion was a poem from J. Harry Stedman, of Rochester. Both Mr. Wakeman and Mr. Stedman have attended a large number of national street railway conventions in the past, and the many friends of both will undoubtedly be interested to see the verses contributed by Mr. Stedman. They follow:

What's Flag Day? New Year's? July Fourth?
Skiddoo! For Heaven's sake, man,
June twenty-first we celebrate—
It gave us Jimmy Wakeman.

No wonder Nature honored it,
Longest-to-gladden-earth day,
With sheen of sun and summer joy—
'Tis Jimmy Wakeman's birthday!

And Jim reciprocates in kind,
Warm heart—all silver lining—
Old Sol has intermittent moods,
But Jim is always shining.

To-day the shadows dim our skies,
For Jimmy's going to leave us;
But well we know that New York's loss
Is London's redivivus.

Old pals, whene'er they rally,
Will know a vacant chair
And a dearth of mirth and sally,
For Jimmy won't be there.

We will miss that martial figure,
That jeunesse dorée style,
That thrill of hearty hand clasp,
That kind, pearl-pointed smile.

On Friendship's shares and Friendship's bonds
The wealth of life depends,
Jimmy has won life's highest prize,
Jimmy is rich in friends.

May every twilight find you glad!
Go vegetate in clover!
But send a tender thought to us
When you are half-seas over.

God bless you, Jimmy Wakeman!
And guide you o'er the main
To rest and recreation;
Then bring you back again.

Cordially,
(Signed) JOHN HARRY STEDMAN.

In the presidential address of C. J. Spencer, general manager of the Bradford Corporation Tramways, before the ninth annual conference of the Municipal Tramways Association, held at Bradford, England, Sept. 21, some interesting statistics were given of the allowances for depreciation, obsolescence, etc., made by the private tramway companies and by the municipal tramways in Great Britain. The private tramway companies put aside during the year 1909 1.05 per cent of their total capital investment of $119,440,000, whereas the municipal tramways put aside 3.5 per cent of their total capital investment of $235,670,000.

REPORT OF COMMITTEE ON EQUIPMENT*

BY JOHN LINDALL, CHAIRMAN; H. A. BENEDICT, M. V. AYRES, R. C. TAYLOR, TERRANCE SCULLIN, A. T. CLARK

The chief subject assigned to the committee this year was the consideration of methods for reducing the weights of cars in new construction, with due allowance for strength of parts. The following is submitted:

CAR-BODY DESIGN

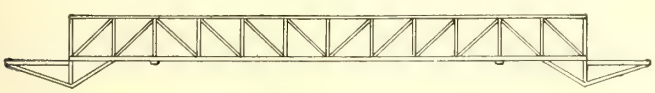
Reduced to its simplest form, the double-truck car body consists of a rectangular platform supported at two points on its longitudinal axis, equidistant from the ends. The points of support are the truck centers. The primary problem of car design is to construct a car body which will be both strong enough and stiff enough. Strength and stiffness are two distinct and different requirements. Strength is the ability to resist fracture, and stiffness is the ability to resist distortion. A car body or any part thereof may be deficient in either one of these qualities and amply provided for in the other.

All possible combinations of methods for trussing and stiffening the side frame of cars have been used, and a majority of all the designs shown are frequently to be found in one and the same car. The result is that cars are almost always strong enough, but very seldom stiff enough, and almost invariably much more weight than required for strength is put into these side frames for the sake of stiffness.

It is probably impracticable to produce a stiff car side of reasonable weight where wood is relied upon to furnish part of the strength. For affording stiffness in wooden cars, the sill plate construction is by far the most effective, because all the vertical stiffness comes from the plate, and the wood sill serves principally as a fastening for the posts and floor timbers.

Three types of car sides are in use in which wood is relieved from carrying the load. One is the so-called fish-belly girder. In this the side sill has all the strength and stiffness needed, and the superstructure can be designed without much regard to strength. The second type referred to is one in which the entire side of the car below the window constitutes a plate girder, metal posts acting as stiffeners, and the plates forming also the outside covering of the car. The third form is one in which the whole side of the car is a plate girder. In this form it is necessary to make the windows circular, or at least of some special shape allowing the transmission of the diagonal strains from the lower to the upper part of the girder. The plate-girder construction can undoubtedly be made the lightest, for the necessary strength and stiffness, of any design so far mentioned.

A design of side frame which seems not to have been tried but which presents some attractive features is the steel lattice girder. This might be made as illustrated. A truss of this form, made of extra high-strength steel, would have ample



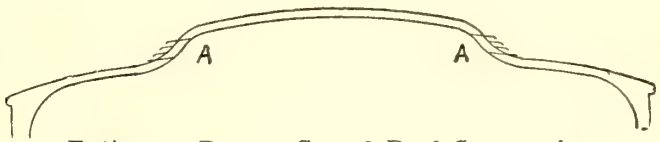
Equipment Report—Steel Lattice Girder Side Frame

strength with a surprisingly small weight. It would, however, need to be covered on both sides with some sheathing material, which might be heavy enough to largely cancel the saving due to the lightness of the frame. Either sheet aluminum or hardwood fiber could be used with satisfaction for this purpose.

It is almost standard practice to use two center stringers close together the whole length of the car, which serve both to transmit the drawbar strain and form supports for the flooring boards. Needlebeams also are put underneath the longitudinal members. It is a question whether it would not be better to transfer the drawbar strains to the side sills and omit the center stringers altogether. This would necessitate the use of deep crossbeams, but those beams could be so spaced as to let the floor come close to the motors.

BOLSTER DESIGN

The built-up plate bolster construction is strong, but heavy, and has been largely supplanted by a truss made of two pieces of steel plate, about 9 in. or 10 in. wide. This bolster is simple, and the tension and compression strains are easy to calculate; but it is too easily distorted, and has to be made heavy to prevent bending up in the middle. Moreover, the method of attachment to the side sills has been found in some cases to



Equipment Report—Curved Roof Construction

produce crystallization and fracture at the point where the top member is bent downard at the sill. The principal reason for the great popularity of truss bolsters is that they offer no interference to longitudinal brake rods, wiring and piping.

Cast-steel or malleable-iron bolsters can be produced of ample strength and of very much less weight than the type of bolster above described, and such bolsters are being successfully used. Probably good results could be secured with a built-up construction of angle iron and plates. Undoubtedly a pressed-steel form could also be used satisfactorily for this purpose.

PLATFORM SUPPORTS

It is necessary to support the platforms with beams of the cantilever type, commonly called platform knees. These exert a downward pull on the transverse members at the end of the body floor framing, and an upward reaction on the side sill some distance back from the end. Platform knees, if stiff enough, are usually unnecessarily heavy, because too shallow. Some cars have been built with deep lattice truss platform knees and some with plate-girders having large holes punched in the webs. Either of these designs is capable of giving great strength and stiffness with light weight.

When the car side below the window sill is a plate girder, the method of attaching the posts that extend above the window sill is a perplexing problem. Perhaps the best solution is to make the posts of steel, and continuous from the bottom sill to the eaves, dispensing with wooden posts altogether. A recent design shows a "U"-shaped pressed-steel section, with its flanges turned outward and riveted to the plate below the window sill, and to a cover plate between the windows.

In a design of this kind it is necessary to remember that the window sill or belt rail is in compression, and the posts prevent giving it sufficient width to resist buckling. The posts, and the roof rafters must, therefore, be depended on to brace the belt rail against this tendency. The "U"-shaped post sort serves this purpose.

The monitor type of roof is not well adapted to hold the tops of the posts, as required by this construction, and is in all cases a rather heavy and costly construction. It would seem that a satisfactory modification would be a curved roof like that seen in some tunnel cars and here illustrated. This can have a louvre type of ventilator set in as shown at *AA*. Doubtless both posts and rafters could be made of suitable rolled sections instead of pressed steel.

OPINIONS OF COMMITTEE

In the hope of obtaining the opinions of car builders in regard to the principles of design above discussed, 13 principles of car-body design were set down and sent to 10 car manufacturing companies, with a letter requesting criticisms. The

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Atlantic City, N. J., Oct. 10 to 14.

principles not fully approved by the car builders were in part as follows:

(1.) The ordinary wooden car body is usually more than strong enough in most of its members, but seldom stiff enough.

(2.) The wooden car side sill trussed with iron rods, and the wood bridge type of truss used in the side framing of many steam passenger cars, if made sufficiently stiff, contain much more material than required for strength.

(3.) In the common built-up bolster a slight buckling of the compression member or a slight slipping of the rivets results in a humping up of the center of the bolster. Also vibrations in the bolster and car body cause a continuous slight bending of the upper plate at the downward bend, resulting in crystallization and ultimate fracture at that point. A bolster construction resembling either a tapered box girder or a tapered "I"-beam would afford a lighter construction with equal stiffness and strength.

(4.) When steel and wood are used in combination in the same beam, or in the same tension or compression member, the strength of the wood is practically wasted, the steel bearing substantially the entire load.

(5.) It is practicable to transfer all drawbar strains to the side sills, dispensing with all other longitudinal members in the floor, except platform supports.

(6.) Some form of curved roof will prove lighter, stiffer and stronger than the conventional monitor type.

(7.) Double floors add to the weight of a car to an amount disproportionate to any benefits they confer.

(8.) Plate glass in side windows and wire-glass in ventilator sash also involve unnecessary weight.

From 10 letters sent, only four answers were received, and one of these was a refusal to discuss the matter. The threee companies replying expressed themselves as indicated below:

OPINIONS OF CAR BUILDERS

(1.) Was criticised by two of the companies, one of them claiming that steel bodies are as likely to be deficient in stiffness as wooden ones, and the other advancing the novel view that a car body can easily be made too stiff, in which case its riding qualities are bad.

(2.) Was criticised by one company, claiming that the queen post truss "is one of the best, lightest, cheapest and most effective in all cases, if properly designed."

(3.) One company states that the common plate bolster, if carefully machined and fitted at the ends, is the most economical and that the type of bolster mentioned would cost more than the advantages gained would be worth.

(4.) Two companies deny this, but only state that wood and steel together give satisfactory results.

(5.) The suggested design is disapproved by two companies, both objecting to transmitting drawbar strains in any other way than a direct line, and one claiming, further, that the design is deficient in diagonal strength.

(6.) All three companies object to a curved form of roof on the ground of ventilation difficulties. One states that practically nothing can be gained in lightness or strength, while another admits that it would be "lighter, stiffer, stronger and cheaper," but less attractive.

(7.) All three companies point out advantages of the double floor, these being as follows: (1) Seats can be fastened more securely; (2) aids in stiffness of body; (3) deadens noise; and (4) warmer.

(8.) One company, while admitting a saving in weight by using the thinner glass, says that it would amount to only ⅛ of 1 per cent of the total car weight.

One company discusses the general subject as follows:

"On the whole, we think the propositions brought up by your committee are correct, and if car designers would follow the principles laid down in your propositions, making sure that everything is correctly worked out and checked, if possible, by test in service, the result would be a very light, strong and serviceable car, although the first cost would probably be somewhat more than for the car of equal capacity built on lines more generally used at the present time."

UNITS OF COMPARISON

The recent growth of interest in the question of car weights has developed a demand for a rational system of units of comparison. The unit most used in discussing car weights is "pound per passenger seat." This may be quite meaningless in comparing cars of dissimilar types. There seems to be a need of a unit of comparison applicable to car bodies of different types, and it is suggested that this unit should be "pounds per square foot of area." The area considered should be calculated by multiplying the extreme length of the car, over platform end framing, by the greatest width, excluding steps or running boards.

This unit can be used for comparing weights both of car bodies and of complete cars. As an example, the following table has been prepared, applying to three specific cars, fully equipped:

Car	Lb. per Pass. Seat	Lb. per Sq. Ft.
60-passenger, semi-convertible	1210	163
44- " "	1135	148
14-bench, open	543	126

Undoubtedly the weights in the second column give a fairer idea of the relative massiveness of the cars than those in the first column. Your committee has given great attention to the reduction in weight of car bodies for the obvious reason that the reduction in weight of car bodies permits reducing the weight of trucks and electrical equipment. For instance, on certain types of equipments, the truck weight per ton of center plate load (weight of car body and maximum load) is 760 lb., and the weight of electrical equipment 65.4 lb. per horse-power. Now, assuming that the service required 7 hp per ton, the total theoretical saving in weight for each ton of car-body weight saved would be as follows:

Saving in car-body weight	2000 lb.
Saving in truck weight	760 lb.
Saving in equipment weight	566 lb.
Total saving in car weight	3326 lb.

The actual saving might be greater or less, depending on whether or not the reduction in car-body weight were sufficient to permit the use of the next lighter class of truck, motor and control equipment.

In the matter of reduction in weight of trucks, your committee has been in correspondence with many of the truck manufacturers and finds that the subject is being given very careful consideration. One manufacturing concern points out that while they are making every effort to reduce weights of trucks, they do not control the weights of wheels and axles.

Your committee feels that while undoubtedly some reduction in weight of trucks can be made by more carefully designing the parts, the greatest gain is to be made in the general design of trucks.

It is suggested that weight of trucks should be compared on the basis of "pounds per ton on center plate," as it is obvious that trucks must be designed to carry the maximum load. The weight of car plus maximum load is the proper center plate load basis.

WEIGHT OF EQUIPMENT

The reduction in weight of electrical equipment was taken up with the electrical manufacturers, who suggest four possible means of reducing weight of electrical equipment, as follows:

(1.) By increasing armature speeds—recent improvement in pinions, carbon brushes, commutator surfaces and brush holders tending to make this possible.

(2.) By forced ventilation of motors.

(3.) By the use of fireproof insulation and operating motors at higher temperatures.

(4.) By the use of field control, which would permit reduction of rheostat weights.

Your committee believes these suggestions are worthy of very careful consideration.

As a means of reducing weights of new cars it may not be out of place to call attention to the saving of weight by the use of single-end cars. The following data apply to a double-truck car of the semi-convertible type.

Weight eliminated by making car single-ended:

Step risers, hangers and brackets	306 lb.
Reversing mechanism for seats	108 lb.
Brake rigging	332 lb.
Fender and hangers	125 lb.
Doors, door pockets and operating mechanism.	548 lb.
Sand box and mechanism	40 lb.
Brake valve	21 lb.
Airbrake piping	100 lb.
Trolley equipment	140 lb.
Electric equipment, wiring, etc.	292 lb.
Headlight	35 lb.
Switch cabinet	75 lb.
Life guards	130 lb.
Snow scrapers	225 lb.
Total	2477 lb.

While undoubtedly single-end operation (as a means of reducing weight) is out of the question in many instances, your committee believes that it should be carefully considered.

UNITS OF COMPARISON

In discussing this question of units of comparison, the point has been repeatedly raised, by members of the committee and others, that a factor should be introduced making allowance for the different speeds for which equipment is required. Probably every one will concede that the weight should increase in some ratio with increase of speed. Perhaps a reasonable approximation may be that the weight should increase as the square root of the speed.

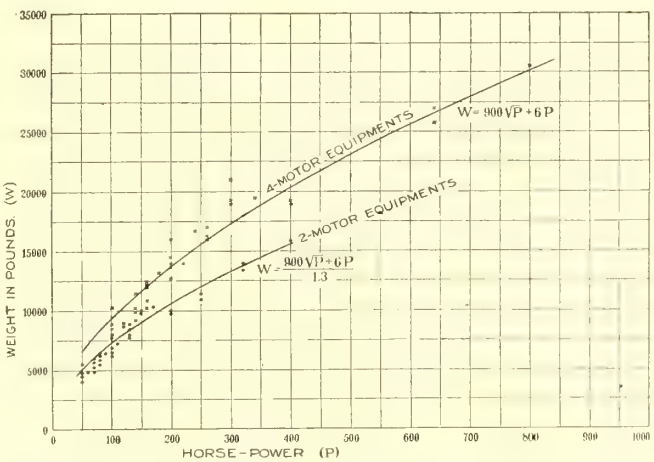
If this assumption be correct, our "weight factor" should be obtained by dividing the pounds per square foot by the square root of the maximum speed in miles per hour. In this case a car weighing 150 lb. per sq. ft., intended for a maximum speed of 30 m. p. h., would have a "weight factor" of 27.4. A car intended for 60 m. p. h. to have the same "weight factor" would weigh 212 lb. per sq. ft. Obviously such a "weight factor" would be a very valuable basis of comparison, provided we could find any law connecting the weight of cars with the speed, but in the absence of such a law a "weight factor" based on an assumed relationship, such as the two above discussed, would be misleading and dangerous. As a matter of fact the weight of commercial electrical equipments seems to vary nearly as the square root of the horse-power. However, there is no direct relationship between speed and horse-power, as the latter is affected by the rate and frequency of acceleration more than by the maximum speed. The weight of trucks, of course, will increase with the horse-power, but not necessarily with the speed; and there seems to be very little need of increasing the weight of car bodies with speed. It will always be impossible to reduce the problem to one of pure mathematics, and there will always be room for the exercise of individual opinion.

It is believed, nevertheless, that it will materially increase the knowledge of this subject if those who make contributions to its literature will use the units of comparison above suggested, namely: "Pounds per square foot of area," the unit of car-body weight; "pounds per ton of center plate load," unit of truck weight, and "pounds per horse-power," unit of electrical equipment weight.

TWO-MOTOR VS. FOUR-MOTOR EQUIPMENTS

There are a number of locations where it is not feasible to consider the adoption of two-motor equipments. These places usually present a number of severe grades, curves of short radii and bad rail conditions, but where conditions are favorable, your committee believes the two-motor equipments to be fully as reliable as those having four motors. Any reduction in weight of equipment is manifestly a reduction in cost of operation, which is, of course, in favor of the two-motor car equipment, and your committee would estimate the cost of maintenance of two-motor equipments to be in the neighborhood of 25 per cent to 35 per cent less than cost of maintenance of four-motor equipments.

The accompanying curves have been prepared to show the weights of two-motor and four-motor equipments, as given by the manufacturers. The crosses indicate the weights, in pounds, of four-motor equipments of various horse-powers, and the dots of two-motor equipments. It is evident at a glance that the two-motor equipments average much less in weight per horse-power than the four-motor equipments. The effort to draw a smooth curve through the points represent-



Equipment Report—Curves of Weights of Two-Motor and Four-Motor Car Equipment

ing the weights of the four-motor equipments suggested that it would approximate a parabola. The upper curve has the equation $W = 900\sqrt{P} + 6 \times P$; W being the weight in pounds and P the horse-power.

This curve probably represents the average position of the points through which it is drawn as closely as any curve that could be selected, and it certainly is a matter of much interest that the weight of any commercial line of apparatus, designed without any thought of a consistent relationship of this kind, should so nearly follow a mathematical law. The extreme variation from the curve is probably due to the circumstances attending the design of particular machines, either special lightness being demanded, or, on the other hand, a special ruggedness being desired.

The lower curve was drawn by dividing the equation of the upper curve by 1.3. That is to say, the upper curve represents weights 30 per cent greater than the lower, or the lower curve, weights 23 per cent less than the upper. The lower curve does not represent the average of the points through which it passes quite so well as does the upper curve, and is obviously somewhat too high. However, to get the best possible curve for the lower set of points would require changing the form of the curve, which would result in making the percentage difference between the two curves vary from point to point.

It seems, however, to be a conservative statement that between 100 hp and 400 hp per car the two-motor equipment is likely to be about 25 per cent lighter than the four-motor, though the saving in any particular case may vary considerably from this figure in either direction, depending on the particular equipment chosen.

As shown in last year's report of the committee on equipment, the electrical equipment usually constitutes about 28 per cent of the total weight of the car, so that a saving of 25 per cent of the weight of the electrical equipment would amount to about 7 per cent of the total car weight. Allowing for the variations in equipment, it seems fair to estimate that the use of two-motor instead of four-motor equipment would save from 5 per cent to 10 per cent of the total car weight. Doubtless these figures can be exceeded when advantage is taken of the use of two motors to lighten the trucks by using smaller wheels and axles for the idlers. This estimated saving of 5 per cent to 10 per cent in weight, while not of conclusive importance, is sufficient to make the change one worth considering.

For a 25-ton car, at the usual value of 5 cents per pound per year, it would amount to a saving of $125 to $250 per year. This, in connection with the possible lower first cost, would constitute an opportunity for economizing not to be ignored.

ROLLED-STEEL WHEELS OF LIGHT DESIGN FOR ONE WEAR

Your committee is obliged to treat this subject entirely from a theoretical standpoint. There is a demand for such wheels, and the following calculations have been made to show the saving that should be expected from their use.

The one-wear wheel, 34 in. in diameter, will be about 100 lb. lighter than the wheel intended to be turned several times. Most of the material removed will come from the inside of the rim, at an average radius of 15 in. from the center. Metal exactly at the tread of the wheel will absorb exactly double the power during acceleration and give up exactly double the power during braking that the same weight of material would if carried in the car body. The mass removed in lightening the wheel, being located about 15 in. from the center, has a velocity of rotation of about fifteen-seventeenths of its velocity of translation. The power required in accelerating this mass is, therefore, about $1^{15}/_{17}$ or 1.88 that of an equal mass carried on the car body.

POWER CONSUMPTION

In frequent-stop service the power consumed in acceleration is the greater part of the extra power consumption. In a typical case, discussed in an article by M. V. Ayres in the Aug. 21, 1909, number of the Electric Railway Journal, power consumption was distributed as follows:

	Per cent
Rheostat losses	9.52
Motor losses	17.28
Track and journal friction	9.55
Windage	3.45
Acceleration	60.20
	100.00

From this it will follow that the mechanical power delivered to the car axles was distributed as follows:

	Per cent
Track and journal friction	13.06
Windage	4.64
Acceleration	82.30
	100.00

There are no available data for separating track and journal friction. Perhaps it would be sufficiently near to assume these two losses as equal. Weight carried in the wheel does not contribute at all to journal friction. It does, however, contribute to track friction, presumably in greater proportion than if carried on spring-supported parts of the car. Let us assume, however, that it contributes only in equal proportion with other weights.

This 100 lb. removed from the rim of the wheel would in the above typical case reduce mechanical power consumption in proportion, which, compared with the effect of 100 lb. carried on the car in general, would be as follows:

	Per cent
Journal friction	0.00
Track friction	6.53
Windage	0.00
Acceleration 1.88 × 82.30	154.70
	161.23

The total electrical input is, of course, practically proportional to mechanical power consumption. We are then led to the conclusion that 100 lb. removed from the rim of the wheel reduces power consumption at least as much as 160 lb. removed elsewhere; therefore, the reduction of 100 lb. in each of eight wheels is equivalent to removing 1280 lb. from the car body.

If we take the commonly accepted figure of 5 cents per pound per year as the cost of power, this reduction in wheel weight is worth $64 per car per year, or $8 per wheel. Figuring on the mileage basis we may estimate, for city cars, a power consumption of 125 watt-hours per ton-mile at a cost of 1.5 cents per kw-hour, including interest on the investment in power plant. This amounts to a saving of $12 per 10,000 car-miles for eight wheels, or $1.50 per 10,000 miles for one wheel. For this to equal the above estimate of $64 per year would require an annual mileage of 53,300, or 146 miles per day.

In order to show the effect of this saving during the life of the wheels, the following tabulation has been prepared from estimates made by your committee:

	Two-Wear Wheel	One-Wear Wheel
Mileage, first wear	75,000	75,000
Mileage, second wear	50,000	
First cost (per wheel)	$20.00	$18.00
Cost fitting wheel " "	.25	.25
Putting wheels in car " "	.40	.40
Removing wheels after 75,000 miles " "	.40	.40
Transporting and turning " "	1.00	
Putting in car " "	.40	
Removing from car after 50,000 miles " "	.40	
Pressing off and scrapping " "	.20	.20
	$23.05	$19.25
Scrap value	2.00	2.00
Net cost of wheel	$21.05	$17.25
Net cost of wheel per 10,000 miles	$1.68	$2.30
Excess cost of power for carrying heavier wheel	1.50	
Cost per 10,000 wheel miles	$3.18	$2.30
Saving by use of lighter wheel per 10,000 wheel miles	.....	.88

In view of the apparent advantage of the light wheel, as indicated by the above investigations, your committee would recommend that this matter be given careful consideration by the railway companies and wheel manufacturers.

PROPOSED STANDARDS FOR ROLLED-STEEL WHEELS

This subject was referred through the executive committee to the 1910 committee on equipment for further consideration in connection with a communication and the accompanying table of standards which were received from the Carnegie Steel Company. Particular attention was directed to the question of reducing weight, not only in the thickness of

Carnegie Steel Company Standards					Standards Recommended by Committee on Equipment of A. S. & I. R. A.			
Drawing No.	Diameter	Rim Width	Rim Thickness	Hub Length	Diameter	Rim Width	Rim Thickness	Hub Length
S-1420	33 in.	3 11/16 in.	2½ in.	5½ in.	33 in.	3 11/16 in.	2½ in.	5½ in.
S-1440	34 "	3 11/16 "	2½ "	5½ "	—	—	—	—
—	—	—	—	—	34 "	3 11/16 "	3 "	6 "
—	—	—	—	—	33 "	4 3/16 "	2½ "	5½ "
S-1444	34 "	4 3/16 "	2½ "	6 "	—	—	—	—
—	—	—	—	—	34 "	4 3/16 "	3 "	6 "
S-1454	35 "	4 3/16 "	3 "	6 "	35 "	4 3/16 "	3 "	6 "
S-1462	36 "	4 3/16 "	2½ "	6 "	36 "	4 3/16 "	2½ "	6 "
S-1473	37 "	4 3/16 "	3 "	6 "	37 "	4 3/16 "	3 "	6 "
S-1447	34 "	4 11/16 "	2½ "	6 "	—	—	—	—
—	—	—	—	—	34 "	4 11/16 "	3 "	6 "
S-1457	35 "	4 11/16 "	3 "	6 "	35 "	4 11/16 "	3 "	6 "
S-1467	36 "	4 11/16 "	2½ "	6 "	36 "	4 11/16 "	2½ "	6 "
S-1477	37 "	4 11/16 "	3 "	6 "	37 "	4 11/16 "	3 "	6 "

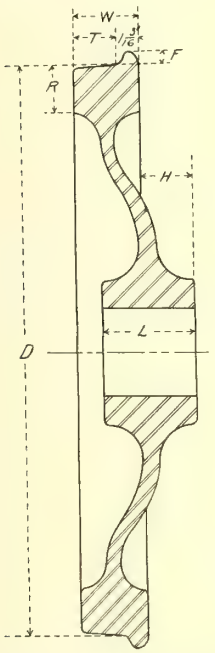
the wheel rim but also in the web. An early report was requested.

Owing to the limited time which your committee had to investigate and report on this subject it has been unable to go into the matter very thoroughly, but having previously studied the question of a light rim wheel as compared with a heavy rim wheel which has just been discussed, your committee believes that the light rim wheel is the most economical proposition and that the suggestion of the Carnegie Steel Company, that certain sizes having 3-in. thickness of rims be dropped from the proposed standards, is a timely one, and in accordance therewith has revised the list of proposed standard sizes as shown in the tabulation and recommends them for adoption as standards.

In reference to the proposed reduction in thickness of web, your committee believes this is desirable providing it can be accomplished without sacrificing necessary strength, and recommends that the manufacturers give the question earnest consideration.

GAGE FOR MOUNTING STEEL AND CHILLED WHEELS

The gage as proposed by the 1909 committee on equipment could not be used on wheels having different thicknesses of flanges, and while it could be used for checking wheels on the axle, it is not convenient for locating the first wheel. We believe that the present general practice of locating the first wheel by gaging from the end of journal to the hub of wheel and then locating the second wheel by gage is more convenient and sufficiently accurate.



Rolled Steel Wheels
Proposed Standard Sizes

D	T	R	H	L
33"	2½"	2⅝"	1⅛ or 2⅛"	5½"
34"	2½"	2⅝"	"	5½"
34"	3"	2⅝"	"	6"
34"	3½"	2⅝"	"	6"
35"	3"	3"	"	6"
35"	3½"	3"	"	6"
36"	3"	2⅝"	"	6"
36"	3½"	2⅝"	"	6"
37"	3"	3	"	6"
37"	3½"	3"	"	6"

Relation of Tread Width Total Width and Flange Height

T	W	F
2½"	3 1/16"	¾"
3"	4 3/16"	7/8"
3½"	4 5/16"	7/8"

Equipment Report—Recommended Standard Dimensions of Rolled Steel Wheels

STANDARD TAPER FOR PINIONS

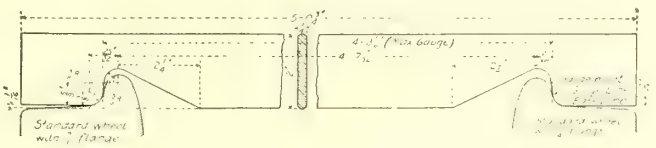
A standard pinion taper would reduce the possibilities of errors and materially facilitate the work of the railway companies in ordering pinions from manufacturers. The advantages to be gained by adopting as a standard a pinion taper which is now in extensive use appear to outweigh the probable advantages of a new pinion taper of dimensions corresponding to units of decimal system. Your committee approves the recommendation of the 1909 committee on standards, that the standard taper for pinions be made in the proportion of 1¼ in. in diameter to 1 ft. in length.

The difficulty of standardizing gears and pinions was not overstated by the 1909 committee on standards, and no material progress could be made by the committee along that line during the present year. It is the general feeling that for motors of 50 hp or over, a material of high grade, or especially treated, is a necessity, and can be used to advantage on the smaller motors.

GEARS AND PINIONS

A very complete paper on "Railway Motors Gears and Pinions," presented by T. W. Williams before the annual meeting of the Street Railway Association of the State of New York, at Cooperstown, N. Y., June 28, 1910 [Electric Railway Journal, July 2, 1910], treats in a very able manner of the theoretical considerations in design of gears and pinions, their lubrication and the present state of the art in their manufacture, etc. Your committee would suggest that careful consideration be given to the matter of gear vibration, as it is evident from experiments made by one of the large manufacturing companies that this is responsible to a large degree for many failures such as broken armature leads, broken gear bolts, gear and motor cases, as well as broken armature shafts and axles. It would seem, therefore, advisable to establish limit of gear wear with reference to the elimination of gear vibration rather than with reference to the mechanical endurance of pinion and gear teeth as is the present practice. This naturally includes the limits of wear on axle and armature bearings with reference to the proper meshing of pinions and gear teeth. Such limits can only be properly established after careful investigation, which your committee has been unable to make, and would recommend that it be taken up during the coming year.

One manufacturer says that "Excessive wearing of armature and axle bearings not only gets the pinion and gear out of mesh, but causes the teeth not to fit entirely across the face. The gear and pinion are, therefore, at an angle to each other, bringing a greater strain on the end of the teeth nearer the motor. It seems that a good limit for the wear of bearings is that they should not be worn in any place to a greater extent than 3-64 in. measured radially. It would not be safe to measure this as ⅛ in. in diameter for the reason that the bearings might be worn on one side."



Equipment Report—Gage for Mounting Wheels

Another manufacturer suggests that in general it is considered good practice to wear pinion teeth until they measure 1-16 in. flat at the tips.

It would probably be better to consider the amount of wear at the pitch line rather than at the extreme tip of the tooth, and it is probable that with the standard pitch of gears now used 3-32 in. on either side of the tooth is about the limit.

SPECIFICATIONS FOR WROUGHT IRON BARS

Your committee believes that the specifications of the International Association for Testing Materials are best for the railway companies to purchase wrought iron under, and that for certain parts of cars grades "B" and "C" could be used to advantage, but as it is seldom practicable for the railway companies to make inspections and tests at the place of manufacture, the clause in reference to "Inspection" contained in specifications recommended by the 1909 committee on standards should be substituted for a similar clause in the specifications of the International Association for Testing Materials. With this change your committee recommends that the Revised Standard Specifications for Wrought Iron, as shown in Bulletin No. 24, dated June, 1901, and adopted Aug. 12, 1901, by the International Association for Testing Materials, be adopted as the standard of the association.

Your committee would recommend the adoption of the M. C. B. limit gage for round iron and also that association's table of sizes of limit gages for round iron as the recommended practice of the association.

REPORT OF THE COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION*

BY M. R. BOYLAN, CHAIRMAN; ALEXANDER RENNICK, F. T. WOOD, HARRY BULLIN, R. E. LEE, T. C. CHERRY

In framing the questions in its data sheet, your committee sought, among other facts, specific data concerning the methods adopted by various companies to prevent abuse of the transfer privilege. A fund of information was acquired, from which stands out prominently the fact that, while most companies suffer more or less financial loss from the misuse of transfers, no general scheme has ever been put into effect by means of which companies can protect themselves from the fraudulent use of the tickets. Your committee does not mean to imply that no company has devised a system for the regulation and accounting of transfers which reduces transfer abuses to a minimum. On the contrary, the replies which the committee received indicate that scientific and substantially effective methods of dealing with the problem are in vogue on many railway properties. The committee was impressed with the wide diversity of practice.

All answers received were compiled and summarized With the data thus in hand the committee sought to agree upon a form of transfer which would be as nearly perfect as possible, conserving to the passenger the full enjoyment of the privilege conferred, and at the same time safeguarding the company against abuses on the part of dishonest employees and unscrupulous patrons. Although the members of the committee were not in full accord as to certain minor details, an agreement was reached on the fundamental propositions, and it was decided to make these recommendations:

A. That a standard form of calendar transfer be adopted.

B. That the transfer tickets intended for a. m. and p. m. use be distinctive.

C. That date of transfers be canceled by clerk at car barn before they are placed in hands of conductors; or, in case of larger companies, date to be printed if desired.

D. That use of transfers be limited, so far as possible, to travel in one general direction, which might be controlled by creation of transfer districts, showing point at which slip is issued as well as direction in which it is intended to be used. (See Appendix A, with map.)

E. That conductors be required to make returns of transfers collected every half trip where feasible, otherwise at the end of each round trip.

F. As to the advisability for using distinctive transfers for a. m. and for p. m. traffic, the committee was unanimous that the utilization of different tickets was conducive to good operation, but opinion as to the most effective method to pursue was divided. The use of tickets of different colors, different forms of transfers and the coupon form to designate the separate periods each had its advocates.

The following is a summary of the replies received to certain questions:

Fifty-seven out of 94 companies issue undated transfers, and 44 of the 57 allow their conductors to cancel the date.

Forty-three out of 90 companies admit that passengers on their lines can return to place of starting for one fare by the use, or abuse, of transfers. Fourteen companies say that they know of no safeguard to be used against this round-trip practice. Other companies have already adopted the zone system or other regulatory methods. Fifty-seven companies say it is possible under their system for conductors to exchange transfers, and only 27 companies reply in the negative. Apropos of the advent of the prepayment type of car, it was gathered that its only effect on the transfer system was to reduce the number of punches to be made in the tickets.

The questions relating to the issuance of transfers and the privileges conferred by them show that 63 companies designate the line to which transfer is issued, 12 transfer designate the junctions, 9 the destination and 10 name no specific point of transfer. Fifty-two companies punch the beginning and 41 the end of the time limit; 77 companies issue transfers only when fare is paid, as against 18 that do not enforce this requirement; 32 companies issue transfers on transfers, 56 companies do not and 6 do conditionally; 28 companies insist on transfers being used at the first intersection, 12 at the last intersection, 22 at either, while 20 of the replies received have failed to specify clearly what practice was followed. As to time allowed on transfers, 29 companies limit it to the "next car," 48 allow from 10 to 20 minutes and 13 over 20 minutes, the time limit being governed in certain cases by schedule provisions.

Efforts to learn what percentage of transfers remain unused, what percentage of passengers receive transfers and what percentage of transfers are collected brought a variety of replies. The percentage of unused transfers reported ranged from 10 to 70 per cent; of passengers receiving transfers all the way from 2 to 75 per cent; the majority of companies, however, reported 25 per cent or less. As to transfers collected, 10 companies reported figures ranging from 18 to 60 per cent, while 53 companies said their returns were from 60 to 99 per cent of the total number issued.

The question dealing with the return by conductors of transfers collected brought out the information that 38 companies require returns to be made at the close of the day's work, 24 companies at the end of each round trip, and 22 companies at the end of each half trip. In this connection your committee recommends that the practice of requiring transfers to be placed in sealed envelopes at the end of each half trip be adopted wherever feasible, especially in the case of long runs. For comparatively short runs a return for each round trip would suffice.

The question asking how transfers are checked has to do with a matter of much importance to companies, yet the character of the answers received indicates a greater diversity of methods on this feature of accounting than almost any other phase of the transfer problem inquired into by the committee. Seventy-eight replies disclosed 16 varieties of accounting for transfers, with the subdivisions of methods as to detail not specified. Nine of the responding companies announced that no check on the use of transfers was attempted and 35 others reported that they check daily, without saying, however, what means are employed to get results.

When transfers are issued to conductors entry should be made by clerk at car barn on a daily transfer report giving the commencing and closing numbers of the transfers given to each man. This report may be printed in book form with originals and duplicates; the original perforated to permit of detachment for forwarding to auditor and the duplicate remaining in book. When conductors make returns at end of run the commencing and closing numbers of unused transfers should be noted in the column provided for that purpose. The unused transfers should then be forwarded to the auditor and checked with transfer report.

At beginning of day's work conductors should be required to enter on their day cards commencing number of transfer, which must coincide with the commencing number on the clerk's daily transfer report. Subsequently, the conductors should be required to enter upon their day cards the closing number of their transfers at the end of each half trip. They should then be required to enclose the transfers collected for the half trip in an envelope, recording thereon the number collected, together with the commencing and closing numbers of the transfers issued by them during

*Abstract of report read before the American Street & Interurban Railway Transportation and Traffic Association, at Atlantic City, N. J., Oct. 10-14, 1910.

that half trip. Envelopes containing transfers should be sealed and deposited in receptacles provided for the purpose at the end of either each half trip or each round trip as convenience may decide. At the close of each day these envelopes should be listed in duplicate on forms showing the number of trips made and the number of envelopes forwarded to the auditor. The original of these forms with the envelopes, unopened, should then be sent to the auditor's office to be checked.

APPENDIX A

The accompanying map illustrates three connecting lines and two forms of transfers. Fig. No. 2 is a transfer designed to prevent abuse of transfer privilege through looping process.

Through the use of transfer, Fig. No. 1, a passenger boarding a car on the dotted line, west of point "A," may receive a transfer good at point "B" and return via the solid line to original starting point "A."

A passenger boarding a car on the solid line, north of point "A," may receive transfer good at point "B," returning via the dotted line to point "A."

A passenger boarding a car on the dotted line, west of point "E," may receive a transfer good at point "C" and return via the line marked by dashes to point "F," one block from original starting point "E."

A passenger boarding a car on the line marked by dashes at point "F" may receive a transfer good at point "C" and return via the dotted line shown on the accompanying engraving to point "E," one block from original starting point "F."

This "looping" can be duplicated in a reverse direction on all of the three lines mentioned. The district form of transfer, Fig. No. 2, would make this impossible.

The line marked "D," and marked by dashes and dots, represents an imaginary or district line, dividing all three lines into districts. All that part of the line marked by dashes west of the line marked by dashes and indicated as "D" is district No. 1 and all east is district No. 2. The same applies to the dotted and solid lines.

Through the use of the district form of transfer it would be necessary for passengers on the line marked by dashes between the points "F" and "D" desiring transfers to the dotted line to board eastbound cars and transfer at point "A," and passengers west of district line or between points "D" and "C" desiring transfers to the dotted line would be required to board westbound cars and transfer at point "C."

Transfers issued to westbound passengers on the line marked by dashes between points "F" and "D" would not be accepted by conductors on dotted line eastbound at point "C" owing to district No. 2 having been punched. The same rule would govern the acceptance by conductors on westbound dotted line cars of transfers good at point "A" issued between points "C" and "D" (district No. 1) to eastbound passengers on the line marked by dashes.

One great advantage of the district form of transfer is that it enables the receiving conductor to tell at a glance approximately where the passenger began his journey.

No. 1

COMPANY LINE — LINE NOT TRANSFERABLE — If no Coupon attached hour punched is A.M. HOUR

NOTICE Not good if detached. This coupon denotes that the hour punched on body of transfer is P.M. HOUR

No. 2

COMPANY LINE-35 — 35 LINE — DISTRICTS

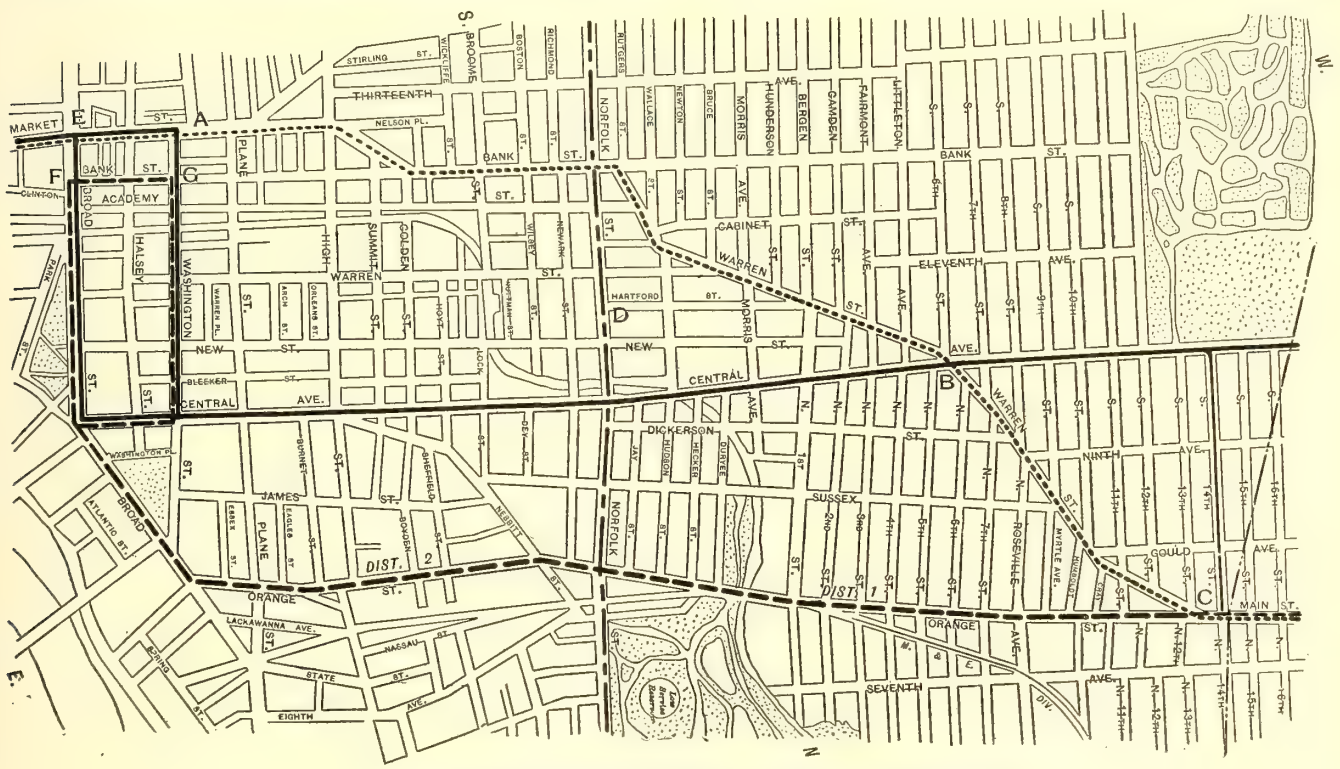
NOT TRANSFERABLE. *This transfer is issued and accepted subject to the conditions printed on reverse side*

If no coupon attached hour punched in A.M. HOUR

LINCOLN AVE. NORFOLK ST. — 1

NORFOLK ST. BANK ST. — 2

NOTICE Not good if detached. This coupon denotes that the hour punched on body of transfer is P.M. HOUR



Map and Transfer Forms to Prevent Looping on Lines Shown

TRANSFER LAWS AND SUGGESTED CHANGES*

BY LEFFERTS S. HOFFMAN, GENERAL SOLICITOR, PUBLIC SERVICE RAILWAY

There are only six States, besides the District of Columbia, in which there is a general law bearing on the abuse of transfers, as follows: Alabama, Maine, Massachusetts, New Jersey, New York and Wisconsin. Besides these general State laws there are ordinances providing for the imposition of a penalty for the fraudulent use of transfers in the following cities: Chicago, Ill.; Cincinnati, Ohio; Little Rock, Ark.; San Francisco, Cal.; Savannah, Ga., and Tampa, Fla.

There was an attempt made in Kentucky to have a bill passed making the fraudulent uses of transfers a crime. The bill passed the lower house of the legislature, but was defeated in the upper house. There was also an attempt made in Virginia to have such a law passed, but without success.

All the laws and ordinances referred to are of comparatively recent origin, none of them having been in existence more than a few years.

There are at least three very important decisions on the law books, the first being an opinion of the Supreme Court of California involving the ordinance of the city of San Francisco. The second is the opinion of the Supreme Court of Illinois involving the ordinance of the city of Chicago, and the third is the opinion of the Supreme Court of Alabama involving a general law of that State.

The first case is entitled "Ex parte Henry Lorenzen, 50 L. R. A., p. 55," decided by the Supreme Court of California in 1900.

Lorenzen was charged with having given away or sold a transfer in violation of the ordinance of the city of San Francisco and was convicted in the lower court. He took the matter to the Supreme Court of California and urged that the ordinance was not valid because "it violates the guaranty of personal liberty contained in the Constitutions of the United States and the State of California; that it is an unconstitutional interference with a right of private property; that it is arbitrary, oppressive and unreasonable, and finally, that it is an illegal attempt to enforce the obligations or assumed obligations of private civil contracts by penal legislation."

By a divided court, the vote being three to two, the conviction in the lower court was sustained. One of the two dissenting judges wrote an opinion, from which it appears that he did not question that a properly framed law or ordinance would be perfectly valid, but held that the particular ordinance of the city of San Francisco was invalid, as it made every giving away of a transfer a violation of the ordinance, irrespective of the intent with which such transfer might be disposed of; so it would appear that the real question involved, that is, the constitutionality of such a law, was decided by practically the entire court in favor of the ordinance.

It was held in this case that a transfer serves a two-fold purpose: "First, to the passenger as an evidence of his contract by which he is entitled to continue his journey upon the connecting road; and, second, to the company as a means of identification afforded to its conductors and servants, by which they may know that the passenger presenting the transfer is entitled to ride without further payment of fare." The court held that the transfer was taken under a contract of passage, and that if used, the original holder alone could use it, and "if he sold it or assigned it, or gave it to another, to the end that another might use it, he clearly violated his contract and put a fraud upon the company."

Another objection raised against the ordinance was that it was an attempt by penal legislation to enforce a private civil contract; that is, it was an attempt to compel the passenger who had received the transfer to use it within the limits of his contract, and subject him to fine and imprisonment for the violation of merely a private agreement between him and the railway company. The court said that if this was the only purpose of the ordinance, the objection might be fatal, but that it appeared to the court that the primary object of the ordinance was to "protect and advance the convenience and welfare of the traveling public."

The second case referred to was that of the city of Chicago vs. Openheim et al., 229 Ill. 313, 82 N. E. Rep. 294, decided by the Supreme Court of Illinois in 1907. The defendants were charged with trafficking in transfers in violation of an ordinance of the city of Chicago prohibiting such traffic and providing a penalty for such violation. The lower court, apparently not being in sympathy with the railroad company, discharged the defendant on the grounds "that the ordinance in question is unreasonable in its terms, and that it is unconstitutional because it operates to take property without due process of law."

The Illinois Supreme Court, following the reasoning of the California court in the Lorenzen case above referred to, decided, however, that the limitation put upon the use of transfers by the ordinance is not taking such transfer away from a passenger "so that he is divested of his title and possession and does not therefore deprive him of his property." The passenger who received the transfer might still in theory have the right to ride on the connecting line except for the fact that he has deprived himself of the only evidence of his contract by disposing of his transfer, as it must be kept in mind that a transfer is "a simple token of a passenger's right to be transported over a connecting line, and when it has served this purpose, to be delivered to the carrier issuing it."

Of course, as soon as a passenger to whom a transfer is issued has disposed of the transfer in any way he has abandoned his right to use it under his contract of passage, and as such right could not have been transferred to another, it is hardly conceivable how any one could have seriously contended that a person has such a property right in a transfer, or a privilege to be carried on a connecting line, as to enable him to dispose of it in violation of the terms of the contract under which he received it.

The third case referred to arose in Alabama and is entitled "Whaley vs. State, 52 So. Rep., 940," decided in 1909. The law of the State of Alabama, passed in 1907, authorized street railways "to adopt rules and regulations for the issue and use of any transfer tickets, commonly called transfers," and provided that a violation of such rules would subject the offender to a fine not exceeding $200 and imprisonment for twelve months or both.

The Supreme Court of Alabama first held that this law was unconstitutional, apparently on the ground that it was an attempt of the legislature to delegate its law-making powers, in that it gave the street railway companies power to make their own rules and provided a penalty for the violation of such rules. A rehearing was had, and by a vote of four to three the act was held to be constitutional.

The only question involved in this case was as to whether or not the legislature had the right to so far delegate its powers as to authorize a street railway company to make rules and regulations a violation of which would be punishable as a crime.

CHANGES IN THE PRESENT LAW

The abuse of transfers has grown to such an extent that in some cities where large and complicated street railway systems are in operation there are usually many places which may be designated as "transfer exchanges," and where a thief is able to obtain a transfer for his ride home at night in place of a transfer which he has deposited in the exchange in the morning. No doubt many of the street railways find that the right which they have to eject a passenger for non-payment of fare when he presents a defective transfer or one that was not issued to him is a sufficient remedy to prevent the abuse to which the transfer system is subject. This remedy, however, does not appear to be adequate in any place where there is a large congregation of people who habitually use the street cars, because,

*Abstract of a paper read before the American Street & Interurban Railway Transportation and Traffic Association, Atlantic City, N. J., Oct. 10-14, 1910.

on account of the establishment of "transfer exchanges" and other equally pernicious customs, the people who take advantage of an improper transfer are quite willing to take a chance of being ejected from a car in order that they may get the benefit of free rides month after month and year after year. It seems necessary therefore that stringent laws should be passed in all of our States where there are street railways carrying large numbers of passengers and that these laws should be actively enforced.

It would no doubt be a great advantage to have as nearly as may be a uniform law throughout the country covering the subject of the abuse of transfers. The New York law, with somechanges, would be one which might well be adopted as a uniform law, and the following is suggested as a law which would cover all the features necessary for the successful prosecution of offenders of the transfer system:

SUGGESTED TRANSFER LAW

"No transfer ticket or written or printed instrument giving or purporting to give the right of transfer to any person from a public conveyance operated upon one line or route of a street surface, elevated or underground railroad to a public conveyance upon another line or route of a street surface, elevated or underground railroad or from one car to another car upon the same line of street surface, elevated or underground railroad shall be issued, sold or given except to a person lawfully entitled thereto. Any person who shall issue, sell or give such a transfer ticket or instrument aforesaid to a person not lawfully entitled thereto, and any person not lawfully entitled thereto who shall receive, with intent to use for passage, or who shall use or offer for passage any such transfer ticket or instrument, or shall sell or give away such transfer ticket or instrument to another with intent to have such transfer ticket used or offered for passage after the time limited for its use shall have expired, shall be guilty of a misdemeanor, and, on conviction thereof, shall be punished by a fine not exceeding one hundred dollars or by imprisonment for a term not exceeding six months, or both."

The above suggestion is made for the use of street railways in the States where no such laws exist. The suggested law covers the essential features of the laws of the various States which already have similar laws on their statute books.

The main features of all the laws and ordinances now in existence are about the same, but they differ widely in the penalty provided for the violation of their provisions, varying from the imposition of a fine of only from $5 to $10 in Wisconsin to the severe punishment provided by the New York statute of a fine of $500 or imprisonment for one year, or both. No doubt a small penalty for a single offense of illegally buying or selling a transfer is adequate punishment for that one act, as the amount involved in that particular transaction is only 5 cents, but such a punishment would have little effect upon the public at large, and it is only fair that the punishment should be a severe one.

CRUSADES CARRIED ON UNDER EXISTING LAWS

Several companies have carried on crusades against the abuse of the transfer system.

The Chicago Railways carried on a crusade with considerable success, as evidenced by the fact that up to Oct., 1909, there had been as many as 1000 arrests in a year by that company under the ordinance of the city of Chicago.

The Boston Elevated Railway Company, of Boston, Mass., has carried on a crusade with considerable success.

The Birmingham Railway Light & Power Company, of Birmingham, Ala., and the Utica & Mohawk Valley Railway Company, of Utica, N. Y., have attempted to enforce the laws to prevent the abuse of transfers in the States in which they are located.

The Little Rock Railway & Electric Company, of Little Rock, Ark., appears to have been very fortunate in stopping the abuse by the public of the transfer privilege.

D. A. Hagerty, general manager of that company, writes, under date of Aug. 17 last, that his road had considerable trouble with the trading of transfers by the public, and in order to remedy this evil he made certain rules and regulations under the authority given by an ordinance of the city of Little Rock. He writes:

"We decided that all transfers should be registered on the same registers with cash fare, so we got up a time transfer with destination, direction and exact time punched when same was given out, and gave strict orders that the same should be accepted only on the next car following on line for which it was punched, passing the intersection point where the same was issued. The conductors were instructed to accept no transfers after the time limit had expired, and only after car had passed intersecting street where the same were given out and on line for which it was punched. These rules stopped the abuse of the transfer privilege by the public."

While the Legislature of Virginia has refused to pass a law to cover the fraudulent use of transfers, the Virginia Railway & Power Company has carried on in the newspapers quite an active campaign against the abuse of transfers. There appear in the public press from time to time items in which are set forth various frauds that are practised on the street railway company, calling particular attention to the dishonesty of the passengers in the fraudulent use of transfers and by this means shaming the public into paying their fares or frightening them into doing so through fear of a public exposure in the event of their being detected in their attempt to evade payment of fare by the fraudulent and improper use of transfers. The company does not claim that this accomplishes a great deal, but that it does a certain amount of good and is about the best it can do in the absence of any law making abuse of transfers punishable as a crime.

In conclusion, I would say that it seems to me that we have entirely underestimated the importance of stringent laws providing for the punishment of the abuse of transfers and the active enforcement of the same, and we do not realize the amount of money loss occasioned by the fraudulent use of transfers.

As an example of the money saving which can be effected, I would call your attention to the results obtained by the Little Rock Railway & Electric Company, on which road it is claimed that the abuse of transfers has been to a great extent, if not entirely, done away with. This happy result was brought about in the year 1908, and in the following year (1909) it appeared that although the cash fares increased 10 per cent, the transfers issued decreased 12 per cent, and for the first six months of the year 1910, as compared with the year 1909, the increase in cash fares has been 9 per cent, while the transfers issued have increased only 4.6 per cent. In the year 1908 the revenue derived from the Little Rock Railway & Electric Company per passenger was 3.94 cents, while in the year 1909 it amounted to 4.3 cents, an increase of 0.91 cents. This result has been brought about principally by stopping the abuse of transfers, not only by the general public, but by the company's own employees. While, of course, this may not amount to a great saving in the smaller systems, the amount in saving would reach large figures in such systems as that of the Chicago Railways Company, where a strenuous crusade has been carried on, and where during one year the road carried 373,000,000 passengers, of whom 153,000,000 rode on transfers and about 3,000,000 rode free.

According to the paper of Mr. Sullivan, general supervisor, the Chicago Railways Company estimates that the cars taking passengers at the principal transfer points in the city of Chicago during the rush hours now get about 75 per cent more cash passengers than formerly.

Even from these results we can all readily see the importance of effective laws aimed at the transfer abuse evil, and I have no doubt that a strenuous campaign carried on for the purpose of enforcing such laws will have a very important effect on the revenues of street railways, second only to the highly satisfactory results obtained by the use of prepayment cars.

REPORT OF THE COMMITTEE ON POWER GENERATION*

BY H. G. STOTT, VICE-CHAIRMAN; G. H. KELSAY, C. E. ROEHL, J. D. ANDREW, E. D. SMITH

At a meeting of the committee held on Feb. 21 various subjects were assigned to the committee members to report upon individually, and their treatment of these subjects constitutes the report. The subjects and the names of the gentlemen to whom they were assigned are as follows: Forced Draft, C. E. Roehl; Flue Gas Analysis, G. H. Kelsay; Low Pressure Steam Turbines, H. G. Stott; Steam Meters, R. J. S. Pigott, and Peak Loads, H. G. Stott.

FORCED DRAFT IN CONNECTION WITH BOILER CAPACITY AND ECONOMY

Artificial draft may be produced by reduction of pressure above the fire or by increase of pressure below the fire. Under the former circumstances it is usually termed induced draft, and under the latter circumstances it is usually termed forced draft. It is in this sense that the phrase forced draft is used in the following discussion.

Induced draft may be looked upon simply as a substitute for natural draft from prohibitively high stacks, but this is not true of forced draft. In viewing the relation of forced draft to high stacks it should be recognized that where low-grade fuel is used forced draft is a necessity. Where low-grade fuel means anthracite screenings forced draft cannot be looked upon as one of two equally efficacious forms of artificial draft substituted for natural draft, but possesses an inherent advantage over induced draft. This lies in its ability to cope with one of the trying features attendant on the use of anthracite screenings, namely, the quality of packing on the grate, whereby great resistance is offered to the passage of air through it. In induced draft this lowering of the fuel-bed resistance does not occur. A fuel bed of anthracite screenings, even when actively burning, offers far greater resistance to the passage of air than the walls of air ducts and ash pit connections. As air ducts and connections of forced draft systems are not designed to efficiently convert the energy of the air leaving the fan or impeller into potential form measured by static pressure, the air pressure values measured in ducts and ash pits refer to rapidly moving air—air moving far more rapidly than can be used without dissipation of energy by eddying currents and jets beneath the fuel bed. Each particle of coal is struck and moved around in the layers near the grate before the air moves sufficiently through the bed to reach the incandescent particles for oxidation. This shifting of position of individual particles of coal does much to break up the otherwise abnormally high resistance of the fuel bed to air flow. This shifting of fuel bed may be slight, moderate, or excessive, depending upon the air pressure. When excessive, the coal is blown from the grate and a good part of it is kept dancing in the furnace, sometimes to a height of two feet.

CONDITIONS GOVERNING CAPACITY

Capacity is fundamentally a matter of rate of firing. Firing rates vary widely, whereas efficiencies with a given grade of fuel do not; therefore, it follows that it is only necessary to get coal into a furnace and burn it to cause the rate of steaming to vary very nearly in proportion to the rate of firing. This practical response of the rate of steaming to the rate of firing follows logically from the modern recognition that with boiler equipment actually in service at the present day the limitation of the heat-transmitting ability of the metal of the heating surface is not approached. It also follows by analogy from the enormously higher evaporating rates used in locomotive practice than in stationary practice.

In power stations of large design great attention can well be given to studies of the relation of rapid firing by one man in charge of moderate grate area as against moderately slow firing of a large grate area represented in practice by having one man fire relatively many doors.

RELATION BETWEEN CAPACITY AND EFFICIENCY

With low-grade fuel, forced draft practically always secures increased efficiency, so far as heating surface alone is concerned. At very high combustion rates the furnace efficiency is apt to fall sufficiently to offset the rising boiler efficiency. This, however, under proper conditions of control occurs only near the upper limit of the usual attempts at forcing, and when forcing is necessary efficiency is not a ruling factor.

Higher steaming capacity usually reduces labor charges and inevitably reduces investment charges. It reduces the labor charges because, as a rule, more coal per man is being fired and more steam per pound of coal is being obtained. Investment charges are reduced because greater power is obtained per boiler. Maintenance charges increase, but the increase is practically confined to the furnace and, except in very special cases, while an offsetting factor, it is not a ruling one.

One of the most seriously limiting factors in what otherwise appears a field where the higher the pressure the higher the over-all station efficiency is the blowing of coal from the grate after a critical pressure has been exceeded. Very fine coal is not only blown from the grate, which would be no serious matter if it came down again, but is blown over the bridge wall, and in some cases is blown through the heating passes and into the flues in considerable quantities. Once in the flues, a good deal is apt to go out at the top of the stack. The economic loss is not often serious, but in cities the trouble and expense may be considerable. Another limiting condition in increasing capacities obtained by increasing combustion is the inability of the lower water tubes to stand the too severe demands which may be made upon them. When forced draft is used with very small-sized coal and a high average combustion rate is being maintained it is practically impossible to avoid spots where for a time the combustion rate becomes extremely high and the endurance of isolated sections of the tubes in the lower rows is severely tested. The approach to the safe limit of endurance of the metal is probably not a matter of its limit of thermal transmitting ability, but of the failure of the water circulating arrangements to provide properly for heat absorption. It is not unlikely that in the trend of boiler modification to meet the surely approaching demand for higher steaming rates this matter of circulation will receive large attention.

Another limiting feature to continually higher air pressures for the realization of higher capacity is the rapidly rising and finally over-ruling cost of air supply at extremely high pressure. This may be a practical obstacle in the future, but it is not at the present. There is room for a large advance over the usual operating rate to-day before the value of further increase would be nullified by the initial and operating costs of the blowing apparatus required to attain it.

Moderate increase of evaporating rate, 100 per cent or 150 per cent, or perhaps more, over the present nominal rate of 3.45 lb. of water per hour per square foot, referred to a 650-hp B. & W. boiler, from and at 212 deg. Fahr., must be brought about. Installation of very large capacity turbines has forced this and in isolated instances a good deal has already been accomplished. There seems little reason to doubt that the best which has at present been accomplished will in a few years become standard practice.

CONDITIONS GOVERNING EFFICIENCY

In railway power plant work forced draft must be adapted to varying steaming rates. The maintenance of steam pressure but slightly below the setting of the safety valve is the desideratum, and as the fluctuations in steaming demand

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Atlantic City, N. J., Oct. 10 to 14.

are large in relation to the steam storage capacity of water tube boilers, the adaptation of the forced-draft system to varying rates must be accurate and prompt. Steaming rates are varied, of course, only by variation of the combustion rates. Efficiency, therefore, demands that the forced-draft system be adapted to permit variation of the combustion rate over wide ranges, and this requires variation of the air pressure. While variation of air pressure will cause variation in the rate of combustion of coal already in the furnaces, it will not do more. Therefore the problem is, where hand labor is concerned (and automatic stokers are not commonly used with high air pressures), to cause the firemen to vary their rate of firing to meet the varying rate of combustion necessary for the coal already in the furnaces. This, then, is the crucial problem in the attainment of high efficiency: to cause the firemen in forced-draft plants in some manner not only to vary their rate of firing with the draft (using the term in a broad sense), but to make their manner of varying it approach as near as possible to the correct manner. This problem is yet to be solved in a really practical way.

In work of large magnitude the ruling conditions in the use of forced draft with the attainment of good firing are most onerous, yet the quality of the labor is most unfavorable; not that the labor is cheap labor, but it is looked on en masse and necessarily so, resulting very often in almost entire loss of individuality in the relation of the man to the boiler. The labor, while reasonably well paid, is largely foreign and not infrequently low in intelligence, thereby excluding the skill which in isolated plant work is sometimes of sufficient merit to make firing approach the level of a skilled trade. In addition to the other handicaps, rapid changes in personnel are not rare.

A few years ago great interest was aroused by the development of automatic CO_2 recorders, but the hopes that they aroused as to a solution of the problem of guidance in the attainment of high efficiency have not been realized. More light is at present available on the cause of the disappointment than was available after the CO_2 recorders had been in sufficiently extensive use to make the disappointment evident. This light is, of course, that concerning the relation between gas velocities and thermal transmitting ability of the heating surface.

The same strictures may be made against the somewhat extensively exploited balanced draft systems. Unquestionably they at once gave very high CO_2 values. The claims of their sponsors in this respect were not exaggerated. Necessarily used only in conjunction with forced-draft systems, they involved the danger of flare-backs from the furnace doors, and aside from this they raised the furnace temperature so high that the tax on men required to stand up in front of the furnace doors and throw in coal was severe.

It has been recognized that high CO_2 values, which are very readily obtained with forced-draft systems, may easily become too high. In addition to the objections just mentioned, high CO_2 is an excellent direct measure of furnace temperature. Furnace temperatures so high as to be destructive to the furnace brickwork were all too easily obtained. Before the research work of the United States Geological Survey and others had made it evident why highest CO_2 values did not correspond with highest efficiencies the best practice had settled down to ruling against more than 12 to 13 per cent CO_2.

The problem of handling forced-draft systems in railway power plant service comes back then to that of getting firemen to fire well at the varying rates which are demanded by the varying load. The general tendency of poor firemen under all conditions is to throw so much coal in one door without stopping that a long interval elapses before the firing operation is repeated. A general corrective expedient for this, and one which, while very simple, is decidedly practicable, is the limitation of the number of shovelfuls permitted to be fired in any one door without stopping. This number may be six or eight, preferably six, and while no limitation to the rate of firing, this at once goes a long way toward establishing the practice of light, thin fires as against heavy, thick ones, whether during the rush hours with high steaming rates or at other times. Equally important, if not more important than thin fires is the correct adaptation of the firing rate to the draft, or in more specific terms, the ash pit or air-duct pressure. With 1 in. air pressure in the duct, should the rate of firing with a given grade of coal and boiler equipment be 16 lb. or 20 lb. per hour per square foot of grate surface, or some other rate? On the answer to this the resulting economy of the evaporation apparently hinges. Extensive experimental work appears to show that there is a definite relation between air pressure and rate of firing, which gives the best evaporative economy over wide ranges of steaming. Differential gages reading to 0.01 in. water column have been tried and are accurate and reliable, but the difficulty is to devise a simple system for their use.

The problems which in their solution will probably mark the most significant advance in forced-draft practice appear to be the better proportioning of air ducts and sealed ash pits, particularly the intakes of the latter from the former, as now large losses of pressure are frequent; the modification of furnaces and boilers to allow the use of higher pressures and gas velocities which are necessary for the utilization of more intense evaporative rates; and the development of simpler means for the control of efficiency, which leaves at present more to be done in the way of control of firing than in control of the air pressure or draft. It is hard to say whether the second of these problems, that of control of capacity, or the third, that of control of efficiency, is the more important.

FLUE GAS ANALYSIS

This is the third year this subject has been before the committee. Inquiries were sent out to all known users of gas analyzers and automatic recorders to learn as near as possible just what development has been made during the past year on this subject. Replies were rather disappointing, as very few new ideas or expressions were received. There still seems to be considerable trouble in getting successful operation from recording apparatus. This may be due partially to a lack of diligence on the part of operating engineers. Probably this objection is gradually being overcome.

There are different opinions among operating engineers as to the importance of continuous records and intermittent records. Some believe in occasional analysis of the flue gases by means of the Orsat analyzer, so as to establish the conditions that give best economy, and then endeavor to keep the firing up to these conditions. Others believe that continuous and recorded analysis of the gases is necessary for best results.

Two methods of obtaining continuous analysis are used. One is the use of the sampling bottle which collects the average gas for a day's run, and the other is by means of the automatic recorder which intermittently or constantly records the CO_2 at the time the gas is being made at the furnace. Some very good evidence has been presented against the sampling vessel, in that it does not indicate to the engineer the time in which he is getting good or poor results in his furnace. It only gives the average for the day, whereas the fireman can watch the continuous recorder and determine what condition gives the highest per cent of CO_2 in his gases. In power stations where the load is a fluctuating one some seem to have difficulty in obtaining good CO_2 records.

It has been the opinion of some that the percentage of CO_2 could be considered as practically a direct indication of boiler efficiency. That is, a high percentage of CO_2 always meant a high equivalent of evaporaton, and low percentage of CO_2 meant a low equivalent of evaporation. However, it has been

proven quite essential occasionally to analyze the gases for CO, so as to guard against the likelihood of excess CO, as it has been conclusively demonstrated that the highest percentage of CO_2 does not mean the highest boiler efficiency and that a very high percentage of CO_2 may be obtained with very low boiler efficiency or a very low equivalent of evaporation. This may be on account of throttling the air supply on the furnace to such a very low point that there is not sufficient to burn the coal, thereby producing such a high percentage of CO in the flue gases as to reduce the equivalent of evaporation, and at the same time give a very high percentage of CO_2.

It is the practice with a few operating engineers to pay firemen a fixed sum with a bonus of variable amounts, depending on the per cent of CO_2 obtained from their respective boilers while they are on duty. The following is a sample of what one company is doing in this respect.

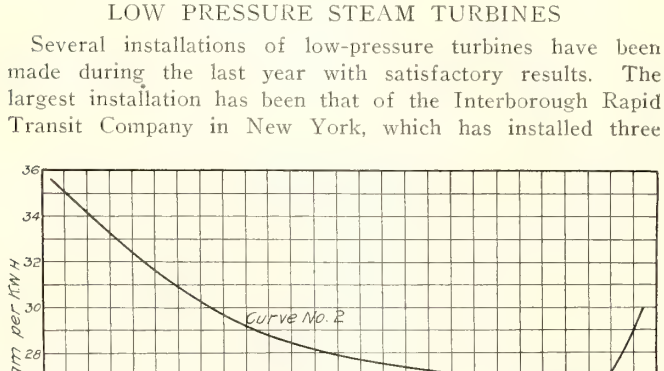
When products of combustion show CO_2—

15 per cent for 10 hours...30c extra per day pay will be given
14 per cent for 10 hours...25c " " " " " " "
13 per cent for 10 hours...20c " " " " " " "
12 per cent for 10 hours...15c " " " " " " "
11 per cent for 10 hours...11c " " " " " " "
10 per cent for 10 hours...10c " " " " " " "
9 per cent for 10 hours... 9c " " " " " " "
8 per cent for 10 hours... 8c " " " " " " "
7 per cent for 10 hours... 5c " " " " " " "
6 per cent for 10 hours... 0c " " " " " " "

It has been the argument of the engineer that the extra amount paid the fireman is a small percentage of the amount the fireman is saving the company through his efforts to obtain the increase in his wages. This method is not generally practised by operating engineers, and it appears to be doubtful whether a bonus should be paid firemen on the basis of CO_2 when there are other important elements entering into the proposition. This is particularly the case when extremely high CO_2 fails necessarily to indicate the most economical furnace operation and when it is possible for a fireman to obtain a very high percentage of CO_2 with a very low equivalent of evaporation.

LOW PRESSURE STEAM TURBINES

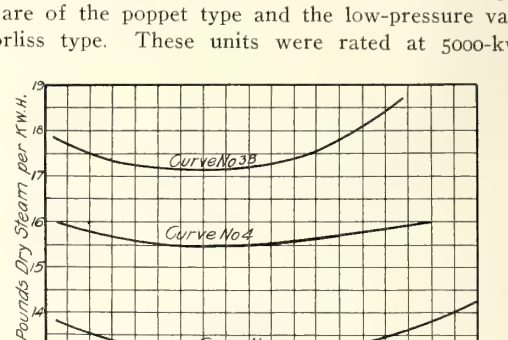
Several installations of low-pressure turbines have been made during the last year with satisfactory results. The largest installation has been that of the Interborough Rapid Transit Company in New York, which has installed three



Curve 1 Shows Water Rate of Engine Running Non-condensing; Curve 2 Shows Water Rate of Low-Pressure Turbine with Varying Nozzle Pressure

7500-kw units and is now engaged in installing two more units of the same size. As full results of a very elaborate series of tests on these low-pressure units have been published,* a brief extract from them follows, as the results may be looked upon as typical of what may be expected in other installations under similar circumstances.

Each of the 7500-kw low-pressure turbine units receives its steam from a Manhattan type of Corliss engine having two 42-in. horizontal high-pressure cylinders and two 86-in. vertical low-pressure cylinders. The high and low pressure pistons on each half of the unit connect onto the same crank, so that the unit consists of two compound engines with the generator between them running at 75 r.p.m. and with a 60-in. stroke. The revolving field of the generator is built up from riveted steel plates of sufficient weight to act as a flywheel for the engines on each side of it. The high-pressure valves are of the poppet type and the low-pressure valves of the Corliss type. These units were rated at 5000-kw with



Curve 3A Shows Water Rate of Combined Unit; Curve 3B Shows Water Rate of Two Original Engine Units; Curve 4 Shows Guaranteed Water Rate of 12,000 kw High Pressure Turbine

50 per cent over-load capacity, giving their most economical results between 4000 and 5000 kw. As far as the heating limit was concerned it has never been reached, as the engine becomes too uneconomical to justify operation before the maximum capacity of the generator is reached.

Curve No. 1 gives the engine water rate when running non-condensing, and Curve No. 2 gives the water rate for

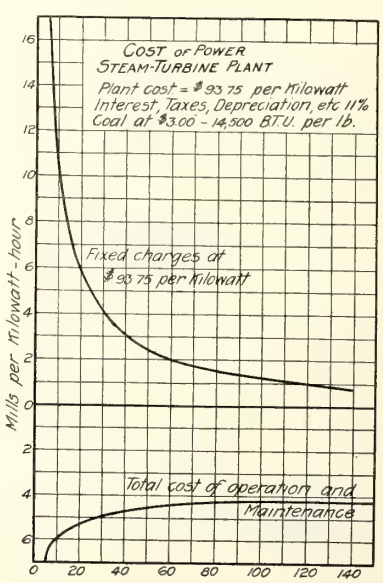


Diagram Showing the Cost of Operation and Maintenance and the Fixed Charges of a Power Plant at Various Loads

the low-pressure turbine, with the steam pressure entering it varying according to the load on the engine from 1 lb. above the atmosphere to 5 lb. below, with a corresponding condenser vacuum of 28.5 in. when referred to a standard barometer of 29.92 in.

*See Electric Railway Journal March 21, 1910.

The opposite slopes of Curves 1 and 2 result in the combined water rate shown on Curve 3A, giving an almost flat water rate for the combined unit between the wide limits of 6500 kw and 15,500 kw.

To show the gain made by the installation of the low-pressure turbines the water rate of two engines is given in Curve 3B for comparison, showing an average improvement in the combination unit of over 4 lb. per kw-hour.

Curve 4 shows the water rate guaranteed for a typical modern 12,000-kw standard high-pressure turbine unit when running under the same steam pressure and vacuum as obtained for the combined unit as shown in Curve 3A.

All these curves show results obtained with saturated steam only.

The thermal efficiency of the combined unit is over 22 per cent.

The results obtained by the installation of low-pressure turbines are as follows:

(a) An increase of 100 per cent in maximum capacity of plant.

(b) An increase of 146 per cent in economic capacity of plant.

(c) A saving of approximately 85 per cent of the condensed steam for return to the boilers.

(d) An average improvement in economy of 13 per cent over the best high-pressure turbine results.

(e) An average improvement in economy of 25 per cent (between the limits of 7000 kw and 15,000 kw) over the results obtained by the engine units alone.

(f) An average unit thermal efficiency between the limits of 6500 kw and 15,500 kw of 20.6 per cent.

One of the novel parts of this installation is the use of the induction type of generator on the low-pressure turbines. The reason for adopting this type of machine was that with the enormous short-circuit capacity of the system, amounting to over 300,000 kw, the addition of large synchronous turbo-generators would result in a largely increased short-circuit capacity and it was feared that the switching apparatus would soon reach its limit of safe operation. The addition of induction generators, on the other hand, adds nothing to the short-circuit capacity and tends to help the regulation by adding so much stored energy or flywheel capacity. The results obtained have fully justified the installation and the simplicity of operation is most marked.

In general, the installation of low-pressure turbines may be recommended wherever there are good engines already installed, or in the case of a new installation where the load factor and the coal cost are high. In plants having a large installation of a good type of reciprocating engine the low-pressure turbine may be added at a total cost, including new condenser, auxiliaries, foundations, piping, etc., of not to exceed $25 per kilowatt, thus bringing down the average over-all investment per kw of the entire plant and so reducing the fixed charges per kw-hour.

STEAM METERS

The following is a list of the principal types of meters for measuring steam:

Anemometer, or jet-turbine type—Holly & Lindenheim; Holly's device was a small vane which operated by a small by-pass, with entry pointing upstream and discharge pointing downstream; the vane wheel drove a clockwork integrating mechanism through a gland. The errors in this meter are: Friction of the gland or stuffing box on the vane-wheel spindle, variable friction losses in the by-pass system, and the absence of a correction device for variation of steam pressure.

Lindenheim's machine was very similar to Holly's, but added a correction device for variation of steam pressure, and in this way was somewhat superior; but both are rendered very unreliable by the fact that friction of the vane-wheel spindle bearings and gland has an enormous influence on the correctness of the reading.

Throttle disc type—The Bendemann, Gehr, St. John, Sargent and several other meters are of this type. The means of operation in all cases is some form of throttling disc or cup in a passage or over a seat, loaded so as to offer a slight resistance to the flow of steam through the passage. Consequently, as more steam flows through the meter the disc or cup is forced up from its seat, so as to expose more area for the steam to flow through, accompanied by an increase in pressure drop through the machine. The rise of the disc is some function of the flow, usually not a straight-line function, as the position of the disc is influenced by eddy currents, which vary with rates of flow and with the shape of the disc and seat or passage. Unless this variation of proportionality be corrected by means of an empirically graduated scale or by suitable mechanism the motor will have an inherent error.

The Bendemann meter consists of a disc floating in an inverted conical passage, in which the stream is flowing upward. The spindle of the throttle disc is carried up into a glass tube (under pressure) and the scale is attached to the tube. Thus the friction error of a stuffing box on the spindle is avoided, but no recording device is attached to the meter. In a later modification the spindle was extended downward and ended in a long taper plug partially closing an orifice. The amount of steam released from this orifice, therefore, varied with the main flow, and was condensed and passed through a small water meter. The St. John meter has a taper plug, moving in an orifice vertically, the movement being transferred by a system of levers, through a stuffing box, to a recording sheet. There is no device on these meters to correct for pressure variation. The Sargent meter has a conical cup, fitting over a conical seat; the motion of the cup spindle is transferred without levers through a labryinth stuffing box and has a pressure variation correction in the shape of a bourdon gage. This type of meter has the advantage of large movement of the throttle disc over the range, which gives open scales; but the friction of glands and lever systems introduces an error which may overbalance this. The throttling action tends to erode disc and passages, and must eventually destroy the accuracy of the meter with wet steam. If the meters are spring loaded, or use spring-pressure corrections, they become subject to the additional inaccuracies of springs. The bulkiness of this type of meter prevents its use in anything above 6-in. pipe sizes.

An electric meter was proposed by Prof. Thomas, in which the temperature of steam is taken before and after passing an electric-heating coil; the energy sent into the coil is also measured. If the quality and pressure are known the above quantities give a measure of the flow, which is absolutely accurate; but the quantity of electrical energy needed becomes enormous if the steam is 2 or 3 per cent wet, practically prohibiting the use of the meter. For superheated steam or dry gases it is a very good means of measurement. There is no limit to its size.

The remaining forms of steam meter are those in which difference of pressure is employed—working on the principle of the Pitot tube and the Venturi meter. These meters have the best opportunities for accuracy, since there are no moving parts to stick or cause friction, and no parts to wear from erosion. They can also make use of mercury and other accurate differential gages.

The advantages of the Pitot tube type are obvious. There is nothing to do to the piping but put in a small Pitot plug; the recording device may be at any reasonable distance from the point of measurement, and may be made portable. But the total difference of pressure amounts to only ½ in. of mercury at ordinary velocities, so that a very slight leak or bubble of air in the piping to the meter recorder is sufficient to throw it off, and only a most delicate recording device can be used. The Venturi type has the additional advantage of being designed for almost any difference of pressure, allowing a robust recording device and not being easily affected by small leaks.

One feature which is not taken account of by any meter, but has a large effect, is the variation of moisture in the steam. The Pitot tube, Venturi and electric meters are most affected by

variation in quality, but their accuracy in actual measurement partially offsets this when the quality variation is not compensated for.

To sum up, the throttle disc meters suffer, both in measurement and mechanically, from moisture, are usually impaired in accuracy by friction in the mechanism, and are prohibited in large sizes by bulk and expense of installation. In small sizes they are reasonably good.

The electric meter is most accurate, but is too expensive to operate for wet steam, and requires knowledge of the quality to be of any value whatever.

The Pitot meter is simple, durable, and easy to install and operate, but is affected by very slight leaks or pulsation in the steam mains.

The Venturi meter has the same advantages as the Pitot tube, with the additional point of much greater differences of pressure and less delicacy. It is probable that the Venturi form of meter will offer the most reliable and accurate means of measurement.

All the meters are affected by variation in quality, and some by variation in pressure (when no compensation device is used). In the present state of the steam meter, it seems as if the safest way to measure the steam output is by means of a Venturi meter placed in the feed line to the boiler. By this means results can be readily secured which give the output to 1 per cent.

MOST ECONOMICAL METHODS OF CARRYING PEAK LOADS (WITH SPECIAL CONSIDERATION OF FIXED CHARGES)

In any electric railway the first requisite of the system is that the power supply shall be absolutely reliable, and the second is that it shall be produced economically. The first principle is so thoroughly understood that nothing further need be said in regard to it. The second, however, involving all the cost of power, is not so clearly understood as might be wished, especially as regards peak loads.

The curve below the horizontal axis in the diagram herewith shows the total maintenance and operating costs per kw-hour for various percentages of load factor, while the curve above this axis shows the fixed charges per kw-hour for various load factors. The sum of the ordinates above and below the axis gives the total cost of power under the conditions which have been assumed.

From a consideration of these curves it will be seen that for peak loads having an annual load factor of from 5 to 15 per cent the operating and maintenance charges are relatively unimportant and the fixed or capital charges are of the greatest importance.

The various sources of power to be considered for peak-load purposes are as follows:

(1) Storage Batteries. (2) Purchased Power. (3) Hydroelectric Power. (4) Gas Engines. (5) Steam Turbines.

(1) Storage batteries would seem at first sight to be an ideal means of carrying peak loads, as obviously they would not call for any additional plant capacity, but if we apply our double curves to it, we will find that the fixed charges on a battery capable of discharging at its maximum rate for two hours at a time are so high as to leave it out of the question.

(2) Purchased power almost invariably carries a heavy fixed charge per kilowatt of maximum demand, varying from $15 to $25 per kw per annum, with a further charge per kw-hour actually used. The first charge should be treated as a fixed charge and so plotted above the axis. This will in all probability show an extremely high cost per kw-hour of peak load.

(3) Hydroelectric power, if transmitted more than a few miles, will inevitably show very high fixed charges, owing to the large investment in the power plant, hydraulic development, transmission lines, etc.

(4) Gas engines, while attractive from the point of view of small cost for fuel during the period the plant is idle, are inadmissible from the point of view of high fixed charges due to the large investment per kilowatt.

(5) Steam turbines are at present the most satisfactory type of prime mover in the market for the peak-load problem, owing to their low first cost. If a reciprocating-engine plant in good condition is available, then the addition of low-pressure turbines will result in the development of a kilowatt at an investment of about $25, provided there is enough room available in the engine room and if the boilers can be forced sufficiently to carry the extra load.

In the boiler room the investment can be kept down by adding grate surface instead of more boilers, and by the use of forced draft the old rating of 10 sq. ft. of heating surface per boiler horse power can safely be reduced to four or five without materially adding to the cost of boiler or furnace maintenance.

While the over-all boiler efficiency will begin to fall off gradually beyond 175 per cent or 200 per cent rating, the small loss thus entailed is insignificant compared to the saving in fixed charges as shown in the sheet.

The solution of the problem of carrying peak load economically is therefore to be found in reducing the investment per kilowatt to a minimum, and this can be best accomplished at present by the use of steam turbines and by the use of large grate area, such as a ratio of 30 or 40 sq. ft. of heating surface to each foot of grate area, instead of the present ratio of 55 or 60 to 1. Forced draft may be employed with advantage with any grate area and will in almost any case result in increased economy as well as capacity.

ELECTRIFICATION OF THE LONDON, BRIGHTON & SOUTH COAST RAILWAY

On Sept. 5 Philip Dawson read a paper at the meeting of the engineering section of the British Association for the Advancement of Science on the single-phase equipment of the London, Brighton & South Coast Railway. Several short articles on the equipment of this line have been published in this paper.

The selection of the system was determined not only by the conditions on the suburban lines, but in view of the possible extension of the line to Brighton. Between Brighton and London there are at present 36 trains each way a day. The 25-cycle, single-phase system is used with 6700 volts on the trolley wire. Acceleration seems to be as rapid as on the underground lines in London, equipped with direct current. The weight of a complete single-phase train is between 5 and 10 per cent more than if direct current was used. The energy consumption at the station per ton-mile has been from 70 to 80 watt-hours.

Each motor car is equipped with four 115-hp motors. The commutators on these motors have run 50,000 miles before requiring turning. Sparking is a little more obvious than with direct-current equipment, but apparently does not injure the commutators to the same degree as with d.c. motors. The motors have an efficiency of over 80 per cent and the power factor of the system is over 80 per cent. The average voltage at the motors is 750.

The collectors are aluminum bows with a groove containing grease. Their cost of renewal is $1.68 and their life has been 15,000 miles. The line insulators were tested mechanically to 14 tons and electrically to 65,000 volts. In no case did the insulators break down at 70,000 volts, but there was sparking across their surface. The clearance at one point between the top of the bow and the roof of the car is only 1½ in.

Double catenary construction is used. Boosters are used on the return circuit to comply with the Board of Trade regulations that the average fall in potential in the return should not exceed 20 volts. Mr. Dawson believed that the drop on the return never exceeded 12 to 15 volts.

The cars have side entrances, side aisles and cross seats. The seats are arranged symmetrically, half on one side at one end of the car and half on the other side at the other end of the car, as illustrated in the Electrical Railway Journal for Oct. 12, 1907.

THE PUBLIC SIDE OF STREET RAILROADING*

BY PATRICK CALHOUN, PRESIDENT UNITED RAILROADS, SAN FRANCISCO

No men, not even those engaged in public life, come in such close contact with the people of the cities of this country as those who manage their daily transportation. From this contact we learn an important fact—the utter indifference of the general public to what may be termed the private side of street railroading. How many of the general public do you find who understand the tireless energy, the constructive genius, the wasted experiments, the tremendous labor which have been required to develop the art of electrical transmission necessary to propel economically a street car? How many who realize the vast sums expended during the past 25 years in constructing, first, your horse-car lines; their conversion into cable lines, and then the conversion of the cable lines into electrical lines; or the amount wasted in abandoned electrical machinery? And yet, many of your modern, up-to-date railroads represent the entire cost of these successive stages.

Theoretically, the public side of the question should be confined to three propositions:

(1) That the complicated machinery and organization of a street railroad system shall result in cheap, first-class and efficient service.

(2) That the best methods of granting the use of streets for transportation purposes shall be adopted, and full payment be made for such use.

(3) Whether a higher return for the use of the streets and a better and more efficient street car service thereon can be more cheaply obtained through public than through private operation.

These propositions involve non-political questions of a business nature. Their discussion should create no heat and arouse no rancor. All classes are interested in their correct solution. In every city of the country the problems of street railway transportation are receiving the attention of the most skilled and competent men, yet, no questions affecting our city life have created more virulent, demagogic attacks, have been discussed with less intelligence or more bitterness. The politician, the yellow journal, and the muckraker have combined to misrepresent the position of the railroads. Managers and owners are falsely charged with being the chief source of corruption in city government, and the effort is being made to separate them from the balance of the community. They are denounced as the enemies of society. The result of these attacks has been in a notable instance, in the city of Cleveland, to throw a perfectly solvent, splendidly managed property into the hands of receivers; to make many conservative investors fearful of the future of the securities of street railroads, and to place such securities in the speculative, instead of in the investment class, where they belong properly.

The reason for this is twofold: The railroad management is brought in contact with every phase of city life; every character of request for assistance is made upon it, from a contribution to a church bazaar, to a contribution to an international exposition; from furnishing a special car for an infant's baptism, to a funeral car for a man's last ride; from the just demand for increased service during the busy hours of the day, to the unjust demand of the real estate speculators that unprofitable roads should be built into unpeopled suburbs. No other business comes in contact daily with so many people, so touches the daily life of the citizen, or is so important to the orderly conduct of the people's business.

The railroad has no control over the street traffic. Oftentimes its tracks are the only well-paved part of the street; wagons and teams crowd upon them, and an inefficient or inimical city administration, neglectful of the people's comfort, allows the ordinary street traffic to delay the cars. The hurried and impatient patron, who does not see the cause, blames the railroad for the delay. While a large majority of the people are reasonable, the railroad must haul all kinds, the halt, the lame, the old, the blind, the thoughtless, the careless and the impatient. The inconvenience necessarily incident to the surface transportation of all large cities breeds discontent and creates a fertile field for the agitator.

And this brings us to the second cause for the attacks upon street railroads. There is a growing class of men in all of our cities, socialistic in their views, some sincere, others insincere, who desire to create that condition of unrest and distrust which will prevent further street railroad extension and bring about municipal ownership. With this class the end justifies the means. No attack is too wicked, no misrepresentation too false, provided it aids in the creation of public sentiment in favor of municipal ownership.

Allied with these men are local agitators and ward politicians who hope through municipal ownership to acquire jobs for themselves, or increased power through the increased patronage wihch would come from public operation.

Allied with both of these are the unscrupulous demagogues who seek support, frequently as reformers, sometimes as progressive reformers, through fostering unrest and discontent, and who believe that so great is the unrest and discontent of the country that popularity and power are to be gained through attacks upon corporations. Not frequently this demagogue is a practical politician who declares that the interests must be driven out of politics, while he seeks to extort excessive fees or campaign contributions from the railroads on the ground that he alone is strong enough to protect the corporation from the attacks of its enemies. The logic of his position is this: The corporate manager cannot and should not take an active part in local affairs. To do so will render the road unpopular. The managers therefore should stand aside and rely upon others to protect their interests. Publicly this politician will declare that he seeks to drive the corporations out of politics; secretly he will say to the corporate managers that he proposes to protect their interests and they can rely upon him. Under this system the corporation finds itself with no means of protection except the good will of the political boss. It has been and will continue to be open to cinch-bill annoyances and blackmail of every character. There is but one safe rule. A politician who will not enter by the front door should be barred from the back door.

There is not an intelligent street railway manager in the country who does not desire to keep his corporation per se out of politics. No class of men is more opposed to corrupt alliances between corporations and politicians; no men more earnestly favor the overthrow of the boss system in party management; no men more sincerely desire non-partisan discussion and non-partisan action in regard to the serious business problems involved in city transportation; no men are better equipped to help the people arrive at correct conclusions on this subject; no men have greater selfish interests or broader patriotic motives in seeking the proper solutions of the problems; no men will unite more cordially with their fellow citizens in an effort to better conditions, materially and morally. They believe earnestly that the railroad companies and the problems involved in their operation should not be made the targets of political attacks, but should be left unmolested, subject to public, non-partisan control, to carry on their business.

They know that coöperation between the railroad, the general public and city officers—cordial, sympathetic, willing cooperation—is an essential to efficient service. In some of our larger cities intelligent police regulation of the general traffic of the street has become most effective in preventing blockades and in keeping the street car tracks free for public use. It is only through such regulation, which the railroad itself cannot enforce, that delays can be prevented.

There are two methods by which corporate interests can be protected. One is by their officers and officials apparently abstaining from politics, apparently devoting themselves en-

* Abstract of paper presented at meeting of the American Street & Interurban Railway Association, Atlantic City, Oct. 10-14, 1910.

tirely to business, claiming to be business men and not politicians, and making secret deals with those politicians who will give them protection. This has been in some degree the method of the past, and this has been unquestionably a cause of political corruption. The corporation, without a just public opinion upon which to rely, has found itself without any defender except the corrupt politician, whether under the name of reform or machine, who has demanded his price for his protection.

The other method is for the corporate manager to defy boldly the politician, high or low, who undertakes to drive him from a participation in public affairs; to refuse to be blackmailed, to refuse to buy political protection through campaign contributions, to put his trust in the plain people of the country, and, willingly, boldly and fearlessly lay his case or his needs before them.

I advocate, absolutely, clean political methods—bold, fearless, courageous methods—and the establishment in every community, by the men who manage corporations, of a reputation for fearless political courage, until they secure a leadership in civic affairs recognized to be disinterested and for the public good.

I advocate a campaign of education, the widest publicity of the affairs of public service corporations, freedom from entangling political alliances, the sternest integrity in the administration of both the private and the public side of corporate management, and the passage of such laws as are necessary to establish non-partisan tribunals of a judicial rather than a political character, with power to grant franchises and regulate public service corporations.

One of the causes of political distrust of the corporation to-day is that corporate managers have sometimes professed to be out of politics, while they have had secret deals with the demagogue who has been proclaiming his desire to keep the railroad out of politics.

I have in mind the picture of a scene that occurred in the office of the Governor of one of our States. He was in discussion, friendly and cordial, with the general counsel of a railroad. While this discussion was going on some of his farmer constituents appeared at the door of the executive office. The back of the railroad counsel was to the door; the Governor faced it. He saw his constituents, immediately raised his voice, and said, without pertinency to what was then transpiring, "I tell you, sir, I will not allow myself to be dictated to and controlled by the hireling of any corporation," and launched into a tirade against railroads. His constituents paid their visit and left, when the Governor apologized for the abrupt change in his manner by the statement that it would never do for him to be found in friendly conversation by his country constituents with a corporation lawyer.

These facts are calculated to make cynics of railroad managers, and distrustful and suspicious voters. I am an opponent of corruption, a contemner of hypocrisy, and an advocate of the widest publicity. Why should we leave the field of publicity to the muck-raker and the demagogue? The people in the end are the arbiters of our destinies; the great bulk of them are honest, upright, sincere, truthful; they hate a liar, and if the demagogue lies and gets off with his lies, it is because he is not exposed and the people are not convinced of his malevolence and untruthfulness—they too frequently attribute his misstatements to mere impulsiveness. But the railroad man, whose corporation will continue to operate after his day is past, cannot afford to lie; he must be truthful, plain-spoken and upright. He has not only his own moral character and personal future to regard, but also the trusts which are imposed upon him, in behalf both of the stockholders and of the public whose servant he is.

There is no doubt that a campaign of lies has been inaugurated and is being carried on by our opponents. Why should not the railroad interests of the country inaugurate a campaign of truth and go before the people confident that the campaign of truth will win out over the campaign of lies? They may meet with temporary defeat here and there. What of it? Defeat should only be an inspiration for more vigorous action if a man is armed with conscious integrity. The time is ripe for a movement of this character.

We represent one of the most honorable of occupations, one that requires a high order of executive ability and a high order of technical information. The men who manage the railroads are patriotic, upright and honest. They have the capacity to express themselves, and the means at hand of laying their views before their fellow citizens.

We know that no men are so interested in the material welfare and growth of a city as those who own its street railways. We must make the public know this too. The rate of fare is fixed; it cannot be increased, and there is no possible way by which gross earnings can be increased except through increased population. The public must be educated to recognize that there is no conflict between it and its railroad managers. No men are willing to work harder, more patiently, more effectively for the public welfare. No men are more interested in good government—not the bastard sort of the reformer for office, but careful, prudent, economic, efficient, honest government.

Now, you cannot eliminate the corporations, and the men connected with corporations, from an interest in public affairs. They pay taxes; they meet the public in every direction; they want careful, prudent, economical government; they form a part of the best life of the country. It is foolish to assume that under modern conditions corporations can be destroyed, or that it would be wise to destroy them if they could be destroyed.

A bold, frank, open, courageous course will give any man a standing, whether he is a corporate manager or whether he is not, in any American community. The people will listen to what he has to say, if they believe truth and honesty are in his words, backed by strength and character.

Railroad managers should take an active leadership in providing the best method by which franchises may be granted with the least temptation to corruption and the best results to our cities. This is a subject upon which all good citizens should unite. Corporate managers do not desire to overreach the people in acquiring new franchises.

No greater misconception exists in the public mind than that the franchises generally of street railways have been founded in corruption. As a matter of fact these franchises were originally granted to the foremost men in their respective communities, often influenced by a noble public spirit and the desire to give to their communities the transportation absolutely essential to a city's growth. They were granted when the risk in street railway construction was great, and when the communities were most anxious to grant the franchises. In many cases, too, they became burdens instead of benefits to the promoters and yielded no profits for many years. Such corruption as has existed has grown mainly out of efforts to procure speculative franchises in opposition to the old established roads, most frequently not to give any needed transportation, but for the purpose of levying blackmail upon the older enterprises through forcing them to purchase the new grants.

We may admit, however, at the start in the discussion of this subject, that the present method, by which the State grants a charter to a public-service corporation, and then leaves it to the local legislative bodies in our towns and cities to grant franchises for the use of the streets and to regulate the rates of public service corporations, has been the source of corruption. The system is wrong. So long as greed is strong in the human breast, so long will you find some politicians ready to hold up the corporations until they have exacted their pound of flesh. Nor will the fact that the public laws controlling the city charter provide for the freest advertisement of franchises for sale to the highest bidder meet the difficulty. A striking illustration of this fact has been found in San Francisco. By the charter of that city to-day any franchise for a street railroad must be advertised for 90 days and the bidder must pay a minimum amount of the gross receipts to the city government. At the end of 25 years all the property of

the railroad passes to the city without consideration other than the grant of the original franchise.

Some of the foremost gentlemen of San Francisco applied to the Board of Supervisors for a franchise to build a railroad through the sand dunes of what is known as the Sunset District. There were no houses in this district and the streets had not been opened. These gentlemen, who were large real estate owners, determined to open an important boulevard at their own expense, and to build a street railroad into this desert of sand for the purpose of developing their property and putting it upon the market. The street railroad franchise was of no value. They knew that it could not be made profitable, and that they would be compelled to charge the money which they expended in the construction of the boulevard and the building of streets to the cost of their real estate. It was manifest that it was to the interest of the city that the franchise should be granted, and yet it was held up for months by the Board of Supervisors. Finally some of the men connected with the enterprise employed a prominent lawyer, who then also occupied the position of a political boss. They paid him a fee. Still the franchise was not passed during his period of political control. Subsequently certain members of the Board of Supervisors were bribed, on a skating rink ordinance, by a set of buccaneer financiers and politicians who had banded together to gain control of the city for personal exploitation. These men offered and gave complete immunity to the Supervisors whom they had bribed provided the Supervisors would incriminate, among others, these land owners in the Sunset District. The Supervisors promptly accepted the price of their immunity, and declared that they had been promised money by the so-called political boss if they would pass the ordinance for the railroad. The land owners who had projected the road and who were ready to build, and did subsequently build, a splendid boulevard at their own expense were promptly indicted. The political boss was also given a written contract of immunity in the hope that he could be forced to incriminate the land owners among others, but it developed that the Supervisors never received a cent of money either from the political boss or from the gentlemen connected with the enterprise. The political boss declared that he had received a fee in connection with the road, but that he had never been authorized, directly or indirectly, to pay or promise any money to the Board of Supervisors, and had never done so, and that he would not perjure himself to convict innocent men. The franchise was held up for nearly three years, when the so-called reform administration granted it under the public pressure which had been aroused and the fear of political retribution if they held it up longer. The result was that a most unprofitable street railroad was built, while the assessor states that real estate values tributary thereto advanced 800 per cent.

Now, no system of granting franchises under which such a condition has occurred, and may recur in the future, is wise or safe. I suggest that the remedy is for the State to refuse to delegate the power of granting franchises and regulating their rates to varied local bodies, too frequently corrupt and irresponsible, but to reserve this great right to itself; to provide franchise courts or public service commissions composed of a few men of the highest ability, character and integrity, who should have the power to grant franchises only after the fullest public hearing. The court or public service commission should hold public meetings in the different cities and towns. The grant of franchises should be withdrawn entirely from politics and left to such court or commission.

The period when public pressure and the consideration of the public phase of railroading is brought close home to a street railroad manager is during a strike. Then it is necessary more than at any other time for a railroad manager to have a definite conception of his public duties and of his private rights. Tremendous pressure will be brought to bear upon him by civic and religious bodies, well-meaning to the core, but who, without knowledge of the great fundamental rights which lie at the basis of society, are willing to temporize and adopt any expedient which will produce a speedy resumption of traffic.

No man, no set of men, has a right to say to any man he shall not work when and how and as he pleases; no employees of a corporation have a right to abandon their occupation and still claim to have relations with the corporation. I concede to the employees the right to organize for mutual protection, to better their condition, and to stop work when they want to, even without notice to their employer, but I deny absolutely the right of any body of men to leave the service of any employer and say to him, "We will prevent by violence other men from seeking your employment and you cannot carry on your business without submitting to our dictation." No strike can be successful unless the employer is weak enough to deal with the men after they have struck, and industrial strife will necessarily stop if strikes continually fail.

Our government was formed upon the principle that there were certain inalienable rights of man of which the whole of society could not deprive him, and that one of these inalienable rights was free speech, particularly in defense of himself and his property when attacked. The railroad manager himself should seek to deprive no man of his liberty, but he should allow no group of men to deprive the humblest of his employees of the liberty to work if he wants to work and if he is faithful and honest in the discharge of his duties. He must be prepared to defend vigorously the rights of the property entrusted to his care, and that of his humblest employee in his own labor.

No man has so great an interest in the stability of property rights as the honest workman, of whatever calling, who has no property except the property to be acquired through his own labor. No prosperity can exist except where there is the utmost protection and safeguard to the rights of the individual in his property, whether it be in his labor to-day, or whether it be in the results of yesterday's labor which he has husbanded and saved. All despotic governments which have failed to give full protection to the rights of property have had in them men of large wealth, who, in one way or another, through power or corruption, were able to take care of themselves, but the masses of mankind under such despotic governments have been invariably reduced to the lowest conditions of poverty. You cannot separate the rights of man from the rights of property acquired by his labor without depriving him of his liberty and reducing him to a condition of serfdom. Railroad franchises rest upon the law to the same degree that the title to the real estate fronting upon the streets rests upon the law. Both rights were acquired by grants from government, but the rights entrusted to our care are clothed with a public use, while the rights derived from a grant to a piece of real estate may be all private. It behooves us, therefore, more than any other class of men in the country, to study and to understand what are our private rights and what are our public duties.

It is the patriotic duty of the railroad manager, fighting demagogism and socialism on the outposts of society, to stand firmly for the protection of those limitations which form the basis of the liberty of the individual. He must learn and he must teach that our principles of government did not spring from a written constitution, but that our written constitution, carrying with it the protection of life, liberty and property, sprang from principles which were the product of eighteen centuries of conflict with despotic power; that the principles that a contract must be held inviolable, and that the humblest citizen of a community, as well as the richest, has certain inalienable rights of which the whole society cannot deprive him, are necessary in order that the people may prosper and find liberty and happiness in their prosperity; that a government of, for and by the people has no place in it for the political serf or the beneficent ruler; that equal and exact justice to all men can be found only under a reign of law. In this day, when we hear so much of the conservation of our material resources—and every patriotic man wants to see them intelligently conserved and legally developed—I say to you, gentlemen, that the conservation the country most needs is the conservation of a government of law.

REPORT OF THE COMMITTEE ON POWER DISTRIBUTION*

BY A. F. HOVEY, VICE-CHAIRMAN; S. L. FOSTER, E. J. DUNNE, E. J. BURDICK, WM. ROBERTS

The loss which the association has sustained in the death of our chairman, James Heywood, has been felt particularly by his fellow committee members, and the work of the committee, which was then largely in the formative stage, received a serious setback.

No formal report, therefore, has been prepared, but the specifications for high-tension three-conductor and for low-tension single-conductor cable, which were included last year in the appendix to the report, have been revised after conference with representatives of the cable manufacturers, and are submitted, not with recommendations for adoption as standards but rather for full discussion, as they are in the form in which it was intended to submit them to the committee at a proposed later meeting for consideration and final revision.

It was in the mind of our late chairman to attempt to arouse an interest in some of the features of last year's report which from lack of time, did not receive much discussion; and it is hoped that those members or others who were prepared to discuss some of the matters last year will feel that such discussion will be welcome this year and will take part in it.

[Inasmuch as the specifications are not yet in their final form they are not presented at this time.—Eds.]

SPECIFICATIONS FOR OVERHEAD CROSSINGS OF ELECTRIC TRANSMISSION LINES**

The following specifications are a proposed joint report of the committee on electricity of the American Railway Engineering & Maintenance of Way Association and the committee on overhead line construction of the National Electric Light Association. They are respectfully submitted by the committee on power distribution for consideration by the members of the American Street & Interurban Railway Engineering Association.

GENERAL REQUIREMENTS.

1. Scope: These specifications shall apply to all overhead aerial transmission line crossings, except trolley contact wires, over the railroad company's tracks, lines of wires, or property, and to lines parallel to the railroad company's tracks, lines of wires, or property, when side clearance is less than the height of the transmission line supports.

2. Location: The poles or towers supporting the crossing shall preferably be outside the railroad company's right-of-way.

3. The towers or poles supporting the crossing span and the adjoining span on each side shall, if possible, be in a straight line.

4. The wires or cables shall cross over telegraph and telephone wires.

5. Cradles or overhead bridges shall not be used over the railroad company's property or tracks.

6. Clearance: The side clearance from the center line of the nearest track shall not be less than 12 ft. 6 in.

7. The clear headroom shall not be less than 30 ft. above the top of rail.

8. The clearance above any existing wires shall not be less than 6 ft.

9. The separation of conductors shall not be less than:

10. By voltage:

Volts.	Spacing.
6,600 or less	12 in.
11,000	24 in.
13,000	24 in.
22,000	33 in.
33,000	33 in.
44,000	44 in.
60,000	60 in.

etc., etc.

11. By sag:

Normal Sag.	Spacing.
. . . . .	. . . . .
. . . . .	. . . . .

12. Conductors: The conductors in the crossing span and the adjoining span on each side shall generally be so strung that the normal tension will be the same in each span.

13. The conductors shall not be spliced in the crossing span.

14. Conductor Attachments: An approved device should be used to attach the conductors to the poles or towers, and such device shall be arranged to hold the wires to the supporting structure in case of excessive stresses, broken wires or shattered insulators.

15. Wooden Poles and Crossarms: Wooden poles or crossarms shall not be used for voltages over 13,000.

16. Guys, Double Arms: Where possible, wooden poles shall be guyed both longitudinally and transversely, and the next adjoining pole be double-armed and guyed toward the crossing.

17. Clearing: If possible, all timber, underbrush and grass shall be removed from the immediate vicinity of the poles.

18. Protection and Grounding: If required by the railroad company, danger signs of an approved design shall be placed on all poles and towers located on the railroad company's right-of-way.

19. Steel structures shall be grounded in an approved manner.

20. Temperature: In the computation of stresses and clearances, and in erection, provision shall be made for a variation in temperature from 10 deg. Fahr. to 120 deg. Fahr.

21. Inspection: All material and workmanship shall be open and subject to the inspection of the railroad company's representatives.

22. Defective material shall be removed and replaced with suitable material.

23. On the completion of the work all falsework, paint and rubbish incident to the construction shall be removed and the site left unobstructed and clean.

24. Drawings: . . . . complete sets of the general and detail drawings shall be forwarded to and approved by the railroad company before any construction is commenced.

LOADS

25. The conductors shall be considered as uniformly loaded throughout their length with a load equal to the resultant of the dead load plus the weight of a layer of ice ½ in. in thickness and a wind pressure of 8 lb. per sq. ft. on the ice-covered diameter, at a temperature of 0 deg. Fahr.

26. The weight of ice shall be assumed as 0.033 lb. per cu. in.

27. Insulators, pins and conductor attachments shall be designed to withstand the maximum tension in the conductors.

28. The poles or towers shall be designed to withstand the combined stresses resulting from their own weight, a horizontal wind pressure of 13 lb. per sq. ft. on the windward and 9.75 lb. per sq. ft. on the leeward exposed surface of the pole or tower, and the above wire loading on all crossing spans and the next adjoining span on either side.

29. The poles or towers shall also be designed to withstand the preceding loads combined with the unbalanced tension of . . . .

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Atlantic City, N. J., Oct. 10 to 14.

**Submitted as Appendix A of the report of the committee on power distribution, read before the American Street & Interurban Engineering Association, Atlantic City, N. J., Oct. 10-14, 1910.

FACTORS

30. The ultimate unit stress divided by the allowable unit stress shall not be less than the following:

31.

Wires and cables	2
Insulators, pins, conductor attachments	3
Wooden poles and crossarms (untreated)	5
Wooden poles and crossarms (treated full length)	4
Structural steel	3
Reinforced concrete	3
Foundations	1.5

32. Insulators: Insulators shall have an electrical factor of safety of at least two at the normal working voltage, under a precipitation of 1/5 in. per minute.

MATERIAL

33. The conductors shall be of copper, aluminum, or such non-corroding material as may be approved by the railroad company.

34. The minimum size of conductors shall be as follows:

	Copper	Aluminum
Voltage, not over 6600	No. 6, B & S, solid or stranded	No. 2, B & S, stranded
Voltage, over 6600	No. 4, B & S, stranded	No. 0, B & S. stranded

35. Insulators: Insulators shall be of an approved grade and type of porcelain or other material of equal strength and durability.

36. For voltages over . . . . volts insulators shall be of porcelain.

37. Strain insulators in guy cables shall have an ultimate strength not less than that of the cables.

38. Pins: Insulator pins shall be of steel, wrought iron, cast steel, malleable iron, or other approved metal or alloy and shall be galvanized or otherwise protected from corrosion.

39. Guys: Guys shall be galvanized, stranded, steel cable, not less than 5/16 in. diameter.

40. They shall have a substantial anchorage of an approved type and be protected or of extra strength at the ground level.

41. Wooden Poles: Wooden poles shall be of selected timber, peeled, substantially straight, free from defects which would decrease their strength or durability, and not less than 8 in. in diameter at the top.

42. Concrete: All concrete shall be in accordance with the specification for . . . . of the joint committee.

STRUCTURAL STEEL

43. Structural steel shall be open-hearth, railway bridge steel, in accordance with the Manufacturers' Standard Specification (1903).

44. The design and workmanship shall be strictly in accordance with first-class practice.

45. The form of the frame shall be such that the stresses may be computed with reasonable accuracy.

46. The sections used shall permit inspection, cleaning and painting and shall be free from pockets in which water or dirt can collect.

47. The material shall not be less than ¼ in. in thickness.

48. The length of a main compression member shall not exceed 125 times its least radius of gyration.

49. The length of a secondary compression member shall not exceed 150 times its least radius of gyration.

50. Bolts shall not be used in place of rivets except as specified upon the approved plans, and when used the holes shall be made to a close fit.

PROTECTIVE COATINGS

51. All structural steel shall be thoroughly cleaned at the shop and be galvanized or given one coat of approved paint.

52. Painting: All contact surfaces shall be given one coat of paint before assembling.

53. All structural steel shall be given two field coats of an approved paint.

54. The surface of the metal shall be thoroughly cleaned of all dirt, grease, scale, etc., before painting, and no painting shall be done in freezing or rainy weather.

55. Tests of galvanized material shall be in accordance with the American Telephone & Telegraph Company's specifications (1908).

56. Galvanizing: Bolt holes in galvanized material shall be punched before galvanizing, and riveted connections shall be given two coats of paint after riveting.

57. Creosoting, etc.: Wooden poles or towers shall be creosoted or otherwise treated with preservative for a distance of not less than 2 ft. above and below the ground line.

FOUNDATIONS

58. The foundations shall be designed to resist overturning, the depth and dimensions to be determined by local conditions.

59. The weight of "earth" shall be assumed as 90 lb. per cu. ft. and that of concrete as 140 lb. per cu. ft.

60. No steel shall extend below the surface of the ground, unless encased in concrete.

61. The top of the concrete foundation, or casing, shall not be less than 1 ft. above the surface of the ground or of extreme high water.

62. When located in swampy ground, wooden poles shall be guyed and set in barrels, broken stone or timber footings.

63. When located in the sides of banks, or when subject to washouts, foundations shall be given additional penetration or be protected by cribbing or riprap.

UNIT STRESSES

64. Structural Steel:

Tension (net section)	18,000 lb. per sq. in.
Shear	14,000 " " " "
Compression	18,000-60 $\frac{l}{r}$ " " " "

65. Rivets, Pins, Bolts:

Shear	10,000 " " " "
Bearing	20,000 " " " "
Bending	20,000 " " " "

66. Wires and Cables:

Copper, hard drawn, solid, B&S gage, 4/0, 3/0, 2/0	25,000 " " " "
Copper, hard drawn, solid, B&S gage, 1/0	27,500 " " " "
Copper, hard drawn, solid, B&S gage, No. 1	28,500 " " " "
Copper, hard drawn, solid, B&S gage, No. 2, No. 4, No. 6	30,000 " " " "
Copper, soft drawn	17,000 " " " "
" hard drawn, stranded	30,000 " " " "
" soft drawn, stranded	17,000 " " " "
Aluminum, hard drawn, stranded, B&S gage, under 4/0	12,000 " " " "
Aluminum, hard drawn, stranded, B&S gage, 4/0 and over	11,500 " " " "

67. Timber (untreated):

	Bending.	*Compression.*
Long leaf yellow pine	1300 lb. per sq. in.	$1300\left(1-\frac{L}{60\,D}\right)$
Short leaf yellow pine	1100 " " " "	1100 "
White oak	1100 " " " "	1300 "
Chestnut	1000 " " " "	1100 "
Cedar	800 " " " "	900 "
Douglas fir	1200 " " " "	1200 "

L = length in inches.

D = least side, or diameter, in inches.

Bion J. Arnold, of Chicago, is referred to in "Hampton's Broadway Magazine" as consulting engineer by profession and a street railway doctor by choice. According to "Hampton's," however, it will be some years before all the medicine which Mr. Arnold has given New York is assimilated and the ailment for which he is prescribing is cured.

REPORT OF THE COMMITTEE ON INSURANCE*

BY H. J. DAVIES, CHAIRMAN; S. J. DILL, A. H. FORD, F. A. HEALY, G. B. HIPPEE, S. L. TONE

Your committee on insurance makes the following recommendations:

1. That the association appoint an insurance expert, with authority to employ such assistants as may be necessary, whose duty it shall be to give advice and assistance to such members of the association as may desire to avail themselves of his services on all subjects relating to fire insurance, including forms of policies, appraisals of property, schedules of rates, the elimination of unnecessary commissions, the construction and improvement of properties with a view to the lessening of fire hazards, and the adjustment of losses, and to represent member companies, upon request, before inspection and rating bureaus; the insurance expert and his assistants to be the inspection and survey bureau of the association; the expenses of the bureau, not to exceed $25,000 per annum, to be paid by the association, and to be collected from the members in the proportions in which annual dues are now collected, or in proportion to the value of the services rendered by the bureau to the several members of the association.

2. That traction companies have appraisals made, by independent appraisers, of the value of their properties. Such appraisals, if made by recognized experts, will aid the companies in adjustments of losses.

3. That each member company employ permanently an inspector to examine its properties, particularly with reference to cleanliness, condition of buildings and fire drills, or that it assign this work to an officer or employee, and that the man assigned to these duties be of sufficient intelligence, experience and authority to criticise and condemn conditions and recommend improvements.

4. That particular attention be given to the inspection of car wiring and the wiring of buildings.

5. That car yards be protected by standpipes surmounted by nozzles that may be easily turned in any direction, each of which will throw a stream an inch or more in diameter at least 100 ft., at the rate of from 250 to 300 gal. per minute, the standpipes to be so distributed that two streams may be made to play at the same time upon any car in the yard. The water supply should be obtained from city mains or from reservoirs, and, if the pressure be less than 80 lbs. per square inch, it should be increased by a steam or electric underwriters' fire pump. Your committee has witnessed a test of this form of protection in Cleveland, where it has been installed in a large car yard containing cars valued at more than a quarter of a million dollars. Drawings showing the Cleveland installation are attached to this report.** The plan has also been adopted in Minneapolis, where a still larger yard is to be equipped. Such standpipes and nozzles will effectively protect any car yard in which they may be erected, and will entitle the company installing them to a very low rate of insurance.

6. That approved chemical extinguishers be carried in each interurban car. If a fire starts in a car between cities, where it cannot be reached by the apparatus of any municipal fire department, it is likely to be totally destroyed, whereas the fire might be easily extinguished in its incipiency if an extinguisher were at hand. Several fires have, to the knowledge of the committee, been put out under such circumstances. We see no objection to the protection of city cars in the same manner.

7. Without repeating the recommendations made in former annual reports, your committee calls attention to them, and suggests that they be read in connection with this report. The committee believes that if members will adopt its recommendations they will be able to obtain contracts of insurance with the best insurance companies at reasonable rates and upon good conditions. If they protect their properties as the committee believes they should be protected, they will be in position to say to companies soliciting their insurance that if the rates offered are not fair, they (the traction companies) will carry their insurance themselves, either individually by means of a cumulative insurance fund, or jointly with other companies by means of the establishment of a joint fund or the maintenance of a railway insurance company that will operate for the benefit of street railway companies and not for the profit of others.

The committee was advised in January that a resolution had been adopted by "the executive committee of the Central Traction & Lighting Bureau," reciting a desire on the part of the bureau to establish and maintain harmonious and mutually helpful relations with the American Street & Interurban Railway Association, and inviting the association to confer with the bureau or its committees from time to time and present to and discuss with the bureau matters of mutual interest. Your committee acknowledged receipt of a copy of the resolution, and stated its willingness to meet the bureau for conference. Since that time it has extended invitations to the bureau to attend its meetings, but the last communication received from the bureau said that if it desired to have a representative at our meeting it would so advise us in due course. Your committee knows nothing in regard to the activities of this bureau except that it is said to have done some work upon "schedules."

*Abstract of report read before the American Street & Interurban Railway Association, at Atlantic City, N. J., Oct. 10-14.

**See also *Electric Railway Journal*, Oct. 8, 1910, page 663.

DETAIL RECORDS: THEIR USE AND VALUE *

BY J. H. NEAL, GENERAL AUDITOR, BOSTON ELEVATED RAILWAY

To establish and maintain the maximum of efficiency in co-operation between the administrative and producing forces is well recognized as one of the fundamentals of skilful business management.

Apparently, however, it is not quite so well recognized, at least in street railway affairs, that not only one, but both of these branches should be provided with equally powerful tools in the shape of ample and carefully selected records.

Since the advent of adding machines and loose-leaf methods it is becoming more and more the custom to utilize original records at the executive offices. From these machines abstracts of figures only are made in duplicate; the duplicate going to the maker of the original records, who, of course, has kept a carbon copy of the details. Thus he is provided with two or more sets of both details and summaries.

It will usually prove an excellent investment to spend as great an amount of time and ingenuity in designing a form as would be spent upon an improvement in a machine for the purpose of achieving some special result or to save an extra operation.

EXPENDITURE RECORDS

A record which quickly shows the total amount spent upon any account and at the same time shows the cost and finest detail of each separate job included is a good and satisfactory system.

Proper filing being of supreme importance, it will be found most convenient to reduce all time sheets and time cards to not over two sizes, and all material records to one size, twice that of a time card.

The labor which is reported on time cards should conform to the modern cost-keeping systems, which require a separate time card for each job number, besides a card

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

showing the total time for the week. Cards should be sorted by job numbers and listed on slips of the same size by adding machines. The labor which is reported on time sheets should also be abstracted upon slips instead of upon large abstract sheets, as is the usual custom.

"Material consumed" sheets should be self-abstracting. This is accomplished by using a separate sheet for each job or account number. They should be listed, folded and then filed with the listed time slips by account numbers.

Invoices charged direct to a job or account number should be abstracted on slips of the same size as time cards, as should also all miscellaneous charges.

Summaries should be drawn off on adding machines from all of these papers; totals being proven against total payrolls, total invoices, etc. The summaries added together constitute a report of expenditures. Carbons of summaries are sent to all departments concerned.

Everything, except time sheets and weekly time cards, should be filed in one place by account numbers, instead of in separate cabinets for labor and others for materials, etc. The cost time cards should be returned, after listing, to the department from which they came, not only to reduce bulk in main office, but to furnish detail needed by departments. All filing should be vertical and each account may be subdivided like a card record as much as may be desired.

Outside offices should file in the same manner as the main office. No recopying is necessary, and yet every item of material and even the names of men working upon any account may be quickly obtained. In department offices, to still further perfect the plan, sketches, original orders for work, shipping receipts, etc., are included in the same file.

One may do all the things outlined here, and, indeed, much more, without deriving any benefit from it if he spends too much time in perfecting systems instead of devoting a necessary amount to drawing valuable conclusions from them. From our records we should constantly endeavor to determine the efficiency of employees, we should prevent waste, establish piecework prices, detect inadequate and improper handling of equipment, gather data regarding depreciation and a hundred and one things.

REVENUE RECORDS

Conductors' records should be kept separately for each route upon which they run, but the cash and tickets need not be separated. Cash and tickets received should be checked against conductors' records for "receiver's overs and shorts." Conductors' records should be listed on adding machines, with a separate slip for each route number. These slips should contain date, amount, revenue passengers, free passengers, and trips run. Conductors' records should also be checked against starters' records for "auditor's overs and shorts."

Corrections on account of overs and shorts, etc., should be noted on the back of the listing slip for each route and one charge made in total on the front of the slip will suffice. Once a week the totals from these daily slips should be listed on a monthly slip with similar headings, but with the 31 days of the month printed at the side in addition. At the end of the month the totals of the monthly slips should be listed on a large form which contains a line for each route. The large form should contain a description of each route. Additional information should be calculated and introduced, such as mileage, earnings per mile, per passenger, etc., and comparison with the previous year.

Carbon copies should be made from start to finish.

The original conductors' records should be vertically filed for use of the claim department and for other reference purposes. The daily and monthly listed slips should be vertically by route numbers as a detail record of each route. The monthly tabulation should be filed in a loose-leaf binder, which will eventually contain a whole year's work.

The duplicates, either in whole or in part, should be distributed for inspection and analysis to every subordinate, as well as to every executive whose criticism may prove of benefit. Continual comparison with the previous year, month or week should not only be encouraged, but even forced in every direction. Everything needed for the most exhaustive investigation and study will be found instantly accessible in the revenue system described.

PHYSICAL RECORDS

Foremost in value among physical records stand those of car defects.

Troubles with car equipment are most intimately associated with public convenience, or, I may say, inconvenience, on account of street delays. They have a direct bearing upon the cost of platform labor and furnish important evidence of the degree of wisdom displayed in the investment of large amounts of money in the types of apparatus employed.

A car defect may be due to improper handling by the operating department, to neglect on the part of the maintenance force, or to inadequate apparatus, and it makes considerable difference, therefore, as to who reports the trouble; each department, anxious to make as good a showing as possible for itself, may lay the fault to "the other fellow," or both of them to the equipment itself. A competent judge must decide these matters. All defects should be reported upon suitable forms and should be tabulated monthly for each and every kind of equipment in use.

Voluntarily, the foreman of the elevated shops connected with the same company as the writer keeps individual records of triple valves, controller parts, etc., and, as a result of studying his records, has almost entirely eliminated certain classes of defects which would have tied up the system.

Tabulations should be widely distributed among all the operating and mechanical forces. Saving in repair costs can better be effected by this method than by a study of dollars and cents expended. This plan will also permit a better study of the varying conditions of operating territory and weather. It will also indicate the frequency with which inspection should occur. It will eliminate the use of defective material and improve the quality of labor. From the highest official to the lowest it will compel attention to either expensive and wasteful methods or machinery.

Track and line records may be kept in such a manner as to constitute a perpetual inventory by showing all additions and removals, together with a memorandum of repairs.

Of course, these principles may be applied to almost any property which a road possesses, from a car barn to a register. In fact, they are applied to these identical items by the company with which the writer is connected.

In conclusion, it may be said:

1. That on some original record even the smallest transactions in labor, material or physical changes are recorded.

2. That intelligent management requires the study on the part of some one of almost every item, while economy forbids recopying or recasting in different form.

3. That assuredly the details and summaries can be used to as good, if not better, advantage outside of the main office as within, thus necessitating at least a duplicate set.

4. That proper self-indexed filing can reduce the entire mass to an almost inexhaustible library of detail instantly available and only requiring the spirit and desire to obtain and use the information contained therein.

Among the Exhibits

Some excellent samples of Cameron commutators are shown at the booth of the Western Electric Company.

* * *

The metal department of the National Lead Company is represented at the convention by Edgar A. Mueller, of St. Louis.

* * *

Bishop Gutta Percha Company, New York, is represented at the convention by J. W. Mundell, of the sales department.

* * *

Clarke P. Pond, of David Lupton's Sons Company, Philadelphia, manufacturer of skylights and fireproof windows, spent Wednesday with his friends on the Steel Pier.

* * *

Wagner Electric & Manufacturing Company, St. Louis, has no exhibit, but is ably represented at the convention by W. A. Layman, vice-president, general manager, St. Louis; E. W. Goldschmidt, manager New York office, and John Mustard, Philadelphia.

* * *

National Lock Washer Company, Newark, N. J., is showing in spaces 650 and 652, Building No. 2, its well-known sash lock. This is made of solid bronze with locking levers to lock the window at any height automatically and prevent all rattling. When used with the company's face and edge springs, a dust-proof and draft-proof sash is obtained.

* * *

The booth of the Indian Refining Company, in Building No. 2, is a Mecca for those interested in lubricating oils. This company, which has its headquarters in Cincinnati, Ohio, furnishes lubrication on fixed car mileage and kilowatt hour bases. J. V. Smith, manager of the railway department, is in personal charge here. He is assisted by A. J. Varrelman, T. B. Connor, T. U. Franklin.

* * *

The Lorain Steel Company, Johnstown, Pa., has mounted in a large frame all of its "live" girder rail sections, showing all forms of side and center bearing, grooved, guard and Trilby rails used in the United States and foreign countries. The rails vary in height from 3½ in. to 9 in. and in weight from 50 lb. to 165 lb. The exhibit is an object lesson in the necessity of standardization and in illustrating the law of the survival of the fittest.

* * *

Garwood Electric Company, Garwood, N. J., is at the entrance of Machinery Hall, where it has a working exhibit of electric welding apparatus for welding broken trucks, motor frames, bolsters and anything else of a metallic nature. The exhibit consists of a standard welding equipment, including a special motor-driven, low-voltage, double-commutator generator. Represented by W. E. Elliott, George Hills, B. H. Harrison.

* * *

Q. M. S. Company, Plainfield, N. J., exhibits in space 805, Building No. 3, the various shop and labor-saving appliances which it manufactures. A working exhibit has been installed of its pneumatic pit jack and a "D" type 3-ton capacity hand-rocked traveling crane, equipped with a No. 6 load-retaining air hoist, especially adapted for street railway shops. The well-known Stanwood car step and the Stanwood steel folding car step, of a design similar to steps furnished for many P-A-Y-E cars, is shown; also a car wheel grinder, which is attracting much attention. Represented by C. H. Holbrook, F. R. Phillips, E. R. Packer, L. Wharton-Bickley.

The well-known "National" railroad trolley guard for steam railroad crossings made by the National Railroad Trolley Guard Company, New York, is exhibited by the Ohio Brass Company and the Electric Service Supplies Company, which are sales agents for the guard. L. J. Mayer, of the New York office, however, is present in the interest of the company.

* * *

The exhibit of the Under-Feed Stoker Company in Aquarium Court is one of the most elaborate coal stoker displays ever made at a convention. This company is showing one of its full sized "New Jones" self-cleaning, automatic stokers in operation. Demonstrations are made showing how grate fires are mechanically cleaned and stoked and how the boiler capacity is increased and the cost of operation reduced by its adoption.

* * *

The American Steel & Wire Company is making an attractive exhibit of its rail bonds and bonding machines. The representatives are also calling attention to the new Crown bond-testing outfit. This device is self contained, being independent of the return track current. It furnishes a ready means of quickly determining whether a rail joint is well or poorly bonded. The company is passing out a valuable book entitled "Electrical Wires and Cables."

* * *

The American Rolling Mill Company, of Middletown, Ohio, has an exhibit of special interest to engineers and maintenance of way men. It consists of samples of the American ingot iron which is used extensively in the manufacture of Watson corrugated metal culvert pipe and for building purposes. Photographs of some noteworthy culvert installations on railways are also shown. The representatives, G. H. Charls and G. F. Ahlbrandt, are demonstrating by acid tests the rust-ressting quality of American ingot iron.

* * *

Baird Electric Company, Chicago, is exhibiting in space 455 a working model of its steam and electric railroad train dispatching telephone system. The exhibit contains a complete dispatcher's equipment, with a dispatch line and signals for both the steam and electric railways. The flexibility of the apparatus permits the service to be adjusted to suit the local conditions and operating methods of any road, it containing as well the fundamental principles for standard dispatching methods, by means of which telephone service and signals are given over existing wires.

* * *

Dossert & Co., Inc., New York, exhibit solderless splicing devices in space 813, Building No. 3. The various types include cable taps two-ways, types A, B and C; insulated two-ways and cable taps; three-ways Y's, lugs, front and back-connected angle and swivel; stud connections; cable anchors; equalizers; grounding devices; third-rail jumpers. Mr. Logan, president, reports that the Dossert joint is fast becoming standard on large electric railways for splicing and connecting work because of its adaptability and time-saving qualities. Represented by H. B. Logan, S. A. Jenkins.

* * *

Among the switch pieces exhibited by Wm Wharton, Jr., & Company, Inc., Philadelphia, spaces 208-216 and 304, are a number of their manganese steel center types, in which the centers are fastened by split keys driven through the lugs which extend downward from the manganese steel center itself. This metal and the "keyed-in" method of holding the centers in place have been Wharton standards for the past sixteen years. The company considers this result a remarkable proof of the superiority of manganese steel treated by the original Taylor-Hadfield process and of the Wharton "keyed-in" work. A few years ago "easily renewable centers" were in demand, but it was found that they came loose too easily under traffic. The "keyed-in" method holds the centers tight throughout the life of the piece.

Butler Keyes is here in the interest of the Hemming Manufacturing Company, New York.

* * *

G. C. Reiter, Canton, Ohio, is showing, at space 453, a complete line of street-car gongs, among which are the all-steel rotary gong and a pneumatic gong.

* * *

The Hoeschen Manufacturing Company, Omaha, Neb., which manufactures the Batteryless crossing signal for protecting highway crossings, is represented at the convention by its manager, Mr. Ryner, who arrived here Wednesday.

* * *

Charles F. Etter, of Harrisburg, the Rapid Ready Change Carrier man, has found during his stay at the convention that it is as necessary for him to be rapid in order to keep pace with the delegates as it is for his rapid change carrier in the hands of conductors.

* * *

Herman F. Gerhard, superintendent of the treating department of the C. A. Wood Preserver Company, Austin, Tex., arrived here Tuesday night to spend the remainder of the week at the convention. The company has no exhibit this year, but its interests will be taken care of by Mr. Gerhard.

* * *

D. I. Cooke, chief engineer of the Vacuum Car Ventilating Company, Chicago, is explaining the details of the Cooke system of car ventilation. Sample equipments are shown in space 835, Building No. 3, and a complete installation of the system is shown in the Brill car in the track exhibit.

* * *

Indianapolis Brass Company, Indianapolis, Ind., is showing in space 667, Building No. 2, an assortment of overhead line material manufactured by it. The representatives, James H. Drew and Fred. C. Hornstein, are calling particular attention to the new section insulators which were recently placed on the market.

* * *

Columbia Machine & Malleable Iron Company, Brooklyn, is showing some excellent examples of the class of special work it is prepared to do, such as special forgings, slack adjuster levers, dead and live motor truck levers, brake cylinder connecting rods, motor and trailer truck brake pull rods, hand brake levers, motor truck equalizer brake lever, etc.

* * *

"Universal" window fixtures form the major part of the exhibit of the McCord Manufacturing Company, Chicago and Detroit, at spaces 945-947, Building No. 3. This fixture includes notable improvements in car window designs. It contains gravity wedging locks which insure a light, non-rattling joint between the sash and outside stop and a cushion for the sash enclosing. A flexible weather stripping at the top, bottom and sides allows loose-fitting easily operated sash and insures dust-proof air-tight joints around the window.

* * *

To delegates interested in the mechanics of steel car construction no exhibit is more attractive than that made by Forsyth Brothers Company in booth 954. Among several devices shown is the Brinckerhoff unit pressed side construction. This type consists of pressed flanged steel units, which, when assembled in connection with Doyle posts and side sills and plates, form a truss of the entire height of the car, affording unusually strong and substantial car side. The units are so constructed that the number of parts, joints and rivets is reduced to a minimum, and the units are easily removed for repairs. Among the many other car devices shown is a sample draft riggings, 1,600 of which are now being made for the cars of the Interborough Rapid Transit Company, of New York.

International Register Company, space 611-13, Building No. 2, is showing for the first time a coin register for prepayment cars. This device receives in a hopper nickels and dimes, and pennies if desired, and registers them on a totalizer and trip which is visible inside the car. The money is passed through for the conductor to use in making change. It also makes change mechanically for a dime offered for one fare. The company is also showing several types of its standard fare registers, Heeren enamel badges, International trolley cord, ticket punches and register fittings.

* * *

W. T. Van Dorn Company, Chicago, has an exhibit in Machinery Hall of Van Dorn couplers of the M. C. B. type as well as the standard interurban type of coupler and draft rigging. One of the attractive features of the exhibit is a full-sized M. C. B. coupler mounted in working position on a frame showing also the commendable features of the new draft rigging, which combines simplicity with durability. Other devices shown include a Van Dorn No. 31 three-fourth size M. C. B. head, standard heads and four types of draft rigging. The booth is in charge of W. T. Van Dorn, president, and H. E. Van Dorn.

* * *

Emery Pneumatic Lubricator Company, St. Louis, Mo., is showing at booth 435, Building No. 1, its pneumatic lubricator. This is an automatic device for uniformly lubricating air brake apparatus, by means of a solid compound which is dissolved by the moisture normal to compressed air and is carried through the pipes to all frictional surfaces in contact with the air current. Its effect is to preserve the packing leathers of brake cylinders, switch group cylinders and all apparatus of a like nature from wear and leakage and through its cleaning effect to render unnecessary the periodical dismanteling of this portion of the equipment hitherto required in order that first-class conditions may be maintained. It has become standard on many railways.

* * *

Curtain Supply Company, Chicago, Ill., is exhibiting its new "Rex" all-metal curtain roller, which is designed with a view to durability. Unlike other curtain rollers on the market, the barrels, springs, mandrels, end pieces, brackets, etc., are formed entirely of metal. The roller bearing is seamed instead of being soldered. This insures uniformity in diameter and thereby always allows the curtain to be rolled uniformly around it, and also prevents the barrel opening at the front. The pressed metal ends are accurate and uniform and keep the pins in the center of the barrel; as the pin at the end is part of the end, it cannot get out of alignment. The extension plugs, mandrels, springs and other parts are made of metal and are especially designed by the company for this service. The roller is made in standard sizes and in any required length. The various parts are interchangeable.

* * *

R. D. Nuttall Company, Pittsburg, has a very interesting exhibit, extending through from the main building to a section of Machinery Hall, with a reception space in the Main Building and a display of apparatus in Machinery Hall. F. A. Estep, president of the company, is in attendance at the exhibit. A pnuematic pantograph trolley of its latest type, for service where conditions provide low clearance, is shown in operation. This is used on the New York Central lines. Ball-bearing bases, types Nos. 11, 13 and 14, for interurban railway service, are also shown; air compressor gears and pinions; street railway gears and pinions, and automobile transmission apparatus. Another interesting feature is furnished by the butt-welded, reinforced trolley poles. These combine strength and resiliency, being built so as to withstand much abuse. When bent they can be straightened out cold and put into good condition for service. Seamless trolley poles are also shown.

Frank Ridlon Company, Boston, Mass., is represented at the convention by R. A. Perry, T. E. Stimson and Harry DeSteese.

* * *

National Brake Company, in addition to its regular exhibit in space 654, Building No. 2, has brakes installed on the Brill car.

* * *

Dayton Manufacturing Company, Dayton, Ohio, is represented at the convention by Franklyn M. Nicholl, Joseph and Peter Leidenger and B. C. Watts.

* * *

Homer Commutator Company, Cleveland, Ohio, is making no formal exhibit this year, but Fred Baird is on hand and is doing his company and the occasion full justice.

* * *

Harold P. Brown, New York, has a substitute for rubber on exhibition at his booth. It is so new that it has not been christened. Users of automobile tires and insulation for wire should be interested in it.

* * *

Speer Carbon Company, St. Mary's, Pa., is so confident of the high grade of its carbon brushes that visitors are invited to break any brush taken at random to see for themselves the fine uniform grain and total absence of laminations of this product.

* * *

Davis Expansion Boring Tool Company is exhibiting boring tools of various types for use in street railway shops. Among those shown are tools designed for boring cast-iron wheels, steel wheels and for general use. W. N. Mathews, E. E. Davis, J. W. McKeen are in attendance.

* * *

The Galena-Signal Oil Company, while not making an exhibit of its well-known lubricating oils, has one of the most popular booths on the pier. It is serving tea and cakes to the ladies and presenting them with candy. There are cigars also for their men friends. The booth is most beautifully decorated with ferns, palms and flowers.

* * *

Flower lovers have manifested much curiosity in learning the names of the beautiful and rare floral decorations in space 679 of the W. B. McVicker Company, New York. Their names are Selocia, immortelles, acutifolius and yellow Aspidium fern. They form a most attractive background for the display of McVicker lubricants, boiler and hydraulic elevator compounds.

* * *

The car seats and the chairs for private and special cars which were shipped for display in the booth of Ford & Johnson Company have been delayed in transit, and as a result the company is making no display in its booth in spaces 662 to 665, Building No. 2. Three of the company's representatives, A. D. Martin, Clarence A. Van Dervere and Walter J. Bennett, are present.

* * *

Davis-Bournonville Company, New York, has an exhibit at booth 657, Building No. 2, showing a rail bond welded to the web of a grooved rail by the oxy-acetylene process. No solder is used, as the copper in the bond is simply amalgamated to the rail to form a perfect contact. This process of bonding is now in use by the Twin City Rapid Transit Company, Minneapolis. Wilbur R. Noxon is present in the interest of the company.

* * *

Bayonet Trolley Harp Company, Springfield, Ohio, is showing in Building No. 2 its new low-down trolley base with detachable pole clamp. Other devices shown are detachable harps, Butterfly sleet cutters, Bayonet wheels and self-lubricating bearings. C. S. Olinger and R. A. Garlough, the representatives present, are making practical demonstrations of the changing of trolley wheels and poles, which act requires about one minute's time.

The I. B. C. insulated adjustable crossing for use in overhead construction is one of the new devices shown by the Indianapolis Brass Company in space 667, Building No. 2. It is composed of an insulated wooden runner and special I. C. B. brass composition metal parts. Other devices shown include samples of the full line of overhead equipment manufactured by the company.

* * *

T. H. Symington Company has on exhibit its well-known journal boxes, dust guards and center bearings. In the journal-box exhibit is shown an improved form of the Symington "lift off" lid, embodying the use of a safety pin for the lid, which makes its loss from a heavy jar or broken spring impossible. Something new in the center-bearing line is a design of truck center plate which, by means of a ball-and-cup bearing between the truck center plate and truck bolster, equalizes the load on each ball in the bearing regardless of any change in alignment between the truck and body bolsters. The company's representatives include C. J. Symington, assistant manager Eastern sales; W. W. Prosser, assistant manager Western sales; A. H. Weston, mechanical engineer.

* * *

Taylor Electric Truck Company, Troy, N. Y., is showing in Machinery Hall trucks and truck fixtures. Among the exhibits is a little heavier type of single truck with very long wheel base, designed to overcome end-teetering and to be operated as fast as double-truck cars. The company is also showing the S. B. type of truck with its unusual one-piece non-chattering brake hanger. The M. C. B. quadruple type of truck shown is for high-speed service. Other apparatus on exhibition comprises a full line of full-elliptic and half-elliptic springs and coil springs; also the Taylor malleable center, steel-tired wheel. The tire is constructed of hardened crucible steel and has an internal flange shrunk and bolted to the center to prevent it from loosening when brakes are applied. The Taylor truck exhibit is in charge of John Taylor, G. A. Tupper, Thomas Thornes and Walter E. Taylor.

* * *

Carnegie Steel Company is showing in Building No. 3 how a steel cross tie can be fitted so that the rail can be fastened to it with a common railroad spike. It requires about twice as much power to pull this spike from the steel tie as out of an ordinary wooden tie. The scheme consists of the introduction of a malleable iron hollow casing inserted between the two flanges of the I-beam ties. The interior is filled with a wooden block, into which the spike is driven after first passing through a square hole punched in the top of the tie. This scheme is only in the experimental stage, but several thousand ties installed at the Duquesne Steel Works of this company demonstrate its practicability. The track men can apply it with the same ease as they apply the steel spike in the wooden tie. This method was invented by W. W. Hill, one of the department superintendents.

* * *

One of the most successful and interesting exhibits at the convention is that of the H. R. Langslow Company at space 821, Building No. 3. The attention which the Langslow prepayment system is attracting makes this booth a busy place at all times. The universal comments of railway men prove the undoubted value in the total check which is afforded by the combination of the fare box and automatically released turnstile. The turnstile, through its economy of space, is really adapted to any platform. Its design and operation are such that it is impossible for the projecting arm to injure a person who is crowding too closely after the passenger who is passing through the turnstile. It is also impossible for two passengers to pass through on one release. The automatic recording and admitting feature of the system economizes the conductor's time and leaves him free to make change, issue transfers and attend to starting the car.

Coleman Fare Box Company, Buffalo, N. Y., space 823, Building No 3, is exhibiting several styles of fare boxes for pay-as-you-enter cars; also portable boxes.

* * *

Pressed Steel Car Company, of Pittsburgh, has no exhibit, but is represented by J. H. Regan, assistant secretary, of New York, and Mrs. Regan; F. Koch, engineering department, Pittsburgh, and W. H. Wilkinson, of New York. Mr. Wilkinson is chairman of the rolling chair committee, which is a subcommittee of the entertainment committee.

* * *

Buffalo Foundry Machine Company has a novel system of decorations in red and black for its space 825, Building No. 3. The exhibit is almost entirely of transparent views of the plant, machines and processes. This is supplemented by an entertaining and instructive stereopticon display. The devices thus advertised consist of vacuum drying and impregnating apparatus, Bell steam hammers and general castings. The company is represented by E. G. Rippel, general sales manager, and H. E. Jacoby, manager of the New York office.

* * *

Trolley Supply Company, Canton, Ohio, is exhibiting at space 608, Building No. 2, for the first time, the No. 3 Knutson trolley retriever, also the No. 2 retriever and the "Ideal" trolley catcher. The "Peerless" No. 10 trolley base for heavy duty for high-speed interurban roads is also being exhibited for the first time. This trolley base is said to operate practically frictionless. In addition it is showing the new Star base, which is the latest development for city and interurban service. It has the same roller bearing as the Peerless base. J. A. McLain and Joseph Hollis are in attendance.

* * *

Through the courtesy of General Superintendent John N. Akarman, of the Atlantic City and Shore Railroad, car 107, fitted with Hess-Bright ball bearings, which have been in service over two years, is on exhibition at Virginia avenue and the Boardwalk. This car will make trips to Ocean City at 3:15 p. m. on Thursday and Friday to carry convention members. A representative of the Hess-Bright Manufacturing Company will provide free transportation for those wearing official badges at the car. Other special features of this car are an automatic shim brake slack adjuster and an air purifier for the compressor.

* * *

National Brake Company, Buffalo, N. Y., is exhibiting in space 654, Building No. 2, models of the Peacock and the Ackley adjustable brakes. The company devotes special attention to designating efficient lay-outs for brake rigging to be used with these brakes. Frank D. Miller, W. D. Brewster and S. A. Benedict are in attendance. Among the recent important orders for brakes received are the following: 650 for the Chicago Railways; 100 for the New Orleans Railway & Light Company; 100 for the Washington Railway & Electric Company; 100 for the Connecticut Company.

* * *

Whitmore Manufacturing Company, Cleveland, Ohio, has, in spaces 555-557, an interesting exhibit of gears and pinions which have been lubricated by Whitmore lubricating composition and have seen service on the Chicago Railway and Schenectady Railway, Utica & Mohawk Valley Railways, Spokane & Inland Empire Railroad. Blue prints are shown, giving a record of these gears and pinions. Those used on the Chicago Railways were in operation 14 months and traveled a distance of 113,793.77 miles; Spokane & Inland Empire Railroad, three years and one month, 194,700 miles; Utica & Mohawk Valley Railway, nearly two years and 10 months, 126,482 miles, and the Schenectady Railway, one year, nine months and 23 days, and traveled 104,322 miles. The company is represented by S. W. Whitmore and W. M. Lawyer.

Southern Exchange Company, New York, is in space 626, Building No. 2. Arranged about the booth are sections of long-leaf pine, octagonal and square poles, sections of Southern white cedar poles, cross arms, high-grade long-leaf standard and special sizes; also large pictures of mills and yards. Represented by E. G. Chamberlin, Walter Mitchell.

* * *

Electric Omnibus & Truck Company, Passaic, N. J., has at the convention a Field electric omnibus equipped with the Edison storage battery. This omnibus ran down from Passaic last week and made from 50 to 60 miles a day over the rough road between here and Passaic. It was recharged at Hightstown and Lakewood. The omnibus is now on exhibition on Ohio Avenue, between the Marlborough and Blenheim hotels, and demonstrations are given every hour during the daytime. C. J. Field, a pioneer in electric traction, is in charge.

* * *

The Smith Premier Typewriter Company, which has lately won the Grand Prix at the Brussels Exposition, has a very elaborate booth, banked up with handsome palms, flowers and hanging plants, and furnished with Oriental rugs. Two expert women operators from its Philadelphia office are in attendance. These operators are attracting some attention, as they are dressed in white with red silk regalia, with "Smith-Premier" gold-lettered front and back. These young women not only demonstrate the machine, but write letters to other exhibitors and members free of charge. The company is exhibiting 12 different models of the late No. 10 machine, the different width carriages that go on same; the new carbon roll machine, carrying 60 ft., which works automatically; condensed charge and billing machines for unit, statistical work and compound forms; also different models for correspondence.

* * *

Samson Cordage Works, Boston, Mass., have an exhibit in the Electric Service Supplies Company's space, No. 800, where they are conducting a test of the durability of the Samson solid braided cotton register cord, duplicating service conditions as nearly as possible. They have two registers placed on a standard with cords leading to them, which are pulled continuously by a small motor in imitation of a conductor ringing up fares. Samson cord is said to wear at least four or five times as long as leather, besides having the advantage in first cost. The company also is showing coils of the Samson spot waterproofed trolley cord and of Samson bell and register cord in various sizes and colors, with and without wire centre. Some attractive pencils and holders are distributed for souvenirs. The Samson Cordage Works are represented directly by F. J. Coakley, secretary of the company, W. G. Webb, R. G. Whiting, E. J. Wilson.

* * *

Acme Indicator Company, Cleveland, Ohio, is exhibiting in space 815, Building No. 3, two types of Acme indicators. One is double-faced showing stations on both sides and is hung in the center of the car. It has two push buttons, for running the machine in opposite directions. These buttons are attached to the door frames of the car and are pressed by the conductor upon leaving the station. This indicator is operated by a spring motor, capable of turning 500 stations without rewinding. The other indicator exhibited has a single face showing the station and two advertisements. It is hung at the end of a car. A model of the Acme trolley wire station shows the automatic operation of Acme indicators on cars where the overhead system is used. This station can be readily placed on the span wire at each crossing. When in contact with the station a brass collar on the trolley pole carries the current through the wire in the center of the pole. C. W. Johnson, T. W. Small and A. P. Machie are demonstrating these devices to visitors.

NEW STEEL-TREAD WHEEL

C. K. Knickerbocker yesterday received from President T. A. Griffin, of the Griffin Wheel Company, a telegram announcing that the company, after two years of experimenting and careful testing, is prepared to furnish car wheels with a special high carbon steel tread. These new wheels are claimed by the Griffin Company to be superior both as to wearing qualities and as to their freedom from objectionable noise in operation. With the advantages which the new wheels afford, the manufacturers are of course able to give increased guarantees as to mileage and wear.

ELECTRICAL APPARATUS IN THE WESTINGHOUSE COMPANIES' EXHIBIT

The Westinghouse Electric & Manufacturing Company has on exhibition a complete working outfit of its new type "HL" multiple unit control, for street and interurban lines, connected to two 40-hp railway motors, which are loaded by prony brakes. One of these motors is the familiar type No. 101-B-2 40-hp non-interpole motor; the other is a type No. 307 40-hp interpole motor. A large number of detail parts of the control apparatus also are shown. A K-34 drum type contoller for operating four 75-hp motors is part of the exhibition.

The standard railway motors displayed include the No. 303-A 100-hp motor, for high speed interurban service; Nos. 305 and 306 motors, rated at 50 hp and 60 hp, respectively, for lighter cars, and No. 321 90-hp motor, for 1200-volt service.

Of particular interest are the No. 101-B-2 motor parts, including shaft, bearing housing, field coils, brush holders, etc. Many of these parts are cut in sections so that the good points of their construction can be more readily appreciated. The noted No. 3 motor, now 20 years old, is also on view.

A welded sheet steel gear case shows one of the coming possibilities for reducing the weight of equipments.

The Westinghouse single-phase system is represented by the No. 135 motor, which has a capacity of 75-hp when operated on 25 cycles, and 90-hp when operated on 15 cycles. This is the motor used by the New York, New Haven & Hartford Railroad Company. The Boston & Maine Railroad also has recently decided to electrify the Hoosac Tunnel with the same system. The rest of the exhibit includes a complete line of line material, a. c. and d. c. motors for shop machinery, transformers, and incandescent lamps.

BRILL INSIDE EXHIBITS

In addition to showing its new semi-convertible car on the Boardwalk, The J. G. Brill Company has its usual comprehensive exhibit of miscellaneous products in Building No. 1, directly opposite the booth of the Electric Railway Journal. The company is showin the following trucks, covering various classes of interurban and city service; No. 27—M. C. B. 1, equipped with Griffin chilled-steel wheels, total weight, 7100 lbs., and maximum center-plate load, 23,000 lbs.; No. 27-M. C. B. 3, equipped with Midvale rolled-steel wheels, total weight, 12,750 lbs., maximum center-plate load, 40,000 lbs.; No. 21—E, single-truck Ramapo steel wheels; No. 39—E, maximum traction single-motor truck, with Lobdell cast-steel wheels, weight, 4760 lbs., maximum center-plate load, 20,000 lbs., and No. 27—FE-1 truck, also with Lobdell wheels. The fare boxes are of various types so that any conditions of collection can be satisfied. There are stationary fare boxes; portable fare boxes; registering fare boxes which separate the pennies, nickels and dimes and return them to the conductor for change; boxes which take cash when the handle is pulled one way and tickets when it is pulled the other way, etc. The Brill folding gate, vertical brake handle, "Dedenda" gong and "Dumpit" sand boxes are all mounted on one dummy stand. The various styles of car seats are both instructive and comfort-giving to the visitor. The space is also ornamented with revolving photograph racks and several framed pictures of the handsome private car built at the Kuhlman shops for the Beebe Syndicate, Central New York.

BRILL AND WASON RECEIVE GRAND PRIX AT BUENOS AYRES EXPOSITION

A cablegram received yesterday from Buenos Ayres, Argentina, announced the award of the Grand Prix for cars and the Grand Prix for trucks to The J. G. Brill Company and the Wason Manufacturing Company. The exhibit of these companies at the Buenos Ayres Centennial Exposition consists of a train of six steam coaches, and will be delivered to the Buenos Ayres & Western Railroad Company at the end of the exposition. This train will be the finest of its kind, it is said, in service in the South American continent. It is made up of two sleepers, two day coaches, one diner and one mail coach, all richly finished and completely equipped in the most modern fashion. The roofs are of the plain arch design, the underframes are all-steel, and the interior finish, with the exception of the mail coach, is of specially selected mahogany. The coaches are all mounted on six-wheel trucks built at the Brill plant. The type is a modification of the Brill heavy electric truck, with each wheel piece solid, forged in a single piece. These wheel pieces are the longest ever made by the solid forging process, in which the pedestals and end extensions are an integral part of the forging.

THE OHMER EXHIBIT

The Ohmer Fare Register Company has a very attractive exhibit, in space 600-2-4, Building No. 2. The display includes a new 60-fare recording register, and two combined detail and total counter recording machines. The 60-fare register is used for registering and printing separate records for 60 different classes of fares, giving the various values of the tickets collected. The total cash recording register besides printing a detailed record of the collections made shows the total amount of all cash fares registered. The company is also showing John F. Ohmer's "Turn-In" car. This provides a new means of entering a car and automatically registering the number of passengers boarding the car by the aid of a platform turnstile. The turnstile as well as the gates are in direct control of the conductor, who is stationed at the rear end of the platform and facing the front of the car. Other devices shown include special equipment and registers for P-A-Y-E cars and the company's standard type of registers. The booth is under the personal supervision of John F. Ohmer, who is assisted by a corps of able representatives.

American Mason Safety Tread Company, Boston, Mass., is in space 833, Building No. 3. Safety treads for all purposes, lead and carborundum filled car treads, treads for station, subway, platform, stair, elevated and building construction are shown; also "Karbolith" composition flooring for car and building construction in surface and transverse sections. The latter flooring is now widely specified by both steam and electric railways, especially for steel cars, because it is fireproof, sanitary and durable. Among others, orders have been secured for "Karbolith" flooring from the Pennsylvania Railroad, 500 steel passenger coaches; Interborough Rapid Transit Company, 600 cars; Hudson & Manhattan Railroad, 200 cars; Philadelphia Rapid Transit, 150 cars; Long Island Railroad, 300 cars. There are now in service between 2500 and 3,000 cars with "Karbolith" flooring. Henry C. King is representing the company.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Street & Interurban Railway Association and Its Affiliated Associations

VOL. XXXVI NEW YORK—OCTOBER 14, 1910.—ATLANTIC CITY No. 15D

PUBLISHED DAILY BY

McGraw Publishing Company

James H. McGraw, President. H. M. Wilson, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

HENRY W. BLAKE, Editor.
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G. J. MACMURRAY, FRANK J. ARMEIT.

NEW YORK, 239 WEST THIRTY-NINTH STREET.
ATLANTIC CITY, MILLION-DOLLAR PIER.

CHICAGO: Old Colony Building.
PHILADELPHIA: Real Estate Trust Building.
CLEVELAND: Schofield Building.
LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.
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TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9500 *copies are printed.*

NEW YORK—OCTOBER 14, 1910.—ATLANTIC CITY

PROGRAM FOR TO-DAY

9.30 a.m. Greek Temple, Convention Pier, Meeting of Engineering Association.

2.00 p.m. Greek Temple, Convention Pier, Meeting of Engineering Association.

9.00 p.m. Exchange, Marlborough-Blenheim, Concert by Marlborough-Blenheim Quartet.

Training of Transportation Employees

The session of the Transportation & Traffic Association yesterday was devoted to the committee reports on the training and assignment of the men in electric railway operation. Both subjects are fundamentally connected with the maintenance of satisfactory service. The relations of a company and its employees, so far as time is concerned, can be divided broadly into three periods. In the first the future employees are selected from the list of applicants. In the second they receive their training in the work which they are to perform, and are finally accepted. The third period covers their relations with the company as regular employees.

The period which the committee this year discussed is the second, and in some respects the most important of all. This is the time when men who have no real aptitude for the work but have passed the preliminary physical and mental examinations can best be weeded out, and during this period a foundation is being laid for the employee's future record. As the committee well says, too much emphasis cannot be placed upon the importance of getting men started right. From the standpoint of the men also, the period is a critical one, and many a man who is capable of future good work, but is unfamiliar with railway service and is slow at grasping its principles and those of the electrical machinery, is apt to become discouraged. On the other hand, there is equal danger, with a different kind of man, that the prospective employee will be too self-confident and will assume that the superficial knowledge which most men acquire during the first few days of their training is sufficient to qualify him to operate a car without further instruction.

The man of the former class should be encouraged to ask questions, and if necessary to prolong his period of instruction until he has satisfied both himself and his instructor that he is capable of rendering good service. The employee of the latter type, if retained, should be so thoroughly examined before being put in charge of a car that any lack of preparation will be apparent to the instructor and to himself. Above all, the men should be taught that esprit de corps which makes them proud of the uniform they wear and of the service in which they are engaged. This spirit, if properly felt, is not only the greatest inspiration to the performance of good service by each man, but it makes each man discountenance poor service in other employees.

Mr. Weston's Proposed Franchise

The ideal urban electric railway franchise, according to Mr. Weston, is one which provides simply the maximum rate of dividend which a public service corporation shall pay, or else the profit which it can earn on the amount of money which it has actually invested in its enterprise. Such a franchise would specify that the rate of fare to be charged would be either raised or lowered by the city at definite periods, according to the returns from operation. The rate could then be either a flat rate, like the straight 5-cent fare, or could be based on the length of ride, a plan which Mr. Weston thinks more equitable to the company and the public on certain kinds of urban properties. The franchise would grant the company a monopoly of the transportation facilities in the territory which it serves, and the right, under certain conditions, where the traffic is insufficient to make the line otherwise profitable, of being financially assisted by subsidies raised by local assessments on the land benefited.

Mr. Weston clearly characterizes the usual methods of granting franchises as very "haphazard" and as resulting in conditions that are detrimental both to the companies and the communities in which they operate, and he presents a strong array of arguments in favor of his plan. It should certainly encourage investment in legitimate railway enterprises. The ordinary business risks of a railway company can be fairly well calculated in advance, but it is difficult to secure

the engagement of capital in undertakings where the profits and even the integrity of the investment depend so largely as they do now upon the whims of municipal or State authorities. We believe also that many, if not most, railway properties would be in very much better financial condition at present if their franchises had been drawn along the lines suggested by Mr. Weston. At the times of their organization the risks involved seemed large and liberal rates of return would undoubtedly have been allowed. Some railway companies ultimately become prosperous and others do not, but the public, forgetting the failures, usually considers that those which are successful should not be allowed to pay more than a very low percentage on the capital invested in them.

We are not sure that all will agree with Mr. Weston that the surplus to go to the public with successful companies should be in the form of fare reductions. There are many who believe that the community as a whole is entitled to any such proportion rather than the users of the line. This, however, is a comparatively small detail, and a plan which would prove attractive to the authorities of one city might appeal differently to those of another. In the same way, to increase the compensation which a company now receives for the transportation of passengers, many people believe that a reduction of taxation would be better than to increase fares. Altogether, Mr. Weston's proposed substitute for the present chaotic conditions will undoubtedly have many partisans.

Schedules and Timetables

It is remarkable that the topic of schedules and timetables should not previously have been made the subject of a report at an annual convention. In a sense it is the basis of the entire service. The simplest method of railway operation is to maintain the same headway and running time of the cars throughout the day. This would make the distribution of the men and the arrangement of their hours of labor a very easy matter. Unfortunately the volume of traffic does not follow this simple law. Economy requires the headway between cars to be increased when the traffic falls off and policy dictates that it be decreased as the traffic rises. This necessitates the use of trippers and complicates the arrangement of straight and swing runs.

Theoretically the number of seats furnished by a railway company should bear a direct ratio to the number of passengers carried, but as the volume of traffic presenting itself for transportation cannot be known in advance and is affected by the weather and other causes, the best that a company can do is to provide timetables to suit the different prospective conditions, and vary them at short notice if necessary. We notice from the report that 36 companies of the 64 reporting on running time maintain the same running time throughout the entire day, and that 39 companies out of the 57 reporting on schedules maintain their regular schedules during stormy weather, but the committee evidently does not consider this practice advisable, as it recommends that the companies avoid, as far as possible, the use of inflexible timetables.

The committee makes in all nine recommendations. Of these one contains certain definitions; four, those upon passenger counts, adjustment of running times and service and the construction of timetables, relate purely to the company; two, those in regard to lay-over time and the assignment of tripper service, relate both to the company and the men; and two, or those in regard to the selection of runs and to trading runs, principally concern the men, although they also have a bearing on efficient operation.

The advisability of the adjustment of service to traffic requirements on city roads, which are the only ones considered in this report, will commend itself to every one, and to do this properly there should be records of the passenger traffic and a competent constructor of timetables to utilize this information. Nor can we see any objection to the rulings of the committee in regard to the assignment of runs or the reduction of lay-over time. The latter sometimes cannot be entirely eliminated, as a short lay-over time is necessary with certain lengths of run and headway between cars, and if there is a logical method, like seniority, by which the men can indicate their preference for runs, there is no reason why they should want to trade runs permanently among themselves. As for trading single runs, it is practically always possible for a man to get relief from a single run, if he notifies his division superintendent in advance. His run then properly belongs to the first man on the extra list, so that any unauthorized trading simply creates confusion and dissatisfaction.

Advertising for Traffic in the Central States

The advertising methods of electric railways in the Central States offer an interesting subject for study because of the great variety of mediums used for soliciting traffic. The publicity matter of each road reflects in a way the local situation. That is, a road which has a terminal in a large city and offers service to park or lake resorts can afford and usually does undertake to distribute more expensive and thus more attractive publicity matter than does a smaller road serving a community of people living on farms and in villages and towns. The road in the latter situation and the service which it has to offer are more a part of the every-day life of the community than is the property reaching the metropolitan districts. Thus the population knows what the road has to offer and, with the exception of special excursions and interline business, extensive advertising would not be profitable.

The increase in interline travel on interurban railways in Ohio and Indiana experienced during the past year is due both to improved service and to publicity. The publicity has been obtained largely in two ways. Practically all of the interline roads include in their advertising programs announcements of the through connections that are offered. The second and more indirect method of presenting the possibilities of through electric railway travel to the general public has been by the operation of special cars on trips of from 300 to 400 miles to and from the meetings of the Central Electric Railway Association, which are held every two months at some important traffic center in Ohio or Indiana. At the time of these meetings the daily papers have given considerable space to describing the long trips of the special interurban cars. This publicity, followed by regular announcements made by the railways offering the sale of through tickets to any point on the connected lines represented by the Central Electric Railway Association, has been a profitable means of promoting long-distance travel. The use of advertising methods for soliciting freight traffic is being more widely accepted than ever before and the anticipated results are being obtained. As with passenger advertising, those interurban roads which are in position to handle freight to the greatest number of towns and offer the best service in comparison with competitive steam lines spend most for advertising.

The features which are most widely advertised in addition to those of regular passenger and freight traffic, both local and interline, are excursions and amusement resorts. The advertising matter soliciting such traffic is published irregularly and takes many forms. Nearly every company has adopted some form of advertising emblem.

Conventionalities

Au revoir until 1911.

Anyhow, the weather has been fine.

Whose face did you wash this morning?

And you may yet see one game of the world's series.

Have you had your railroad ticket validated, so that you can get home without pounding the ties?

Smiling "Freddy" Dell" who is assisting Secretary Keegan of the Manufacturers' Association, is with us again this year. Ask him how the baby is.

W. G. Gove, superintendent of equipment, Brooklyn Rapid Transit System, is rumored to have standardized a bathing suit good for all seasons of the year.

Bert Berry and Ross Hayes are beginning to show the effects of the strain. Being chairman of the finance committee or the entertainment committee is not a bed of roses.

William V. Dee, of the G. Drouve Company, enjoyed himself immensely Saturday and Sunday. He was sad the rest of the week. After Sunday Anti-Pluvius was conspicuous on the Boardwalk.

Wylie Brown, general sales agent of the Bridgeport Brass Company, is at the convention in the interests of Phono-Electric trolley wire. He is an attentive listener to the discussions of the Engineering Association.

James Anderson, general manager, Canadian lines, Detroit United Railway, is the great organizer of the convention. He has formed the "Cocktail Club," the emblem of which is a feather of the shape and color of a cocktail worn in the hats of members.

"Nick" Trist, V. S. Yarnell and W. E. Berry, of the Carnegie Steel Company, are very fond of riding in the "seagoing hacks." The other night they tried to induce proprietors of a chair stable to equip the chairs with solid steel wheels. It's not the altitude, but the salt air.

Shuffleboard at the Chalfonte is an exciting game especially at 4 o'clock in the morning, at least it seems so to Parker and Keys, of the Detroit United contingent. If their fingernails had held out they would be at it yet; as it was, a manicure had to be consulted.

The total registration up to 5 p. m. Thursday was about 2,600. The registration of the five associations was 1,019 delegates and affiliated associates. The men guests numbered 87, making a total of 1,106. The Manufacturers' Association had registered 1,127 members, and nearly 400 ladies' badges had been issued.

John N. Nind, Jr., has resigned as assistant to the advertising manager of The J. G. Brill Company, Philadelphia. For several years previous to his connection with the Brill Company, Mr. Nind occupied positions as assistant business manager and assistant editor of the Electric Railway Review and the "Railway Age."

E. J. Burdick, superintendent of power, Detroit United Railways, is at the convention for business, not for a good time. The latest improvement in equipment, the fine points of operation, the important and salient features of all the papers and discussions will be thoroughly assimilated for his work on the Detroit United Railways.

Duncan McDonald, general manager Montreal Street Railway and president of the Pay-As-You-Enter Car Corporation, arrived at the convention Wednesday morning. Fresh from the boulevards of Paris he sports French apparel from top to toe, insists on ordering his "dejeuner" "à la Parisienne" and talks with a pronounced French accent. This is natural, as he is a direct descendant from McDonald, the famous marshal of Napoleon.

The convention being almost over, the State authorities have decided to put a tighter lid on Atlantic City. At a meeting of the Grand Jury at May's Landing Oct. 11 Justice Trenchard said that it had been brought to his attention that liquor was being sold after hours in Atlantic City and enjoined the jury to indict those who violated the law.

The name seems a little strange at first, but appears to fit the conditions better than American Street & Interurban Railway Association and is certainly much easier to say. Anyone visiting the Pier and seeing so much electric railway apparatus in evidence would have no difficulty in identifying this convention as that of an electric railway association.

Philander Betts, chief engineer of the Board of Public Service Commissioners of New Jersey, spent Wednesday in Atlantic City. He returned yesterday to Trenton to be present at a hearing to establish a standard classification of telephone accounts. Under the New Jersey law the telephone companies are included among the other public utility corporations which are under the jurisdiction of the commission.

It's Hay here and Hay there among the exhibits these days, for between them the two Hay brothers of Easton, Pa., are well nigh ubiquitous. They are accompanied by eight other live representatives of the Hay properties, which are the Northampton Traction Company, Easton & Washington Traction Company and the Montgomery Traction Company. W. O. Hay, Jr., the crown prince of the Hay dynasty, is also present to enjoy the technical and social features of his second Atlantic City convention.

The paper by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway, on the subject of "Criminal Negligence," read at the meeting of the Claim Agents' Association Wednesday, attracted a great deal of attention. It was thought at first that Mr. Schneider would not be able to come to the convention and present the paper in person, as he was indisposed last week, but fortunately he was able to do so. He is feeling much better on account of his trip to Atlantic City.

After an absence of seven years in Paris, Fred L. Merritt has returned to the United States and is attending the convention this week. Mr. Merritt recently met Nelson E. Weeks, vice-president and general manager of the Rand Avery Supply Company, Boston, and accepted a position with that company to further its interests in the transportation field. Before going to Paris to work for the North German Lloyd Steamship Company, Mr. Merritt was for many years in the electric railway supply business in this country. His return to the field will be welcomed by a large circle of friends.

E. H. Baker and Scott H. Blewett, the two new members of the Manufacturers' Executive Committee, are both decided acquisitions, as both have had extended experience in convention work. Mr. Baker has been for years conspicuous in the work of the Master Car Builders' and the Master Mechanics' Association. He has served previously on the committee to which he has just been elected, and was treasurer of the organization four years ago. Mr. Blewett has been a member of the supplymen's organization at the steam railway convention, and served one term as chairman thereof.

The electric railway business includes many men who have graduated into it from the steam railroad business, but there are comparatively few men who have abandoned the delights of electric railroading to engage in the steam railroad business. One of these, however, is Eugene Chamberlain, who has spent considerable time at the Pier this week. Mr. Chamberlain is chairman of equipment of the clearing house of the New York Central lines and was formerly connected with the Brooklyn Rapid Transit Company. He was originally a New York Central man and later returned to that company, but has always kept his interest in electric railroading and nearly every year finds him at the electric railway convention.

MEETING OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The final meeting of the Transportation & Traffic Association was held yesterday morning at the Greek Temple. President Todd called the meeting to order at 10 o'clock and announced that the first subject on the program was the presentation of the paper on "The Use of Metal Tickets," by George L. Radcliffe, superintendent Cleveland Railway. This paper is found elsewhere in this issue. In the absence of Mr. Radcliffe, the reading of the paper was dispensed with and on motion it was entered on the record as prepared.

TRAINING OF TRANSPORTATION EMPLOYEES

The report of the committee on training of transportation employees was then presented. It is published in another portion of this issue.

C. D. Emmons, Fort Wayne, Ind., stated that during the past month he had been present at four investigations, at which the primary thought in the minds of the investigators seemed to have been whether or not sufficient care had been taken in the hiring and training of men. Fortunately, his company had adopted very largely the standards proposed by the committee whose report had just been read and its records were in splendid shape. He thought that it was a matter of great importance to keep records in this way.

D. H. Lovell, Pennsylvania Railroad, said that one of the most important points mentioned in the report, according to his steam railroad experience, was the written examination of men, graded by percentages. He thought that after the men had been accepted they should be given this written examination. The Pennsylvania for 35 or 40 years had paid special attention to training men for its service, and all of the prominent officials, as well as every other man in the company, had been so trained. Thus, the president of the company was an engineer. The result is that if the company should be so unfortunate as to lose one of its staff officers his place could be filled with a man from the company's own ranks. Another important point in connection with the training of the men was to induce the men after they had been trained to remain with the company. Every one knew that it was a difficult matter to get any man away from the Pennsylvania Railroad. The reason was that the company looked after the interests of the men. While its discipline was uniformly general, it was not unduly severe, and if a man was discharged he really discharged himself. He thought the difficulties which arise are usually the outcome of some trifling thing which should have been corrected when the question arose.

W. H. Collins, Fonda, N. Y., was interested in the best methods of breaking in men for the high-speed service, and he was specially glad to note that the committee recommended giving the candidate for a position more shop training or technical training than had been customary in the past. He believed that a little more knowledge of technical matters on the part of motormen would often save a great deal of delay in operation, as well as damage to the equipment. For some years all new men employed by his company had been given a written examination and if the candidate did not pass a certain percentage he was not accepted. Another valuable point of the written examination is that it supplies a permanent record of the fact that each man has been given instructions and has been examined in the different subjects covered by the examination. The written examination also makes the candidate realize that the company places great stress on his being instructed and informed on the different subjects treated. His company has recently compiled a handbook of electrical equipment with diagram charts for the use of inspectors, starters and motormen, to give them an idea of the mechanical working of the machinery of the car. It had also compiled a book of questions covering all the rules, which motormen will have to learn before they are permanently appointed.

W. R. W. Griffin, East Liverpool, Ohio, said that he had also made it a point to impress the men with the fact that their work was a dignified one. The wages paid motormen and conductors compare very favorably with those paid bank clerks, for instance, and they should be made to feel that it is worth their while to engage in the work as their life work.

Mr. Lovell, Pennsylvania Railroad, said that when his company installed electric power between Atlantic City and Philadelphia the men had rather looked down upon the new motive power, but he had secured their interest in it by appealing to their loyalty. Recently, in talking to a motorman on the line who had been a locomotive engineer, and all of the motormen on the line had formerly been locomotive engineers, he said: "Mr. Lovell, the only trouble with this thing is that it did not start early enough. If it had started twenty years ago, I should have lived twenty years longer." That illustrated the changed opinion of the men in respect to electric operation.

L. H. Palmer, New York, said that the Metropolitan Street Railway Company had been using graphic methods for educating the men, with excellent results. It had recently found that some men did not know how to use the telephone. Every man must now pass an examination on how to use the telephone. He understood that the Chicago City Railway had prepared a very simple diagram showing how a man should handle an air brake. In Boston a letter of advice is issued to new motormen and conductors; it was so good that it has been adopted almost verbatim in New York. He thought that in some large cities it might not be practicable to conduct written examinations. Instead, in New York, the men are obliged to attend meetings once a month, in which all the rules are carefully reviewed. He had found that the best way of making the employees able to understand and appreciate the rules. It was also important that the men should realize that the position of motorman was a very responsible and important one and that they should be interested in and proud of their work.

Upon motion of Mr. Shannahan, Baltimore, the report was then accepted and the committee was continued for another year.

SCHEDULES AND TIMETABLES

The report of the committee on the construction of schedules and timetables was then presented. It was read by the secretary and is published elsewhere in this issue.

Prof. A. R. Richey, Worcester, said in opening the discussion on schedules and timetables that he had recently been engaged in standardizing the timetables of a large city and surburban system in the eastern part of Massachusetts. The methods followed were largely those outlined in the committee's report. He had found that the definitions for "straight" and "swing" runs and one or two other expressions in common use varied widely on different roads. He hoped that the committee would continue the work of preparing definitions and thought that the terms "tripper" and "extra" should also be defined. He had a pretty good idea in his own mind as to where the line should be drawn between a "tripper" and an "extra," as he supposed all had, but thought that if these distinctions should be brought together, they would vary almost as widely as the distinctions between "straight" and "swing" runs. He would also like to have some specific term to indicate the difference between two different methods of determining schedule speed. One is to include the lay-over time; that is, to divide the total number of miles run by the total number of car hours per day. The other is to divide the number of miles run per trip by the time used to make the trip excluding the lay-over time. He thought that possibly the expression "schedule speed per trip" was as good as any which he knew at present to describe the speed when the lay-over time was excluded. Another important matter was to determnine the best kind of timetable for suburban service. The timetables of city roads usually gave the evening time at each terminal of the road. But, as those lines where the headway is frequent were usually double track, there was no question about designating meeting points. With single track

suburban line, however, there may be some variation in meeting points.

J. K. Punderford, New Haven, brought up the question of the design of timetables, and said that he was partial to the graphical timetable, especially as his company had electrified steam lines and lines where electric cars moved under half hour or hour headway on the same road with steam trains with unequal headway. He asked whether the committee had made any investigation of that point.

N. W. Bolen, Newark, said that the committee had asked in its data sheet whether interurban companies preferred the construction of timetables by diagram or by the string method, but could not get any replies, so had confined the attention this year largely to city timetables. He thought that the committee next year should go more deeply into the subject of interurban timetables.

T. C. Cherry, Utica, said that as an aid to constructing timetables the transportation department on his road required the conductors to report on each trip the number of standing passengers as well as delays in suburban service of over five minutes and in city service of over two minutes. These reports are separate from the trip cards and are filed in the main office.

J. E. Duffy, Syracuse, thought the most satisfactory way of counting passengers was by special inspectors. Diagrams showing these counts are often of value when complaints are made as to the character of service in any particular locality and also in the construction of timetables. He agreed with the committee that the tripper service should be shown on the regular timetable as far as possible because it allowed the carhouse foreman to assign the same men to the same trippers every day. He realized, of course, that this was impossible under all conditions, because more tripper service was needed on some days than on others. But carhouse foremen were more particular in sending out extra service if it was regularly incorporated in the timetable. A very important point was that the construction of timetables and the duty of their periodic revision should be in the hands of one man. Possibly, only large roads can afford the expense of a special man for this work. But the smaller roads can assign the work to some man as a part of his duties.

E. L. Hibbard, Toronto, said that his company had a very heavy morning rush and heavier evening rush, with small normal traffic during the day, so that the transit problem was a difficult one to handle in Toronto. His company had constructed its timetables in such a way that the extra men required are reduced to a minimum. Each division superintendent and each inspector has blue-printed copies of the timetables so as to be familiar with the roads and the times that cars should pass certain points. The company also has roadmasters, to check up the travel and running time of the cars. They believed that a counting staff attached to the transportation department was a more reliable means of ascertaining the traffic on a line than conductors' reports, and they had such a staff. The records compiled by the counts thus secured were tabulated in chart form for the convenience of the company, and these charts had proved very valuable.

Mr. Bolen, Newark, speaking for the committee, then said that it had been impossible for the committee to include in its report all of the data compiled during its investigations, but that these data were on file in the secretary's office, and also a large diagram in which the principal data had been charted. This information was available to the member companies through the secretary.

H. C. Page, Worcester, thought that it was impossible to eliminate lay-over time entirely, unless a very large number of cars were run. If there was no lay-over time, it would be difficult to keep cars on schedule time, and this was a point which the public was demanding to a constantly increasing degree. He agreed with the recommendations of the committee in regard to methods of counting passengers. In regard to conclusion 6 of the report, that is, on the method of selecting runs, a rather peculiar system was followed in Worcester. The men on each division had the right to bid for any particular run. These bids had to be in writing and placed in a box provided for that purpose. The older men were given the preference of runs in the method of selection.

Mr. Bolen, Newark, said that on the Public Service Railway the selection of runs was made by posting the timetables in the car barn and the men make their selection in the order of their seniority.

Mr. Palmer, New York, said that it was advisable for the larger companies to study the possibility of short service of cars operated between intermediate terminals. This could be done by studying the traffic load line. He believed in making passenger counts by a special force composed of men who do that work continually.

Upon motion of Mr. Cherry, the report of the committee was adopted.

MISCELLANEOUS BUSINESS AND ELECTION OF OFFICERS

President Todd then referred to the proposed change in the constitution and by-laws in regard to the change in the name of the association. Upon motion of Mr. Page, the change was approved.

President Todd then called for the report of the nominating committee.

Mr. Allen, Utica, in presenting the report, said that before doing so he would like to make a short explanation. He said that at the Denver convention four officers or members of the executive committee were retired. This year the committee recommended retiring five officers or members of the executive committee, leaving three in position, and these, the committee proposed, should be promoted. The committee had tried to recognize geographical distribution so far as it could in these selections, to name gentlemen who had served on committees, and to include four general managers, three superintendents and one passenger man. He then read the nominations of the committee, which were as follows:

For president, H. C. Page, general manager, Worcester Consolidated Street Railway, Worcester, Mass.

First vice-president, J. N. Shannahan, general manager, Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.

For second vice-president, C. E. Learned, superintendent of inspection, Boston Elevated Railway, Boston, Mass.

For third vice-president, Dana Stevens, Cincinnati Traction Company.

For members of the executive committee: C. D. Emmons, general manager, Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.; J. B. Sullivan, general supervisor, Chicago Railways Company, Chicago, Ill.; J. W. Glendening, general passenger agent, Saginaw & Bay City Railway Company, Bay City, Mich.; A. Gaboury, superintendent, Montreal Street Railway, Montreal, Can.

These officers were unanimously elected, and President Todd appointed Mr. Allen to escort President-elect Page to the chair.

President Page, upon being installed, expressed his appreciation of the honor which had been extended to him in his election and solicited the support of the members in making the work for the coming year a success.

Mr. Allen then moved a resolution of thanks to the officers of the association for their efficient work during the past year. This motion was seconded and carried. Mr. Page then announced that the meeting was adjourned.

The Acme Indicator Company, Cleveland, Ohio, has recently received an order for the entire equipment of the Hudson & Manhattan Railroad, New York, and for the partial equipment of the Metropolitan West Side Elevated Railway. The company's register shows a large number of railway managers who are investigating the matter.

MEETING OF THE AMERICAN ASSOCIATION

The final meeting of the American Street & Interurban Railway Association, now the American Electric Railway Association, was held yesterday afternoon, at the Greek Temple on the Pier. President Shaw called the meeting to order at 2.30 p. m. The report of the committee on education was then presented. The following papers were then read: "Franchises," by Charles V. Weston, president South Side Elevated Railroad, Chicago, Ill.; "What Interurban Railway Companies Do for the Public," by Joseph A. McGowan, secretary and treasurer Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., and "Taxes and Licenses," by Guy E. Tripp, Stone & Webster, Boston, Mass.

The report of the committee on education and the two first papers mentioned are published elsewhere in this issue. The paper by Mr. Tripp will be published in tomorrow's.

The president then called for the report of the committee on nominations. This was presented by the chairman of the committee, C. Loomis Allen, who reported as follows:

For president, Arthur W. Brady, president Indiana Union Traction Company, Anderson, Ind.

For first vice-president, Thomas N. McCarter, president Public Service Railway, Newark, N. J.

For second vice-president, George H. Harries, second vice-president Washington Railway & Electric Company, Washington, D. C.

For third vice-president, Charles N. Black, vice-president and general manager United Railroads of San Francisco, San Francisco, Cal.

For fourth vice-president, W. G. Ross, managing director Montreal Street Railway.

These officers were unanimously elected. President Shaw called President-elect Brady to the chair, which invitation he accepted.

President-elect Brady then made a short address, in which he spoke of his appreciation of the high honor which had been conferred upon him. He referred to the presence at the meeting of H. H. Littell, who had issued the call for the first meeting of the association in 1882, and was elected at that meeting as the first president of the association. Only 27 persons were present at that meeting, and Mr. Brady drew a striking comparison between the condition of the industry and the association at that time and at present. In conclusion, he stated that he thought the best evidence of his appreciation of the honor of his election as president which he could afford was to follow in the footsteps of President Shaw and his other predecessors.

RESOLUTIONS

The secretary then read the report of the committee on resolutions. In the first resolution the thanks of the association were extended to all members of the association and its affiliated associations for the preparation and aid in preparation of the reports and papers presented at the meeting. The second expressed the appreciation of the association for the disinterested and unselfish labors of the committees on active and associate membership. The third extended the thanks and appreciation of the association to the Manufacturers' Association for the exhibits and entertainment provided at the convention. The fourth extended the thanks of the association to the technical press for its wise support and careful attention to the broad development of the electric railway art and to the problems confronting the various properties. The fifth referred by name to those connected with the industry whom death had taken during the year and reported the sense of loss which the association and the industry had sustained in their death.

H. H. Littell, Buffalo, then offered a resolution thanking Mr. Shaw for his able and efficient management of the association and for the work he had done in the interests of the association and for the fair and impartial manner in which he had discharged his duties as presiding officer.

Upon motion, the meeting then adjourned.

THE NEW PRESIDENT OF THE AMERICAN ASSOCIATION

Arthur W. Brady, president and general counsel of the Indiana Union Traction Company, who was elected president of the American Association at the meeting yesterday afternoon, although a young man, is one of the foremost interurban railway executives in the United States. Mr. Brady was born in Muncie, Ind., in 1865 and received his early education in the public schools of that city and in a private school at Litchfield, Conn. Entering the academic department of Yale University he graduated in the class of 1887 and then returned to Ft. Wayne, Ind., where he read law for one year. In 1888 he entered the law school of the University of Michigan and graduated in 1889. He began the practice of law in Muncie, Ind., immediately after graduation and remained there until 1902. During the early years of his practice he was elected Mayor of the city and held that office for four years. His



Arthur W. Brady, President-Elect American Electric Railway Association.

first experience in electric railway work was in the capacity of counsel for the Citizens' Street Railway of Muncie, which was subsequently acquired by the Indiana Union Traction Company. He was also employed as counsel by the Union Traction Company of Indiana, which at that time was actively engaged in the construction and extension of interurban lines, and he was also retained as counsel by the Muncie, Hartford & Ft. Wayne Railway, now the Bluffton division of the Indiana Union Traction Company.

When construction work was begun on the Indianapolis Northern Railway, which is now the Indianapolis-Noblesville division of the Indiana Union Traction Company, Mr. Brady was elected secretary of the new company and he moved to Indianapolis, where the offices of the company were located. Shortly after the organization of the Indiana Union Traction Company in 1903 Mr. Brady was elected its vice-president and in 1904 he was elected president. At that time the general offices of the company were removed to Anderson, Ind., and Mr. Brady left Indianapolis to take up his residence in Anderson.

Mr. Brady is a director of the Ohio Electric Railway and has been closely associated with the management of the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis Traction & Terminal Company, although he has never had any official connection with either of these companies.

At the Columbus meeting in 1906 Mr. Brady was elected third vice-president of the American Street & Interurban Railway Association, in 1907 he was elected second vice-president, and in 1908 he was advanced to the office of first vice-president, which he has held for two years.

The company of which Mr. Brady is president is one of the largest interurban systems in the United States and Mr. Brady's long connection with it in an executive and legal capacity has afforded him wide opportunities for studying the many problems connected with interurban railway management and policy. His close connection with a number of city systems has also given him an insight into the problems peculiar to urban transportation companies. Mr. Brady is an excellent presiding officer and the association is to be congratulated upon having selected as its president a man of such marked executive ability, long experience and wide acquaintance in the electric railway field.

A CANADIAN TEA PARTY

A notable feature of the convention has been the large number of Canadians. On Wednesday evening some 22 faithful sons of the Maple Leaf assembled in one of the cafés on the Boardwalk to prove that good fellowship is not confined to Yankees. Among those who were on hand to give and take enjoyment on this occasion were the following; Thomas H. McCauley, manager and electrical engineer, Calgary Street Railway; Wilford Phillips, general manager and chief engineer, Winnipeg Electric Railway.; R. R. Knox, traffic manager, Winnipeg Electric Railway; L. Garrett, master mechanic, Winnipeg Electric Railway; C. L. Wilson, assistant general manager, Toronto & York Radial Railway; A. M. Smith, master mechanic, Toronto & York Radial Railway; Walter McRea, superintendent, motor, truck and mechanical department, Toronto Railway; A. Gaboury, superintendent, Montreal Street Railway; D. E. Blair, superintendent rolling stock, Montreal Street Railway; and A. J. McDonald, superintendent of city division, Quebec Railway, Light & Power Company.

THE DIXIE SPREAD

The second annual banquet tendered to various executives of Southern street railway properties by the Southern Street Railway Supplymen, held at the Marlborough-Blenheim, was a splendid success. Plates were served for 52. The affair was informal, the object of the dinner being to bring the purchasers and the salesmen in closer affiliation. Quite a number of very distinguished gentlemen were present. The well-known and successful operator, T. W. Passailaigue, superintendent of railways, of Charleston, S. C., acted as toastmaster. The following railway men responded to toasts: T. H. Tutweiler, Memphis; Percy Warner, Nashville; D. A. Hegarty, Little Rock; M. S. Sloan, Birmingham; H. J. Dressel, New Orleans; D. C. Frost and A. T. Powell, Lynchburg; J. W. Hancock, Roanoke; C. A. Avant, Birmingham; W. W. S. Butler, Newport News; Mr. Embry, of Ford, Bacon & Davis, and J. T. Nyman and W. J. Massee, of Macon.

The following supplymen also spoke: George W. Watts, Electric Service Supplies Company; C. K. King, vice-president Ohio Brass Company; Sterling G. Turner, manager Atlanta Car Wheel & Manufacturing Company; Sam (Red) Watkins, Atlanta Car Wheel & Manufacturing Company; Ralph Sanger, of Wonham, Sanger & Bates; Fred L. Markham, The J. G. Brill Company, and W. A. McWhorter, Galena Signal Oil Company.

Other railway and supplymen who attended the gladsome feast included W. C. Devane, Savannah; E. A. Longmire, Norfolk; T. H. Rabe, Birmingham, and E. W. Alexander; T. D. Massee, Macon; C. A. Smith, John D. Chambers and C. H. Matthews, Atlanta; D. L. Proctor, Athens; Roy V. Collins and H. A. Goode, Wonham, Sanger & Bates; George E. Willis and J. E. Slimp, Ohio Brass Company; W. M. Beisel, National Brake & Electric Company; R. E. Holt, American Brake Shoe & Foundry Company; A. Y. Evans, More-Jones Brass & Metal Company; Lee Watson, Allis-Chalmers Company; George E. Morton and Jack Thurston, Galena Signal Oil Company; H. F. Cameron, Westinghouse Electric & Manufacturing Company, and T. C. Gibboney.

A rising toast was given in honor of Patrick Calhoun, president United Railroads of San Francisco, who was absent. After the close of the banquet the party attended the vaudeville show in a body.

The success of this banquet was largely due to the efforts of Messrs. Turner, Markham and Willis.

THE A. S. I. R. M. A. GOLF CHAMPIONSHIP

The prize winners of the men's golf tournament, held at the Atlantic City Country Club yesterday afternoon, were R. E. Hamilton, Stone & Webster, Boston, Mass., who was three down to Colonel Bogey; T. J. Mullaney, Third Avenue Railroad, New York, who was four down, and J. W. Rollins, Jr., who was also four down. Mr. Mullaney and Mr. Rollins drew lots for second and third places. W. L. Conwell, with 89, won the prize for the low gross score. The contest was match play against bogey, with handicaps based on the handicaps allowed by the home clubs of the contestants.

LADIES' AFTERNOON AT THE COUNTRY CLUB

Ladies' afternoon at the Atlantic City Country Club lured about 150 ladies of the convention from the diversions of the Boardwalk. Special automobiles took the guests out and back. Tea, lemonade and sandwiches were served in the club house. There were 36 entries in the clock golf putting contest and the winners were Mrs. J. W. Rollins, Jr., with a score of 19; Mrs. F. E. Donohoe, whose score was 20, and Mrs. R. E. Belknap with 21. The committee in charge of the afternoon entertainment consisted of Messrs. Garland, Berry, Oesterreich, Hegeman, Elmquist and Meeteer.

THE JAPANESE TEA

About 120 ladies of the convention attended the Japanese tea given yesterday afternoon in the Solarium of the Marlborough-Blenheim. The ladies were served with tea and other light refreshments to the accompaniment of delightful music furnished by a ladies' string quartet. During the course of the afternoon R. J. Owens, vice president of the Whipple Supply Company, rendered several songs which met with long applause. Later T. B. Owens, of the Union Switch & Signal Company, Pittsburgh, entertained the ladies with magic and card tricks.

Each of the ladies was presented with a souvenir in the form of an attractive tray. The Solarium was tastefully decorated and the committee of ladies in Japanese costumes gave a picturesque touch to the occasion. This committee consisted of the following ladies: Mrs. C. Loomis Allen, Mrs. T. C. Cherry, Mrs. W. B. Rockwell, Miss May Hedley, Mrs. W. E. Bartholomew, Mrs William Wampler, Mrs. W. K. Archbold, Mrs. A. L. Whipple, Mrs. A. J. Pizzini, Mrs. William H. Heulings and Mrs. A. C. Clark. The entertainment committee of the Manufacturers' Association was represented at this function by the chairman, Ross F. Hayes.

C. F. Rice, works manager of the Wason Manufacturing Company, arrived Wednesday evening.

MEETING OF THE ACCOUNTANTS' ASSOCIATION

At the opening of the Thursday morning session of the Accountants' Association, President Swift announced that he had received a letter from Prof. M. E. Cooley expressing regret at his inability to be present to present an address on the subject "Overhead Charges."

M. R. Boylan, general auditor, Public Service Railway, Newark, N. J., then read a paper on "Collection and Auditing of Receipts of Prepayment Cars." An abstract of this paper is published elsewhere in this issue.

J. H. Neal, Boston Elevated Railway, said it appeared to him that the use of a box with compartments was unnecessary. For years the conductor had made the change, placing the fares in his pocket, and turning in a record at the end of the day on a time card which was compared with a reading taken by a starter. Plenty of fare boxes would receive the money deposited, register it and allow it to pass into a compartment where the conductor could receive it, and thus continue easily to make change. It was a sufficient check to have such a box read by the starter as well as by the conductor, and very much more convenient to have the conductor turn in his money with the day card as in the past. This would require no change in the general system of accounting. By the use of an audible signal in the fare box, the advantage furnished by the register was given because an audible signal of that character could be heard easily by inspectors on the car. The only feature of the present arrangement with a register which would be absent with the fare box would be that the inspector on the inside of the car could not tell by the register the number of fares that had been taken previously. Mr. Neal thought that the compartment boxes provided a rather cumbersome way of handling the cash.

Mr. Boylan stated that in two years' operation his company had not been able to get a registering fare box which would receive the coins of the different denominations, such as pennies, nickels and dimes. There were a number of devices on the market that would receive a 5-cent piece.

Mr. Neal said that if the money was expelled from the box to the conductor, he could make change easily. Several boxes were constructed so that they would not receive a coin as large as a 25-cent piece. The conductor upon observing that a person had inserted a coin of that size would make the necessary change instantly. If a person should tender a 10-cent piece, the conductor would give two 5-cent pieces, one of which would be dropped in for a fare. If, however, a person who was unfamiliar with the arrangement should drop a 10-cent piece in a fare box, change could be given on one device. Mr. Neal thought that a method would be adopted whereby a person who dropped a 10-cent piece into a box which was adapted to receive only a 5-cent piece would be given a rebate check which might be cashed at the main office. Several devices worked well in receiving and assorting money. These devices registered 1, 5 and 10-cent pieces, and automatically sorted them. These boxes had audible signals so that an inspector on the inside of the car could count fares collected by this method.

Mr. Boylan said that his company returned the small currency daily to the banks, which supplied it to the different stores and concerns.

C. E. Thompson, Chicago & Milwaukee Electric Railroad, said that it had been the practice of his company not to accept coins which the bank would not take. Mr. Boylan said it was not the purpose to have a fare box that would take mutilated coin. The idea was to have one that would take coins a little larger than uniform size. The banks would accept coins of that kind.

C. S. Mitchell, Pittsburgh Railways Company, said that a few months ago about 125 of the compartment fare boxes were installed on double-truck cars in Pittsburgh. Before installation of these boxes a visit was made to the headquarters of the Public Service Corporation and practically the same general details for handling money that were outlined in Mr. Boylan's paper were adopted in Pittsburgh. The company had recently ordered 100 more boxes and now had under consideration the advisability of installing some kind of a fare box on all the cars. At the present time the company was not in favor of the coin-counting box.

W. F. Ham, Washington Railway & Electric Company, said that he was perfectly satisfied that even with the prepayment car it was absolutely essential to have the fare box. Any one who used 25 cents for car fare in Washington usually bought tickets. The company was now following the practice of having reports made to the accounting department whenever any coin larger than a 10-cent piece was passed into a box. This arrangement would scarcely be practicable for companies that did strictly a cash fare business. The register on the box was not satisfactory yet.. It was not necessary to use a compartment box. The fare register was portable and every conductor secured his fare box at the time he started his rounds and turned it in when he finished. The objection to the register was that the number of fares in the box did not agree with the number rung up.

Mr. Neal said that the register on the inside of the box would probably disagree also. Mr. Ham said that was not necessarily so. In registering the fares directly in the box there was more chance of making a mistake than if they were rung up on the register. While the company had not abandoned the idea of making the register operate, he could not say that it was considered satisfactory. It was an open question as to the best method of registration. Of course, it was likely that some of the difficulties were due to defect in the register.

Thomas P. Kilfoyle, auditor, Cleveland Railway, said that the majority of the fares in Cleveland were paid by ticket and the company had not yet been able to find a box that would take care of tickets. The Cleveland conductors were supplied with small slips and when a passenger inserted 10 cents or 25 cents the conductor wrote the passenger's name, the amount deposited and the car number and placed the slip in the box, notifying the passenger to go to the main office for a refund.

Mr. Ham said that his company had just started to record all tickets that were not good but were passed into the fare boxes and accepted by conductors.

Mr. Boylan said his company had a scheme similar to that outlined by Mr. Ham, but it insisted that the conductor make a note on his day card of any foreign coins or tickets deposited in the fare box. When any foreign tickets or coins were found by clerks in the cashier's department notes of the fact were made.

H. J. Davies, Cleveland Railway, stated that the Cleveland franchise ordinance contained a provision that whenever any rate of fare requiring the use of tickets was enforced a reissuable ticket should be used. That provision was inserted because at the time of passage of the ordinance a metal ticket adapted to use in the fare box installed by the Municipal Traction Company was used. It was a serious question now as to the sort of tickets to be used if the rate of fare should be so changed as to necessitate the sale of tickets. What was a reissuable ticket? Could a paper ticket be construed to be a reissuable ticket? As the ordinance was originally drawn by the city, it required a metal ticket. Upon objection by the company to the limitation of a metal ticket, the word metal was changed to reissuable. The company had not sold any of the metal tickets since it resumed possession of the property.

MEETING OF NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS

Mr. Ham then presented the report of the committee appointed to attend the meeting of the National Association of Railway Commissioners on December 16 to 19, 1909. Mr. Ham and S. C. Rogers attended the meeting as the delegates of the association. The report said in part:

(Continued on Page 825.)

REPORT OF COMMITTEE ON INTERSTATE COMMERCE COMMISSION AFFAIRS*

BY GEORGE H. HARRIES, CHAIRMAN; C. S. SERGEANT AND FRANK R. FORD.

The "reign of economic terror" through which we have struggled and are struggling is not the destructive era which legislative propositions might have made it. Bad as many conditions are, they are better than they would be had not sober sense frequently and successfully intervened when the vicious, the uninformed, or the unthinking framed and presented legislative demands and suggestions and sought—subtly or vociferously—to compel place for them among the effective statutes.

Computation as to the output of controverting energy is impossible, but some idea of its retarding volume may be had from the bill records of the United States Senate and House of Representatives for the first and second sessions of the Sixty-first Congress.

The committee files are loaded with exhibits which historians will study with exceeding interest in years to come. We, however, must do our studying to-day.

The House of Representatives was the birthplace of 56 bills which relate to interstate commerce, while the Senate's conservatism was shown by its affording temporary shelter for only 18 legislative infants of the interstate commerce kind. Of the total of 74, but four became law—H. R. 17,536, "an act to create a commerce court, and to amend the act entitled 'an act to regulate commerce,' approved Feb. 4, 1887, as heretofore amended, and for other purposes;" H. R. 5702, "an act to supplement 'an act to promote the safety of employees and travelers upon railroads;'" H. R. 3649, "an act requiring common carriers engaged in interstate and foreign commerce to make full reports of all accidents to the Interstate Commerce Commission, and authorizing investigations thereof by said commission;" and H. R. 24,375, "an act to amend an act entitled 'an act to regulate the construction of dams across navigable waters,'" approved June 21, 1906.

Fourteen bills—nine in the House and five in the Senate—propose to deal with the rate question in one form or another. The characteristic features of some of these found place in the Commerce Court act, but the more drastic theories did not command the support of the majority. Of the unsuccessful efforts a conspicuous example is that found in S. 3776, introduced by Senator Cummins, of Iowa, which sought to compel a carrier to continue to do a portion of its business at a loss (if so ordered by the Interstate Commerce Commission) provided its entire business produced a net result which would enable it to keep alive. The proposed proviso is sufficiently interesting to be quoted, as follows:

"Provided, however, That no court shall enjoin, set aside, annul, or suspend any order or requirement of the commission determining and prescribing the just and reasonable rate or rates, charge or charges to be hereafter observed, unless it is alleged and proved that all the rates of any such carrier, as applied to all its business, will be, by reason of the order or requirement of the commission, insufficient to enable the carrier to earn upon all its business and for its whole service the compensation protected by the Constitution of the United States against legislative act."

Dealing specifically with organization and capitalization there were nine bills—seven House, two Senate.

Of these the most notable is the one (S. 3720) introduced and strongly supported by Senator Newlands, of Nevada, in which it is provided that complete control of capitalizati n of existing or projected lines; the character, issue, marketing or decrease of all forms of securities; records, accounting and reports; corporate merger or dissolution; differences with employees; the establishment of an accident and insurance fund for the benefit of employees, and the payment of dividends—if anything happens to be left—shall be vested solely in the Interstate Commerce Commission. The States, however, are graciously and specifically permitted to continue interstate control and taxation, but "the Interstate Commerce Commission shall hold conferences from time to time with the regulating power of any State with a view to such harmonious adjustment and regulation of State commerce and interstate commerce as will protect the public against abuses or extortion, and the railroads against inadequate returns upon their investment, and as will promote the efficiency of such corporations as common carriers. With such end in view the said commission shall call and hold at least once each year a conference with the railroad commissioners of the several States, and with such other State officers having any duty of supervision, taxation, or regulation of railroads within their respective States. Such conference shall be held in the District of Columbia, and the presiding officer at such conference shall be the chairman of the Interstate Commerce Commission, or some other member of said commission designated by its chairman." The comprehensive and armor-plated character of federal control set forth in the measure is made quite clear in the sections which deal with service or disability pensions for employees and with dividends. The former provides that "the conditions entitling employees to pensions, the amount and time of payment, the investment of the fund, the disbursing of the same, and the entire management thereof shall be under rules and regulations to be made, and from time to time amended, by the Interstate Commerce Commission," The latter reads as follows:

> "That no corporation organized under this act shall pay or distribute to its stockholders in any form, during any one year, a dividend or dividends exceeding in total amount seven per centum upon its capital stock without the consent of the Interstate Commerce Commission. If, after the payment by such corporation of its operating expenses, maintenance, improvements and betterments, its taxes, its interest on bond or on other indebtedness, and its contribution to the accidents fund, there shall be a surplus over and above the amount necessary to pay such dividend of seven per centum per annum, such surplus shall be reported to the Interstate Commerce Commission, which may direct the same to be applied, in whole or in part, to betterment of the road or equipment, or to extra dividends, or to a guaranty fund in the Treasury of the United States against future inadequacy of earnings or reduction in dividends, such fund to be controlled and invested under the direction of the Interstate Commerce Commission."

In order that there may be no doubt (if there is room for doubt) about the federal power Sec. 26 makes sweeping provision "that the Interstate Commerce Commission shall make and from time to time alter, amend, or repeal rules necessary for the complete enforcement of the provisions of this act."

Then as a closing assurance this measure—which was declared to be in the interest of a permanent understanding between the federal government and interstate corporations—winds up in Sec. 27 with this invitation to future congresses: "That this act and all franchises required under it shall be at all times subject to amendment, alteration, or repeal by act of Congress."

Bills aiming to prevent overcapitalization and the consolidation of interstate carriers were not wanting, each proposing to increase the powers of the Interstate Commerce Commission so that its control over the issue of securities would be complete.

Occasionally appeared a suggestion that ignored all thought of control; that was wholly prohibitive. One of these, H. R. 13,885, introduced by Mr. Russell, of Texas, provides that "it shall be unlawful for any corporation engaged in interstate or foreign commerce to purchase, acquire, own or control itself, or through its agents or employees, any stock in any other corpo-

*Report presented at the annual meeting of the American Street & Interurban Railway Association, Atlantic City, N. J., Oct. 10-14.

ration engaged in interstate or foreign commerce"; furthermore, that "it shall be unlawful for any two or more corporations engaged in interstate or foreign commerce to have the same officers or board of directors; but each corporation engaged in interstate or foreign commerce shall have its own separate and distinct officers and board of directors, and they shall not be chosen from the officers, directors, stockholders, agents, or employees of any other corporation engaged in interstate or foreign commerce where such other corporation is engaged in the same kind of business or is, or may be, in the remotest degree a competitor of the corporation whose officers or directors are to be chosen."

In another section it is proposed to make it unlawful "for any trust, or combination, or association of persons in restraint of trade, or a monopoly, to use the United States mail for any purpose whatsoever." Finally there is cheering insistence that "any corporation, combination or association of persons in the restraint of trade or monopoly violating any of the provisions of this act shall be fined in any sum not exceeding $25,000 for each separate offense, and any person violating any of the provisions of this act shall be, for each separate offense, fined in any sum not exceeding $10,000 or imprisoned in the penitentiary not exceeding five years, or both such fine and imprisonment in the discretion of the court."

With respect to the vital topic of security issues, Congress came to the conclusion that it was without sufficient information; so it laid aside both prohibitory and permissive bills, and in Sec. 16 of the Commerce Court act authorized the "President to appoint a commission to investigate questions pertaining to the issuance of stocks and bonds by railroad corporations, subject to the provisions of the act to regulate commerce and the power of Congress to regulate or affect the same." That commission has been appointed. It is composed of President Hadley, of Yale; B. H. Meyer, professor of political economy at the University of Wisconsin, chairman of the Wisconsin Railroad Commission and representative of that commission at the national capital; Frederick N. Judson, of St. Louis who was counsel for the United States in some prominent rebate litigation; Walter L. Fisher, of Chicago, who was city attorney and a potent factor in the settlement of the Chicago street railway controversy, and Frederick Strauss, of New York, well known as a banker and economist.

Inseparably a part of the securities-issue problem is physical valuation. Two bills—S. 596 by Senator La Follette and H. R. 26,986 by Mr. Madden, of Chicago—providing for investigation and report on the value of physical property of interstate carriers, are in committee. One bill—S. 4724, by Senator Crawford—goes a step further, for it authorizes the Interstate Commerce Commission to determine the cash value of the property and franchises. In view of the reasonable certainty that some such measure will be pressed vigorously in the near future, these three bills will be found with the recent enactments in the appendix to this report.

Prospective controversies affecting interstate commerce were prospectively met by four bills, on none of which was there any action. A typical investigation measure is H. R. 12,376—by Mr. Townsend, of Michigan—which proposes to vest in the President authority to appoint a special commission of seven to take testimony and to report to him. The approved findings and recommendations would be forwarded to the principal parties to the controversy and to Congress.

Of another variety is H. R. 13,905—by Representative Steenerson, of Minnesota. This—as an amendment to "an act concerning carriers engaged in interstate commerce and their employees"—might easily, if enacted into law and declared to be effective, produce boundless confusion. It provides "that whenever controversies between a carrier subject to this act and its employees shall be of such nature and magnitude as to prevent or obstruct, or threaten to prevent or obstruct, the operation of its railroad or any substantial part thereof, and thereby to inflict, or threaten to inflict, upon the localities and communities and general public served by such carrier great and irreparable injury, the Attorney-General of the United States, if satisfied that such controversy cannot be adjusted by mediation and conciliation, or by arbitration, may file a bill or bills in equity to prevent the commission or continuance of the public mischiefs caused or threatened as aforesaid in any circuit court or courts of the United States within whose circuit or circuits said carrier may do business. Said bill or bills shall pray for the appointment of a receiver or receivers of the road and property of said carrier pending the continuance of said controversy, and for all such other orders and decrees as may be necessary to protect and conserve the public interests involved and to secure the use and operation of said road and property in aid and promotion thereof. The defendants of said bill shall be the carrier and the employees directly engaged in said controversy, together with all known corporations, organizations, or individuals participating therein, or aiding or abetting either said carrier or said employees: Provided, however, That when said parties are very numerous, so that the joinder of them all would be impracticable or highly inconvenient, it shall be sufficient to join so many as will adequately represent all the different interests involved. The said circuit court or courts of the United States are hereby given full jurisdiction in the premises, and any orders or decrees under said bills may, in the discretion of the court, be directed to all said parties participating, aiding or abetting, as aforesaid, whether actually named or joined as defendants or otherwise, and shall be operative upon all, whether so named or joined or otherwise, having actual notice thereof: Provided, further, That nothing in this act contained shall be so construed as to enlarge the remedies at law and in equity in courts of the United States now enjoyed by private persons, firms or corporations, except as specially provided in sections four, six, seven and eight thereof; and that in cases of controversies between interstate commerce common carriers and their employees concerning rates of wages and terms of employment involving the public interests and threatening irreparable public injury, no statute of the United States shall be construed as permitting the equitable jurisdiction of the courts of the United States to be invoked except by the Attorney-General of the United States."

Relief associations were touched upon only in one bill—H. R. 22684, by Mr. Cox, of Indiana—in which it is declared to be "unlawful for any railroad engaged as a common carrier in interstate commerce between the States or between the States and any Territory of the United States or between any States and the District of Columbia to compel their employees to enter into any voluntary association organized and conducted by said railroads for and on behalf of the employees of said railroad, and any and all contracts made by and between any railroad engaged in interstate commerce and their employees whereby said employees are compelled to contribute to the support of said relief association and exempting all railroad companies from liability on their part to their said employees are hereby declared to be unlawful."

Of "safety" bills there were 16 in the House and two in the Senate. They deal with equipment details; block systems; the hours of labor; car construction; the manning of trains; the examination and licensing of telegraph operators, with power to the Interstate Commerce Commission to fix the operators' compensation; the establishment and maintenance of safe clearance between cars and structures; and the equipment of cars with first-aid devices (all employees to be so instructed that they "may become familiar with the application and use of such first-aid equipment;") while one proposes a world-wide prize competition (under the inevitable auspices of the Interstate Com-

merce Commission) to determine the best device or devices for the prevention of collisions, wrecks, etc. Of these bills two—specifying certain freight car construction requirements—became law.

Of five bills requiring accident reports one—now effective—became law.

With respect to the ownership of commodities by interstate carriers there were but three bills; two of them aimed directly at express companies.

Eight bills—five House and three Senate—dealing with passes presented only two uncommon features—one making it possible for the carriers to exchange passes for newspaper advertising; the other authorizing the issuance of passes to officers and employees of baggage transfer companies. These are still in committee.

Then there was Representative Mann's very comprehensive bill (H. R. 16,312) in which he proposed a Bureau of Transportation in the Department of Commerce and Labor; the Commissioner of Transportation to hear complaints, to investigate, to report (when necessary) to the Attorney-General, such report to be by him transmitted to the Interstate Commerce Commission. The superintendent would also be vested with supervisory powers over the issue of securities. The passage of the Commerce Court bill covered the ground, however, in what Congress deemed to be a better way.

There was no action as to Representative Sulzer's H. R. 17,411, "To create the Department of Transportation." This proposed to give transportation a definite place in the President's Cabinet and created offices galore, including six assistant secretaries of transportation, six chiefs of bureaus, with chief clerks, examiners, auditors and clerical assistants in sufficient number to make the organization all that a department of the federal government ordinarily is.

While your committee kept careful watch over every legislative suggestion made or discussed at the center of federal government, it naturally devoted the greater proportion of its thought and energy to the Commerce Court bill because it was known that some such measure would certainly become a statute. The hottest corner, for the electric carriers, of an extremely hot fight—a painfully and exhaustively prolonged struggle—was where we had to deal with through rates, general classification and joint rates. There was more than a mere disposition on the part of many of the standard steam roads to prevent through routing of freight over electrically operated roads. The details of the contest are many and discussion thereof would hardly be profitable. Sufficient be it to say that when the act received the approval of the President section 15 contained the following provision: "The commission shall not, however, establish any through route, classification, or rate between street electric passenger railways not engaged in the general business of transporting freight in addition to their passenger and express business and railroads of a different character. * * *"

Another feature of the law which should be given careful consideration by this association is that paragraph of Sec. 6 which provides that on or before the eighteenth day of this month "every common carrier subject to the provisions of this Act shall designate in writing an agent in the city of Washington, D. C., upon whom service of all notices and processes may be made for and on behalf of said common carrier in any proceeding or suit pending before the Interstate Commerce Commission or before said Commerce Court, and file such designation in the office of the Secretary of the Interstate Commerce Commission. * * *" Since the passage of the act there has been much solicitation by attorneys resident in Washington for designation as agents. Some of those seeking the business have offered to accept the responsibilities for a sum so insignificant that the figures are or should be clear indication of inefficiency or lack of standing. Complying with many requests and after conference with the president and other officers of the association, the chairman of your committee gave careful thought to the agency question, and after duly weighing the relative merits (as he saw them) of possible agents recommended to the president that it was more than advisable—almost essential—that representation of electric carriers before the Interstate Commerce Commission should be centralized, and gave the name of a firm which would undoubtedly render service of the most efficient sort. Up to this time nothing has appeared to show that our member companies are likely to be of one mind with regard to organized action in their dealings with the Interstate Commerce Commission and the Commerce Court. The evils which will surely spring from lack of cohesion in this most important matter must be evident to every official who will give to the subject the thought it deserves.

Since the 1909 convention there has been a great awakening of those who had previously been unmindful of the forward movement of federalization and the consequent decline of local self-government, but the discussion is as yet vague and is minus a well defined objective. After the results of the forthcoming State and Congressional elections are apparent it may easily be that the popular desire—in some parts of the country at least—will be clearly on record.

Throughout the entire term of our national life there has been bitter controversy over the constitutional relationship of the sovereign States and the supersovereign federal power which of necessity they had created. Always the creators have insisted that their creation should be entirely conscious of its artificial construction and its material dependence. Always the created has striven to acquire and retain at least all of the powers—expressed or implied—which the creators wrote into the great instrument that made and keeps us a nation. Always—with only an occasional halt—has there been steady progress of federalization until it has about achieved all that is possible in centralized popular government.

At this boundary line is a problem of the greatest moment to all mankind, the solution of which calls for all that is best in human wisdom.

Those of us who demand a strong government are face to face with those of us who demand that there be even less of interference with the natural rights of the States; while between these two millstones vast and vital property interests are being ground to inequitably diminished proportions. That some of the grinding can be justified affords no comfort to the innocent investor, financier or operator; nor is there any profit to the millions who, while applauding the processes, fail wholly to realize that efficient transportation is as essentially a part of their daily lives as is clothing for their civilization-softened bodies.

That practical socialism has made many strides during recent years is now evident as we essay to assemble for review the active components of disturbance. Widely separated utterances and happenings, seeming to be of trifling importance, were little noticed and soon forgotten. Relatively, they appeared as unimportant as was the fabled request of the camel that he be permitted to warm his nose by putting it barely within the doorway of his sympathetic owner's tent. We were not wholly sympathetic, but we offered no objection to the apparently harmless nose of an "ism" which is, anyhow, more or less in harmony with the general disposition of republican government. We all remember that the camel's head and neck and shoulders were progressively sheltered (with the owner's consent) and that finally the animal occupied all of the tent, having first thrust his humane but thoughtless proprietor into the chilly outer world.

It is now our duty to ask ourselves and our neighbors, "How far is it desirable to extend the practice of socialism?" We have admitted the beauty of the socialistic ideal, and have long had acquaintance with some of its non-ideal performances. We shall see others unless there

be a speedy check. It is a comparatively short march from governmental control to public ownership. Indeed, the latter may some day prove to be the only way out for investors in public service securities. Many of us have many times considered seriously the tremendous applause which has greeted—in recent days—the announcement of the politically prominent favoring "the rights of man rather than the rights of property;" that illogical and class-making war cry which the multitude never analyzes, but which survives and is potent despite the unassailable fact—for which every man will fight—that one of man's primary and essential rights (under any form of government) is his right to the property he has secured by conquest, by inheritance or by purchase.

A campaign of reason, of education, is the present duty. That there are minor corporate evils to be extirpated—in very few places—is certain, but while we are at work on the desirable extermination let us make known the fact that corporate honesty is the rule, and that we of the transportation agencies have contributed and are contributing in overflowing measure to a national welfare which without such agencies could never have achieved existence Let us seek to avert the hasty legislative action which is nothing less than revolution. Let us insist that time is an important element of true reform. Let us give combat to those who—did nature accept the theories and practices which they endeavor to force upon us—would shorten to one-half or one-third the period of human gestation.

REPORT OF THE COMMITTEE ON EDUCATION.

BY H. H. NORRIS, CHAIRMAN; R. E. DANFORTH, A. S. RICHEY, W. F. KELLEY, J. F. CALDERWOOD, D. C. JACKSON

Your committee on education has now been in existence for three years, and a fair question to ask is, "What has been accomplished in this time?" The committee was created to keep the members of the association in touch with methods for improving the efficiency of employees by direct and indirect efforts to make them more intelligent in regard to their work. The executive committee realized that steam roads, gas companies, manufacturers and others were making more rapid progress in this direction than the electric railroads.

During the period before the next annual meeting after its appointment the committee collected material regarding the practice of companies in other fields and presented it at the meeting. In the following year an effort was made to interest the members in a cadet or apprentice system. Last year correspondence was conducted relative to the introduction of a correspondence course for bright young men in the employ of the member companies. The plan was laid before the membership by means of a circular letter and considerable enthusiasm was manifested. The members stated that at the start they would put from 500 to 1000 young men into such a course if it was established. The committee considered all the details of the proposed plan and reported these to the last annual convention. The matter was referred to the executive committee for action during the past year. The committee has held itself in readiness to carry out the wishes of the executive committee, but under the circumstances it could take no further initiative in the matter until instructions from the executive committee were received.

At the request of the president, the chairman of the committee attended the midwinter conference of the association in New York city to be prepared to give the executive committee any desired information regarding the work of the committee. Mr Danforth, of the committee, was also in attendance. Mr. Danforth and the chairman were requested to present a working plan to the executive committee, which they did. The plan was as follows:

That several, say five, member companies within easy reach of one another be requested to assist in some experimental work by the committee. The committee proposed to ask each of these companies to select five bright young men in their employ to form an A. S. I. R. A. correspondence class. These boys were to be furnished by the committee with questions, sheets, and instructions along the lines already suggested. That is, the committee was to furnish questions based on the surroundings of the young men, who were to be educated in the terms of their environment. The committee proposed to engage the part-time service of a young man of the necessary experience to visit the classes now and then and become acquainted with actual conditions surrounding such a course. It was proposed that the association bear the entire expense of this preliminary work and for this purpose an appropriation of $500 was asked. The members of the committee could not devote the necessary time and energy to do this work, hence the request for the above amount. As the complete scheme contemplates the eventual employment of an educational secretary, the proposed expense was considered by the educational committee to be reasonable and expedient. The executive committee took the suggestions under consideration, but did not deem it wise to make the appropriation at the time. The committee has, therefore, taken no further steps while awaiting the decision of the executive committee. It believes that a preliminary experiment on a small scale would be a conservative method of determining the details of the complete plan.

During the month of August the committee, through the secretary's office, sent out a circular letter to obtain information regarding recent progress.

In conclusion, your committee would state that while little in the way of practical results has been accomplished this year, the committee feels that educational work may be of great value to the companies large and small. The member companies are evidently endeavoring to apply the educational principles to their several needs. Undoubtedly they would welcome the unquestioned stimulus which a well directed correspondence course would provide. The committee has requested one of its members, R. E. Danforth, to give a report of his experience with the cadet plan which his company adopted several years ago.

VALIDATION OF RAILROAD TICKETS

It is very important that the return coupons of all railroad tickets sold at reduced excursion rates be validated before starting home. Tickets reading via the Philadelphia & Reading Railroad may be validated at the city ticket office on the Boardwalk, in front of the Chalfonte Hotel. Pennsylvania Railroad tickets should be validated at the company's ticket office, corner of Atlantic and South Carolina Avenues. Tickets which have not been validated will not be accepted by the conductors on trains. Pullman reservations may be made through George E. Armstrong, representing the American Railway Guide Company, who has a booth on the north side of the lobby, on the Convention Pier.

Even the natives of Atlantic City, who are used to seeing strange sights, stood on the edge of the Boardwalk Wednesday night and gazed with amazement on the peregrinations of an electrically lighted wheel chair which made irregular journeys to the Apollo Theater, the hotels and the cafés. The chair was elaborately decorated with autumn foliage and flowers and festooned with myriads of small incandescent lamps. During the early part of the evening it served as a carry-all for the ladies only, but later the police report that it was engaged in the less gallant but more utilitarian work of helping night owls to their rooms. The superintendent of transportation in charge of the chair was McConnaughy, of the Dearborn Drug & Chemical Works.

STREET RAILWAY FRANCHISES*

BY CHARLES V. WESTON, PRESIDENT, SOUTH SIDE ELEVATED RAILWAY, CHICAGO

Urban and interurban railway companies have a right to exist equal with that of other corporations. Primarily that right is based on the charters conferred on them through general or special statutes. Above these are limitations imposed by the constitutions of the States. In general, the charter regulates the internal government of the company. A clear distinction should be kept in mind between "charter" and "franchise." The charter grants the right to be. The franchise permits the occupation of specific localities—usually streets or highways—and is issued as an additional authorization by the local governments within whose jurisdiction the railway is to be operated, and provides certain rules under which the company must conduct its business.

These pioneers of urban transportation were hailed as public benefactors. The public conceded that here were men who were willing to risk their money in experimental efforts in which, if the experiments succeeded, the people would gain quite as much in swifter and more comfortable traveling methods as those who built the systems. The service which those road builders rendered to the people soon came to be not only a convenience but a necessity of the first magnitude.

It was the happy period of the street car business—those early days. Companies became prosperous, outwardly, almost in a night. It appeared to be but the simple case of keeping the rolling stock moving and gathering in the nickels. Alas! these companies appeared to be more prosperous than they really were. Few, if any, of the first owners of street railway privileges had the gift of foresight. Things that to-day we know to be elemental principles in railway management were to them unknown quantities. They failed utterly to take into consideration some of the most important matters of expense, matters which later experience has taught managers to recognize, and to know that upon their treatment depends success or failure of the enterprise.

Thus there was opened up a tremendous field, and into it flocked not only the unscrupulous operators who, by manipulation of securities of the companies, extracted larger and larger sums, to the ultimate loss of the investors, but also those political parasites who began to see that the franchises granted to public service corporations had a value which could be converted into money and political power.

The remarkable success achieved by each of these two classes was accepted by the public as conclusive evidence that the urban transportation business was unreasonably profitable. It was popularly believed that the users of the service were paying more than a fair price for it and that the companies, with facilities located on the public's property, maintained and operated there by virtue of the privileges conferred by the people, were getting rich through the control of a public necessity. That spirit of antagonism—which in considerable degree still exists—soon manifested itself in the form of demands for the enactment of legislation placing restrictions on the companies—by limiting the life of the franchise to a few years; reducing the rates of fare either directly or indirectly through unlimited transfer privileges; the payment of special compensation for rights conferred in addition to the ordinary taxes on the property and business of the companies in the form of car licenses, paving, sprinkling, cleaning and lighting streets; payment of a percentage of the gross receipts and numerous other requirements which, like those enumerated, are of doubtful value in respect to promoting the public welfare.

One popular form of grant is that fixing the rate of compensation and limiting the term of the franchise without making provision for the disposition of the tangible property at its expiration. Chicago has done somewhat better than this in that it has provided for the integrity of the investment. The rate of purchase is at a fixed valuation, the computation being defined in the ordinance. But Chicago has also fixed its rate of compensation, and this must be paid under a flat rate of fare, almost unlimited transfers and other special compensations which make the conditions, other than the guarantee of the value of the properties, much as they are elsewhere.

Laws which have been laid down for the regulation of the street car corporations are as varied as the weather. One of the points, of course, toward which there is a great municipal effort at control is the fare. It has been said that a reduction of fare was offset by the increase in traffic. This, I believe, has been proven to be an unsound argument. It is now a recognized principle that in fixing the rates of fare the distance which a passenger rides must be taken into consideration. All expenses of conducting the business are figured with the utmost accuracy on a car-mile basis, and with the same exactness the revenues should be determined on a passenger-mile basis.

The belief of pioneers in street railway building—that a low rate of fare, irrespective of the length of ride within a city, would so stimulate traffic as to defeat the apparent inequality between revenue and service—does not hold good except in very densely populated districts, where the great number of very short hauls compensates for the unprofitable long hauls. In such situations the average distance of haul is the factor which determines the financial success or failure of an enterprise where a flat rate of fare prevails.

Another element of expense which works unjustly toward both the companies and the public is car license. This, in theory, has the same basis as the licensing of the huckster and the cabman, and is primarily intended not to be a source of revenue but a matter of regulation. Being fundamentally a matter of regulation, it holds for the companies all the terrors of any law which may be changed once or twice or ten times a year, at the whim of a city council, unless the amount of the license fee is fixed for the full period of the franchise and named therein. Regarding the matter from the standpoint of the public, the license law is objectionable because it may tend to reduce the number of cars operated.

Another form of taxation may be seen in several cities of Pennsylvania, where a fee is charged on the poles of the traction corporations.

Paving: There is a saying that but two things are inevitable—taxes and death. The traction manager easily may add a third—paving. So general is the custom of cities to require the street railway lines to pave that it may be said to be universal. There are small differences in the various municipalities, but generally it may be said that all corporations are made to bear the expense of paving and maintaining the space between their tracks and in many cases a certain distance outside.

In many cases also the company must clean the street space occupied, remove snow and ice, and sometimes keep it sprinkled.

It is probable that, aside from car licenses and paving requirements, the most common form of special compensation in this country is that which demands a percentage of the gross receipts. Occasionally also there is found an instance where a company is required to make an annual payment based on profits rather than on the gross business.

I think no one will dispute me when I say franchise granting should be done in a systematic manner. It should

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10-14, 1910.

be according to well established principles of business, instead of in the haphazard way that has heretofore obtained in every important center of population in this country. It is gratifying, however, to note that there has been within the last few years some advancement in the recognition and acceptance of fundamental ideas relating to public service utilities which formerly were antagonized by legislative bodies and by many corporation managers. Regulations should guarantee to the public adequate, safe, speedy and convenient service at a reasonable cost, and in the same enactment there should be protection for the investor by preserving the integrity of the investment and providing a reasonable return thereon.

Referring specifically to the matter of speculation, if the street railways are to be recognized and treated as legitimate business enterprises, in which the owners and the people have a mutual and equally important interest, these enterprises must be permanently removed from the field of stock manipulation, which has for its sole purpose the drawing out of the people's money in payment for that which does not represent intrinsic value.

With this end in view, one of the first things to be conconsidered and adopted in the construction of franchise grants is the limiting of capitalization of the corporations to such sums as will represent only the actual cost of the physical property plus reasonable allowance for discounts, interest, supervision, legal expenses and other legitimate charges during the creative period, and for additions to the physical property subsequent to the time of commencing actual operation. In other words, capital investment should represent only such expenditures as can be reconciled with accepted methods of accounting the various elements of cost in the creation and extension of the property. In any valuation of existing properties on account of expiring franchises or for other reasons due consideration should be given to that part of the original investment represented by facilities which have been abandoned in the effort to satisfy public demand and in keeping pace with the development of the art.

Another matter which is of the very greatest interest is the publicity of accounts. Uniformity and publicity of accounts are coming more and more to be an essential question in the relations of the people and public utility corporations. This matter of uniformity and publicity of accounts must be considered in any comprehensive method of franchise granting. Not only must there be a safeguarding of public rights, but there must be employed such methods as will convince the people that their rights actually are being safeguarded. We must bring them to a perfect belief in the fairness and integrity of the corporations.

Most of us, I believe, are convinced of the fact that the street railway business is a natural monopoly. The majority of latter-day economists admit this to be the case. In the rendering of public service, competition means a duplication of investment, of service and of expenses, all of which spell ruin to the enterprises involved. With competition there always is the frantic effort to pay interest on wasteful investment and service is skimped to the disadvantage of the public, whereas if only one system had originally been given monopolistic privileges under proper public control both the company and the public would have been the gainers.

Study of the history of competition in public service undertakings leads to the conclusion that, no matter what provision a franchise may contain against consolidation, it is only a question of time when every franchise holder seeks the safe haven of monopoly and that, from the standpoint of the people and from the standpoint of the business itself, monopoly franchises, under proper public control, are the best.

The franchise, I believe, should fix the rate of dividend or profit to the investor, but it should not undertake to determine the rates to be charged for the service. The return on the investment should be in proportion to the hazards and should be liberal enough to attract capital. The rate charged for the service should be that which will yield a fixed return on the investment, the operating costs, maintenance and renewals, and fixed charges, and provide for a fair sinking fund, unless there is provision for returning to its owners the capital investment at the termination of the grant by purchase by the city or otherwise. It is my belief that the municipality should not share in the earnings of the public service corporations. The compensation which the people should receive for the privileges granted is adequate service at cost plus the reasonable return on the investment.

Franchises based on the principle of regulating the rate of dividends or profits and of controlling the amount of capitalization would, in the case of urban transportation companies, operate automatically to increase or diminish the rate to be charged for the service as the density of population over the entire system increased or diminished and as the length of the average haul varied with the shifting of the centers of population. The periods for the readjustments of rates should be fixed as to each community served.

Furthermore, I am of the firm belief that some law permitting assessment aid should be incorporated in the statutes of each State so as readily to bring about financial assistance toward the construction of lines into territory which is not sufficiently populated. It seems perfectly fair that those who inhabit a sparsely settled section and induce traction managers to build lines into their region should be made by law to pay a certain percentage—even though very small—of the upkeep cost of those lines during such period as they may be non-paying. Such a provision recently has been enacted in the State of New York.

I venture the opinion that the plan of franchise which I have described in outline is entirely practicable, and is susceptible of being worked out in detail and in harmony with all constitutional limitations of the various States of the Union; that it is scientific in its construction, reasonable and eminently fair to both the people and the corporations, because it safeguards the public in every respect, and that it insures to the company the integrity of the investment and a reasonable return thereon.

I predict that future franchises will be monopoly grants, embodying all of the principles herein suggested, varying only in detail to suit different local conditions, and that in the readjustment of the affairs of existing corporations these fundamental ideas will be adopted so that we may reasonably look forward to the time when public service companies will operate under licenses which conform to a consistent theory of franchise granting.

From the practical application of grants based on the principles suggested we may fairly be assured of these results:

The public interest is safeguarded by limiting the capitalization to the amount actually invested in the enterprise, thereby preventing the inflation of securities and their manipulation in the market.

To the users of the service offered by the corporations there is assured an adequate transportation at a reasonable cost.

To a great extent it solves the labor problems in respect to wages, hours and general working conditions. With an inflexible amount demanded of the company by the municipality, the company is the sufferer when cost of materials, etc., increases. Should labor demand an addition in wages at such a period, the natural result is that the company resists, creating a condition which is detrimental to the corporation, the city and the employees.

It insures the upkeep of the property along lines which will provide for the highest degree of safety and efficiency and will maintain the intrinsic value of the property represented by the investment, and gives further assurance that the facilities provided for the operation of the properties will keep reasonable pace with the development of the art.

Under such conditions the transportation problems of cities would cease to be a political question and would no longer be considered a temptation to public wrong-doing.

The value of street railway securities would be made stable, and the shares would be sought by the public as permanent investments.

There is no question that the transportation companies have very serious obligations to the public, but the public also has an honest obligation to the traffic corporations. If the people receive a speedy, efficient service, they should in all fairness pay what that service costs, plus the reasonable profit which is due to any man or body of men who risk their money in a legitimate enterprise, and who are endeavoring to live up to the obligations imposed on them by their franchises.

Coöperation between the public and the transportation companies is a vital necessity. It is the one thing that will bring order out of a disordered business; the one thing that will place carrying corporations on a basis of fair profit where they will be enabled to pay more and more attention to the every need of the traveling public, rather than to the gnawing question of how long they will be able to keep afloat.

The situation is urgent. How long, with constantly increasing expenses, demands on the part of the cities for through routes, better equipment, more liberal giving of transfers, the added cost of materials and higher wages, can the companies carry passengers for indefinite distances for a flat rate of 5 cents? That they cannot do it much longer is asserted by those who have most closely studied the question.

That the problem to be solved is a great one is certain, yet unquestionably it is possible of solution, and that in a manner which will be acceptable to both the companies and the public.

I have suggested that the real answer to the problem lies with the people in the granting of franchises, which are equally fair to both sides. I have also suggested that coöperation between the public and the transportation companies is a vital necessity.

There seems to me to be only one way to bring about that coöoperation and to arrive at the final answer to the problem—that is by placing before the people the exact truth in regard to the situation and by advocating those fundamental principles of franchise granting which will place the business of transporting people in and about the great centers of population on a firm basis of permanency and stability which will give to the people full value of the price they pay for the service.

It seems to me, too, that the only reliable source from which the truth about these matters can emanate is from those who have been in closest contact with the problem and who have real expert knowledge concerning all phases of it. That means you and me, and it will require not only our individual effort, but also our combined efforts, exerted consistently and persistently in accordance with a well defined plan of action, to inaugurate a campaign of education which will give the widest publicity to the truth in respect to public service corporations. I have an abiding faith in the justness and willingness of the plain people of this country to stand strongly for that which is fair and right.

J. B. Strong, of the Ramapo Iron Works, reached Atlantic City Thursday morning.

The representation of the G. Drouvé Company, Bridgeport, Conn., has been increased by the arrival of H. F. Tatlow.

THE USE OF METAL TICKETS*

BY GEO. L. RADCLIFFE, SUPERINTENDENT, CLEVELAND RAILWAY CO.

I find that the scarcity of available material on the subject of the use of metal tickets makes it very difficult to prepare a paper which will be of any considerable value to this association, in fact I have been unable to obtain any information on this question outside of Cleveland.

Years ago, before the advent of electric cars and even before the appearance of the horse car conductor, several railway companies in Cleveland were using a composition ticket. These tickets were made in the shape of a coin somewhat larger in circumference than a nickel. The ticket used by the Broadway & Newburgh Street Railway at that time was made of a pressed paper or pulp composition; the Brooklyn Street Railroad had tickets made of celluloid, while the East Cleveland Street Railway Company used hard rubber. The tickets bore the name of the issuing company and the usual marking to designate that they were good for one ride on the cars operated by the company. These tickets were adopted because of fare boxes being in use on the cars; they were more easily dropped into the box and less readily taken out than the paper ticket. As soon as the several companies put conductors on the cars and removed the fare boxes, they discontinued the use of the composition ticket and began to use paper tickets. This was true of all the companies in Cleveland except the Brooklyn Street Railway, which continued to use the celluloid ticket until 1893, when it was merged into the Broadway & East Cleveland Railroads.

Metal tickets were first used in Cleveland by the Municipal Traction Company when it began the operation of the 3-cent line. This ticket was of aluminum and was about the size and thickness of a five-cent piece, with a hole in the center, One side of the ticket bore the name "Municipal Traction Company," while the other side bore the inscription, "3-cent Ticket, 1907."

There were several reasons for the introduction of these tickets on the 3-cent fare line, none of which would be of particular value to a going railway system. One important factor was the considerable amount of advertising which the introduction of a new kind of ticket gave the company, which it was very desirous of obtaining at that time. Another reason was that the company desired to procure some working capital and figured that metal tickets would soon be accepted by merchants in payment for groceries, meats, etc., and as a matter of fact tickets did pass quite freely as money for small change, especially among the newsboys and small grocers. It was also thought that a great many of these tickets would be carried away from Cleveland as souvenirs, and that it would not be necessary for the company to redeem them. To what extent this hope was realized I am unable to state, but I have seen tickets in cities far distant from Cleveland being carried as souvenirs.

As to the results of the use of metal tickets in actual service, let us first consider the question from the standpoint of the conductors, who as a general rule did not like the tickets. One of the strong objections advanced was that the tickets were heavier and much more bulky in the conductor's pockets, and could not be put up in the small neat package in which the conductors were accustomed to handle their supply of tickets.

On the ordinary cars equipped with registers the supply of tickets was left continuously in the hands of the conductor or the passengers. The company did not permit the conductor to turn in any tickets when making returns of the daily receipts, which, of course, was an advantage to the company, the receipts being entirely in cash. The conductor was compelled to

*Abstract of a paper read before the American Street & Interurban Railway Transportation and Traffic Association, Atlantic City, N. J., Oct. 10-14.

resell all tickets which he collected and in many cases found this a difficult proposition.

Some opposition also developed on the part of the public, for the reason that the conductors at times became offensively insistent in their efforts to have passengers purchase tickets. To force the sale of tickets an order was issued by the company instructing conductors to refuse to make change for a nickel or a dime, so that if a passenger did not wish to buy tickets it was necessary for him to present the exact amount of fare to the conductor, namely, 3 cents. Following out this rule a passenger who presented a nickel to pay one fare, or a dime to pay two fares, did not receive any change, although the rate of fare at that time was only 3 cents. The final result was that the company redeemed the conductor's tickets at the station, but still maintained the rule that the daily receipts should be in cash only.

Under this system of fare collection the cashier's office and the counting room were relieved of considerable work in the counting of the daily receipts. The cashier was not burdened with the responsibility for tickets after he had verified the manufacturer's count, placed the tickets in packages and made his first sale to the conductors.

With the advent of the prepayment fare box, however, an entirely new proposition presented itself. The first fare box installed by the Municipal Traction Company was designed especially for the reception of metal tickets and paper tickets could not be deposited, as the fare boxes were built with a metal runway in the top of the box, through which nickels and tickets passed before reaching the magazine. The runway was placed in a slanting position so that when a nickel or ticket was deposited in the small slot at the mouth of this runway, it passed through the runway by its own weight. The entrance to the runway was made only large enough to receive a 5-cent piece. The metal tickets were dropped into the fare box and could not be re-sold by the conductor. It was necessary therefore that a supply of tickets be kept on hand for sale to the conductors in the same manner as had formerly been done in the case of paper tickets. The magazines were drawn from the car and sent to the counting room, and the contents counted, a process which involved a greater amount of labor than was necessary with paper tickets under similar conditions. The cashier was then required to verify the counting room returns and place the metal tickets in packages for distribution to conductors each day. At first the metal tickets were placed in small envelopes, but as this method was unsatisfactory, a wire clip, holding the tickets in packages of five, was adopted. A considerable amount of extra help was employed to count and place these tickets in packages.

I had no personal experience in the handling of these metal tickets, as the Cleveland Railway returned to the use of paper tickets when it resumed the operation of Cleveland lines, on March 1 of this year, but W. E. Camp, our cashier, has given the following information on this subject, with a comparative estimate of the cost of handling paper and metal tickets on our system. He estimates that it would be necessary to have on hand a number of metal tickets five times as great as the number of tickets received on the cars every day, in order to keep the conductors supplied, and estimates that the life of the metal ticket will not exceed five years in continuous service. Based upon our entire system being equipped with prepayment cars, he finds that the extra cost of using metal tickets instead of paper tickets would be about $79,000 for five years, or about $16,000 per year. In this estimate he has included in the cost of metal tickets the labor for counting and assembling, the cost of wire clips, rent of room, repairs to counting machines, handling and storing on account of extra bulk, the first cost of the ticket supply, and the cost of extra machines and trays for counting tickets. In the cost of paper tickets he has included the first cost of tickets each month, labor for counting same, labor for destroying cancelled tickets and royalty on counting machines used in counting the paper tickets. I might add that our company is using about eleven million tickets per month, and the above comparison is made on this basis.

The metal ticket, I believe, has one advantage over the paper ticket, and that is its adaptability to the prepayment fare box. We have had considerable trouble in finding a fare box in which the paper tickets do not stick and become clogged before reaching the magazine. While we have overcome this to a very large extent, it is not unusual to have a car turned in because the fare box does not work properly on account of clogging due to paper tickets. I believe that this trouble would be entirely overcome by the use of metal tickets.

No doubt, if the railway systems of the country adopted metal tickets, machines for counting such tickets would soon be brought out, but at the present time there is no machine on the market adapted to this purpose. Should such a machine be produced, it would greatly reduce the present necessary labor cost.

There is another feature of the metal ticket which might become a serious matter, and that is counterfeiting. While paper tickets have been and still can be counterfeited, I do not think the counterfeiting can be done as easily with paper tickets as with metal tickets. I am told that a machine can be constructed at a very slight cost, by an ordinary skilled mechanic, which will produce metal tickets similar to those which were used in Cleveland. There is one way in which the counterfeiting of metal tickets could be stopped and that is by making the intrinsic value of the metal of which the ticket is made of greater worth than the fare which it is required to pay. There would then be no object in counterfeiting tickets, though whether this plan is practical or not, I am unable to state.

THE LAST DAILY

This is the last daily issue of the Electric Railway Journal for 1910. An issue of the paper will be published tomorrow in New York, but it will be our regular weekly issue. It will contain the papers read at the sessions held to-day, reports of the discussions at those associations and one or two of the longer papers presented at Atlantic City which could not be published in the daily issue.

The reports and papers at the convention this year have been much more numerous than ever before, and the discussions at some of the sessions have been so interesting that they have lasted late into the evening. These conditions have complicated somewhat the publication of the daily issues, especially when all the printing has to be done in Philadelphia, 60 miles away. Nevertheless, there seems to be the need of a medium like the daily for promptly informing those in attendance at the convention of what has occurred at the different meetings. With five associations, each meeting three to five times during the week, it is manifestly impossible for any one to attend all or even most of the meetings. If the daily has been of assistance, and has facilitated the work of the association, we feel that it has accomplished its purpose. In this connection we wish to express our appreciation of the kindness extended us by the officials of all of the associations and particularly by the secretaries. Without this assistance the publication of the daily would have been impossible.

May & Turner Company, of Atlanta, Georgia, a recently organized company, is showing the Burroughs railway nut lock at space 684, Building 2. This nut lock is manufactured from American ingot iron and also from open-hearth steel and is made to fit any joint. It consists of one piece of iron with square upset surfaces fitting directly beneath and locking each nut. The spikes that fasten the rails to the ties hold the nut lock in position. The company is represented by Sterling G. Turner and Oliver B. Burroughs, the inventor.

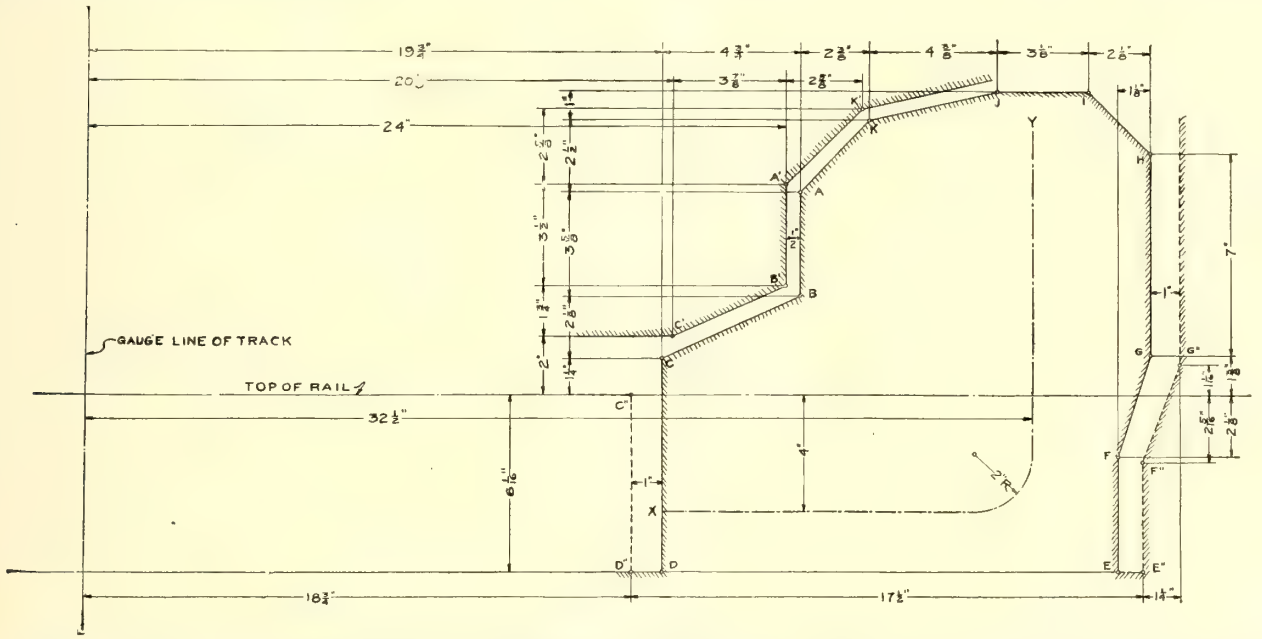
REPORT OF COMMITTEE ON HEAVY ELECTRIC TRACTION*

BY J. S. DOYLE, CHAIRMAN; E. R. HILL, E. B. KATTE, W. S. MURRAY AND J. H. DAVIS

The subjects allotted to this committee this year by the executive committee were: (1) Specifications for heat-treated steel axles, and (2) General maintenance of heavy electrical equipment. Owing to the late date at which the organization of the committee was effected, the committee after canvassing the field concluded that it would be best to devote its energies to the further consideration of specifications for heat-treated steel axles, on which considerable work was done last year by the committee on equipment, and to the consideration of a standard location for third-rail working conductors.

On the question of axles the committee held a conference with the manufacturers Aug. 2, at which the following gentlemen were present: Radcliffe Furness, Midvale Steel Company; W. P. Barba, Midvale Steel Company; E. O. Acker, Bethlehem Steel Company; J. L. Replogle, Cambria Steel Company; J. S. Doyle, Interborough Rapid Transit Company; Norman Litchfield, Interborough Rapid Transit Company; W. A. Bostwick, Carnegie Steel Company.

It was deemed advisable to submit but one set of specifications, and that for the heavier service.



Limiting Clearances of Permanent Way and Rolling Stock Equipment to Permit of Standard Third-Rail Location

In accordance with this conclusion, the following specifications for heat-treated steel axles are submitted as standard specifications for material designed for use in the most severe service:

SPECIFICATIONS FOR HEAT-TREATED STEEL AXLES

1. All axles are to be made of open-hearth carbon steel, either acid or basic, with phosphorus not over 0.04 per cent.

Drillings for analysis are to be taken as described in paragraph No. 7.

2. A sufficient amount of discard must be made from top of each ingot to insure freedom from piping and undue segregation.

3. Physical properties given in paragraph No. 4 must be obtained by a heat treatment, which in general is to be as follows:

Each axle is to be allowed to cool after forging, is then to be reheated to proper temperature, quenched in some medium, allowed to cool and then reheated to the proper temperature for annealing.

Warped axles must be straightened hot, and before offering the axles for test.

4. Test pieces will be cut as described in paragraph No. 7 from one of every ten axles, and must show, when tested by the company's inspector, the following characteristics:

Ultimate strength not less than 85,000 lb. per sq. in.

Elastic limit not less than 50,000 lb. per sq. in.

Elongation in 2 in. not less than 22 per cent.

Contraction of area not less than 45 per cent.

The elastic limit is to be determined by extensometer, the increments of load between readings above 40,000 lb. to be 1000 lb.

5. Workmanship must be first class in every particular. Axles that show defects after being finished by the railroad company will be rejected and returned to the makers, who must pay return freight.

6. Maker's name, heat number and individual axle number are to be stamped on each axle.

7. Drillings for analysis, and U. S. Navy Standard tension test piece, which is a specimen 2 in. x 0.505 in., will be taken from the crop and parallel with the axis on any radius, 50 per cent of the distance from the center to the circumference.

The inspector is to test one of every ten axles, keeping the crop ends in his possession, and is to analyze one axle from each heat. He is to report to the railroad company, giving results of physical tests and chemical analyses, and individual numbers of axles treated together.

8. Manufacturers must notify the railroad company that they are ready for the company's inspector in sufficient time to allow him to proceed to the works and obtain the information required by these specifications without delaying the scheduled deliveries, and must provide him with the necessary facilities for so doing.

STANDARD LOCATION FOR THIRD-RAIL WORKING CONDUCTORS

The committee has investigated the standard location of third-rail working conductors and presents the following report and recommendations:

In undertaking this work the committee has had at its disposal the results of a similar investigation made by a special committee of the American Railway Association, extending from December, 1906, to October, 1909, which resulted in the adoption by that association of a standard

*Abstract of report read before the American Street & Interurban Railway Engineering Association, at Atlantic City, N. J., Oct. 10-14.

location for third rail, which location has since been recognized as standard by a majority of roads adopting heavy electric traction.

In view of the fact that the American Railway Association has adopted a standard location, it is obviously inexpedient for this association to adopt another location as standard without very good cause. It has been found that the data and conditions governing the adoption of a standard location at this time are practically the same as those upon which the American Railway Association based its action in 1908. The committee further considers that the conclusions reached by that association are consistent with said data, and therefore recommends the same standards.

The committee, one member dissenting from first item, recommends that the following standards be adopted by the American Street & Interurban Railway Engineering Association:

1. The gage line of the third rail to be located not less than 26 in. and not more than 27 in. from the gage line of the track, and the contact surface of the third rail to be not less than 2¾ in. or more than 3½ in. above the plane of the top of the track rail.

2. Lines of clearance for both rolling equipment and maintenance of way structures to be as shown in accompanying engravings, leaving the space as shown within the lines A, B, C, D, E, F, G, H, I, J and K available for third-rail construction.

3. In designs of new rolling equipment that is to be used in interchange the clearance line K′ A′ B′ C′, including such horizontal and vertical variations as may in any reasonable probability occur in combination at one time, should not be exceeded. In determining this, the position of the equipment on a 20-deg. curve should be considered, making allowance for the side-throw of the bolster and the consequent effect on the location of such portions of the equipment as are attached to the car body. Variations in equipment should be allowed for as follows: Horizontal, 2½ in. in all; vertical, 4 in. in all.

4. In designs of new bridges, trestles, tunnels and platforms no part that is continuous for more than 7 ft. should come within the space indicated for third-rail structures, i. e., A, B, C, D, E, F, G, H, I, J, K, and such parts should preferably clear this line by at least 1 in., as is shown by the line C′ D″ E″ F″ G″, but structures that are not continuous for more than 7 ft. may be allowed to come to the line X Y.

Horizontal variations in rolling equipment should be allowed as follows:

Wear of axle, collars and boxes	9/16 in.
End play of brasses	⅛ in.
End wear of brasses	¼ in.
Wear on wheel flange	⅜ in.
Clearance between new flange and rail	7/16 in.
Constructional variations	1 in.
Total	2½ in.

Vertical variations in rolling equipment should be allowed as follows:

Wear of journals and brasses	¾ in.	passenger	¾ in.	freight
Radial wear on wheels (passenger, steel tires; freight, cast iron tires)	1¼ in.	"	¼ in.	"
Compression of springs	4¼ in.	"	1⅜ in.	"
Sagging at center of car	1 in.	"	1 in.	"
Constructional variations	1 in.	"	1 in.	"
Total	8¼ in.	"	4⅜ in.	"

The probability that the combination of variations mentioned will occur in any one piece of equipment at the same time is very remote and it seems not unreasonable to consider that when a vertical variation of more than 4½ in. occurs it may be considered in the same light as a wreck with the consequent indeterminate damage done, although in this case it probably would be no worse than the breaking of steps or some of the third-rail protection.

The committee further recommends that the following terms and definitions be adopted in connection with third-rail working conductors:

1. Third Rail: An electrical conductor placed adjacent to and parallel with the track rails as a means of conducting electric current to the locomotives or cars. It is maintained in permanent relation to the tracks by suitable supports and is insulated from ground.

2. Third-Rail Contact Shoe: A conductor attached to the car or locomotive for the purpose of collecting current from the third rail.

3. Third-Rail Contact Surface: The surface of the third rail with which the contact shoe makes contact.

4. Top-Contact Third Rail: A third rail with the contact surface on the top.

5. Under-Contact Third Rail: A third rail with the contact surface on the bottom.

6. Gage of Third Rail: The distance measured on the plane of the track between the gage line of the nearest track rail served to the nearest gage line of the third rail.

7. Elevation of Third Rail: The distance at right angles to the plane of the track between the top of track rail and the contact surface of the third rail.

8. Third-Rail Support: The support that holds the third rail in position as regards elevation and gage.

9. Third-Rail Insulator: That part of the third-rail support that insulates the third rail from the ground ties, track work and other grounded structures.

10. Third-Rail Protection: A covering employed to guard the third rail against the weather and from accidental contact of persons and material.

11. Third-Rail Platform Protection: The guard used at low station platforms to protect the contact shoes from persons on the platform.

Note.—This term applies principally to the protection along edges of platforms when the third rail is on the opposite side of the track from the platform.

12. Third-Rail End Incline: The sloping approach at the end of a section of third rail made to receive contact shoes moving in line with the third rail and bring them from their free position to contact with the normal surface of third rail.

13. Third-Rail Shoe Incline: The sloping approach at the side of a third rail made to receive contact shoes moving laterally toward the third rail and guide them from their free position to contact with the normal surface of third rail.

14. Third-Rail Tie: The tie which is extended beyond the end of the standard track ties to provide a base for the third-rail support.

15. Third-Rail Anchorage: A device that holds the third rail in position longitudinally, preventing creeping.

16. Third-Rail Jumper: A cable connecting the ends of the third rail at openings made necessary by track and road crossings or other local conditions.

Note.—On surface roads the third-rail jumpers are usually placed in conduit under ground.

17. Third-Rail Jumper Head: A device placed at the end of a conduit for a third-rail jumper to protect and insulate the end of the jumper.

Note.—This is usually an insulated structure projecting above the track ballast and from which the third-rail jumper may be flexibly attached to the third rail.

18. Third-Rail Bond: An electrical conductor bridging a joint in the third rail used to secure electrical continuity of the third rail.

19. Third-Rail Feeder: The connection between the source of power supply and the third rail.

Note.—This is usually a cable carried either overhead or in conduit underground.

20. Third-Rail Feeder Tap: A connection between the third-rail feeder and third rail in which there may or may not be a switch.

COLLECTING AND AUDITING RECEIPTS OF PRE-PAYMENT CARS*

BY M. R. BOYLAN, PUBLIC SERVICE RAILWAY, NEWARK, N. J.

The topic naturally suggests that new methods of accounting have had to be devised to meet changed conditions in operating street surface cars.

The use of the "pay-as-you-enter," or other types of so-called pre-payment cars upon which the passenger is expected to pay his fare when he boards the car, is not new to the street railway business, a similar method of fare collection having been in vogue 35 or more years ago. In the earlier horse-car days the earnings usually did not warrant the regular employment of a conductor on each car, so the driver acted as conductor as well, or at least saw to it that the riders deposited their cash in some form of fare box. As the traffic increased, requiring the employment of conductors, various methods of accounting for fares collected were introduced. For many years the registering bell punch and trip slip were almost universally used. Then followed the stationary register operated by rod or cord, the conductor collecting the fares up and down the cars as suited his convenience. This method continued with the introduction of the electric car and is in vogue to-day, not only upon the older style of cars but, in slightly modified form, upon various types of pre-payment cars in different parts of the country.

The collection of fares on pre-payment cars is divided into three methods: First, the use of the fare box without the register; second, the use of the fare box and the register, and third, the use of the register without the fare box. The writer is satisfied from his experience and observation that the second method is the most reliable.

The company with which the writer is connected adopted the pre-payment type of car early in 1908 and at the present time is operating, approximately, 900 cars which are classed as of that general type. At present each car is equipped with a fare receiver containing a cash box. This cash box contains four removable metal boxes so arranged that the receipts for any one trip or any number of trips desired can be mechanically directed to any one of the metal boxes. This makes possible separate records of the money collected by each conductor should the car crews be changed between trips or during the day's run of the car.

The company's rules require each conductor at the commencement of his day's work to provide himself with $5 in change. This sum is supplemented with an additional $10 in change furnished by the company, for which the conductor must sign a voucher. The supervisor at each car barn is provided with a fund sufficiently large to furnish this money to conductors in change, and any additional change that may be required by them during the day. This fund consists principally of nickels.

When the conductor takes charge of a car he is required to drop into the fare box a small slip giving the date, line, run number, car number, box number, compartment number, his name and the number of his badge. This slip positively identifies both the man and the compartment in case any question should arise later. The conductor must also make the necessary entries on day card and car record. When relieved either temporarily or after finishing his day's work, the conductor, in order to relieve himself of further responsibility, must turn and set the pointer of the fare box to the next compartment number. This operation transfers the chute to the new compartment and it is impossible to reverse to a compartment when once closed.

As each car pulls into the car barn the cash box is removed by the station master or his clerk and is replaced with an empty cash box, the station master or clerk making the necessary entry on the car record and also on separate station report. When the boxes have been removed they are placed in crates which are securely locked and forwarded to the cashier's office, shipments being made as often as conditions warrant or as the auditor directs.

Upon reaching the cashier's office the crates are unlocked, the cash boxes removed and their numbers entered on the checker's sheet. The metal boxes containing cash are then removed and empty ones are substituted in the cash boxes and the cash boxes are replaced in crates and returned to the car house. The metal boxes containing cash are then distributed by the cashier among his force of counters, who count and list the contents of each separately. A memorandum is made by the cashier of the number of metal boxes given to each counter, who is held responsible

PREPAYMENT CAR

DAILY CAR RECORD *Car No.*.....

Date..... *Route*.....

Register No......

TIME A. M.	TIME P. M.	CASH BOX No. IN	CASH BOX No. OUT	COMPARTMENT No.	STARTING	TOTAL	ENDING	BADGE

21 Lines

Instructions to Conductors

Indicate by filling in the above blank the time, Cash Box No., Compartment No., and register reading when you take this car, and the time and register reading when you leave this car, also your *badge number*. If there is any difference in your reading of the register and the previous reading, call the attention of the officer in charge. In the absence of any officer please call the attention of witnesses, giving their names and addresses, and note the same on your report.

Instructions to Car House Men

Stamp in Route. Record the Cash Box No. and register reading on this blank when the cars come in the car house at night, and record same reading on the blank for the next day. Next morning send all car records for cars in use and those not in use, *in the bag* to the General Auditor. On sending or receiving a car, note the route from which it was received or to which it goes and note the register reading, and in the same way note any change in the register by recording the number of the register.

In making entries on car record, use the blank line nearest the top of the page, giving the route and register reading, and sign your name at the end of the line.

Instructions to Shop Men

You are instructed to record on this blank the register reading when you receive this car, and also the register reading when you dispose of it, and sign your name.

General Instructions

Any defect in the register must be reported by any employe at once in writing to the Division Superintendent. Note the same on the blank and sign.

Cash Box Number in Column OUT to be filled in by Station Master only.

Daily Car Record

for them until the contents are properly checked and returned. To expedite the work of computing the returns, electrically operated machines are used which automatically sort and count the coins. When the receipts for each line are counted and tabulated they are returned to the cashier, who in turn summarizes and deposits the receipts for all lines, preparing duplicate deposit slips and forwarding to the treasurer and auditor.

The counters' reports, checkers' lists, car records, conductors' day cards and cashier's summary are then compared and checked by the accounting clerks, who determine whether the number of metal boxes received by the cashier agrees with the number reported on day cards and car records. The accounting clerks complete the counters' reports by entering from the day cards the total registered passengers and the number of transfers collected, and checking the totals of the counters' reports with the cashier's deposit slip.

As a matter of convenience the cashier is instructed to keep on hand at all times a sufficient supply of nickels to furnish each car barn with necessary change. To save time in handling this fund, the company leases machines which are capable of counting and wrapping nickels in packages of $2 at the rate of about $6,000 per 8-hour day.

The writer offers the result of his observation of the use of the pre-payment type of cars on lines doing a short-

*Abstract of paper read before the American Street & Interurban Railway Accountants' Association, Atlantic City, N. J., Oct. 10, 11, 12, 13 and 14.

haul business, or lines operating through a business center where many passengers are entering and leaving the cars. The pre-payment car practically puts an end to losses through missed fares; eliminates the conductor from the interior of the car, where he frequently causes passengers discomfort in crowding back and forth in pursuit of the nickels, and pleases riders because having once paid their fare they are not again annoyed. Supervision of fare collection is simplified when the conductor makes all collections from one point. Where the fare box is used the company receives all the fares put in the box, even though, during the rush, a conductor might inadvertently fail to register some of them. The location of the conductor upon the platform or at the entrance places him in a position to safeguard the passenger in boarding and leaving, thus reducing the claims arising from this class of accidents. During the rush hours the cars can be operated at a faster schedule speed because the conductor is at the entrance where he is able to determine the very instant when it is safe to start the car.

WHAT INTERURBAN RAILWAYS DO FOR THE PUBLIC

BY JOSEPH A. M'GOWAN, SECRETARY AND TREASURER, TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

Twelve years ago the first interurban road in Indiana was built. Two years later, in 1900, the first interurban railroad to enter Indianapolis was opened. Between 1900 and 1903 several other lines were built into Indianapolis and the number of passengers carried in and out of that city increased from 378,000 in 1900 to 2,348,000 in 1903. Each road had for its terminal a spur track and there was no common depot or shelter. This awkward condition was overcome by the construction of the nine-story Traction Terminal Building and train shed containing nine tracks, located in the business center of the city. This terminal station, which cost $1,500,000, was opened to the public on Sept. 12, 1904. From this date began a new era for the interurban railways in Indiana.

In 1904 3,275,000 interurban passengers were carried into and out of Indianapolis. During 1905 old lines were extended and new lines were built so that at the end of the year 10 roads entered the city. They carried approximately 4,000,000 passengers in and out and this number was increased to nearly 4,600,000 in 1906 and exceeded 5,000,000 in 1907. The panic, while not materially affecting the business of the interurban railways, arrested for the time being further extension and building of new lines. The number of passengers carried in 1908 and 1909 was only slightly in excess of the number carried in 1907. At the present time there are 14 different interurban lines entering the Indianapolis Terminal Station and it is conservatively estimated that by the end of 1910 5,500,000 passengers will have been carried in and out.

Over 425 cars arrive at and depart from the station daily. These reach all the principal cities in the State and connect with lines in Illinois, Ohio, Michigan and Kentucky. The erection of the Terminal Building has increased real estate values in the immediate vicinity by millions of dollars. While the population of Indianapolis is about 250,000 it is conservatively estimated that the trading population is nearly 500,000. This is due largely to the facilities for travel offered by the interurban lines. Some merchants state that 50 per cent of their customers come to the city on the interurban cars. In this connection it is well to state that while large business centers profit by interurban service, the smaller towns are also benefited by this easy means of travel from the rural districts.

The interurban freight and express business has developed steadily also. During the early years of their existence the interurban roads paid little attention to carrying freight and express packages. At the present time all lines entering Indianapolis do a profitable freight and express business. Three large brick freight houses adjoining the Terminal Station are used for this purpose.

Perhaps a more comphrehensive idea of the growth of interurban railways throughout the whole State of Indiana may be given by stating that as compared with 11 miles in 1898 there are at the present time 1800 miles of interurban roads exclusive of all city lines operated by interurban companies. The number of passengers carried in 1900 was less than 1,000,000, while in 1909 nearly 20,000,000 passengers were carried. Gross earnings in 1909 were $10,000,000. Farm property in Indiana, which was taxed on a valuation of $540,754,000 in 1900, increased in value to $666,200,000 in 1909, largely through the development of interurban railways.

*Abstract of paper read before the American Street & Interurban Railway Association, Atlantic City, N. J., Oct. 10-14, 1910.

THE BRADY LUNCHEON

A distinguished company sat at luncheon at the Windsor Hotel yesterday in honor of A. W. Brady, the president-elect of the American Association. It was a Brady function, as D. M. Brady, of the Brady Brass Company, was the host. The compliments from the Bradys to the Bradys were numerous and luminous. Intermissions were active, with stories, quips and repartee from such artists as Peirce, Shaw, Ely, Harries and Williams. Those present were: James F. Shaw, retiring president; W. Caryl Ely and H. H. Littell, past-presidents of the American Association; Arthur W. Brady, president-elect of the American Asociation; E. A. Maher, vice-president and general manager, and J. S. McWhirter, superintendent of car equipment, Third Avenue Railroad Company, New York; H. C. Evans, Lorain Steel Company; Hugh M. Wilson, vice-president McGraw Publishing Company; J. R. Ellicott, president American Street & Interurban Railway Manufacturers' Association; David Belden, vice-president and general manager New Hampshire Traction Company; E. C. Foster, ex-president New Orleans Railway & Light Company; General G. H. Harries, second vice-president Washington Railway & Electric Company; E. H. Baker, Galena Signal Oil Company; J. M. Richmond, vice-president and general manager Berkshire Street Railway; John F. McCabe, purchasing agent New England Investment & Securities Company; E. M. Williams, Sherwin Williams Company; C. C. Peirce, General Electric Company; C. C. Castle, United States Metal & Manufacturing Company; John Reid, Brady Brass Company; Mr. Rhoades, Pennsylvania Railroad; Henry A. Robinson, New York; William H. Heulings, The J. G. Brill Company. Much to their regret, the golf engagements of Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and of W. O. Wood, president of the New York & Queens County Railway Company, prevented them from attending.

EXHIBIT OF NATIONAL BRAKE AND ELECTRIC COMPANY

The National Brake & Electric Company is exhibiting in spaces 539-545, Machinery Hall, a complete line of air brake apparatus, as well as stationary and portable air compressors, of various capacities and voltages. The compressors for air brake purposes are from 11 ft. to 50 ft. capacities. Various styles of governors and engineers' valves are shown. The latest type of engineers' valves is known as the P. V. valve, and is constructed without ground joints. Since this valve was introduced it has given such good satisfaction that a number of street railways have adopted it as standard, and have changed over the slide and rotary valves. A three cylinder vertical 3 V. S. compressor of 100 ft. capacity is in operation, and is equipped complete with combined automatic controlling devices. Portable outfits, equipped with water-jacketed compressors, cooled by circulation of water through automobile type of radiators, are also on exhibition.

REPORT OF COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIMETABLES*

BY N. W. BOLEN, CHAIRMAN; P. N. JONES, WM. SIEBERT, TIMOTHY CONNELL, J. J. DOYLE, JAMES BRICKER, BRUCE CAMERON

The proper treatment of the matter of schedules and time-tables is probably the most important single feature of electric railway operation, for on no other unit rests so great a measure of responsibility for the prosperity of the operating company. This is true, first, because practically it is the medium which through the character of the service rendered moulds the public feeling for or against the railway company; second, because it influences the attitude of the employee through the division of the hours of work, and, third, because it is the foundation upon which the whole financial structure is built. Therefore, it may be said that insofar as it may be practicable there should be embodied in all schedules and time-tables elements which will tend to bring about the following results:

a. A public satisfied that the company, to the best of its ability, is supplying a fair and adequate service.

b. A working force convinced that the division and arrangement of the hours of work provide a fair average day's wage for a maximum number of employes, and that in addition due consideration has been given to the health, comfort and general welfare of the employee and his family.

c. Traffic receipts which will insure a reasonable return on the investment.

ANALYSIS OF DATA COLLECTED (CITY LINES)

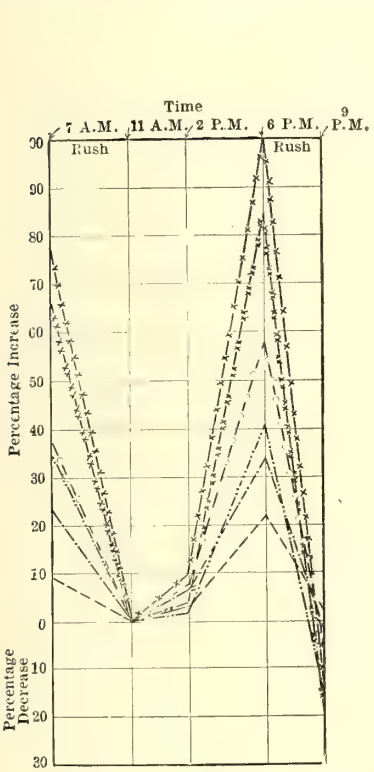
The number of city railway companies responding to the data sheet was 66, with a total of 7696 miles of single track or an average of 116.6 miles per company.

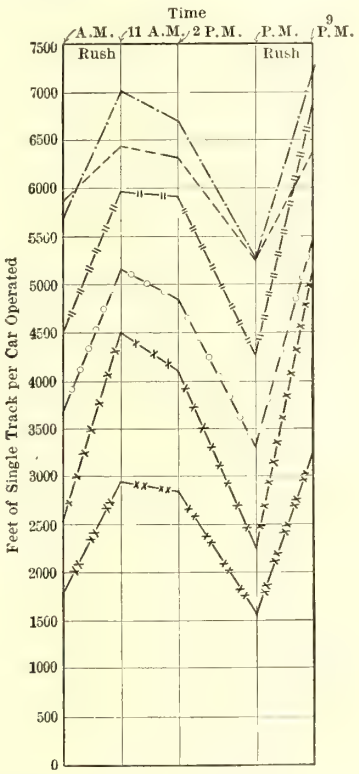
CARS IN SERVICE AT DIFFERENT PERIODS

To ascertain the general practice with regard to changes in headway during various periods of the day, your committee requested information as to the number of cars in operation during the a. m. rush, at 11:00 a. m., at 2:00 p. m., during the p. m. rush and at 9:00 p. m. The accompanying diagrams indicate the manner in which the service is changed by the different companies. In these diagrams the companies have been divided into classes according to number of cars operated and it has been assumed that 11:00 a. m. is the hour at which the normal service is given. Therefore, all other periods are shown in their relation to the 11:00 a. m. basis. The first diagram shows the percentage of variation in number of cars operated at different hours of the day, the service being assumed to be normal at 11:00 a. m. The second diagram shows the average number of feet of track per car operated at various hours.

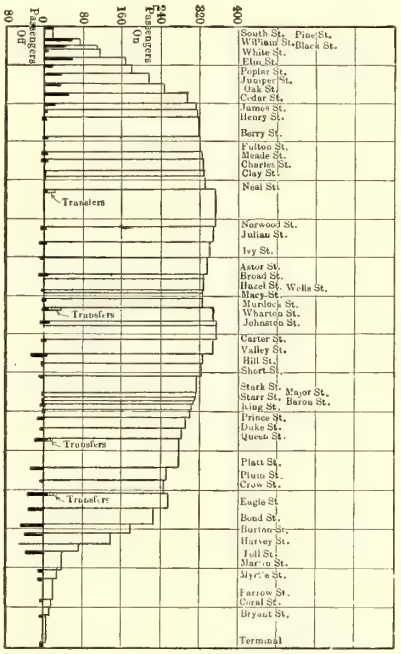
KEY TO CHARTS.

-- -- --	Class A	1- 25	Cars Operated
—.—.—	" B	26- 50	" "
||--||--||	" C	51- 100	" "
--o--o--o	" D	101- 200	" "
--x--x--x	" E	201- 500	" "
--xx--xx	" F	501-1500	" "





Schedules and Timetables — Diagrams Showing Cars Operated at Different Hours of the Day. Normal Service at 11.00 A. M.



Schedules and Timetables—Passengers on and off Cars at Stated Periods and Points

rush hours. A tabulation of the relation of lay-over time to running time of all the companies reporting shows that the lay-over time constitutes 6.1 per cent. of the total service time of all the companies replying to this question and 12.5 per cent of the total service time of those companies reporting lay-over time. Your committee respectfully suggests that the matter of lay-over time be given thoughtful consideration, to the end that it may either be entirely dispensed with or reduced to a minimum.

LAY-OVER TIME

Thirty-seven members reply that they do not allow any lay-over time, and 25 state that such time is allowed on all trips or during certain portions of the day only, generally in the

RUNNING TIME, HOW DETERMINED AND MAINTAINED, AND WHEN CHANGED

Many points must be considered in the determination of running time. Among them are: Franchise requirements, speed and stop ordinances, intersections (number and character), grade crossings, width of streets and character of district, both

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association at Atlantic City, N. J., Oct. 10 to 14.

as to business and population, type of cars and equipment, vehicular obstructions, stops and passenger traffic in total and in kind. The following tabulation shows various methods in use:

24 companies report simply an observance of speed regulations, allowances for character of line, and street inspection or inspection of trip reports, both as to first determination and later checks.

14 companies report periodical check at time points and at terminal.

2 companies report a general inspection of grades, curves, switches, frequency of stops, traffic, etc.

7 companies report a system of periodical trial trips either on special cars making arbitrary stops or on cars in actual service.

1 company reports that running time is based upon the average running time of a given number of trips.

Following the establishment of running time and the subsequent checking to see that it is basically correct comes the question of how to maintain a strict observance on the part of the trainmen. The following is a summary of the methods in vogue:

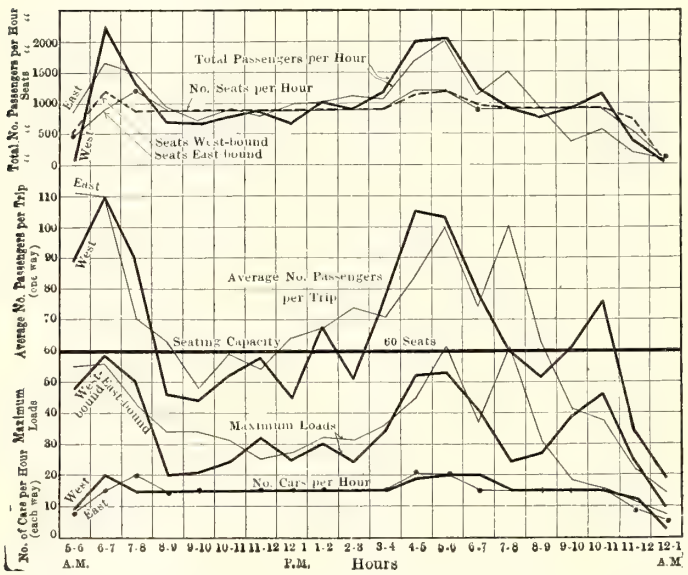
34 companies report that motormen are checked at time points by street inspectors who, as a rule, are required to report delays beyond a certain number of minutes.

6 companies report that all cars are checked at a given point (loops generally) usually by the dispatchers stationed there.

2 companies report that all cars are checked at the terminals.

1 company reports a combination of check-ups by street inspec-

1 company reports a continuous check-up at a central point and at terminals also.



Schedules and Timetables—Traffic Chart Showing Number of Cars Operated, Maximum Loads, Average Passengers Per Trip, Total Passengers and Total Seating Capacity Per Hour in Both Directions

One method reported is that of a periodical check by employes of the time-table department, usually at an intersection where two or three lines may be observed. In connection with this there is a daily examination of all delay reports and, in addition, supervision by line inspectors and dispatchers at terminal points.

In the opinion of the committee, conditions in various cities would seem to warrant a shorter running time during certain hours of the day. Considerable saving may be effected in adjustments of this nature, but a study of the replies received does not indicate any very general adoption of the plan. The committee finds that,

36 companies maintain the same running time throughout the entire day.

19 companies increase the running time in the a. m. and p. m. rush hours.

3 companies increase the running time in the a. m. and p. m. rush hours, maintaining normal time during other daylight and evening periods, except that a reduction is made at night.

5 companies maintain the same running time in the early a. m. and at the conclusion of the p. m. rush, when a reduction is made which continues until the beginning of the morning rush.

1 company reduces running time after 9:00 p. m. and another after 10:00 p. m.

Decreased running time on Sundays and holidays appears to be a general custom.

Rules vary on different systems as to the application of the change of running time. One method is to make the change effective at a given hour, regardless of where the cars may be located. Another plan specifies both hour and location; for instance, at 6:30 p. m. in a prescribed belt. The cars would then not pick up the new speed until they reached the belt named, on the trip first following the hour fixed. In this last named plan some slight adjustment of headway is necessary to secure uniformity of spacing between cars running at the different speeds.

Your committee recommends that advantage be taken of variations in operating conditions due to fluctuation in traffic, vehicular interferences, etc., by adjusting running times to conform thereto, the hour and method of application to be left to the judgment of the respective operating officials.

PASSENGER COUNTS

Thirty-six companies report that they have methods of making passenger counts. In most cases inspectors are used, but in a few cases conductors are employed for this work. All of the companies which report that they use the conductors' reports for this purpose state that they tabulate these figures daily. The other companys conduct these counts at various intervals, varying from twice a week to once a month or at irregular intervals. As a rule the point at which the count is taken is the point of the maximum load or heavy transfer points, but others conduct it all over the city. One company keeps a special staff for this purpose. The results are usually charted, and two typical charts are presented herewith.

In the opinion of your committee the periodical development of records of passenger traffic is an absolute necessity in present-day electric railway operation, not only because such records are valuable as a means of determining service requirements, and thus probably effecting increases in gross return or decreases in operating cost, but also because they may bring to light conditions in need of correction and permit of their remedy before these conditions are made the subject of public criticism or complaint. The size of the property, the character of the territory served and the rapidity of its growth, the density of traffic, variations in travel due to business conditions and season changes, are some of the factors which may automatically determine the period at which these counts should be taken. But the committee feels that the interval between counts, while varying on different roads, should be comparatively short to secure full advantage of fluctuations in traffic and to anticipate public complaints. As to the method of making such counts, the committee is not a unit. Some members have had considerable success with the plan of requiring conductors at stated times to tabulate the number of passengers on board at various points along the line on each trip for an entire day; other members have had unsatisfactory results from this method and prefer that special inspectors stationed at maximum load points count the passengers being carried. The summarized data resulting from the count made, whether in tabular or charted form, should show volume of travel for the entire day in divisions of time not to exceed 30 minutes.

TIME-TABLES MADE ON HOURLY OR TRIP BASIS

Fifty-six companies responded to this inquiry as follows: 28 companies use the hourly basis; 26 companies use the trip basis; 2 companies utilize both plans.

ADJUSTMENT OF SERVICE IN STORMY WEATHER

A summary of the replies to this is as follows: 39 companies maintain regular schedule during stormy weather; 5 companies increase the number of cars; 7 companies decrease the number of cars; 1 company decreases beginning at the noon hour; 1 company decreases service on Sundays and holidays during snowstorms only; 1 company decreases service during snowstorms only; 1 company decreases service only on lines having a short headway; 2 companies discontinue service altogether during electrical storms.

The replies show that the superintendent and division superintendent are in most cases given authority to make changes in schedules. In a few cases, however, dispatchers or starters may do so, provided they first secure the approval of the general manager or superintendent of transportation.

SUPERVISION OF SUNDAY AND HOLIDAY SCHEDULES AND TIME-TABLES

Sunday and holiday schedules under the direct supervision of the local superintendent or supervisor brought forth the following:

In most cases the Sunday and holiday schedules are under the direct supervision of the local or division superintendent. A novel method for determining the proper service for a given holiday is reported as follows: "For holidays the division superintendent stipulates the schedule he desires; this is checked with the records of previous years and with current traffic counts; is generally discussed by all superintendents at a meeting and the table decided upon at this meeting made effective."

THE USE OF "PATCHES" FOR TIME-TABLES

The following is a summary of replies received to this question: 40 companies report that they do not use patches for time-tables; 18 companies report that they do use these patches; 2 companies report the use of patches for holidays only.

The committee recommends that companies should avoid as far as possible the use of inflexible time-tables. They should rather treat the established time-table as the basis of operation and permit the proper officials to add to or take away from the number of cars in operation, as the service requirements of the day seem to demand.

DEFINITIONS OF "STRAIGHT" AND "SWING" RUNS

The confused and uncertain views as to what constitutes a "straight" and what a "swing" run have convinced your committee of the necessity of establishing definitions of these terms. After a careful study of the replies received, it recommends the following:

Definition of a "straight" run: A "straight" run consists of a day's work of an established number of continuous hours, broken only by an interval for a meal.

Definition of a "swing" run: A "swing" run is a run constituting a day's work in which the time composing it is divided into two or more periods, with intervals of not less than two hours intervening.

SELECTION VS. ARBITRARY ASSIGNMENT OF RUNS

While almost universally the rule of seniority prevails, there still remains a well-divided sentiment concerning the merits of the two methods of making actual assignments, *i. e.*, arbitrarily assigning runs or permitting trainmen to select them. The replies show that 25 companies employ the arbitrary plan and 39 companies allow the employes to indicate their preference. In some cases and in both plans reassignments are made weekly, monthly, semi-annually, just previous to season changes, or at other stated periods, even though vacancies may not have occurred, and some latitude seems to be allowed men with regard to changing runs among themselves, in some instances, however, the approval of the operating official being required.

The majority of the committee heartily favors the individual selection of runs, the dissenting members basing their disapproval upon the ground that the pronounced success of the arbitrary plan on their respective systems does not warrant any change. A unanimous assent being therefore impossible, your committee submits a majority recommendation that trainmen, in such manner as may be consistent with their seniority of service, be permitted individually to indicate and obtain preferred runs, that reassignments be made as vacancies occur throughout the year and that a general reassignment be made at stated intervals regardless of whether or not vacancies exist. It also recommends that the practice, wherever followed, of permitting trainmen to trade runs at will among themselves be discontinued as being against the best interests of the employees.

TRIPPER SERVICE

Important in its relation to the general make-up of schedules and time-tables is the question of whether the trippers should be included on the time-table and assigned like the regular cars or treated as extra service entirely and assigned to extra men. The inquiries made, with 50 companies responding, show that 31 companies hold trippers wholly as extra service; 17 companies include them in tables and assign them the same as regular cars, and 2 companies use a combination of both plans. Despite this indication of majority practice, your committee is of the belief that tripper service should be shown in its proper place on the time-table and the hours of work which this service covers regularly assigned. To sustain its position your committee advances the following as some of the advantages which may be derived from the recommended method: Increase in total hours of work assigned regular men; possible increase in number of regular runs or increased general average length of runs (in each of which cases the regular employees as a body are benefited); improved flexibility permitting of a more equal division of hours of work and a minimum of short length runs; greater uniformity in headways and fewer accidents on account of the greater familiarity of the trainmen with service conditions at specified times, and reduction of clerical work in making assignments, pay-rolls, etc.

NIGHT CAR CREWS

Below will be found several different plans of assigning work for night car crews:

7:00 or 8:00 p. m. to 5:00 or 6:00 a. m.

6:00 p. m. to but not including a. m. rush.

P. m. rush until a. m., with one hour at midnight for meal.

Last half of late straight run, relief at midnight (1 hour), then runs balance of night.

Makes dinner relief and takes night car at 4:00 p. m.

Assigned to men at top of extra list, who also work a. m. and p. m. trippers in order to secure full day.

Seventeen companies require night car crews to operate through as a. m. trippers.

Thirty-one companies do not require this.

SCHEDULE AND TIME-TABLE DEPARTMENTS

As will be noted below, comparatively few of the companies reporting are maintaining specially organized departments for the preparation of schedules and time-tables and the development of charts and records. The proper construction of and time-tables demands more than the drawing up of a headway sheet and a development of runs. A few of the requirements are:

A thorough knowledge of the population served, its character and habits, its business pursuits and hours of labor.

A clear conception of the physical characteristics of the city and the nature, extent and location of manufacturing enterprises and business districts.

A full understanding of operating difficulties of all kinds, particularly pedestrian and vehicular congestion and fluctuations thereof.

Information as to the conditions of the physical property of the company itself, particularly as to the rolling stock available for service.

The above points toward the need of centralizing time-table work, and your committee, after careful consideration, is of the opinion that all electric railways operating 100 or more 10 to 18-hour cars should install a schedule and time-table department under the jurisdiction of the proper operating official. This department should have charge of all work connected with the development of statistics of population, traffic counts and traffic charts, the determination of original running times and of periodically checking them, and the development and final preparation in written or printed form of all schedules and time-tables, headway sheets, run sheets, etc., but not the actual assignment of runs. It should also be familiar with causes for delays and do such other work having to do with passenger traffic and service as the superior officer may elect.

On smaller roads the committee recommends that all schedules and time-tables be made by one man, especially trained for the work; that he be given such assistance as he may need from time to time in performing his duties, and that such of his time as may not be required in the preparation of time-tables, schedules, and charts be devoted to actual supervision of cars in operation.

TYPES OF TIME-TABLES USED

Two general methods of time-table construction are employed, viz., the original street railway type, showing the time of car or train horizontally across the table, with headways in vertical columns, and the steam railway plan, showing time of cars or trains vertically and headways horizontally. The first plan seems to remain the prevailing practice, though some few of the companies reporting utilize the steam railway type.

The evolution of a time-table can briefly be described as follows:

1. Development of figures showing passenger movement by periods of time and direction.
2. Determination of fluctuation in passenger movement as it occurs on each day of the week and as it is affected by weather conditions.
3. Determination of intervals between cars required to accommodate the traffic.
4. Determination of time required for a trip under varying conditions of traffic, etc.
5. Determination of number of cars required to fill the line at various periods.
6. Arrangement in tabular form of the times of departure from the terminals of each car operated.
7. Division of the trips of the several cars into sections and assembling of these sections into groups to form runs or periods of work for the trainmen. These assembled sections are gathered together on a run, guide or assignment sheet.

TIME-TABLES FOR INTERURBAN OPERATION

A considerable fund of data covering the practice of interurban member companies in the construction of schedules and time-tables has been collected by the committee, but because of the amount of time which would be required to develop the study properly, the committee suggests the material in hand be submitted to the committee for 1911 with a request that there be included in its report a section devoted to interurban operation.

CONCLUSION

In conclusion, your committee groups and briefly repeats below the recommendations covered in this report, namely:

1. Lay-over time—That it either be entirely dispensed with or reduced to a minimum.
2. Adjustments of running times—That the member companies take due advantage of variations in operating conditions due to fluctuations in traffic or vehicular interferences by adjusting running times to conform thereto.
3. Passenger counts—That there should be periodical developments of records of passenger traffic with comparatively short intervals intervening.
4. Adjustments of service to meet changes in traffic requirements—That member companies should avoid as far as possible the use of inflexible time-tables, but rather treat the established time-table as a basis of operation permitting proper officials to add to or take away from the number of cars in operation, as service requirements of the day seem to demand.
5. Definitions of "straight" and "swing" runs—That the following definitions be approved as interpreting straight and swing runs:

"A 'straight' run consists of a day's work of an established number of continuous hours, broken only by an interval for a meal;" and "A 'swing' run is a run constituting a day's work in which the time composing it is divided into two or more periods with intervals of not less than two hours intervening."

6. Individual selection of runs—A majority recommendation, that trainmen, in such manner as may be consistent with their seniority of service, be permitted individually to indicate and obtain preferred runs; that assignments be made as vacancies occur throughout the year, and that a general reassignment be made at stated intervals regardless of whether vacancies exist or not.
7. Trading runs—That the practice wherever followed of permitting trainmen to trade runs at will among themselves be discontinued as against the best interests of the employees.
8. Assignment of tripper service—That tripper service should be shown in its proper place on the time-table and the hours of work which this service covers regularly assigned.
9. Schedule and time-table departments—That electric railways, operating 100 or more 10 to 18-hour cars, install a schedule and time-table department under the jurisdiction of the proper operating official. On smaller roads, that all schedules and time-tables be made by one man especially trained for the work, etc.

Finally, the committee desires to call attention to the need of clearly defining many terms in common use in street railway work, for instance, patches, run, run guides, run number, train number, block number, assignment sheet, a car, a train, etc., and respectively suggests that this be made a part of the work of the committee for 1911.

The resignation of John W. Corning, secretary and treasurer of the Engineering Association, which was announced at the meeting on Wednesday morning, was received with regret by all the members of the association. Mr. Corning was elected secretary and treasurer of the association at the first Atlantic City meeting in 1907 and has held that office for the past three years. The valuable work which has been accomplished by the association during his term of office has been due in no small measure to his untiring efforts in attending committee meetings, preparing data sheets and editing the reports of the committees before printing. He also has served as editor of the association "Question Box." His tact and patience have been appreciated by every member of the association with whom he has come in contact. The increasing duties of his position as electrical engineer of the Boston Elevated Railway prevent him from continuing to serve the association for a longer time. Mr. Corning is a graduate of Johns Hopkins University in the class of 1894. Immediately after graduation he accepted a position with the West End Street Railway of Boston and took up electrical work in the power stations of that company. In 1905 he was appointed electrical engineer for the Boston Elevated Railway, which position he still holds.

The London County Council Tramways has announced that blind persons properly authenticated, and accompanied by a guide, will be carried free on the Council's tramways system.

(Continued from Page 808.)

"With the tendency of state railroad commissions to exercise more and more jurisdiction over electric railway companies, the honorary membership enjoyed by this association in the National Association of Railway Commissioners is a privilege that should be highly esteemed. We recommend that our delegates to attend their conventions be selected sufficiently in advance so that their attendance may be insured. Their next convention is to be held on Nov. 15, 1910. As this date is only about one month later than the usual date of holding the convention of our association with the attendant election of new officers, it appears to us wise that the delegates to attend their next convention should be appointed by the present president of our association. We furthermore suggest that the delegates be appointed from States where railroad commissioners are active in their supervision over electric railway companies. If the same delegates from our association are selected for more than one year we believe greater good can be accomplished than by selecting different delegates each year, personal acquaintanceship with the commissioners being a decided advantage."

Mr. Ham then read a report of the committee on construction and operating expenses of electric railways, submitted to the National Association of Railway Commissioners and adopted by that organization. An abstract of this report was published in the report of the executive committee of the Accountants' Association in the issue of the daily Electric Railway Journal for Oct. 12, 1910, page 720.

The report was accepted and, in accordance with the recommendation of the committee, President Swift appointed the following committee to attend the 1910 convention of railway commissioners: A. L. Linn, Jr., New York State Railways, chairman; H. L. Wilson, Boston Elevated Railway; W. F. Ham, Washington Railway & Electric Company.

REVISION OF BLANKS AND FORMS

H. E. Weeks presented a report of the committee on revision of blanks and forms. An abstract of this follows:

"The revision of the collection of blanks and forms was made necessary by the change in our classification of accounts. The collection now contains 16 books, carefully indexed, and the information included in these books is of great value. The detail work of making up the revised collection was under the supervision of Secretary Donecker, and much credit is due him for the manner in which it has been accomplished.

"The following inquiry was sent out and the information collected is of interest as it indicates that uniform accounting, which this association has so long worked for, is making rapid strides: 'Have you put into effect the standard classification of accounts adopted by the Accountants' Association at the 1908 convention?' One hundred and sixty-three answers were received. Ninety-six companies had adopted the classification. Fifty-seven companies had not, and 10 companies were using the classification required by the State commission of the State in which they were operating."

Upon motion, the incoming president was directed to appoint a joint committee to act with the Engineering Association and a similar committee to act with the Transportation & Traffic Association.. The latter committee will take up the subject of freight accounting.

The letter of Charles S. Clark, Pennsylvania Steel Company, in reference to a uniform invoice was referred to the incoming president. An abstract of this letter was published in the daily Electric Railway Journal for October 12, 1910, page 721.

STANDARD CLASSIFICATION OF ACCOUNTS

Mr. Ham, as chairman, then presented the report of the committee on standard classification of accounts. This report said:

"At your last convention this committee submitted to you for consideration cases which had arisen under the standard classification of accounts up to that time. These decisions were known as cases Nos. 1 to 58, inclusive, and after discussion and consideration received your approval.

"Your committee now presents decisions in cases Nos. 59 to 185, inclusive, and recommends their approval. These cases, as well as cases Nos. 1 to 58, are contained in accounting bulletin No. 5, issued by the Interstate Commerce Commission, and through its courtesy presented now to this convention in pamphlet form. We ask that this bulletin be considered as part of our report.

"Besides the 185 cases contained in this bulletin, your committee has passed upon about 50 other cases, which will be published in due course. You will appreciate that to give careful thought and consideration to all these cases, involving questions which have arisen in every part of the country, has required much time and effort on the part of your committee. They have had two meetings, one at New York City, in January, and one at Atlantic City during this convention week. They have conducted a vast amount of correspondence, as the members of the committee live in widely separated sections of the country. We have felt at times that possibly we were sacrificing the interests of our own companies to devote so much time to committee work. Yet we have felt justified in such expenditure of time and labor in the belief that we were engaged in a constructive work which, in the long run, will be of great value to the electrical industry.

"At your last convention the matter of defining car-miles and car-hours was referred to this committee. We have not been able to give to this question more than passing attention, and believe that it will be to the best interests of the association that this work be assigned to a separate committee for report. We therefore ask to be relieved of further consideration of the matter.

"Our relations with the Interstate Commerce Commission have continued most harmonious. We believe that the continuance of the coöperation now existing between this association and the commission will bring about most satisfactory results, not only to our companies, but to the public as well."

Supplementing the report, Mr. Ham said that the classification committee had been in the work of classification since 1897, when the association was organized. At that time there was nothing that was uniform in the way of electric railway accounting. The great criticism was that uniformity was impossible. In the course of the last three years the committee had worked in coöperation with the Interstate Commerce Commission in what was called the new classification. This classification included a greater number of accounts than the old classification, but in general Mr. Ham thought it was quite true to say that it did not depart materially from the old classification. He believed the old classification, which was adopted when there was no governmental authority to compel its adoption, was adopted mainly on account of two things: First, its simplicity, and second, its elasticity.

Mr. Ham thought those two features were continued in the present scheme. The elasticity feature was well illustrated by the report of the joint committee on shop accounting, which recommended that a given account may be subdivided into some 40 or 50 or 60 special accounts. That was what he meant by elasticity, that one primary account was capable of infinite subdivision. It might be carried so far as to keep a record of the account of maintenance of every type of car, of every type of motor, whatever it might be, and yet it all fitted into the scheme of having the primary accounts. It was possible for a small company that wanted a simple system of accounting to keep its books according to this classification, and yet the large company could get all the information it required from the same scheme by simply elaborating and subdividing the accounts.

By simplicity, Mr. Ham meant in essence that the scheme should be simple; that there should not be an attempt to carry

out subdivisions or apportionments of items, charging up to this account one little thing and to that account another little thing, but that there should be cerain general groups of accounts, and that each one of these accounts be carried as far as possible in its integrity.

The classification of accounts was not a system of cost accounting. No attempt was made to say in the primary account what represented the total cost of the things that might be covered by that particular head. The classification of accounts simply meant a subdivision of operating expenses; nothing more than that. It was not intended to say that account No. 2 covered all the expenses in connection with the maintenance of cars. A large portion of the shop account was on the two accounts, Nos. 32 and 36, maintenance of cars and maintenance of electrical equipment of cars. They were not separated because it was preferable to keep the shop expenses together. It was desirable to keep all the printing and stationery in one account and to keep in one account the maintenance of surface equipment.

Simplicity was secured by avoiding the unnecessary refinements of accounting, by not spending time in distributing things that didn't amount to anything after they were distributed.

A. F. Weber, statistician New York Public Service Commission, First District, said he had been particularly interested in this meeting and especially in the very valuable and timely paper by Mr. Davies, because the Cleveland situation was one that was of very general interest throughout the country. Outside of Massachusetts and some cities in different parts of the country, there was still no real settlement of the traction question, and the Cleveland settlement was one that interested everybody. One possible weakness in the settlement was discussed. Of course, there must be some incentive to the management of any enterprise, if all possible economies were to be secured; yet it seemed to him that the directors of the Cleveland company might very well take this position, that 25 years from now their franchise would expire, and there would then be a readjustment of the situation and a new settlement. The company would then presumably desire to be in a good position for negotiating another settlement, and it would be very much to its advantage to have the goodwill of the people of Cleveland.

That could best be secured by giving to the people a good service at the lowest possible price. Even though larger profits could not be secured it seemed to Mr. Weber that it would be altogether to the benefit of the company to give the people of Cleveland the lowest fare provided in the ordinance; and if in pursuance of that policy the directors should pass a resolution to give a bonus to the management, to the president or the general manager for every improvement that reduced operating expenses, he could not believe that the council at Cleveland would disapprove of any resolution for increased compensation.

It did not seem to Mr. Weber necessary to pay a bonus to the stockholders to get that increased efficiency in management.

Upon motion, the incoming president was directed to appoint a special committee of three to consider the question of defined car-miles and car-hours.

W. B. Brockway presented the report of the committee on resolutions, expressing the appreciation of the association to all who assisted toward the success of the convention.

C. L. S. Tingley, American Railways Company, then presented the report of the nominating committee, as follows:

President, W. H. Forse, treasurer, Indiana Union Traction Company; first vice-president, M. R. Boylan, general auditor, Public Service Railway Company; second vice-president, Will Browne, auditor, Utah Light & Railway Company; third vice-president, H. E. Smith, comptroller, Montreal Street Railway; secretary and treasurer, H. E. Weeks, secretary and treasurer, Tri-City Railway Company; executive committee, L. T. Hixson, auditor, Terre Haute, Indianapolis & Eastern Traction Company; F. B. Lasher, traveling auditor, New York State Railways; Charles H. Lehr, auditor, Northern Ohio Traction & Light Co.; F. J. Pryor, Jr., auditor, American Railways Company.

The secretary was instructed to cast a vote for the nominees and they were declared duly elected.

Mr. Forse, the new president, and others of the new officers expressed their appreciation of the action of the association.

The convention thereupon adjourned.

PROMENADE CONCERT AND BALL

Last night the lobby on the pier was again the scene of a delightful entertainment. The symphony orchestra of Louis Aroll rendered a charming concert program of six numbers, beginning at nine o'clock. The entire lobby was filled with animated groups of congenial friends and the galleries also were crowded with appreciative listeners. The ladies, as usual, were gowned in lovely creations. At 10 o'clock the floor was cleared for dancing, which continued until a late hour. After the fourth dance a flashlight picture was taken of the assembly.

AMERICAN BRAKE SHOE COMPANY'S DISPLAY

The exhibit of the American Brake Shoe & Foundry Company is located in Section 801, where it shows samples of various types of brake shoes ranging from the extra durable and efficient shoes of heavy interurban equipment and subway coaches, to the narrow-tread shoes for the lighter city cars. A catching object lesson is shown of the advantages obtained by standardization of heads and shoes, by which, through the efforts of this company, many railroads have largely benefited. Thirty-eight old-type non-standard brake shoes representing a new weight of 1174 lbs., a scrap weight of 478 lbs. and a mileage of 146,876, are shown alongside of a pile of standard shoes, 38 in number, representing a new weight of 917 lbs., a scrap weight of 197 lbs., and a total mileage of 152,000, effectually demonstrating the saving due to standardization, where the cost per pound of the non-standard and standard shoes is the same. To this must be added the fact that the standard shoes represent a single pattern, while the non-standard shoes cover many patterns, some of which are right and left hand. A large proportion of the railway officials visiting the exhibit personally testify to the saving due to standardization and their appreciation of the efforts of the company to bring it about. F. W. Sargent, chief engineer, is in charge of the booth.

Atlanta Car Wheel & Manufacturing Company is represented at the convention as usual by Sterling G. Turner, manager, and Sam Watkins. Their exhibit space is 683, in Building 2, and this year was used as a reception booth which was in the nature of "headquarters" for Southern railway men.

Meyer Safety Guard Company, Omaha, Neb., is showing a 12-ft. working model in space 941-943, Building No. 3. This guard is designed to prevent passengers from falling off moving open or closed cars. It gives the conductor and motorman complete control of passengers in boarding and alighting from a car. Its ease of operation is one of its commendable features. Martin Meyer and R. N. Burgess are in attendance.

The Hoeschen Manufacturing Company, Omaha, Neb., is showing its Batteryless crossing bell in the booth of Forsyth Brothers Company, space 954, Building No. 3. This bell is very serviceable and is used as a signal at highway crossings to warn of approaching cars. It is simply operated by the depression of the running rail by the weight of a passing car. H. P. Ryner, manager of the company, has charge of the exhibit.

Among the Exhibits

F. E. Felt has joined the publicity department of The J. G. Brill Company, Philadelphia.

* * *

Sterling Meaker Company, Newark, N. J., is represented at the convention by Raymond T. Stowe.

* * *

G. T. Abel, Brooklyn, N. Y., expert in car painting by contract, is at the convention in the interest of his business.

* * *

Mason Rumney, general superintendent, Detroit Steel Products Company, is here in the interest of "Detroit-Fenestra" steel sash..

* * *

C. E. Sawtelle, vice-president and general manager, Tool Steel Gear & Pinion Company, Cincinnati, is highly gratified at the number of customers who have brought prospective users to his exhibit.

* * *

Habirshaw Wire Company, New York, although not represented with an exhibit, has its interests ably cared for by James B. Olson, secretary of the company. Mrs. Olson is accompanying Mr. Olson.

* * *

Major Robert E. Mills, special representative of Berry Brothers, Ltd., Detroit, Mich., is actively explaining to visitors at space 651 the diverse merits of Berry varnishes as applied to car woodwork.

* * *

The post cards of the Indianapolis Brass Company were hailed with delight by the delegates who were so busy, of course, that they did not have the time to write long letters to their stay-at-homes. It was much easier to fill in the blanks on these conveniently worded cards.

* * *

W. J. Jeandron, New York, had a visit at his booth on Wednesday from Mr. Misaki, chief engineer, Hanshin Electric Railway Company, Amagasaki Setsu, Japan. Mr. Misaki has placed an order for approximately $5,000 of "Le Carbone" brushes.

* * *

Presto Company (owner and patentee of the "Presto" convertible coat collar) is exhibiting many different styles of conductors' and motormen's uniforms equipped with this collar. J. W. Starbuck, advertising manager for the company, is in charge of the exhibit.

* * *

A timely exhibit is that of the National Carbon Company, Cleveland, Ohio, in spaces Nos. 463, 465 and 467. The noted Laclede brush is on exhibit, and a number of very interesting specimens of brushes that have given several hundred thousand miles' service are there for the inspection of visitors.

* * *

Economy Oil Cup Company, Augusta, Ga., is showing its new oil cups in space 525, Machinery Hall. This device fits any journal or motor bearing and has a felt pad at the bottom which distributes the lubricant direct to the shaft. The wear on the felt is compensated by the weight of the cup and its contents. The interests of the company are looked after by H. E. Fitzgerald, E. M. Crozier and Wonham, Sanger & Bates.

* * *

Jewett Car Company, Newark, Ohio, did not bring a car to the convention this year and therefore had no formal exhibit, but Edward Besuden, their genial and popular sales manager, was on hand, of course, and displayed his usual activity. Mr. Besuden always shows much zeal in the work of the Manufacturers' Association and among other things served very acceptably on the nominating committee at the annual meeting Wednesday.

Globe Ticket Company, Philadelphia, Pa., is showing in space 960, Building No. 3, a full line of city and interurban railway tickets, books, transfers and cash receipts. The company is making a specialty of the Pope patent p. m. transfer, which is used by practically all of the largest city companies in the country. There is also shown the Globe ticket destroyer, the Globe ticket chopper, and various kinds of ticket punches. The company is represented by W. C. Pope, P. C. Snow, R. C. Osman, J. Elliott and E. Elliott.

* * *

Warren Webster & Company, Camden, N. J., have an exhibit consisting of a 50-hp. "Star vacuum" feedwater heater and purifier, oil and steam separators, grease traps and various Webster specialties, beside their well-known Webster water-seal motor for use on the Webster system of steam circulation for heating purposes. A miniature copper air washer is shown in operation to illustrate the Webster method of cleaning and pumping air. Represented by H. A. Terrell and W. F. Bilyeu, of the Camden office; G. A. Eagan, of the Philadelphia office.

* * *

U. S. Metal & Manufacturing Company has space 609 in Building No. 2. It is now sales representative of the Carbon Steel Company for interurban and street railway lines handling that company's various axle products. It is exhibiting a sample of the Cunningham axle, which is an exclusive product of the Carbon Steel Company. Other products handled are: "Barol," a coppered carbolineum wood preserver; "Diamond" tapered steel poles, the type recently installed by the North Shore Traction Company (Long Island, N. Y.) throughout its line; Wolfe rail joint lock, and the Columbus lock nut. Represented by A. B. Hegeman, Charles C. Castle, Edwin D. Hillman, F. C. Dunham, H. A. Hegeman, Arthur Masters.

* * *

Coin Counting Machine Company is in spaces 659 and 661, Building No. 2. The company's representatives are demonstrating the Johnson coin counters, which have been successfully used for several years by the United States Treasury, Bank of England, leading American banks, Interborough (New York) Rapid Transit Company, Chicago City Railway, United Railways of St. Louis, and hundreds of other traction companies. These machines count 1000 coins per minute, and have attachments for wrapping coins, stopping automatically when a given number has been deposited in the wrapper or bag. This year the company is showing a nickel machine, designed to facilitate the separation and count of coins collected in fare boxes. The Public Service Railway Company uses 30 of these machines in Newark and Jersey City; 20 are used by the Third Avenue Railroad, New York, and others are used in Baltimore, Rochester, etc. Represented by C. H. Birdsall, W. P. Butler, S. F. Champion, Jr.

* * *

The efficient telephone service provided on the pier by the Delaware & Atlantic Telegraph & Telephone Company, which is one of the associated Bell system companies, is greatly appreciated by the exhibitors and others in attendance at the convention. The telephone company installed 105 telephones and switchboard to connect the various exhibits and placed a switchboard with two operators in a private room on the pier. Ten trunk lines connect this switchboard with the Atlantic City exchange. In order to obtain the quickest service possible, operators on the pier were furnished with a list of the names of the members registered, together with the name of the company which they represented, the number of the exhibit space, the telephone number and the hotel address. This list is used by the operators to enable them to locate readily any person connected with the convention. The printing of the daily edition of the Electric Railway Journal has been greatly facilitated by the long distance telephone service between Atlantic City and Philadelphia.

E. G. Long & Company, New York, are having their interests carefully attended to at the convention by E. H. Mays.

* * *

Wright Wrench & Forging Company, Canton, Ohio, has space 812, Building No. 3, where it is displaying drop-forged levers and wrenches. Represented by William B. Haight, sales manager of the company.

* * *

Badger Fire Extinguisher Company, Boston, Mass., is exhibiting in space 436 its 40-gal. chemical engines, mounted on truck for station, car house and repair shop service; also its hand chemical fire extinguishers for car interiors. Represented by C. R. Edwards, A. E. Stone.

* * *

The Philadelphia Electric Manufacturing Company is exhibiting several different styles of Tungsten arc lamps, ornamental street lighting fixtures, fuse boxes, line material of all kinds and a new device for detecting open circuits in railway motors. Represented by W. O. Dale and C. L. Bundy.

* * *

Walter Chur, of the American Railway Supply Company, New York, is enjoying the week at the convention, meeting his many friends and customers. On a neat board in his booth, space 826, are displayed conductor coat and cap badges, motorman and employee cap and coat badges, uniform buttons, police badges and other specialties manufactured by his company.

* * *

Adams & Westlake Company has a display, in space 682, Building No. 2, of a new type of sliding-door lock which locks open and shut. The representatives are also showing a pressed steel headlight which weighs about one-quarter less than the ordinary cast headlight. Other devices shown include samples of the company's line of car hardware, headlights, lanterns, etc.

* * *

Whitmore Manufacturing Company, Cleveland, Ohio, is showing several gears and pinions which have been in service on some of the large electric railways and have been lubricated by Whitmore lubricating composition. It is very adhesive, forming a cushion between the metal surfaces of the gear and pinion to minimize frictional resistance and wear on the metal surfaces, and at the same time doing away with the usual gas noises.

* * *

Standard Paint Company, New York, is in space 822, Building No. 3, which has been fitted up as a reception room, where the friends of the well-known P. & B. products are received by the representatives of the company. Represented by J. H. Thomas, general manager of sales; Chas. E. Smith, manager of the electrical department; H. E. Lavelle, street railway representative from the New York office; H. A. Inwood, street railway representative from the Chicago office.

* * *

Leeds & Northrup Company, Philadelphia, Pa., is exhibiting in space 617, Building No. 2, a complete line of electrical measuring instruments for traction companies. The Herrick inspection test set is of special interest. This instrument is used for the rapid and accurate determination of the resistance of the various circuits of an electric car. It may also be used for the measurement of insulation resistance and for determining the position of armatures with relation to the pole faces. The set includes all connections, leads, etc.; also a frame for use in measuring armature coil resistances. There is also exhibited a bridge for locating faults in heavy cables by means of the Murray loop special construction. Among other apparatus exhibited is a complete potentiometer outfit, various types of Wheatstone bridges, a portable testing set, insulation testing apparatus and resistance thermometers. Represented by Morris E. Leeds, Charles S. Redding.

Fred S. Wonham, president of Wonham, Sanger & Bates, arrived at the convention early Wednesday morning. After the fender and wheel-guard test of the Public Service Commission at Schenectady two years ago, Mr. Wonham had the courage of his conviction that the "H-B" life guard had merits to justify him in introducing it into the United States. In less than two years over 15,000 "H-B" life guards have been installed in the United States.

* * *

National Lock Washer Company, Newark, N. J., is displaying its sash balance in spaces 650 and 652, Building No. 2. This is a spring roller installed in the heading above the sash and connected to the sash by belts with brass straps at either end, making a noiseless fixture. The webbing is chemically treated to make it waterproof and fireproof. The company is also furnishing chain connections with this balance, when desired, and has a new device for fastening the chain to the roller without soldering.

* * *

Corell Railroad Tie Company, Mount Jewett, Pa., is exhibiting at space 457 a model of the Corell concrete railroad tie. It is a double sleeper instead of a long rigid tie. The ties thus far made have been about 12 in. wide, 10 in. thick, and each block or sleeper about 28 in. long on the bottom, tapering to about 22 in. on the top. The dimensions are subject to the requirements of the roads where installed. Among some of the roads now using this tie are the International Railway, Cleveland Railway, Buffalo, Rochester & Pittsburgh Railroad and the Buffalo Creek Railroad. H. J. Corell and J. W. Caverly are in charge.

* * *

In recent years heavier cars and increased traffic have made it absolutely necessary in some places to use switches, mates, frogs and crossings, built entirely of manganese steel. Particularly is this true of steam over electric crossings, where the constant pound of the car wheels soon shakes bolted crossings apart. In Wm. Wharton, Jr., & Company's exhibit in spaces 208-216 and 304 a crossing of the latest solid manganese steel construction is shown, as well as switches, mates and frogs of solid manganese steel and manganese steel center construction. Springs and locks for switches are also exhibited.

* * *

Black Damond Boring Machine Company, Monongahela, Pa., has on exhibition in space 537, Machinery Hall, a machine for boring armature and axle bearings and other parts; also a patent adjustable boring tool and an adjustable rolling tool. All of these devices are being demonstrated. The company has recently received orders for its products from the Boston (Mass.) & Worcester Street Railway; Virginia Passenger & Power Company, Richmond, Va.; Little Rock (Ark.) Railway & Electric Company; Pacific Electric Company, Los Angeles, Cal.; and a repeat order from the Pittsburgh (Pa.) Railways Represented by T. M. Boggs, A. J. Brown.

* * *

Hess-Bright Manufacturing Company, Philadelphia, Pa., is showing in space 571-573, Machinery Hall, an exhibit of ball bearings for main journals on railway cars and for railway motors. The first includes one axle and wheels on ball bearings rotated light to a speed of 45 m. p. h.; sample bearings and boxes as used on the Atlantic City & Shore Railroad. Pictures of these cars are in the booth, while the cars themselves may be seen on the Boardwalk near Virginia Avenue and near the exhibit pier respectively. The main feature of the second portion comprises two G. E.-80 motors, one with and one without ball bearings, showing how it is possible to put these ball bearings on motors with integral frame heads. Represented by Henry Hess, president, Cyril J. Hopkins, E. W. Rubencame.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, OCTOBER 15, 1910 No. 16

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 15, 1910.

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Atlantic City Convention

The Atlantic City convention of 1910 has now passed into history. To those who attended this year it would be almost a truism to say that the convention was the most successful in the history of the association and that the results reflect great credit upon everyone who had anything to do with the arrangements. This includes the executive committee and secretary of each of the associations, and also the entertainment committee, the exhibit committee and the other committees of the Manufacturers' Association whose work was so much in evidence at Atlantic City. The thanks of the association are also due to the weather man, whose good behavior on this occasion, in spite of the prevalent drought in the East, added so much to the enjoyment of those in attendance at the convention. Through our daily issues published at Atlantic City those who were not able to be at the convention have been able to read the papers and reports presented at the meetings of the different associations and follow their proceedings, at least in outline. This issue contains a report of the meetings on Friday of the Engineering Association, the only association which met yesterday, and also one or two of the papers whose length or lateness of presentation precluded their inclusion in the daily issues.

The Coming Year

The association begins its new year under the most favorable auspices. The membership is the largest in the history of the association, and the reorganized association, which has done such excellent work during the past five years, is now old enough to demonstrate its ability to be of great help to its members and a vital force in the field. The selection of Mr. Brady for president places in direction of the affairs of the association an executive who has had long experience in association affairs and one who has the confidence of the industry. He will be supported in his new work by a strong executive committee. The election of W. G. Ross, of Montreal, to the vacant place in the list of officers was a very fitting one. Mr. Ross has long taken an active interest in the association work, first with the Accountants' Association, of which he was president in 1904-05, and later with the American Association. His ability as a manager is recognized on both sides of the boundary line. He represents, geographically, a nation which has many loyal members of the association. No better choice could have been made. The healthy and virile condition of the American Association is duplicated in each of the affiliated associations. Expressions of satisfaction over the work accomplished during the year and at Atlantic City from members of each of the affiliated associations and the main association were heard on every side. The general opinion was undoubtedly that the organization as a whole, under its new name, commences the second half decade of its existence with every indication that it will be of even greater benefit to its members than ever before.

Pay-Day Economies

Loss of time and therefore of productive capacity almost universally accompanies the arrival of pay day in large repair shops and factories. The larger the number of employees to be reimbursed for their labor, the more expensive the process of paying off tends to become, because the retardation in the rate of output and the actual stoppage of production run to a higher average. The efforts of one large street railway company to reduce the cost of paying its repair shop forces are worth considering elsewhere. The company's officials have been striving for several years to pare down operating costs to the quick, in the effort to offset in some measure the constant increase in the cost of labor and materials and the insistent tendency toward a longer haul which it, in common with other systems, has had to face. It was found perfectly feasible to pay off even the employees of a single department in five groups, each man having a number and taking his place in his group at the sound of a bell signal. With a maximum of 20 men in a group the time each employee was away from his work on pay day varied from perhaps 20 seconds to four minutes. The men were numbered about the shop with reference to their locations, so as to interrupt scattered classes of work as little as possible, and each filed past the paymaster in numerical order to save time at the table. The few women employed, by being assigned to the last group, were paid separately and without confusion or intercourse with the preceding groups. There is little doubt that sectionalizing the paying-off process in ways like this may be the means of saving a large company a good many hundred dollars a year.

Electric Traffic Signs

With the advent of the electric sign into the field of traffic promotion it is important to recognize that central station experience with publicity illumination offers something of value to the railway company. In view of the growing public sentiment against crudely designed or poorly built signs it will pay to spend some little time upon the selection of the type of sign best suited to a particular location. In general, electric signs are of two types, one in which the sign proper is illuminated by a reflector or transparency arrangement of lamps and wording, and the other in which the publicity work is performed by the lamps themselves. It is important to avoid deflecting the attention of the reader from the message of the sign, no matter which type be used. In a park sign recently noted the proper lighting effect was largely spoiled by the use of frosted incandescent lamps of relatively large size around the border of a frame without reflectors, the attention of the passer-by being attracted to the lamps more than to the wording of the advertisement. Since the advent of the low candle power tungsten lamp the cost of electric sign lighting upon company current has dropped to a pretty low point, and there should be a wider use of signs in which the lamps form the letters. Central stations use low-powered carbon lamps very largely for this class of service, but the tungsten lamp for fixed locations is so much more efficient and its maintained candle power so much better that the carbon lamp has but little place where the best results are desired. If alternating current is available, low-voltage tungsten lamps can be used with remakable life results, judging by records obtained by central stations in certain classes of residence service. As in the car sign, a short, pithy message is generally most desirable. Experience has shown that fully as good results can be obtained on close letter spacing with 2-cp tungsten lamps as with lamps of double that power.

ENGINE AND GENERATOR CAPACITY

The relation between generator and engine capacity in direct-connected units is one of the most interesting ratios with which the modern power plant designer has to deal. It is principally affected by the efficiency of the generator and by the losses in the engine mechanism between the cylinder and the revolving shaft carrying the armature or the field as the case may be. While the term "engine horsepower" is somewhat elastic, the commonly accepted meaning as applied to an engine of the reciprocating type is the cylinder power at which the most economical steam consumption is maintained. If we allow 5 per cent for frictional losses in the engine mechanism and say 5 per cent more for the losses in the generator at full load, it will be necessary to rate the engine at about 10 per cent more than the generator in order to assemble a set which shall be a proper unit from the standpoint of the normal capacity of its component parts. Overloads will be handled by using steam in reciprocating engines less and less expansively, so that when the engine is giving out its maximum power the cut-off in the valve motion comes so late that efficiency is a secondary consideration. It is clearly desirable that the maximum power that the engine shall be capable of giving out shall be equal to the task of operating the generator at normal speed at the maximum overload consistent with the sparking and heating limits. If the steam pressure is properly maintained, it is generally the case that an engine capable of handling the normal output of a generator at the point of minimum steam consumption will be equal to at least a 75 per cent to a 100 per cent generator overload for a period in which efficiency is less important than capacity.

In a total of 10 railway power plants recently examined the ratio between the rating of the generators and that of all the steam-driven prime movers in the different stations was 91 per cent. The plants included both modern and older installations, but the stations of larger capacity were characterized in the main by the use of direct-connected units, consisting of horizontal or vertical cross-compound engines driving 600-volt direct-current generators. In the oldest plant examined there were some 12 generators belt-driven by four engines, and here the ratio was 119 per cent, there being an excess in generator over engine capacity. The five principal and most modern stations disclosed the following ratios: 97, 86.5, 90, 88 and 89 per cent, all of these being steam plants, with but one turbo-unit in the group. Among the stations covered were two gas engine plants with direct-connected machinery. Here the generator ratings were 87 and 78.5 per cent of the engine ratings, the difference between gas and steam presumably being due to the necessity of rating the gas engine much nearer the maximum instead of the normal capacity of the corresponding generator. Again, gas engines are rated at brake hp instead of indicated hp, which tends to reduce the ratio.

In the selection of an engine to drive a generator of predetermined size, it is apparent that considerations of available speed, cost, delivery and other factors must be taken into account and that an absolute percentage cannot be followed invariably with the best results. Among a series of competitive bids it may easily happen that one manufacturer will offer a

slightly larger engine of a given speed for the service than is submitted by his rivals. Questions of price may determine its choice as against an engine more closely rated to the generator, or again, the demands for power may be so insistent that a guaranteed short delivery may justify the selection of a machine with a small percentage of excess capacity. The ratios of the different units suggested in any given case, however, are worth calculating, for comparisons with practice elsewhere.

POWER DISTRIBUTION IN THE REPAIR SHOP

In the ordinary repair shop the distribution of power to motors driving miscellaneous tools is a very simple matter. The available supply is generally 600-volt direct-current service, the wiring runs are short, the control at the tools of the simplest character, the use of the machinery largely intermittent, and the lighting maintained on the time-honored basis of five lamps in series per circuit. As the demand for additional facilities increases, however, it becomes of much consequence to adopt the principles of centralization which have been found so beneficial in the field of commercial electrical supply. Improvements may be effected by bringing all the power and lighting leads to a common point of control and metering; by replacing open runs of cable with conduit construction; by going over the fuse installation with a view toward securing better protection of the sections of the plant from shut-downs and at the same time insuring ample protection against fire; by making a few simple tests upon the more important distribution circuits to determine if the drop in voltage is such that the full capacity of the motors cannot be properly utilized, and by testing the energy demands of individual tools for the double purpose of checking the motor rating and analyzing the cost of operation in connection with the larger repetitive processes. It is a good rainy-day task to make a study of the loading of different shop feeders. Conditions may be gradually changing in the utilization of power.

The old central station practice of substituting a few large transformers for many smaller units may well be followed in the railway repair shop which is lighted by alternating current. In a recent installation it was noted that the various shop buildings were served by individual transformers separated by only a few bays of the walls. As the service was continuous the core and resistance losses were of considerable magnitude. Modern methods of regulation at the power plant or substation switchboard permit the operation of lighting and power services without difficulty on the same bus. Nothing is wanting on the score of reliability, and the extension of secondary circuits is seldom great enough to overcome the advantages of reduced energy losses secured by the centralization of transformer equipment.

Another desirable improvement is the housing of lighting and power transformers in suitable quarters. For a few hundred dollars a reinforced concrete shelter can be built which will house several hundred kilowatts in transformer equipment, enable the consumption of different departments to be separately metered if desired, and assemble in a convenient and safe place all the lighting, protective and circuit opening devices, preferably under lock and key. Alternating-current motors have as yet not attained much vogue in electric railway shops, but their reliability of service is so marked where variable speed work is not required that in some of the larger work of the future it is probable that group driving by induction motors will come into favor, particularly in shops where the areas served are large. Their effect on the power factor is negligible if rotaries are in regular service on the same high-tension supply lines, and they permit economical supply from the standpoint of copper investment when the tools are considerably scattered.

THE GROWTH OF CITIES

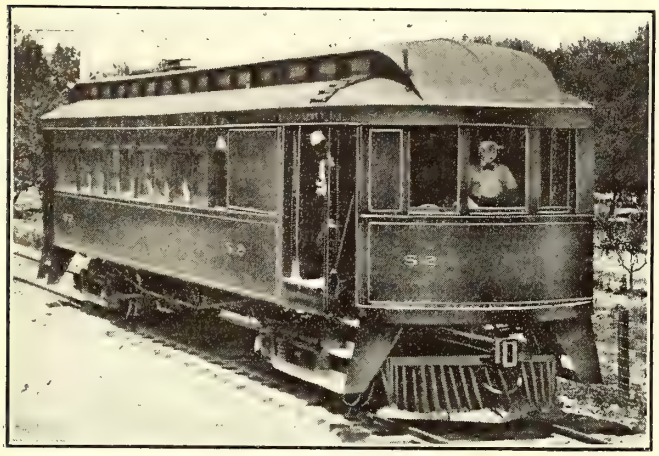
A recent publication gives an interesting view of the growth of large cities and its relation to traffic as shown at the international exhibition of last summer in Berlin. The figures referred to 1907, but the data show astonishingly close estimates for the population of American cities at that epoch and are specially interesting in that the cities are considered with their environments. Greater London is, of course, incomparably the largest city in the world, and it is interesting to note that its rate of growth is second only to that of Greater New York for the periods since 1890, Berlin following as a good third.

The process of aggregation by which cities have been growing within the last quarter century enormously transcends any general growth by natural increase of the population or by immigration. One may guess at the future population, but the accuracy of the guess would seem to be almost a pure matter of chance without extremely close attention to the local conditions which govern the aggregation of population in each particular city. The problem of transportation, which requires almost prophetic foresight as to the future conditions, is most intimately bound up with such facts as these, and it would be well worth the while for some investigator to make a special study, district by district, of the sources and causes of the huge increase in population that comes from the tendency of the modern city to sweep clean the rural districts and draw to itself their population as a magnet collects iron filings.

Of the great cities under comparison it is worth noting that four American cities—Boston, Philadelphia, New York and Chicago—in the order mentioned, showed greater amount of travel per capita than London, Berlin and Paris, but that the total figures in rides per capita annually varied only from 268 to 500 in spite of the diverse conditions existing in the several cities and countries. For any given city it seems to be pretty well determined that the amount of riding per capita tends to increase with the population, as is natural considering the fact that the area also tends to increase so that the distances become longer. There are two factors, therefore, working to produce extraordinary conditions which must be met by any scheme for rapid transit. Ordinary estimates based on population go awry and their result has been often seen in the overcrowding of new lines, in many cases, from the moment of their opening. Estimates of the growth in the population of different cities are also apt to be wrong, as the recent census statistics for city populations in 1910 prove. As practically all calculations of future traffic are based on the population of the city to which they refer, they are liable to error with any variation in the fundamental factor assumed. Nevertheless, such calculations are important, not to say necessary, not only with reference to the possibilities of rapid transit, but because they open an important field of sociological study in connection with the housing and distribution of population.

NOTES ON THE GRAND JUNCTION & GRAND RIVER VALLEY RAILWAY

The Grand Junction & Grand River Valley Railway Company was organized in the year 1908 by Colorado parties, to build and operate city and interurban lines in the famous fruit growing section of the western slope of Colorado called "The Grand Valley." The completion of some 3.5 miles of line within the corporate limits of the city of Grand Junction, Col.,



Grand Junction & Grand River Valley Railway—Standard Combination Car

was celebrated May 22, 1909. The first of this company's interurban lines, and the second one in the State, that from Grand Junction to Fruita, was opened to the public July 14, 1910. It is 16.02 miles long, running for the entire distance through the intensely cultivated orchard lands which are expected to yield its greatest revenue. This road was built with the special object of handling fruit in refrigerator cars direct from the orchards to the steam railroad yards at its terminals. The construction of the railway through a district where irrigation is universally practised made it necessary for the company to install on its 16 miles of railway no less than 8000 ft. of culverts and inverted syphons, which are of Watson corrugated culvert pipe.

POWER AND LINE

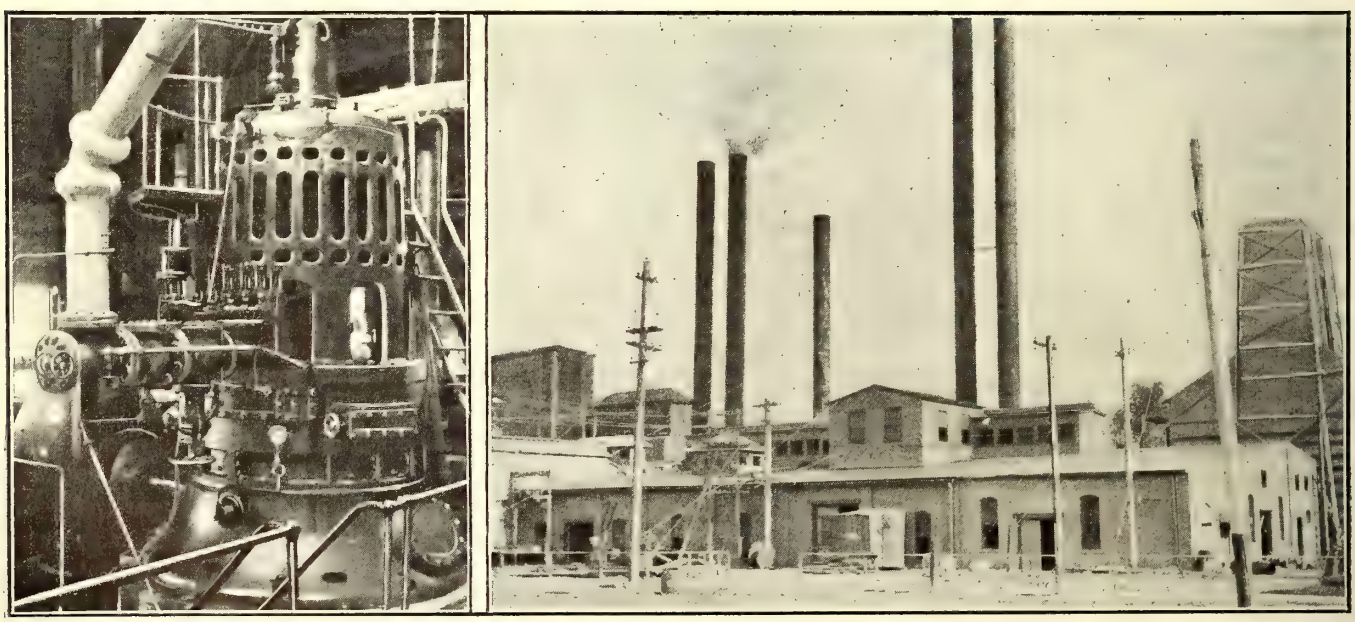
Both the city and interurban lines are operated at 600 volts direct current, and obtain power from an affiliated corporation, the Grand Junction Electric, Gas & Manufacturing Company, which has the control of the power, gas and artificial ice utilities in Grand Junction. Power is transmitted to the Fruita terminal at 11,000 volts, three phase, where a 200-kw rotary substation feeds the trolley, and also a No. 0000 bare feeder which is tapped into the trolley at the quarter point; a similar substation equipment of 300-kw capacity is to be installed in the central plant at Grand Junction, with an auxiliary 150-kw belt-driven, 600-volt Westinghouse generator which is now feeding the line at that point. This generator is at present driven by a 200-hp Ideal high-speed engine.

The transmission line at 11,000 volts, the No. 0000 grooved trolley, the telephone dispatching circuit and (for about 4 miles at each end of the line) a No. 0000 bare copper feeder



Grand Junction & Grand River Valley Railway—Electric Locomotive

are all mounted upon 35-ft. Idaho cedar poles. These poles have tarred butts, and are set 5 ft. 6 in. in the ground and cemented. The span on tangents is 100 ft. and on curves 80 ft. About 13.7 miles of the line consists of iron bracket suspension for the trolley, with iron insulator pins on the bracket arm for the feeder. The remainder of the line is cross-suspended over streets with the feeder on iron side brackets. The telephone line, of No. 12 copper-clad wire, is hung from wooden side brackets and transposed at every fifth pole. This telephone circuit is given very thorough protection, for G.E. telephone transformers are used at all sidings and terminal points where there are installed fused carbon gap lightning arresters; both wall and desk sets are heavily insulated. Each car carries a portable telephone set containing a repeating coil and the jacks for the portable sets are placed at every fruit loading spur. Drainage coils also have been placed every 3 miles. The No. 4 hard-drawn copper transmission is protected at each end by

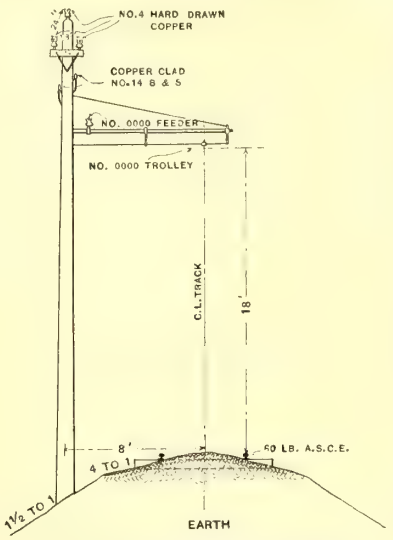


Grand Junction & Grand River Valley Railway—Power Plant, Showing Cooling Towers at the Right; Also 500-kw Turbine, Looking Toward Condenser Pit

electrolytic cell arresters, and the trolley by automatic fusible arresters placed 8000 ft. apart.

POWER PLANT ADDITIONS.

To meet the needs of a growing business and also to furnish power for the railway the electric plant of the Grand Junction Electric, Gas & Manufacturing Company has been completely rebuilt under the supervision of the Stearns-Roger Manufacturing Company, Denver Col. The boiler room now contains two new 500-hp Heine water-tube boilers and two old batteries of two 350-hp boilers, each of the same make. The feed-water and hot-well pumps are also installed in the boiler room. The generating equipment includes a 500-kw Curtis turbine and three 150-kw belted generators, the latter being driven by single-cylinder Hamilton-Corliss engines. These machines are 60-cycle, three-phase, 2300 volts. They are run in parallel with the 800-kw water power station of the Redlands Power & Irrigation Company, located 3 miles south of Grand Junction, to which they are connected by a 2300-volt line of No. 00 hard-drawn copper.



Elevation of Pole and Line

The steam engines and the turbine exhaust into two Wheeler surface condensers fitted with Edwards dry-air pumps, and so arranged that one condenser and pump set may be held in reserve. The cooling water is circulated by low-speed centrifugal pumps through two cooling towers capable of cooling 36,000 gallons of water each per minute. These towers were especially designed by Henry Schwartz, of the Stearns-Roger Company. They are composed of frames spaced 4 ft. apart vertically, which support baffle strips laid flat and separated by wire netting of 2-in. mesh running vertically from the top of the towers to the bottom. The water is distributed at the top by small wooden troughs having serrated edges fed from the discharge pipe.



Grand Junction & Grand River Valley Railway—One of the Corrugated Culverts

The boiler feed water is heated in Wainwright feed-water heaters, and both live steam and exhaust lines are equipped with Crane oil separators.

The switchboard has one exciter panel for a 25-kw steam-driven exciter; a 25-kw induction motor set; one incoming feeder panel from the Redlands plant; four machine panels; one feeder panel for the Fruita substation; two feeder panels for the Grand Junction load and one arc panel. This board, of General Electric manufacture, replaces an old board on which duplicate machine switches were used to divide the circuits. The old equipment was a relic of the days when alternators were not run in parallel.

ROLLING STOCK, ETC.

The passenger equipment of the railway consists of three interurban cars with bodies built by the Woeber Carriage Company, Denver, Col. These cars are mounted on Brill 27-E2 trucks, each carrying two 50-hp G.E.-219A motors. The trucks have 33-in. American steel wheels. The gear ratio is 19:71. Two of the cars are operated single-ended and have baggage compartments, while the third is a double-end car with a smoking compartment. A 30-ton locomotive, also of 200-hp capacity, but geared only 15:69, will be used in local freight and fruit gathering service. All cars are equipped with both straight and automatic air brakes, and they are strictly standard in all minor details.

The car house is located at the steam railway transfer. It is a steel building containing five tracks on 11-ft. centers and 150 ft. long, together with a brick bay containing the offices of the superintendent and dispatcher, locker rooms and shops. The pit track is equipped with a 20-ton hand-operated crane.

Owing to the fact that fruit shipments originating on this railway are consigned to all parts of the United States its business is being conducted under the classifications of the Interstate Commerce Commission, and its passenger, freight and express tariffs are on file with that body.

SINGLE-PHASE TRACTION IN FRANCE

One of the latest French electrifications is that which the Midi Railway will make in connection with the Montrejeau-Pau portion of the Toulouse-Bayonne Line. The portion to be electrified has a length of some 70 miles; the country is very hilly and the line has a number of grades, one of 3½ per cent being about 7 miles long. This is the largest scale upon which electrification of existing lines has been attempted in France. Later the electrification is to be extended to the entire Toulouse-Bayonne Line, a distance of 200 miles. The Midi Railway has ordered from the French Westinghouse Company the equipments for 30 double-truck electric-motor cars for the passenger service and one electric locomotive for the freight service of this line. The mechanical part of the locomotive will be built by the Italian Westinghouse Company. The design and construction is based on the results obtained in connection with the electrification by the Italian Westinghouse Company of the Giovi tunnel section of the Italian State Railways on the dense traffic line between Genoa and Milan. Each of the motor coaches, seating about 50 passengers, will be equipped with four 125-hp, single-phase motors, 16 2/3 cycles, 285 volts, and with multiple control. These motor coaches will be able to haul trains weighing 100 metric tons—including the motor itself—at a speed of 45 m.p.h. on level track. The weight of a motor coach in running order will be about 56 metric tons. The Midi locomotive will have five axles, three of which will be driven by the motors through jack shafts and connecting rods. The locomotive will have two 600-hp, single-phase motors, will weigh 80 metric tons, and will be able to haul trains weighing 400 metric tons, inclusive of the locomotive. With a haulage load of 280 metric tons the speed will be 25 m.p.h., and with 100 metric tons about 38 m.p.h. The current will be supplied from a 12,000-volt overhead catenary line through pantograph collectors.

The Illinois Traction System proposes to exhibit at the Real Estate and Building Show, to be held at the Coliseum, St. Louis, Mo., from Oct. 24 to 31, a reproduction of the McKinley Bridge across the Mississippi River at St. Louis, which will extend entirely across the front of the booth and be outlined in miniature electric lights. It is proposed to make the booth a headquarters during the show for excursionists from the cities along the lines of the Illinois Traction System. Attendants will be in charge of the booth to give information to visitors and to distribute souvenirs.

STEEL CARS FOR PITTSBURGH RAILWAYS COMPANY

The Pittsburgh Railways Company has had in use for more than four months 50 double-truck steel cars with completely enclosed prepayment platforms. A remarkable operating record has been made with these cars since they were put in service. Only nine accidents occurred on them in spite of the fact that they are being run on the lines of heaviest traffic and during the rush hours are operated in express service. The total cost



Pittsburgh Railways Steel Car—Interior View, Looking Toward Front Exit

of settlement of claims arising from these accidents was less than $20. Aside from the interesting constructive details, their light weight and large seating capacity, the principal novel features are the doors which close the openings above the front and rear platform steps. To the fact that the platforms and steps are entirely enclosed while the cars are running is attributed the small number of accidents.

The accompanying engravings illustrate the general appearance of the exterior and interior of the cars and the seating arrangement. As will be seen from the floor plan, the cars are arranged for single-end prepayment operation, with a wide entrance and exit on the rear platform and a single exit door and step on the right-hand side of the front end. The rear platform is 10 in. below the floor of the car body and is separated from the body by an end bulkhead with an opening 45 in. wide. No bulkhead doors are used. The front platform is not separated from the car body by any bulkhead and the floor is on the same level. Opposite the exit door, however, the floor is cut out in the shape of a quadrant of a circle to form one step down and the second step is dropped down inside the line of the vestibule side. It is covered by a sloping sheet-steel fender secured to the bottom of the sliding door which closes the slip opening and slides back under the seat when the door is opened. The motorman is surrounded with a pipe railing which forms a convenient handhold for alighting passengers. Back of the motorman this railing is supported by two pipe stanchions extending from the floor up to the roof. These stanchions also support a single seat facing to the rear of the car and serve as guides for a vestibule curtain to shield the motorman from the light in the interior of the car. Above the single seat is mounted a switch cabinet.

The seating arrangement is a combination of cross and longitudinal seats. Owing to the limited clearances the cars are only 8 ft. 2 in. wide over all and if cross seats had been used on both sides a narrow aisle would have been required which would interfere with rapid loading and unloading and reduce the total carrying capacity. The cross seats, of which there are 11, provide comfortable accommodations for long-distance passengers and the wide aisle provides a large amount of standing room and permits free movement toward the front exit door. Including the folding seat on the rear platform the cars have a total seating capacity for 61 passengers. The weight of the body, trucks and equipment is but 46,000 lb., so that the weight per seated passenger is only 754 lb. All seats are upholstered with rattan.

The rear platform is 6 ft. long inside and has a step opening 4 ft. 8 in. wide which is divided by a vertical post into entrance and exit passageways of equal width. Each passageway is closed with a double folding door, the two halves of which move together in opening and closing. Each half of the door is hung at the top by a pivot in the center of the top rail, which runs in a slotted track parallel with the door opening, and also by a swiveling sheave at one end of the top rail, which runs on a track at right angles to the slotted track. A toggle arm attached to a sliding block above the door opening is fastened to the other end of the top door rail. When the sliding block is pushed outward the two toggle arms attached to it spread out and force the two halves of the door apart. The sliding blocks to which the toggle arms are fastened move on horizontal pipes and are pushed outward by the rotation of a crank arm and connecting rod. At the angle of the pipe railing surrounding the fare box is a vertical pipe containing within it a solid rod. An operating handle for one set of doors is clamped on the pipe and another handle is clamped to the enclosed rod. The crank arm for moving the entrance doors is clamped on the top of the pipe and a sprocket wheel is keyed on the top of the rod. A piece of bicycle chain connects this sprocket with another mounted on a vertical shaft nearer the bulkhead. On this shaft is clamped the crank arm for moving the exit doors. Both sets of doors may be opened or closed simultaneously or independently of each other by moving either or both of the operating handles. When closed the doors extend down to the outside edge of the step tread, leaving no foothold. Inclined grab handles are fastened to the inside of the doors and when the doors open they can be grasped to aid in boarding and alighting. Owing to the toggle joint connections the doors are self-locking in the open and closed positions.

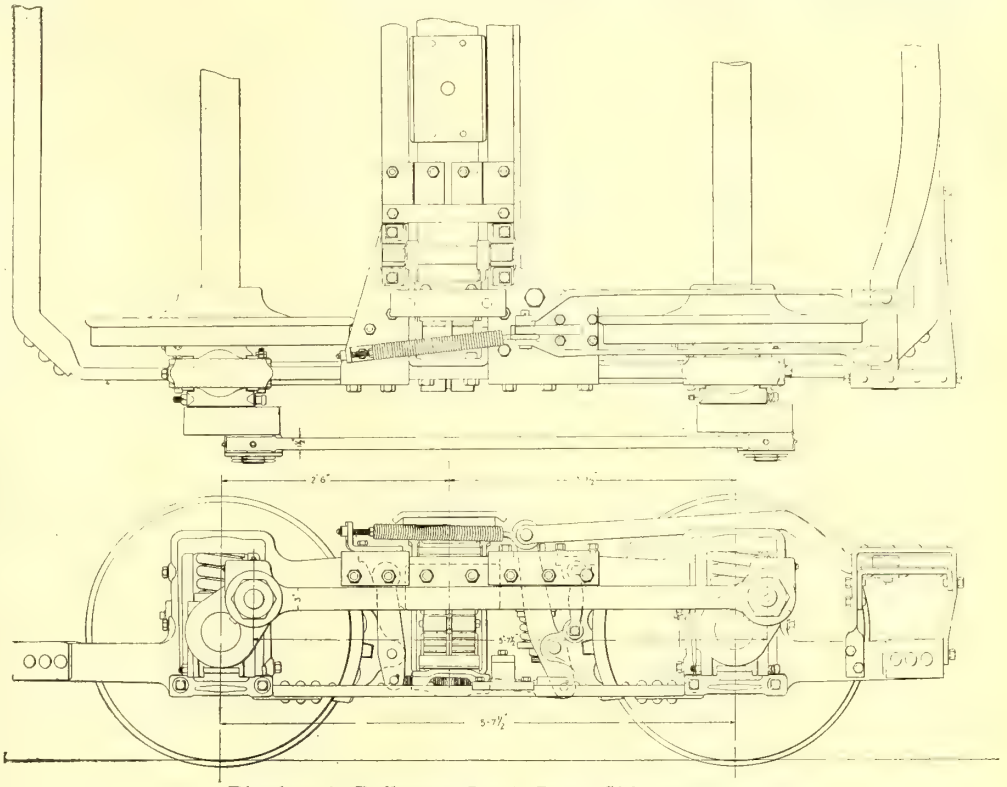


Pittsburgh Railways Steel Car—Side View

The exit door on the front platform slides back into a pocket in the side of the vestibule in opening. It is opened by a pneumatic cylinder and piston mounted above the door and is closed by the tension of a long, spiral spring which opposes the pressure of the pneumatic cylinder. A valve mounted on the front of

the vestibule beside the brake valve is used to admit and release the air in the cylinder to open and close the door. Patents have been granted to P. N. Jones, general superintendent of the Pittsburgh Railways Company, on the front and rear platform door operating mechanisms and on the rear platform arrangement whereby an entrance and exit passageway into the car body is formed by a railing without the use of doors or a dividing stanchion in the end bulkhead.

The car bodies are built entirely of steel below the windows, but wooden posts and roof framing are employed. The principal members of the underframe are the plate girder sides, 2 ft. 11 7/16 in. deep. These are made up of a top flange which is a special flat bar section weighing 6.7 lb. per foot, a ⅛-in. web plate and a 4-in. x 4-in. Tee forming the bottom flange. These girders are stiffened at each post by two 2-in. x 1½-in. x 3/16-in. angles riveted on the inside between which the posts are set and bolted. The center sills are 4-in., 5.25-lb. channels which extend to the end sills. At intervals of 39 in. between the bolsters cross braces formed of 4-in. channels trussed with a ⅜-in. x 4-in. bar are put in. The bolsters are built up of a 9-in x ⅞-in. top plate and a 9-in. x 1-in. bottom plate with a heavy filler casting in the center. Wooden diagonal braces 4 in. x 1¼ in. are built in between the side sills and the trap-door beams on each side of the bolsters to stiffen the ends of the underframe. The outside platform knees are built up of two 4-in. channels, with webs placed back to back and riveted together through the bottom flange of the side girders just inside the end sills. The top channel is bent down only slightly, but the bottom channel has a drop of 10 in. below the top channel under the end sill. The two channels are separated by I-beam fillers, and at their outer ends are again brought together and riveted. The two side knees are bent in from the end sills and at their outer ends are only 28 in. apart. In addition to these main supports two 4-in. channels, which are riveted to the center sills, are dropped down under the end sill and terminate in an anchorage for a Van Dorn No. 27 coupler. The weight of the car body alone is 18,300 lb.



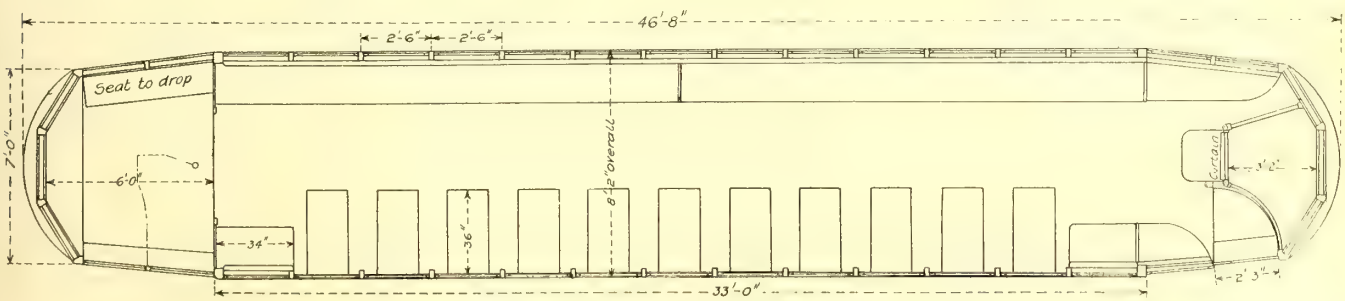
Pittsburgh Railways Steel Cars—Side-Rod Truck

The cars are mounted on Brill trucks of a special pattern with the bolsters offset 3¾ in. from the center line to accommodate the large Westinghouse No. 303 interpole motor of 100 hp which is geared to one axle. The driving and trailing axles are connected on each side with 1½-in. x 3-in. side rods and quartered cranks. A drawing of the truck is reproduced. Counterbalance weights of 54 lb. each are riveted on the web plates of the forged steel wheels opposite to the cranks. Westinghouse semi-automatic air brakes with hose connections for trailer operation are used on the cars. The car bodies and trucks were built by the J. G. Brill Company.

A hearing was held by the joint board on metropolitan improvements at Boston on Oct. 6 upon the proposed tunnel between the North and South Stations. The board is composed of the Massachusetts Railroad, Boston Transit, Harbor and Land, and Metropolitan Park Commissions. Chairman George G. Crocker presided. W. Rodman Peabody, Boston, appeared on behalf of the Boston Chamber of Commerce, which believes that the tunnel should be built by the New York, New Haven & Hartford Railroad Company and not by the city of Boston; also that it should be held by the railroad on terms which would give a fair compensation to the city for its use, with the ultimate right of the city to purchase the tunnel if deemed desirable.

The tunnel would be operated by electricity, and according to the plans already outlined by the New Haven company would afford large economies in the operation of suburban service by the elimination of much of the present shuttle-train movements which are a handicap to the traffic at the great terminal stations. A feature of the ultimate scheme would be the electrification of much of the nearer suburban service outside Boston, on the north, south and west.

The board continued the hearing for two weeks to receive further evidence.



Pittsburgh Railways Steel Cars—Floor Plan

REPORT OF COMMITTEE ON STANDARDS *

BY PAUL WINSOR, CHAIRMAN; H. H. ADAMS, E. O. ACKERMAN, W. S. MURRAY, JOHN LINDALL, J. H. HANNA, G. W. PALMER, JR., AND MARTIN SCHREIBER.

The various standing committees last year made certain recommendations regarding proposed standards and recommended practices, which the executive committee turned over to this committee for action and report. These matters are, severally, as follows:

FROM COMMITTEE ON EQUIPMENT

(*a*) Rolled steel wheels—sizes proposed for adoption as standard (page 162, 1909 Proceedings).

FROM COMMITTEE ON WAY MATTERS

(*b*) Rail sections—girder and T-rail sections proposed for adoption as standard by 1907 and 1909 committees respectively (pages 110-111, 1909 Proceedings).

FROM COMMITTEE ON POWER DISTRIBUTION

(*c*) No. 0000 grooved trolley wire—section proposed for adoption as standard (pages 354, 355 and 366, 1909 Proceedings).

(*d*) Copper wire table—proposed for adoption as standard (pages 366 and 396, 1909 Proceedings).

REPORTED ON BY 1909 COMMITTEE ON STANDARDS

(*e*) Specifications for wrought-iron bars and limit gages for round iron. Recommended for adoption as standard and recommended practice respectively (pages 299, 300 and 301, 1909 Proceedings).

(*f*) Specifications for steel axles. Recommended for adoption as recommended practice (pages 302 and 303, 1909 Proceedings).

ROLLED STEEL WHEELS

The chairman received from the Carnegie Steel Company a letter calling attention to a comparison of the proposed standard sizes and those of that company, and asking that the proposed standards be revised by the use of a thinner rim. This matter and the question of lighter webs have been considered by the committee on equipment.

RAIL SECTIONS

The recommendations of the 1909 committee on way matters regarding proposed standard sections of T and girder rail as embodied in sections a, b, c and d of their conclusions were considered and approved by this committee, and they are hereby recommended for adoption as "recommended practice" of the association.

The advisability of having a wide-head T-rail for use in cities and towns where interurban service requires the use of wide-tread wheels was suggested, and it was decided to make the suggestion that the committee on way matters be asked to give consideration to the design of such a rail. The committee would recommend that this suggestion be carried out.

NO. 0000 GROOVED TROLLEY WIRE

The committee recommends that the section of No. 0000 grooved trolley wire recommended by the 1909 committee on power distribution be adopted as a standard.

It would further recommend that the committee on power distribution consider the design of standard sections for other sizes of grooved trolley wire, all to have, if possible, the same contour of groove so that one hanger may be used for all sizes.

COPPER WIRE TABLE

The copper wire table recommended by the committee on power distribution was voted for approval when checked. This has been done, and we recommend the table for adoption as a standard.

The committee also recommends for adoption as "recommended practice" the following procedure in ordering cables:

"In ordering cables specify by circular millage instead of by gage number. In ordering cables of sizes larger than the existing gage numbers discontinue the present practice of ordering by a round number of circular mils, and order by specifying a standard number of wires of a standard diameter, expressed in thousandths of an inch."

The committee would also ask that the committee on power distribution be requested to prepare a stranding table; and also to define the difference between a "strand" and a "cable."

SPECIFICATIONS FOR WROUGHT-IRON BARS AND LIMIT GAGES FOR ROUND IRON

The recommendations of the 1909 committee on standards in this connection were considered, and it was decided to ask the executive committee to refer these spcifications to the committee on equipment for consideration in connection with specifications for grade A wrought iron, adopted by the American Society for Testing Materials, Aug. 12, 1901, and report further on them to the association. The committee on equipment has taken this matter, together with the question of limit gages for round iron, under consideration.

SPECIFICATIONS FOR STEEL AXLES

The recommendations of the 1909 committee on standards in this respect this committee approves and recommends for adoption as "recommended practice" as covering untreated axles. It is understood that the committee on heavy electric traction is giving consideration to the question of specifications for heat-treated steel axles.

*Abstract of report read before the American Street & Interurban Railway Engineering Association at Atlantic City, N. J., Oct. 10-14.

REPORT OF THE COMMITTEE ON BUILDINGS AND STRUCTURES *

BY MARTIN SCHREIBER, CHAIRMAN; G. H. PEGRAM, F. F. LOW, C. H. CLARK, T. K. BELL AND M. H. BRONSDON

The executive committee assigned two subjects: (1) Urban and interurban passenger terminals, and (2) economical maintenance. The committee decided to consider only the first subject this year.

Your committee has included in the report as an appendix a paper on urban and interurban passenger terminals, and has decided on the following conclusions and recommendations.

CONCLUSIONS

The location of a terminal is not generally determined by conditions, such as the presence of other railway buildings at a certain point, but is the result of the natural growth of traffic.

In determining the real estate necessary for a particular terminal it is well to take into consideration future requirements as well as economical construction and the present needs. A common error is not to allow for reasonable expansion of business.

TRACK LAYOUT

The track layout is the controlling element in the design and subsequent success and efficiency of the terminal, and demands thorough and careful analysis of present and future requirements both by the engineer in charge of construction and the operating man. Generally, loop tracks providing for the separation of arriving and departing passengers are preferable to stub-tracks and crossovers.

In order to guard against interruptions to traffic and provide for low cost of maintenance, all the straight rail should be of open-hearth steel of at least 0.75 carbon, and the special work and curves of solid manganese steel.

No switch should be less than 100 ft. radius, and curves for single cars not less than 38 ft. center radii. Proper drainage of switches should be provided to prevent splashing.

For the simplest layout with hand-thrown switches, facing point switches should be equipped with spring lock boxes to guard against the splitting of switches and derailments.

The ordinary terminal requires that switches controlling movement of cars to loading and unloading platforms be operated from a central position, or be operated electrically by motormen.

*Abstract of report read before the American Street & Interurban Railway Engineering Association at Atlantic City, N. J., Oct. 10-14.

If traffic justifies it, an interlocking system of signals and switches should be installed. Often the capacity of an old terminal may be increased by such an improvement.

The trolley wire for a station should not be less than 00, and preferably of No. 0000 special high tensile strength copper or steel, to give a maximum life, and be supported by barn hangers every 8 ft., that are in turn bolted to a wooden trough. Metal troughing at curves causes excessive sparking and unnecessary noise.

BUILDING CONSTRUCTION

Generally the terminal should be of fireproof construction and of low roof and post type for train shed. The high roof and long span are expensive to construct and maintain. Extra precautions should be taken to embody in the design enough glass surface in walls and roof, or both, to get a liberal lighting effect. Copper and wire glass make satisfactory and permanent construction for light side walls.

Entrances to the station should be large enough to take care of the greatest number of people that may wish to transfer there. The smallest number of entrances that is practical should be provided to give the lowest cost of operating. Stairways should be wide and so constructed as to reduce burden on public to minimum. Climbs of 22 ft. or more with heavy traffic require escalators.

Ticket offices should be grouped so that one office may take care of business during light hours and others be opened gradually as the rush hours approach. The combination ticket booth and automatic register or turnstile is gaining favor on account of low cost of operation. Yet the ticket office and chopping box are still used where there are many people to be handled in comparison with the number of openings or entrances.

A large central exit is desirable. Distributed exits are convenient, but require turnstiles, which are an annoyance; or entrances must be policed, which is expensive.

A terminal for cars of short headway requires only a small retiring room. Lines of long headways, as interurbans, should have a roomy and comfortable waiting room. Toilets at terminals are generally abused, but the public requires more accommodations each year, and such facilities are necessary.

A portion of the toilet facilities may be reserved, which is a source of income and will pay porter's salary and increase value of privileges.

All stations should be thoroughly equipped with signs and the designer should place himself in the position of a total stranger. Entrance and exit signs should be conspicuous and illuminated at night. Loading platforms should have designation signs visible from any part of them. Numerous other signs must be considered. All doors should be clearly labeled; also ticket booths, and there should be signs prohibiting loitering, smoking and the crossing of tracks at improper places.

Ordinarily, only the waiting room and offices require heat. For the small terminal, an attendant who has the privileges may furnish the heat. A larger station requires a low-pressure gravity return or vacuum steam system, or a hot-water heating system.

Light wiring should be done in open conduit, except in an ornamental waiting room and offices, where concealed wiring may be necessary. For low roofs over platforms incandescent lights are easier to maintain than arcs and more satisfactory. Light circuits should be divided to feed from independent sources, so that in the case of more important stations the terminal is not thrown in darkness should one source fail.

Ample fire protection is necessary for terminal buildings. Hand chemical fire extinguishers are essential for protecting not only the stations, but also the cars.

The privileges for booths, news stand and advertising should be considered in the design of the building, and the necessary accommodations, present and anticipated, so far as practicable should be incorporated in the construction.

RECOMMENDATIONS FOR REPORT OF 1911

(1) Economical maintenance.

(2) Proper facilities for employees in connection with operating and storage car house design.

URBAN AND INTERURBAN TERMINALS*

BY MARTIN SCHREIBER AND F. F. LOW

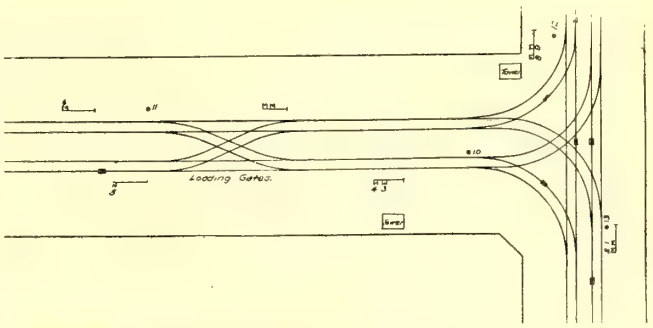
The location of an urban or interurban railway terminal is more or less predetermined by the traffic conditions or by the obligations of the company to the patrons and the public. Before a location is finally decided on the engineer in charge of the design should make a careful study of the operating situation, consulting freely with the transportation department. He should plan for growth not only in one direction but in every phase of the problem. In short, thorough analysis of future as well as present requirements is of the utmost importance before the site is determined upon and construction work commenced.

ECONOMY OF CONSTRUCTION.

It is well to keep the idea of economical construction in mind. Additional ground may mean a cheaper building. A slight shifting of position may mean earth instead of rock excavation, better sewer and drainage facilities, cheaper foundations or less waterproofing. Money and time should not be spared for accurately preliminary surveys, and all possible data that have any bearing on the physical or constructional phases of the problem should be got together.

TRACK LAYOUT

The track layout and car operating arrangements are probably the most important considerations of all. The arrangement demands the co-operation of all the various departments



Urban and Interurban Terminals—Fig. 1—Interurban Terminal with Stub End Tracks

to get the best scheme from a railway standpoint. Generally, it may be said that a loop at a terminal is superior to any other track layout for the handling of people. There may be a number of loading tracks branching from the main tracks, so that cars bound for different localities will have their own loading space in the station or there may be a number of loops. The spacing between the tracks should be as large as the lot will permit. The width of the platforms should be considered with the length in order to give plenty of opportunity for passengers to reach the car they may wish to take. There should be ample clearance around all posts or other obstructions adjacent to tracks. Numerous entrances to the interior of the terminal should be avoided. All loops should be on private land, if possible, so that they may be entirely fenced in.

It was thought best not to attempt to point out the best arrangement for varying conditions, without having concrete cases and particular conditions, but rather to include, as exhibits for discussion and information, various types of some of the most modern surface, elevated and subway terminals that have been constructed, and which represent solutions of actual practical problems.

Fig. 1 is an interurban terminal with stub end tracks for double-end cars—a very simple layout that may handle only a few cars per day, if no signal or interlocking switch arrangement be provided. It may be of interest to state, however, that this layout with automatic signals and interlocking switches

*Abstract of paper presented as a part of the report of the committee on buildings and structures of the American Street & Interurban Railway Engineering Association, Atlantic City, N. J., Oct. 10-14, 1910.

may be arranged to handle several hundred cars per day, and cars may be entering while others are leaving the station. The loading platform is on one side of the station and the unloading platform on the opposite side. The method of handling the cars with signals will be considered under the heading of "Signals and Interlocking."

In Fig. 2 a layout for a surface car terminal is shown that handles 75 cars per hour during the rush period, and where one loop is utilized. The layout is capable of handling 200 cars per hour. Incoming and outgoing passengers are kept entirely separate. Where three loading tracks are provided to separate the cars of the different lines, the plan allows prepayment of fare. A minimum amount of real estate is necessary, as the street and sidewalk are included in the layout. The single unloading platform is approximately 200 ft. long. The loading platforms are about 100 ft. long.

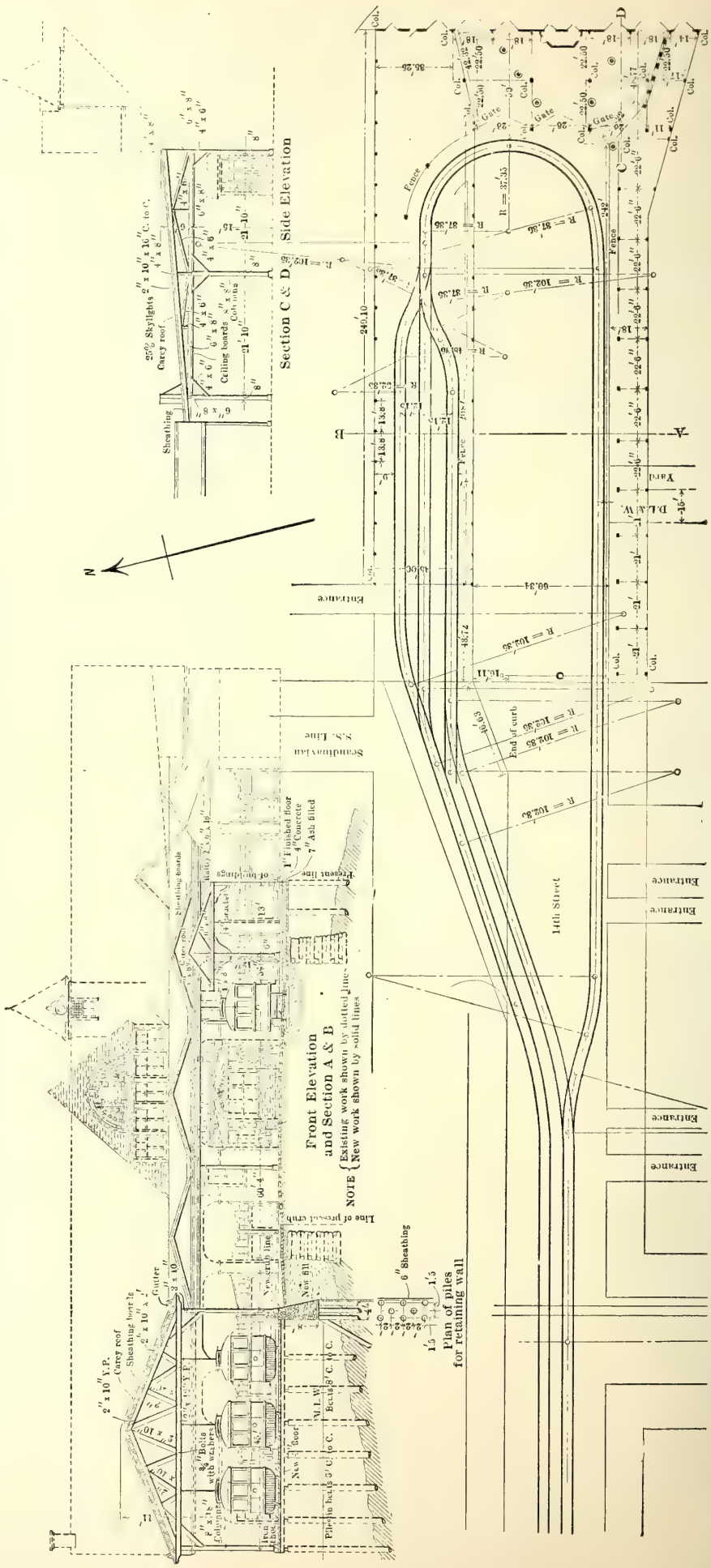
TRACK AND SPECIAL WORK

Tracks and special work should be so laid in all terminals that water will run away from the station and the roadbed. The platforms between the tracks should be laid with a liberal pitch, ¾ in. to the foot, where possible. Rolled crushed stone laid on a compressed sub-grade makes a substantial substructure for the track, using concrete between wood ties to support the granolithic pavement for the platforms and pavement between ties, if any. In an open terminal, without shelter, where passengers cross the tracks, the grooved rail makes the neatest and safest track. If it is practicable to omit the paving between rails, the T-rail is always desirable; often the space between rails is hollowed out and lined with concrete and cement and utilized for a drain.

In no case should the radii of switches be less than 100 ft. or the center radius of the loop be less than 38 ft. Of course, even the 38-ft. center loop radius is impracticable for cars in trains. If conditions warrant the adoption of a high T or girder rail, the section should conform to the recommended standards of the American Street & Interurban Railway Engineering Association. If ordinary T-rail be used, it should weigh from 80 lb. to 100 lb. per yard. All rails on tangents should be of open-hearth steel. All special work, including curves of less than 100 ft. radius, should be of solid manganese steel. A careful study should be made so that a most suitable guard rail may be installed. If the guard rails are to be made of T-rails bolted together, with filler blocks, then the inside rail should be at least ⅜ in. above the running rail and preferably ½ in. higher.

SIGNALS AND INTERLOCKING

Few interurban terminals with long headways require automatic signals, but the more extensive urban layouts demand it.



Urban and Interurban Terminals—Fig. 2—Layout of Terminal for Surface Cars

It may be of interest to refer here to the interlocking and signal plant in the Hudson Terminal Station at New York as being a most improved arrangement for trains under short headway. It is of the electro-pneumatic type, manufactured by the Union Switch & Signal Company. All the switches and station signals are controlled from one machine. The principal signals in the station are starting signals, mounted on the end of each platform, and the route signals at the end of the entrance to the station loop tracks from the inbound main track. Along with the starting signals similar signals are mounted on one end of the platforms for emergency use in case it is necessary to reverse the traffic. The signal tower, which contains the interlocking machine, is also equipped with an illuminated track diagram, showing by lights whether any section of the station tracks is occupied or unoccupied. An important feature of this installation is the use of alternating current for the track circuits, signal relays and lamps.

Referring to Fig. 1, page 837, showing track layout of the terminal of the Pacific Electric Railway Company, Los Angeles, Cal., the operation of the signals and interlocking switches is as follows: A car coming from the south with a "clear" signal, lower arm No. 9, takes the branch-off into the house; and with a "clear" signal of the upper arm of No. 7 crosses over to the north track. Then when signal No. 5 is set for the straight track the cars stop at loading gate. From loading gate with a "clear" signal at No. 10 the car gooes south on the main line. Similarly a car from the north with signal No. 2 takes the south track at the terminal and with upper arm of signal No. 7 "clear," proceeds to the rear of the station, and with No. 6 signal "clear," takes the crossover to the loading gate on the opposite side. After the car is loaded and signal No. 3 is "clear," it moves out to the northbound main line track.

With the above arrangement and an automatic turning device that is provided for the trolley, four-car trains are handled very rapidly. It is understood that clearance is provided so that cars may be entering while others are leaving the station; also that the signals and switches are interlocked against conflicting movements, and a signal giving a car a "clear" movement is tripped after the car passes, which prevents any following car entering the same block.

POWER DISTRIBUTION

Where overhead trolley is used a No. 0000 grooved copper wire of high tensile strength or a steel wire probably will give the best satisfaction when fastened to barn hangers 6 ft. or 8 ft. on centers that are likewise attached to a wooden troughing suspended from the building. Steel troughing is sometimes used on curves instead of a trolley wire, but the troughs are very noisy and are productive of constant sparking on account of the contact of trolley wheel bearing on the flanges. In the larger terminals the trolley wire should be fed so that it may be cut out in sections, or entirely, in case of emergency.

BUILDING CONSTRUCTION

Regarding the design of a building it is rather difficult to properly outline all the features, as conditions met vary within a wide range. Generally, it may be stated that the old type of long-span building or shed is passing, and it is preferable to use posts and short spans. This simplifies and cheapens the construction, as well as the maintenance. Natural lighting facilities should be given special attention. Do not hesitate to put sufficient glass in the side walls and roof to get the terminal building bright and well lighted; also remember that simplicity should be the first consideration, a smooth wall surface being in many cases cheaper and more sanitary. Interior pilasters that go down to the floor should be avoided, as they create sharp corners, which generally will be filled with dirt.

As regards floors, granolithic is often used, but it becomes slippery and is not always desirable. If it is adopted, the sand surface is preferable to a smooth finish. Tar concrete is considerably used by the steam railroads for platform floors, and has given good satisfaction. Of all the wood floors, a rock maple is best for wearing purposes.

Where there is a light wall, copper enclosing wire glass makes an excellent material for covering in, because of its lightness and because it will permit the movement of the steel work. It requires minimum maintenance.

ENTRANCES, EXITS AND TICKET OFFICES

The entrances to the station should be large enough to take care of the sudden unloading of a large number of people who wish to transfer at the station. After passing through the entrances the people should not be landed too near the tracks, but should have ample space, so that they can stop and determine just the proper location at which to take their cars, and also read easily the signs provided to guide them. If practicable only one entrance should be provided, to give the lowest expense of operating. Ticket offices should be grouped, so that one office may take care of the business during light hours, and others be opened up gradually to accommodate the increased number of persons at the rush hours. Ticket sellers and automatic turnstiles will probably be used more and more on account of the saving in operating expense. However, the separate ticket booth and chopper has the advantage of being able to quickly handle the people.

A large central exit is desirable. This may be provided with a gate controlled by a platform man. One large road has tried the experiment of having no attendant; the only check to prevent persons entering is the presence of the ticket seller, a girl in a ticket office, who is in plain view of the exit. A mechanically controlled gong is provided in the passageway, which she can ring to call the attention of the absent-minded passenger who may try to enter the exit.

SIGNS

In order to design the proper signs for a station the designer should place himself in the position of a total stranger. Entrance signs should be conspicuous and illuminated at night It is better, too, to have them visible for some distance from



Urban and Interurban Terminals—Fig. 3—Illuminated Destination Sign

the station. Exits should also be well marked on the outside to prevent people from attempting to enter at the wrong place Inside the station all exits should be plainly marked and signs should be so placed as to be visible from all parts of the platform. At such places signs reading "Out to Street," "Out to Ferry," "Out to Railroad Station," with the "Out" well defined, prove very satisfactory.

A plain sign reading "In" may be made conspicuous and answers the purpose for entrances. Platform signs showing destinations of cars are necessary. A single conspicuous sign, properly illuminated, directly opposite the track, clearly defining the destination of the cars from the track, is often used. Fig. 3 shows a sign that may be illuminated or not. It consists of ground ruby glass backed with opaque glass. Ticket booths should be conspicuously labeled where used, and often are fitted with signs reading "Pay Here."

LIGHTING AND HEATING

Ordinarily, the terminal proper does not require heat, the shelter that protects the public and the employees from the elements being sufficient. However, it is necessary to keep the waiting room and offices comfortable in cold weather. For the small terminal a stove is sufficient and may be cared for by some one enjoying a privilege—a news stand or the like. For the larger structure a hot-water or steam system is required. A gravity low-pressure steam system does well, provided it is

convenient to get the water line of the boiler below the lowest radiator; otherwise a vacuum return steam system or a hot-water system is to be preferred. The steam system requires less attention than the hot-water layout in very cold weather. With the hot-water system there is often danger of having pipes frozen if the outfit is not properly watched.

For lighting the ordinary terminal of the low-roof construction the incandescent lamp is probably to be favored, as it requires less maintenance than the arc light. If the ceilings are high, of course, the arc light is best and will be cheapest for power consumption. On low ceilings for waiting rooms, offices and the like, incandescent ceiling clusters in ground glass bowls make a very ornamental and satisfactory lighting arrangement. In terminals of importance it is probably well to have separate sources of current supply. For example, if the main train shed lights are supplied from the trolley or direct current of the third rail, the lights in the ticket booth and offices may be supplied by the commercial alternating circuit. A few alternating-current lamps located about the loading and unloading platforms are to be recommended, so that in case the current fails from one source the terminal will not be in total darkness. Another plan would be to have an automatic double-throw main switch where current could be cut in any time from storage batteries or other independent sources.

The exposed conduit wiring makes a neat appearing arrangement, and is desirable on account of being always open to inspection and easy to install; it is also satisfactory in offices and in the waiting room of the ordinary terminal. For the more elaborate layouts concealed wiring may be necessary.

FIRE PROTECTION

Ample fire protection is necessary for the protection of terminal buildings. Water plugs should be in close proximity convenient to the use of the regular fire department. A main fire alarm box should be placed near the terminal, or at least a placard posted stating where the nearest box may be found, and if the terminal is large, auxiliary fire alarm boxes should be distributed on the loading and unloading platforms, waiting room and offices. In heated portions of the building hand chemical fire extinguishers are indispensable. They are very convenient in case of fire in any car. In the sheds and unloading platform tanks with non-freezing mixture and buckets are recommended.

PRIVILEGES

Privileges, such as lunch room, bootblack stands, news stand, florist's stand, advertising signs, and with larger terminals a barber shop and other similar privileges, are not only a convenience to the traveling public, but a source of revenue to the company, and should all be considered in the preliminary design.

SOUVENIR PUBLICATION OF BRITISH COLUMBIA RAILWAY AND POWER COMPANIES

As a souvenir of the visit of the Canadian Manufacturers' Association to Vancouver last September a finely illustrated paper-bound album was prepared by the British Columbia Electric Railway Company, Limited; the Vancouver Power Company, and the Vancouver Island Power Company. The introduction contains a review of the electrical developments in Vancouver, from which it appears that in 1904 the street railway work of Vancouver City was handled by one 500-kw rotary converter while to-day the various substations alone have a total capacity of over 7000 kw and new machines are being installed for over 2000 kw more. The railway system comprises 200 miles of track on the mainland and 25 miles in Victoria and the suburbs. The routes system are shown in an excellent map. The illustrations not only present the principal features of the railway and power companies' constructions, but also many interesting views of scenes along the lines of road operated by the companies, and many diverse applications of electric power.

CAUSE OF COLLISION ON ILLINOIS TRACTION SYSTEM

The following is an official statement of the circumstances surrounding the collision between two interurban cars on the Illinois Traction System near Staunton, Ill., on the afternoon of October 4, in which 36 passengers were killed and 27 were injured:

"By overrunning a meeting point at Wall's Siding, one mile north of Staunton, Motorman John Lierman caused a head-on collision which resulted in the death of 36 passengers, serious injury to 12 and minor injury to 15. The accident occurred on a curve at the foot of a grade two miles north of Staunton and one mile north of meeting place at 3:38 p. m. Oct. 4. The motorman whose failure to obey orders caused the wreck admitted that he alone was responsible.

"Among the dead were five of the company's employees—John E. Berry, land commissioner; D. E. Black, assistant superintendent of motive power and equipment; W. W. Street, assistant trainmaster at Staunton; A. A. Price, auditor of disbursements, and Herman Bauer, of the bridges and buildings department.

"Local No. 14 left East St. Louis at 1.30, heavily loaded, northbound. The southbound train, No. 73, which was in two sections, was crowded with visitors returning from the State Fair at Springfield and others going to the Veiled Prophet celebration at St. Louis.

"At Staunton station No. 14 received a new crew, who had just secured their orders from the dispatcher, the first meeting point being at Wall's Siding, one mile north, with the second section of train 73. This meeting never occurred, but No. 14, evidently without checking speed, passed the meeting point and entered a curve one mile north of Wall's, there to crash into the oncoming section. When the retiring crew of No. 14 turned it over to the new crew at Staunton, the incoming motorman, Lierman, was asked what his orders were, replying, 'I meet second 73 at Wall Siding.' This was at 3.25 p. m. As soon as the accident occurred Lierman called up the Staunton dispatcher, informing him of what had happened and hung up the receiver without waiting for reply. He rushed to his locker at the Staunton station, changed his clothes and hurried to the bank, where he drew out his balance. According to the cashier, he seemed frantic with grief, and informed him that he alone was responsible for the terrible catastrophe and would have to go away.

"Lierman was known as one of the oldest, most efficient, sober and careful employees in the service. He was noted for the care with which he executed train orders, and there seems no tangible reason for his fatal, if not criminal, absent-mindedness. Inquiry among trainmen associated with Lierman, to discover whether any trouble was weighing upon his mind, was answered by statements that he seemed unusually happy over the recent birth of a child and that nothing in his actions or demeanor indicated any affection of his mind.

"Mr. Handshy holds in his possession the train orders of second No. 73 and of train No. 14. Both orders are absolutely clear to the minutest detail, showing the dispatching to be blameless. Conductor Leonard of the northbound car is among the injured and has been unable to make a statement.

"The northbound car telescoped car No. 239, which was running as train No. 73, demolishing the front portion. Most of those in train No. 73 were killed or injured. No one was killed in northbound 14. Mr. Handshy, on receipt of report of the accident, ordered a special to the scene, where he assumed charge of caring for the injured and removing the dead. The dead were taken to Staunton and Carlinville and the injured hurried to the hospital at Granite City. Physicians were summoned and every possible means was taken for their comfort. Traffic was delayed but a few hours. Although the accident occurred in the midst of the heavy rush incident to the Veiled Prophet celebration at St. Louis and the State Fair at Springfield, there was no disorganization and cars all over the system were handled with the usual dispatch."

SOME ACCOUNTING FEATURES OF THE CLEVELAND RAILWAY COMPANY'S FRANCHISE

Henry J. Davies, secretary of the Cleveland Railway Company, presented a paper before the American Street & Interurban Railway Accountants' Association at its convention at Atlantic City, Oct. 10-14, on the subject, "Some Accounting Features of the Cleveland Railway Company's Franchise." He gave in detail the principal accounting provisions of the franchise ordinance of the company, drawing attention to the fact that accounting is to be a very important and prominent part of the business of operating the road.

In introducing his paper Mr. Davies said:

"The franchise granted by the City Council of Cleveland, Ohio, to the Cleveland Railway Company in December, 1909, contains several unique provisions interesting to accountants.

"The laws of Ohio do not permit street-railway grants of greater duration than 25 years. This grant runs to May 1, 1934.

"Within the period of the grant the company may pay from its earnings interest upon its bonds and floating debt and 6 per cent per annum (and no more) upon its capital stock."

Continuing, Mr. Davies showed that the accounts are to be kept in the manner prescribed by the American Street & Interurban Railway Accountants' Association or as may be provided by law.

Taking up the capital accounts the paper gives the capital value of the property, stating:

"The bonds, the floating debt and the stock are said to constitute 'the capital value of all the property of the company.'

"The value of the property was fixed by arbitration, the sole arbitrator being R. W. Tayler, judge of the United States District Court for the Cleveland district, who, in this work acted, not as judge of the United States Court, but as a citizen. His decision as to values was conclusive because the city and the company had agreed to be bound by it, and not by reason of any decree or order of court.

"The ordinance states the value of the property of the company to be $22,933,300, including unexpired franchises, valued by Judge Tayler at $3,615,843.89, and physical property valued at $19,317,456.11. This value was assumed and stated to be 70 per cent of the cost of reproducing the entire property new. On this basis the cost of reproducing the entire physical property would be substantially $27,600,000. The property so appraised consisted of about 245 miles of track in streets, with pavement; about 15 miles of yard tracks, 948 revenue cars, 150 miscellaneous cars, four power stations of an aggregate capacity of 25,178 kw, five storage batteries of a combined capacity of 9340 amp-hours, together with land, buildings, stores and the other things necessary for the operation of a street railway."

The paper then gives the provisions of the ordinance which relate to additions to the capital value and quotes the definition of extensions, betterments and permanent improvements in contradistinction from repairs, maintenance, renewals and replacements of property, together with other provisions which relate to the protection of the capital value and the return of the rate of interest agreed upon.

Mr. Davies in describing the earnings accounts refers to the sliding scale of fares with nine steps, the maximum rate being 4 cents cash fare, seven tickets for 25 cents, 1 cent transfer, no rebate. The initial rate, which is now in effect, is 3 cents for a single continuous ride within the city limits, with an additional cent for a transfer. This rate must continue until about Dec. 1. If the company has been unable then to earn expenses, taxes and interest it "shall install the next higher rate . . . unless, in the opinion of the company, a rate of fare higher than the next higher to the rate in force during the said initial period shall be necessary to restore the balance in the interest fund, and to provide for current disbursements therefrom, in which event, with the consent of the city, the company may install any rate of fare not higher than the maximum." In the event of failure to agree arbitration shall follow.

Mr. Davies quotes the section of the ordinance which provides for the operation of surface cars, transportation of mail and operation of special cars for passengers, or of special cars for exclusively municipal purposes.

The paper gives the section relating to the terms on which new grants for the operation of suburban lines or renewals of existing grants may be accepted. The car-mile allowance for expenses of operation and maintenance within the city provided by the ordinance shall not be increased on account of any deficiency arising from the operation of suburban lines. All earnings above operating expenses and maintenance, depreciation and renewal allowances shall go into the interest fund. This fund it is intended shall be maintained at $500,000. According as it is greater or less than that sum the rate of fare shall be regulated.

In regard to the subject of the maintenance accounts, Mr. Davies says:

"It is important, of course, that the property of the company be properly maintained, in the interest both of the city and of the company; in that of the city because, first, the ordinance gives the city the right to purchase the railway system, if it shall obtain the right so to do, at the capital value plus 10 per cent of the par value of the capital stock, and it should receive a full equivalent for its money; and because, secondly, a good road is essential to good service; in the interest of the company because the ordinance contains a reservation of right to the city to purchase the road at the termination of the grant at a value to be fixed by agreement or by arbitration, and the property ought then to be in such condition that the stockholders may receive a sum equal to the amount of their stock.

"With these objects in view the ordinance provides for the establishment and maintenance of a fund or reserve, amounting to substantially 5 cents per revenue car-mile, to provide for keeping the property up to 70 per cent of its value."

Following this introduction are the provisions respecting this allowance. Mr. Davies adds that "there has been no investment of maintenance funds in bonds or otherwise, the fund having been overdrawn to the amount of $231,000 during the first six months of operation under the grant."

After referring to the provision that a value of 70 per cent of the reproduction value is assumed to be standard condition, Mr. Davies adds:

"The allowance per car-mile for maintenance may be increased or decreased from time to time by agreement between the city and the company, or by arbitration.

"This allowance is meant to provide not only for repairs, but for depreciation from every cause—from wear and tear, from rust, from obsolescence due to changes in design of machinery or in methods of operation, and from all other causes."

Provisions governing expenses of operation, taxes and interest are quoted pretty fully in the paper. The extensive provisions relating to the supervision of accounts of the company by the city are also given.

In relation to the other reserve accounts carried by the company Mr. Davies says:

"The company is carrying several reserve accounts besides its maintenance and depreciation reserve and the reserve of 11½ cents per car-mile for operating expenses.

"It charges to expense and credits to an insurance reserve account $3,000 per month, from which it pays the cost of fire and boiler insurance, the wages of night watchmen, etc.

"It charges to expense and credits to an accident reserve account 0.8 cent per revenue car-mile, for the settlement of claims for damages for personal injuries, including attorneys' fees, doctors' bills, etc.

"It charges to expense and credits to a legal expense reserve $2,000 per month for fees and expenses of attorneys engaged on matters other than personal-injury claims."

Taking up next the cost of operation in the first six months of the new ordinance and comparing results with previous years, Mr. Davies states:

"A few figures, without argument or comment, may be interesting.

"The amount allowed by the ordinance for maintenance of

the company's property aggregated, in the first six months of operation, $672,447.04. The amount expended for maintenance within the same six months was $903,941.94. The expenditures, therefore, exceeded the amount allowed by $231,494.90.

"Much the larger part of the maintenance expenditure was for repair and renewal of tracks.

"The 11½ cents per car-mile allowed by the ordinance for operating expenses other than maintenance amounted, in the past six months, to $1,529,117.52; the actual expenditures were $1,506,823.46; leaving a surplus of $22,294.06.

"The tables that are published herewith show the earnings and the cost of operation—in amount, in cents per car-mile, and in cents per fare—in the first six months of operation under the 'Tayler plan,' namely, from March 1 to Aug. 31, 1910, and in the corresponding six months of the four years next previous under several managements, and under very varying conditions as to rates, routes and service. It is impracticable to state here all the variations. They are indicated to some extent in the figures showing the average fare and the number of passengers carried per car-mile. There have been changes in the style of cars, in the method of collecting fares, and in wages.

"In 1906 and 1907 the road was operated by the Cleveland Electric Railway Company, and the figures for those years show the operations of that company only and not the operations of the Forest City Railway Company, which was absorbed by the Cleveland Electric Railway Company in April, 1908. In 1908 the road was operated by the Municipal Traction Company under lease during the six months included in the tables, and in 1909 by the receiver of that company. On March 1, 1910, the property was returned to the Cleveland Railway Company and has since been managed by it. The figures for 1908, 1909 and 1910 include the earnings and the cost of operation of the 16 miles of track acquired from the Forest City Railway Company.

"In 1908 and 1909 the car-miles run by trailers were calcu-

OPERATIONS OF THE CLEVELAND RAILWAY SYSTEM

AMOUNTS.

August	1906	1907	1908	1909	1910
Revenue passengers	11,058,499	11,723,872	12,391,090	12,608,643	15,597,858
Transfers collected	4,622,896	5,051,079	4,003,686	4,764,927	5,628,496
Total rides	15,681,395	16,774,951	16,394,776	17,375,570	21,226,354
Per cent transfers to revenue passengers	41.80	43.08	32.31	37.79	36.09
Passenger car-miles	2,079,016	2,221,416	1,849,454	2,101,874	2,389,191
Other revenue car-miles	18,290	21,169	20,536	24,961	26,961
Total revenue car-miles	2,097,306	2,242,585	1,869,990	2,126,835	2,416,152
Fares per passenger car-mile	5,319	5,278	6,700	5,999	6,529
Transfers collected per passenger car-mile	2,224	2,274	2,165	2,267	2,356
Total rides	7,543	7,552	8,865	8,266	8,885
Passenger earnings	$523,954.23	$553,393.82	$409,261.99	$554,178.57	$536,400.96
Gross earnings from operation	$536,257.56	$566,005.00	$419,083.75	$571,942.55	$554,055.04
Miscellaneous income	3,073.42	3,543.02	3,726.67	3,065.23	3,190.47
Total	$539,330.98	$569,548.02	$422,810.42	$575,007.78	$557,245.51
Operation of power plant	$27,717.63	$34,219.84	$28,885.97	$33,917.38	$40,641.94
Operation of cars	125,931.23	135,648.95	134,203.14	144,853.27	195,077.49
General expenses	48,195.23	40,344.73	29,334.01	36,823.72	44,704.96
Total	$201,844.09	$210,213.52	$192,423.12	$215,594.37	$280,424.39
Maintenance (Reserve)	143,400.58	142,845.91	93,872.30	112,228.67	144,969.12
Total	$345,244.67	$353,059.43	$286,295.42	$327,823.04	$425,393.51
Taxes	21,351.08	23,585.49	22,525.03	24,778.08	28,259.65
Total	$366,595.75	$376,644.92	$308,820.45	$352,601.12	$453,653.16
Interest on bonds and floating debt	$39,296.82	$40,091.67	$40,046.67	$38,589.22	$43,195.99
Wages of motormen and conductors	$104,204.95	$113,836.95	$96,658.42	$115,939.00	$158,380.65

CENTS PER CAR-MILE.

August	1906	1907	1908	1909	1910
Passenger earnings	25.20	24.91	22.13	26.37	22.45
Gross earnings from operation	25.57	25.24	22.41	26.89	22.93
Operation of power plant	1.32	1.52	1.54	1.59	1.68
Operation of cars	6.00	6.05	7.19	6.82	8.08
General expenses	2.30	1.80	1.56	1.73	1.85
Total	9.62	9.37	10.29	10.14	11.61
Maintenance (reserve)					
Maintenance (expenditures)	6.84	6.37	5.02	5.27	6.00
Expenses (including maintenance reserve)	16.46	15.74	15.31	15.41	17.61
Taxes	1.02	1.05	1.20	1.17	1.17
Interest on bonds and floating debt	1.87	1.79	2.14	1.81	1.58
Wages of motormen and conductors	4.97	5.08	5.17	5.45	6.56

CENTS PER REVENUE PASSENGER.

August	1906	1907	1908	1909	1910
Passenger earnings	4.73	4.72	3.30	4.40	3.46
Gross earnings from operation	4.85	4.83	3.38	4.54	3.57
Operation of power plant	.25	.29	.23	.27	.26
Operation of cars	1.14	1.16	1.08	1.15	1.26
General expenses	.44	.34	.24	.29	.29
Total	1.83	1.79	1.55	1.71	1.81
Maintenance reserve	1.29	1.22	.76	.89	.93
Total	3.12	3.01	2.31	2.60	2.74
Taxes	.19	.20	.18	.20	.18
Total	3.31	3.21	2.49	2.80	2.92
Interest on bonds and floating debt	.36	.34	.32	.31	.73
Wages of motormen and conductors	.94	.97	.78	.92	1.02

lated at 50 per cent of the actual trailer-car-miles, in accordance with the provisions of an agreement of lease then in existence between the Cleveland Electric Railway Company and the Municipal Traction Company; in 1910 at 60 per cent of the actual miles, in accordance with the provisions of the ordinance; in 1906 and 1907 no trailers were run.

"The wages of conductors and motormen were raised in the second half of June, 1910, to 27 cents per hour during the first year of service, and 30 cents per hour during the second year and thereafter.

"In 1906, 1907 and the first four months of 1908 the wages of conductors and motormen were 21 cents per hour during the first year of service, 23 cents during the second year, and 24 cents thereafter. From May, 1908, to February, 1910, both inclusive, they were 23 cents per hour during the first year of service, 24 cents in the second and 25 cents in the third and subsequent years. From March 1 to June 15, 1910, they were 23 cents, 25 cents, and 26 cents per hour; and since the middle of June, 1910, they have been 27 cents per hour for first year men and 30 cents per hour for men who have been in the service more than a year.

"Earnings have been somewhat increased, though to what extent it is impossible to tell, by a change of more than half of the company's equipment to pay-as-you-enter cars.

"It is believed that the use of pay-as-you-enter cars has decreased the cost of accidents, but as expense has been charged a fixed amount per car-mile for this item this fact does not affect the figures here presented.

"The amounts set aside for maintenance in 1906 and 1907 greatly exceeded the expenditures of those years on maintenance and renewal accounts. The amount charged against maintenance reserve in 1908 and 1909 was about equal to the 5-cents-per-car-mile reserve of those years. The expenditures for maintenance in 1910 have largely exceeded the maintenance reserve—partly because of the smaller expenditures of the earlier years.

OPERATIONS OF THE CLEVELAND RAILWAY SYSTEM

AMOUNTS

Six Months Ended August 31	1906	1907	1908	1909	1910
Revenue passengers	62,334,042	67,435,302	67,163,189	72,688,628	86,848,832
Transfers collected	24,009,806	27,260,725	18,649,110	25,467,137	29,108,231
Total rides	86,343,848	94,696,027	85,812,299	98,155,765	115,957,063
Per cent transfers to revenue passengers	38.52	40.42	27.77	35.04	33.52
Passenger car-miles	11,750,147	12,537,126	11,376,560	12,075,277	13,171,598
Other revenue car-miles	90,954	95,997	97,863	105,685	125,076
Total revenue miles	11,841,101	12,633,123	11,474,423	12,180,962	13,296,674
Fares per passenger car-mile	5.304	5.379	5.904	6.020	6.594
Transfers collected per passenger car-mile	2.044	2.174	1.639	2.109	2.210
Total rides per passenger car-mile	7.348	7.553	7.543	8.129	8.804
Passenger earnings	$2,944,934.49	$3,013,865.42	$2,502,722.71	$3,177,236.38	$2,974,460.26
Gross earnings from operation	$3,011,574.74	$3,080,751.72	$2,570,717.05	$3,255,194.94	$3,065,887.90
Miscellaneous income	18,313.64	21,232.79	24,240.59	19,932.17	17,729.96
Total	$3,029,888.38	$3,101,984.51	$2,594,957.64	$3,275,127.11	$3,083,617.86
Operation of power plant	$177,138.00	$178,516.94	$217,304.05	$210,653.55	$236,496.09
Operation of cars	722,059.77	780,309.62	778,805.23	846,340.61	1,010,827.45
General expense	223,923.44	238,066.32	178,813.30	223,789.22	259,499.92
Total	$1,123,121.21	$1,196,892.88	$1,174,922.58	$1,280,783.38	$1,506,823.46
Maintenance (Reserve)	829,490.83	804,791.74	573,721.15	633,223.32	672,447.04
Total	$1,952,612.04	$2,001,684.62	$1,748,643.73	$1,914,006.70	$2,179,270.50
Taxes	126,052.51	130,362.85	135,316.62	146,948.71	163,581.71
Total	$2,078,664.62	$2,132,047.47	$1,883,960.35	$2,060,955.41	$2,342,852.21
Interest on bonds and floating debt	$234,338.90	$241,056.26	$233,432.74	$232,765.65	$222,921.18
Wages of conductors and motormen	$591,738.05	$644,773.07	$599,000.03	$661,268.98	$806,673.55

CENTS PER CAR-MILE

Six Months Ended August 31	1906	1907	1908	1909	1910
Passenger earnings	25.06	24.04	22.00	26.31	22.58
Gross earnings from operation	25.43	24.39	22.40	26.72	23.06
Operation of power plant	1.50	1.41	1.89	1.73	1.78
Operation of cars	6.10	6.18	6.79	6.95	7.60
General expense	1.89	1.88	1.56	1.84	1.95
Total	9.49	9.47	10.24	10.52	11.33
Maintenance (Reserve)	7.	6.37	5.	5.20	5.06
Expenses (Including maintenance reserve)	16.49	15.84	15.24	15.72	16.39
Interest on bonds and floating debt	1.98	1.91	2.03	1.91	1.68
Taxes	1.06	1.03	1.18	1.21	1.23
Wages of conductors and motormen	5.	5.10	5.22	5.43	6.07

CENTS PER PASSENGER

Six Months Ended August 31	1906	1907	1908	1909	1910
Passenger earnings	4.72	4.47	3.73	4.37	3.44
Gross earnings from operation	4.83	4.57	3.83	4.48	3.55
Operation of power plant	.28	.26	.32	.29	.27
Operation of cars	1.16	1.16	1.16	1.16	1.17
General expense	.36	.35	.27	.31	.30
Total	1.80	1.77	1.75	1.76	1.74
Maintenance (Reserve)	1.33	1.20	.85	.87	.78
Total	3.13	2.97	2.60	2.63	2.52
Taxes	.20	.19	.20	.20	.19
Total	3.33	3.16	2.80	2.83	2.71
Interest on bonds and floating debt	.38	.36	.35	.32	.26
Wages of conductors and motormen	.95	.96	.89	.91	.93

"There was a strike of motormen and conductors in May, 1908, the effects of which were felt for some time after its settlement. For this reason the statistics as to earnings and expenses are not as valuable as they would be if no strike had occurred. Tables are appended for the month of August in each of the five years, the effects of the strike being imperceptible in the statistics for that month of 1908."

TAXES AND LICENSES *

BY GUY E. TRIPP, STONE & WEBSTER, BOSTON.

The power of taxation is a sovereign power of the State. The State dictates to all citizens, within its jurisdiction, the method, form and extent of taxation, and assesses taxes with entire disregard of the consent of the taxpayer. The only barrier to the absolute authority of the Legislature is a Federal or State constitution.

Except that there shall be uniformity in the assessment of taxes on property or industries of the same class it is not a question of whether they are oppressive; an oppressive or unfair tax is not necessarily unconstitutional. This doctrine of sovereignty is distinct from voluntary contributions, and when carried to its logical conclusions naturally results in the imposition of those taxes which can be the most easily assessed and collected. The power to tax being the "power to destroy, or the power to keep alive," the State uses it to restrict or annihilate undesirable lines of activities—as for example, the manufacture and sale of intoxicating liquors, etc. It also uses its power, through the inheritance tax, for the purpose of retarding the accumulation of large fortunes. Hence it will be seen that the power of levying and collecting taxes is absolute.

Taxes may be generally classified as either "direct" or "indirect." "Direct" taxes always appear to be the more burdensome; and, to the individual, most burdensome of all appears the tax on real property, because it is impossible to conceal. This is also true of some classes of personal property, particularly that belonging to the farmer whose cattle and horses do not escape the eye of the assessor. Personal property in the form of securities—namely, stocks and bonds—generally escapes its just proportion of taxation, because it cannot be easily discovered.

A private corporation, being merely an individual created by the State, theoretically has no advantage or disadvantage over a private individual as regards its obligation to support the expenditures of the government.

It might well be argued that a street railway company should be relieved of all taxes for the reason that the balance, after the payment of a fair return on the capital invested, should reflect itself in the service given to the people. That is, the patrons of the street railway are entitled to all the vitality of the system in improvement of service or low fares, and they should not be indirectly assessed in their more modest mode of traveling in order to relieve from a portion of his taxes the owner of an automobile or a steam yacht. It would be very difficult to work out this theory convincingly so far as real and personal property is concerned, and as a practical matter the street railway company will probably continue to be assessed on that kind of property and on the same basis with other taxpayers.

An entirely different question is presented when we reach the franchise tax. On the theory that a street railway company can make an unusual profit out of its franchise the municipality places a value on the right it has given the company to use its streets. Obviously, if the investor receives no greater return from an investment in a street railway than he can make in any other business the franchise is worth nothing; and because the operation of the franchise tax itself causes his money to earn less than it can in other businesses he is not inclined to invest therein. Some courts have held that there can be no such thing as zero value of a franchise, but that it has some value whether it is profitable or not. However, from the standpoint of the patron of the street railway company any tax placed upon a franchise which is collected at the expense of the service, or of the rate of fare (and in the end it always must be), is collecting from him a sum of money which goes to reduce the taxes of the wealthier classes.

But no uniform theory for street railway taxation has been adopted. The States have used different methods of taxation in almost every locality until it may be fairly stated that there exists no rule or basis upon which the street railway industry is at the present time taxed.

It is quite probable that taxes are based more upon the general feeling among the people that the street railway business has been enormously profitable than upon any other basis and, therefore, some means must be devised by which the public can share in those profits. In no other way can some of the taxes now assessed be explained.

The census report for 1907 gives quite a summary of the different methods pursued in different localities.

The Metropolitan Street Railway Company in New York City pays a very large franchise tax, in addition to the State tax on gross earnings, while the Boston Elevated Railway Company pays none.

Methods vary from year to year in the imposition of taxes upon the same company in the same locality. There are five classes of taxes assessed upon the street railways in New York City. They are:

1. A State tax to which all railways in the State are liable to 1 per cent on the *gross* earnings.

2. Taxes imposed by the terms of the franchise granted, which are in the form of (a) car license fees, or (b) percentage payments of gross or net earnings.

3. Special franchise taxes. This tax has been in force only since 1900 and is practically a local tax. It is assessed by the State Board, but the proceeds go entirely to the city.

4. Capital stock tax. This is the tax on the corporations, as such, to which public service corporations, like other corporations, are subject.

5. Real estate taxes. These are local taxes paid to the city like taxes on all other real estate.

As to the last two (Nos. 4 and 5) there is not much to be said. These taxes are clearly defined and easily arrived at, and, from that standpoint, are as satisfactory as any tax can be.

The State tax (No. 1) is not in the nature of a franchise tax, but is a gross earnings tax, and is paid to the State in common with all other street railways in the State.

When we come to No. 2, car license fees, we find the matter very confusing. The Metropolitan Street Railway Company is composed of subsidiary companies existing under various licenses, some of which require a car license fee of $50; others require no car license fee, but do require payment of a gross earnings tax varying from 3 per cent to 5 per cent; one company has to pay a gross earnings tax of only 1 per cent, while others pay no gross earnings tax whatever.

The history of these companies shows that, in some way or other, the city forgot to collect any car license fees for a number of years and when it did collect them they were not assessed on the true basis required in the grants, namely, $50 per car used, but, instead, were assessed upon the basis of $50 per car for the gross number of cars in daily use at the busiest season of the year. Through the inertia of public officials came another period of non-collection of car license fees. Then, in 1899, the city started to collect the back fees. Its suit was met by the statute of limitations, and the defendants were relieved of paying these back taxes.

The city has been only slightly more successful in collecting the percentages of gross earnings. In many cases the companies made no reports whatever, and in consequence evaded the entire tax.

In 1900 the special franchise tax law was passed in New York, and every street railway company was thereby permitted to deduct from its special franchise tax the amount paid for car license fees and other taxes of that nature. This was the

*Abstract of paper presented at meeting of American Street and Interurban Railway Association, Oct. 10 to 14, 1910.

cause of a great deal of litigation, but it is now practically settled by the Jamaica water case that corporations are clearly entitled to their deductions. inasmuch as the special franchise tax in all these cases exceeds, by a large amount, the percentages of gross earnings and car license fees—that is, the special franchise tax is an additional burden. Even now, with the Jamaica water case settled, there is no clear rule by which a street railway company in New York can know what its tax is going to be, and the State Tax Board guesses at the taxes every year.

No further illustrations are needed, and the foregoing will indicate to anyone who is familiar with the street railway business that the forms, methods and amounts of taxes assessed upon street railway companies are based upon no theory and are not uniform as between companies in the same locality, still less in different localities.

But chaotic as these taxes are they form only a part of the real taxes paid by the ordinary street railway company. The burdens assessed on street railway companies in the way of paving streets, maintaining the paving thereafter, sprinkling streets, carrying city officials, police, firemen, etc., free, carrying school children for half fare, constitute a portion of the amount paid toward the support of the government.

In the case of the Boston Elevated Railway payments of a compensation tax for use of streets, for interest on cost of paving, for cost of maintaining paving, for subway rental, devoted to sinking fund, for removing snow from sidewalks and roofs, amounted, for the 12 months ending Sept. 30, 1909, to over $430,000. In addition to that amount the company paid other taxes amounting to $940,000, making a total amount paid to the account of the public of over $1,370,000, or almost 10 per cent of the gross earnings.

No general information is at hand concerning the expenditures of other street railway companies which would enable a calculation such as the Boston Elevated Railway Company has published in its annual report, but it is probably true that the average company of medium size pays about 10 per cent of its gross in the form of taxes and other burdens along the lines shown in the following table, this being a statement for the eight months ending Aug. 31, 1910, of the street railway company in the city of Dallas, Tex.:

Interest at rate of 6 per cent on paving investment	$20,000.00
Maintenance of paving	4,600.00
Interest at rate of 6 per cent on misc. apparatus investment	540.00
Sprinkling of streets (estimated)	2,400.00
Taxes charged on books	28,700.00
Total for eight months	$56,240.00
Per cent to gross earnings, 10.4%	

The street railway industry probably pays a larger percentage of its gross earnings in the way of supporting public expenditures than is paid by any private corporation or individual, when, logically, it should pay less.

As stated in the beginning of this paper there is no doubt as to the government's power to assess any tax it chooses against the street railway industry, however onerous the burden may be, but it must be assumed that it is the State's intention and desire to be just and fair. It has created boards of equalization for the very purpose of bringing about equity in tax matters. If the street railways are bearing a heavier burden than they should bear it is because the State does not fully realize the total amount of the taxes being paid; or, if it does realize it, has decided that it is not an excessive amount.

Because of the great diversity that exists in the methods of assessing and collecting street railway taxes there is a strong probability of a lack of appreciation of the total amount of the burden that the street railway industry bears. Therefore, it would seem that whatever efforts the street railway companies exert in the matter should be directed toward a more simplified form of taxation.

Outside of a tax upon the real property of the company there should be but one other tax, and that should include all the levies now made, directly and indirectly. In other words, efforts should be made to abolish car license fees, special franchise taxes, paving investments and maintenance, and all other unusual burdens, and a lump percentage sum should be assessed upon the gross earnings of the company. This would remove any opportunity for fraud, or corruption of the returns by the company, would be perfectly clear, and must always be accurate; and the amount paid out of each nickel received by the company could be clearly demonstrated to the public. Then it may be convinced that the tax is too high, but it never can be convinced under the present complicated system of taxation, for the street railway companies themselves do not know how much they may be called on to pay, especially as the principal tax—namely, the franchise tax—is almost entirely a pure guess and dependent upon the attitude of the mind of the assessors.

As a matter of fact, the ideal system of taxation for a street railway enterprise would be to place the entire levy in the form of a single percentage of the gross earnings from which might be deducted the amount paid on real and personal property. There could be no better way of bringing it home to those voters whose only means of transportation are the street cars that out of every dollar they pay in a large proportion goes to swell the general tax fund, thereby reducing the amount of taxes to be paid by the wealthier citizens.

There are many who believe that, inasmuch as the street railway fares and the service are under the jurisdiction of the power that collects the taxes, the amount so collected will come out of the investor and not out of the community.

This may have been so before the days of commissions when the street railway investor got as much return out of his property as business conditions and circumstances would permit, but under the existing conditions, where the aim of the State is to restrict the return to a fair rate of interest and where conversely the rates and service must ultimately be so adjusted as to yield a fair return, taxes, most assuredly, will be paid ultimately by the consumer.

It may be asked why the street railway investor feels such solicitude concerning taxes if they are to be paid ultimately by the consumer; the reply is that a reduction of taxes for the purpose of enabling the investor to have a fair return will be much more popular and more easily accomplished than raising fares will be.

STANDARD SYSTEM OF ACCOUNTS AND CENSUS RETURNS

William M. Steuart, chief statistician for manufactures, United States census bureau, read a paper at the Atlantic City Convention of the American Street & Interurban Railway Accountants' Association, Oct. 10 to 14, on the subject, "The Electric Industries." The paper related principally to the statistics contained in the 1907 census of street and electric railways, which was made public recently. Mr. Steuart stated in reference to the standard system of accounts:

"The standard classification of accounts adopted by your association was used to collect the statistics for income and expenses, but the accounting methods of some companies differed in many important respects from the standard, for others there were slight differences that could be readily adjusted.

"There were only 693 operating companies engaged exclusively in the operation of roads and for practically all of these the accounts were in such shape that the census report could be readily prepared. Two hundred and forty-six operated the road in connection with some other enterprise, such as the sale of electricity, manufacture of gas, operation of steam railroad, water works, ferries, ice plants, purchase and sale of real estate, etc. It was difficult to prepare the reports for these roads, and some of the companies think it impossible to make their bookkeeping sufficiently flexible to fit the census requirements. Six companies operated in connection with steam railroads could not furnish the financial data for their electrical equipment. Fifty-five companies were in operation only a part of the year, but their income and expenses are necessarily combined with those operated for the 12 months."

REPORT OF COMMITTEE ON TRAINING OF TRANSPORTATION EMPLOYEES*

BY G. O. NAGLE, CHAIRMAN; C. E. LEARNED, W. H. DOUGLASS, J. E. DUFFY, L. C. BRADLEY, C. N. WILCOXON

Your committees in previous years have considered particularly the selection, examination and acceptance of men for service, with the result that this association has now a standard method of procedure and set of forms to be used in this work. As these forms seem to be generally satisfactory to the member companies your committee has no alterations or changes to recommend in them. Its work during the past year has been devoted principally to the consideration of two subjects which it believes are especially important at this time, because the changing and more exacting operating conditions due to higher speeds, increasing length of lines, heavier trains, establishment of through service over connecting lines and greater frequency of service have occasioned a corresponding demand for higher individual efficiency in the ranks of the operating force. These subjects are:

1. The most effective methods of educating new men during the "breaking in" period to render them sufficiently familiar with the duties they will be called upon to perform to warrant their being entrusted with the operation of cars.

2. Ways and means, from an operating standpoint, to render employment on electric railways more inviting to a higher class of men and to induce the continuance of efficient men in the service.

Replies to the questions in the committee's data sheet with regard to the practice of educating new men during the "breaking in" period indicate that with few exceptions the same general methods prevail on all roads, though some companies do not provide a school of instruction, skeleton car demonstration, or shop instruction. Your committee respectfully recommends that the work of the committee for 1911 should include the consideration and development of a set of forms outlining a standard method of education during this "breaking in" period, these to be prepared and submitted to member companies for their approval and criticism some time in advance of the next convention.

Your committee recommends the following procedure in "breaking in" new men after they have been engaged by the company. If this course is approved by this association the blank forms just referred to can be prepared to accord with it. The motorman's course should include instruction in the rules of the company and in the actual operation of the car on the road, as well as a general knowledge of the characteristics of the electrical equipment, the latter to be taught either by the use of a skeleton car or by work in the shop or pit. The instruction in regard to the equipment should be sufficiently in detail to enable the prospective motorman to locate minor troubles and remedy them in accordance with the rules of the company. A very important feature in all of the educational work, but particularly that in connection with the equipment, is that it should extend over enough time to enable a man unfamiliar with the work to understand, master and retain the knowledge imparted to him. Too much haste in giving instructions tends to confuse and often to discourage a new employee. On roads where signal systems are in use the course would, of course, include instruction in the purpose and use of the signals.

The conductor's course should include instruction in the rules of the company and in the actual operation of the car on the road, and especially in the proper collection, registration and accounting of fares, and in the handling of tickets and transfers.

Both conductor and motorman, after the completion of their course as "students" and after being "O. K.'d" as capable of operating a car and as familiar with local conditions, should be further instructed as to the procedure to be followed in case of accidents. These instructions should set forth conditions under which telephone reports should be made, and should emphasize the necessity of making written reports in full detail, even of what might appear to be trivial accidents, as well as the importance of obtaining the names of witnesses in sufficient number to insure the obtaining of the fullest information.

These instructions should be followed by a short talk from the superintendent or other responsible official covering points of general guidance, such as courteous treatment of the public, promptness in reporting for duty, the necessity of obeying cheerfully all orders of superior officers and the necessity of co-operation in every possible way to render the service satisfactory to the patrons of the road.

Your committee recommends that after the termination of the period of instruction, as outlined above, the employee be assigned to duty on probation for a period of at least 30 days, and that at the end of this period he should be given a written examination on the rules in general. The committee believes that after the lapse of this short period it will be much more apparent whether the new employee has enough intelligence to warrant the company in continuing him in its service and what special or additional instruction he needs, if any, than if his examination was given earlier. The committee also believes that by withholding the final examination until a man has had at least 30 days' actual service he will understand that he must pass such an examination with a reasonable degree of proficiency, and this will be an incentive to him to pay particular attention to his work and the study of his duties. During this probation period particularly close attention should be given to the work and habits of the man by both superintendents and instructors, so that at the close of the period an intelligent opinion can be formed as to the man's probable worth.

Too much emphasis cannot be placed upon the importance of getting men started right. The first few months in the service are the foundation upon which each employee's record will eventually be formed. If this foundation is properly laid, his future service should be characterized by fewer accidents, fewer delays in operation, more courteous treatment of the public and a more naturally wholesome condition throughout. Men in all walks of life are better satisfied and do better work when they have a clear conception of the underlying reasons for the acts which they are called upon to perform. It is safe to say that no one who works blindly can do justice to himself or his employer; hence it is the duty of the latter to explain fully the whys and wherefores of his rules and orders.

The subject which seems to be of the greatest interest to railway companies at the present time is the problem of how to secure good men, and when once secured how to retain them in the service, and this committee believes that if the more careful training referred to in this report is carried out it will tend to accomplish the desired results.

*Abstract of report read before the American Street & Interurban Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 10 to 14.

ANNUAL REPORT OF THE ALLGEMEINE ELEKTRICITATS GESELLSCHAFT

The annual report of the Allgemeine Elektricitäts-Gesellschaft, the largest electrical manufacturer in Europe, shows that the fiscal period ending June 30, 1910, was a prosperous year. A dividend of 14 per cent was declared on approximately $25,000,000 of stock, $187,500 was paid out for employees' welfare purposes and an equal amount for pensions. The total number of employees was 41,663. There were produced 72,460 machines and transformers, having a total rating of 1,476,623 hp; the corresponding figures for the preceding year were 47,351 and 1,239,639 hp. This difference in output represented an increase in orders valued at $7,500,000. The steam turbine business shows an excellent increase. There were built 174 turbines with a combined rating of 363,188 hp.; the corresponding figures for the preceding year were 152 and 226,507 hp. A large part of the increase in the turbine business was due to more orders for the exhaust, counter-pressure and tap types, some of which were built for a maximum output of 25,000 hp to 30,000 hp.

ENGINEERING ASSOCIATION QUESTION BOX*

NUMERICAL INDEX OF ROADS ANSWERING QUESTIONS.

1. Atlanta, Ga., Georgia Railway & Electric Company; George B. Graves, purchasing agent.
2. Austin, Tex., Austin Electric Railway Company; W. J. Jones, president.
3. Baltimore, Md., United Railways & Electric Company; W. A. House, president.
4. Brooklyn, N. Y., Brooklyn Rapid Transit Company; C. L. Crabbs, engineer way and structures.
5. Brooklyn, N. Y., Brooklyn Rapid Transit Company; William G. Gove, superintendent of equipment.
6. Buffalo, N. Y., International Railway Company; Thomas Pumfrey, chief engineer.
7. Davenport, Ia., Iowa & Illinois Railway Company.
8. Duluth, Minn., Duluth Street Railway Company; Herbert Warren, general manager.
9. East St. Louis, Ill., East St. Louis & Suburban Railway Company; P. S. Tuncil, chief engineer.
10. East St. Louis, Ill., East St. Louis & Suburban Railway Company; M. M. Lloyd, master mechanic.
11. Ft. Wayne, Ind., Ft. Wayne & Wabash Valley Traction Company; L. W. Jacques, master mechanic.
12. Framingham, Mass., Boston & Worcester Street Railway Company; M. V. Ayres, electrical engineer.
13. Harrisburg, Pa., Central Pennsylvania Traction Company; D. B. Moist, engineer maintenance of way.
14. Huntington, W. Va., Ohio Valley Electric Railway Company; James Fagan, engineer.
15. Lemoyne, Pa., Valley Traction Company; C. H. Bishop, superintendent.
16. Little Rock, Ark., Little Rock Railway & Electric Company; D. A. Hegarty, general manager.
17. Los Angeles, Cal., Los Angeles Railway Company.
18. Los Angeles, Cal., Los Angeles Railway Company; E. L. Stephens, master mechanic.
19. Los Angeles, Cal., Los Angeles Railway Company; L. O. Lieber, electrical engineer.
20. Louisville, Ky., Louisville Railway Company; F. H. Miller, superintendent motive power.
21. Mobile, Ala., Mobile Light & Railroad Company; S. M. Coffin, master mechanic.
22. Mobile, Ala., Mobile Light & Railroad Company; J. H. Wilson, president.
23. Newark, N. J., Public Service Railway Company; F. P. Maize, general foreman.
24. Newark, N. J., Public Service Railway Company; Charles Remelius, superintendent rolling equipment.
25. Newark, N. J., Public Service Railway Company; Martin Schreiber, engineer maintenance of way.
26. Newark, N. J., Public Service Railway Company; Martin White, superintendent maintenance of way.
27. New Haven, Conn., New York, New Haven & Hartford Railway; H. Gilliam, electrical superintendent.
28. New Haven, Conn., New York, New Haven & Hartford Railway Company; W. S. Murray, electrical engineer.
29. New York, N. Y., Carbolineum Wood Preserving Company; Ernest F. Hartmann, president.
30. New York, N. Y., Interborough Rapid Transit Company; Norman Litchfield, engineer car equipment.
31. Philadelphia, Pa., Baldwin Locomotive Works; J. R. Dickey, manager electrical truck department.
32. Philadelphia, Pa., Independent Inspection Bureau; E. U. Crosby, manager.
33. Pittsburg, Pa., Standard Motor Truck Company; W. G. Price, mechanical engineer.
34. Portland, Ind., Muncie & Portland Traction Company; E. B. Lincoln, general manager.
35. Salt Lake City, Utah, Utah Light & Railroad Company.
36. Schenectady, N. Y., Schenectady Railway Company; B. Penoyer, engineer maintenance of way.
37. Schenectady, N. Y., Schenectady Railway Company; F. J. Doyle, master mechanic.
38. Seattle, Wash., Seattle Electric Company.
39. Syracuse, N. Y., Syracuse Rapid Transit Company; E. P. Roundey, engineer maintenance of way.
40. Utica, N. Y., Utica & Mohawk Valley Railway Company; W. J. Harvie, chief engineer.
41. Utica, N. Y., Utica & Mohawk Valley Railway Company; M. J. French, engineer maintenance of way.
42. Washington, D. C., Capitol Traction Company; J. H. Hanna, chief engineer.
43. Washington, D. C., Washington Railway & Electric Company; H. W. Fuller, general manager.
44. Anonymous.

POWER STATIONS.

1. *What increase in fuel economy have you been able to accomplish under regular operating conditions? Upon what bonus or premium, if any, has this been based?*

Eight per cent by use of fine shaking grate. No bonus. (2.)

Very satisfactory with better grade coal, using highest grade boiler compound, cleaning boilers every two weeks, keeping tubes, etc., practically entirely free from scale, putting heavier covering (asbestos cement) on top of boilers, and seeing that all cracks and crevices in boiler walls are securely closed as soon as noticed. (34.)

Five per cent by improving boiler conditions. No bonus. (3.)

By increased temperature of feed water, increased vacuum and attention to methods of firing, partly accomplished by installing recording gages wherever possible. (20.)

By keeping the boiler tubes clean and free from soot. Also purchase our coal under specifications in which is inserted penalty for furnishing poor coal and bonus given for furnishing good coal. This specification is based on B. T. Units, percentage of ash, sulphur and moisture. (16.)

2. *Is the use of boiler compound to be avoided if possible? Why?*

Have not noticed any injurious effects. (13.)

I would use some compound, also a mechanical cleaner. (10.)

Should be avoided, because of its deteriorating effect on steel in the boilers. (7.)

Proper kind of boiler compound should give good results. (42.)

Yes. Because of expense and danger of foaming. Better purify the water. (14.)

Should be avoided if possible, on account of it pitting the tubes. (16.)

The use of boiler compound should be avoided if possible, but if necessary to use same care should be taken not to use any more than is absolutely necessary. Practically all boiler compounds will attack the packing in the stuffing boxes on the steam valves and joints on steam mains. In some plants where economizers are used they will attack the caps and joints. Where it is necessary to use compound in large quantities on account of the condition of the feed water, I have noticed that the compound has affected the walls and piston in the cylinders and caused what is commonly called "grooving." In a large number of plants the condition of the feed water is such that the use of compound cannot be avoided, as it will prevent the formation of scale in the boilers to a certain extent. (27.)

Yes, the boiler is no place in which to purify water, its function being to generate steam. All compounds will affect the steam more or less, doing damage to packing on flanges and rods, and having bad effect on rubbing surfaces to be lubricated. (20.)

We see no reason, other than of expense, why the use of boiler compound is to be avoided. (43.)

Yes; unnecessary expense. (3.)

Yes; if water is such that you can do so. Otherwise, the very highest grade boiler compound should be used, because poor quality may cause steam pipes to eat through, and may damage cylinders. The greatest possible care in trying or using boiler compounds should be given. We have tried very many kinds, tested them thoroughly and have always returned to a certain brand which we have found meets our conditions and keeps boilers in good condition. (44.)

3. *What is the nature of tests commonly applied at the boiler-rooms of member companies by insurance inspectors as a basis for certificates guaranteeing safe working pressure on boilers?*

Hammer test. (13, 27, 9, 3, 16, 20.)

Inspector, about every other time, inspects the boiler under full operating conditions, as usually found in every-day operation. Every other time he inspects internally. (34.)

The usual test made by the Hartford Boiler Insurance Company. (7.)

No test; regular inspection made. (1.)

4. *Have you ever used lignite coal? If so, what is your opinion of it as a fuel?*

Compares favorably with any other kind of fuel. (2.)

5. *How can the air space between the bridge wall and grate bars of a chain grate stoker be automatically stopped or reduced in area?*

The incline type of stoker generally has a stationary dump grate attached to the back wall. The other type generally uses overhanging bridge walls. The area can be adjusted by moving the grates on their truck. (27.)

Adjust the distance between the rear end of stoker and bridge wall so that the required thickness of fire may be carried without allowing the ashes to bank up or fall off, leaving an open space. (3.)

6. *Can forced draft be used on a chain grate stoker? If so, how?*

Prefer the induced draft. (9, 14, 27.)

Not unless some method is devised for stopping air space at end of grate. (20.)

7. *Is it good practice to operate large fly-wheel engines of a reputable make without fly-wheel insurance?*

No. (9, 1, 40, 20.)

Yes. (12, 3, 16, 27.)

8. *What should be the cost per 100 kw hours for lubricating the high and low-pressure cylinders of a 1650 kw, vertical, cross-compound condensing engine operating at full load, 75 r.p.m., saturated steam, 150 lb. pressure and 25-in. vacuum?*

$0.0032. (9.)

$0.003, with oil at 30 cents per gallon. (3.)

Cost, based on 50-cent cylinder oil for high-pressure cylinder and 25-cent oil on low-pressure cylinder, should be 5 cents per 1000 kw-hours. (20.)

9. *Do you use a damper regulator? If so, is there any way to prevent smoke when damper is closed?*

The damper regulator should be so adjusted as to prevent closing the damper entirely at any time. (42, 3, 27.)

Yes. Pays for itself in three months' time. Damper regulator is kept adjusted by either shortening or lengthening chain, so as to avoid the smoke. (34.)

TRACK.

10. *What kind of pavement has proved most satisfactory?*

Wood blocks. (13, 1.)

Vitrified brick on concrete foundation. (2, 8, 15, 14.)

Asphalt with block toothing. (35, 17.)

Granite block. (4, 26, 41, 36, 38, 3, 42, 43.)

Brick grouted with cement grout and Barrett paving pitch, and creosoted wooden blocks grouted with either cement grout or Barrett paving pitch. (16.)

Sandstone, especially under heavy wagon traffic. (39.)

11. *What is the most satisfactory practice in the construction of the foundation and sub-structure of a street railway track and loop?*

Concrete base with sand cushion under ties. (35.)

Concrete base. (14, 36, 38.)

Concrete floor with steel ties embedded in concrete. (41.)

Rolled cinder drainage, broken stone, 8-in. creosoted pine ties, filled between with concrete. (16.)

Crushed stone. (26, 42, 8, 3, 39.)

QUESTION 12 OMITTED.

13. *Is it necessary to use tie plates on yellow-pine ties in street railway tracks?*

Not considered entirely necessary with recommended broad rail base on long-leaf yellow-pine ties. (4.)

Yes; where track is open construction. (26, 14.)

I believe that nothing is to be gained from the use of tie plates on yellow-pine ties in street railway tracks. (29.)

Not necessary with 80-lb. T-rail and continuous joints on open track. (41.)

Do not consider tie plates necessary on yellow-pine heart ties where concrete is used between ties extending from bottom of tie to above base of rail. (39.)

We consider it good practice to use tie plates on yellow-pine ties. The necessity, however, depends upon the weight of the cars operated and the frequency of the service. (43, 16.)

Use tie plates on suburban tracks, but not as yet in paved city streets, as the foundation usually is more stable. (3.)

14. *Does it pay to use screw spikes? If so, why?*

Screw spikes, while the ideal form of rail fastenings, are too expensive for street railway companies to use. (29.)

*Presented before the American Street and Interurban Railway Engineering Association at Atlantic City, N. J., Oct. 14, 1910.

We have never been favorably impressed with screw spikes and have for the present discontinued their use, principally on account of the difficulty experienced in making track repairs where they have been employed. (3.)

15. *Taking maintenance of paving into consideration, is not the grooved rail as recommended by the Association more economical than T-rail laid in paved streets?*

Yes. (4, 26, 36, 15, 39.)

We have had little trouble with T-rail that it seems likely would be prevented by use of grooved rail. (8.)

T-rail track more durable and therefore pavement has longer life and less cost for maintenance. (41, 14, 35, 38, 16, 17, 3.)

16. *Would it be economy to install solid manganese special work in paved streets where 20-ton cars are run on 2½-minute headway?*

Yes. (26, 4, 8, 41, 7, 16, 17.)

No. (36, 1, 3, 39.)

17. *Would it be economy at the present price of manganese rails to install same on curves of 80-ft. radius or less?*

Yes. (26.)

No. (36, 43, 42, 3, 39.)

If life of supporting structure is twice that of rails, manganese would be economical. (41.)

18. *Does your experience prove that solid manganese steam-railroad crossings are more economical than three-rail, built-up crossings of latest designs? Give data.*

Two manganese crossings placed in 1904 have been overhauled once. One built-up crossing placed in 1903 has been overhauled every year, with rail and bolt renewals each year since 1905. (41.)

Our experience has proved that solid steam railroad crossings, either of the ordinary steel or solid manganese type, are more economical than the three-rail, built-up crossing of latest design. We have solid steam railroad crossings that were placed in service in 1897, and they are in good condition to-day, having outworn three different crossings of the three-rail, built-up type. (16.)

We have always used either the three-rail, built-up type of crossing or 9-in. hard center construction, and have found that uniformly satisfactory results can be obtained by a judicious selection of the above types with respect to the location. Such wear has been obtained from these types as would hardly seem to justify incurring the considerable additional initial expenditure of solid manganese crossings, especially in view of the present tendency to frequently change standards. (3.)

It does. We now have a crossing installed which has given twice the service that a built-up crossing had given, and from observation would say that it is equivalent to six times the life of a built-up crossing. This company makes a practice of installing nothing but manganese steam road crossings. (17.)

Yes. (1.)

We have a number of solid crossings in use at the present time. One solid crossing which has been under heavy traffic for two years is practically in perfect condition; cost for maintenance for two years, $144. Three-rail type crossings in this location cost $250 to $300 per year for maintenance. Under heavy traffic there is no doubt in my mind that the solid crossing is much the cheaper in the long run. (39.)

19.—*Does greater economy and stability result from filling joints of stone paving with Portland cement grout, pitch or hot quartz sand?*

Portland cement grout. (4, 42, 35, 8, 36, 41, 38, 1, 16, 39.)

Tar and pitch where cars operate while paving. (26, 43.)

We fill our joints with asphaltum. (17.)

20. *Are you obtaining more economical results from manganese center or solid manganese frogs under heavy urban traffic?*

Solid manganese for crossing frogs. (26, 4, 41, 17.)

Hardened center is most economical under average conditions. 8, 16, 3, 1.)

21. *What type of bolted or keyed-in hard center gives best results?*

Keyed-in most satisfactory. (4, 26, 8.)

All three of the types used by Lorain Steel Company, Wm. Wharton, Jr., & Company and Pennsylvania Steel Company will give satisfactory results. (43, 3.)

Good results from Wharton Renewable Center Construction. (35.)

Driven fit bolts through hard centers, best; keyed with steel wedges, good; speltered wedges or bolts, poorest. (41.)

Accompanying engravings show the types we consider most satisfactory. Manufactured in our own shops. (38.)

We are obtaining good results from both keyed-in and bolted work. (39).

Both keyed and bolted renewable hard centers have been in use in Buffalo for a number of years. The keyed centers have become loose in a great many places, requiring the service of a blacksmith's force of three men to reset, key and pour them with spelter. When keyed centers are to be renewed on account of wear, it is often very difficult to remove them if they have not previously become loose. The bolted-in centers have given practically no trouble, especially where the nuts on the bolts are so placed that they can be reset or tightened by an ordinary trackman. (6.)

22. *What is recommended as standard rail to be used in permanent paving—brick, asphalt, bitulithic?*

Grooved girder rail. (4.)

7-in., same as Sec. 393 L. S. (26.)

7-in., 80-lb. Lorain 335. (35.)

T-rail section, brick paving; grooved section, asphalt and bitulithic paving. (36.)

7-in. T-rail. (14, 41, 38.)

9-in. Girder rail. (15.)

P. S. Co. 277, 7-in. high T-rail weighing 80 lb. per yard, in outlying and suburban districts, and P. S. Co. 293 in congested vehicular traffic ked streets. (3.)

We are using Lorain Steel Co. 97-420. (43.)

We use for the lighter traffic, 72-lb. T-rail, Penna. Steel Co. Section No. 274; heavier traffic, 87-lb. T-rail, Lorain Section No. 399. (17.)

23. *Has satisfactory service been obtained from patent joints designed for use on old rail where the rail is considerably worn?*

We have had very satisfactory results with cast weld joints on old girder rail and with continuous joints on old light T-rail. (42.)

Not satisfactory. (26, 13, 38.)

Yes. (36, 16.)

Yes, use Continuous joints. (15,14.)

Clark, Continuous and Atlas joints have prolonged life of worn rails. With Clark and Continuous joints turn rails to make receiving end high and grind down rail head. (41.)

No.

We have not obtained even reasonably satisfactory results from the use of patented joints under the conditions specified. In fact, we have had to remove these joints and replace them with electric welded bars on the web of the rail, from which uniformly satisfactory results have been obtained. (3.)

We have had satisfactory service from "Atlas" rail joints designed for use on our old rail. The end of this joint which takes the receiving rail is upset 1/16 in. and after the plates are in place and bolted up the joints are ground off smooth. (43.)

We are obtaining good results from the use of patent upset joint plates for repairing worn rail; however, the important point for the success of this work is to properly grind and file the rail ends to a perfectly even surface after the joints are bolted up. (39.)

CAR HOUSES.

24. *What is the best system of fire protection for open railway yards?*

Fire hydrants and hose with proper regulations and inspection. (4, 3, 10.)

1. Auxiliary fire alarm stations. 2. Carey frost-proof fire hydrants with hose and nozzles in protected rack. 3. Non-freezing chemical fire extinguishers. An ordinary fire extinguisher in heated compartments. (25.)

Plenty of fire hydrants and hose houses with watchman's service. (11, 8, 14.)

Provided open railway yards cannot be roofed over and enclosed, thus constituting a relatively draft-free space in which automatic sprinklers operate with known success, probably the best developed fire protection consists of erecting non-flammable partitions at frequent intervals, and supplying adequate 2½-in. standard fire streams in connection therewith. The object of these partitions would be to interfere with the fire spreading laterally among the cars, particularly if impelled by a wind, and afford a barrier from behind which hose streams could be operated to advantage. The partitions could be made of 2-in. cement plaster occasionally pilastered, and extended above the roof of the cars a moderate distance, say 5 ft. A somewhat expensive development of the extinguishing facilities would be the frequent use of monitor nozzles, but in most cases frequent hose outlets, with means maintained for quickly carrying hose from one location to another wherever it might be needed, should answer every purpose. (32.)

No. 311.

The best system of fire protection for open railway yards we believe to be an installation of aisle sprinklers with the main pipes under ground and with automatic valves at the junction of the riser and main pipe so that normally the risers have no water in them. (30.)

Dry sprinkler systems, and hose plugs with pipe laid under ground, and hose box protected; also fire hose to be kept on reel in boxes to prevent freezing and deterioration on account of being exposed to the weather. (16.)

Hose houses so placed that at least two lines of hose can be brought to any one point in the yard. (40.)

Broad spaces should be left at intervals, so that city or local fire department may enter to fight a fire. Hydrants at intervals are necessary. (44.)

25. *Is there any automatic system for open yards?*

Yes, dry system sprinkling outfit. (25.)

Yes; dry sprinkler system manufactured by the General Fire Extinguisher Company. (16.)

System referred to in my answer to Question 24 is now being installed in one of our yards. (30.)

It does not seem practical to have anything more than aisle sprinklers in an open yard. These can be installed by erecting posts between every, or every other track, and connecting the tops with a timber construction under which a line of sprinkler heads can be placed. (44.)

LINES OVERHEAD AND UNDERGROUND.

26. *What should be the transmision loss on a d-c. 600-volt line, provided proper amount of copper is put up?*

Three volts per 1000 ft. (8.)

Not over 10 per cent. (14, 13, 16, 3, 20.)

Twenty per cent at maximum load. (7, 40.)

In substation work, however, where the substations are located as in our case, a very economical way is by the use of comparatively small feeder and feed-in at different points; that is to say, by trunk feeders between the different substations. The loss in the transmission is governed to a great extent by the condition of the bonding and ground return, which in many cases the engineers have overlooked. For example, it would not, of course, be practical to provide, say, 500,000 c.m. feeder for the overhead when the capacity of the bonding or ground return would not be equivalent to this amount, as the feeder cable would suffer loss on the poor condition of the return or negative circuit. (19.)

27. *Have you used gasoline wagons for either emergency or regular city trolley repair work? If so, how long, how many, weight and horse-power of engines?*

No.

We use one gasoline and one electric emergency wagon; the electric wagon having been in service four years, the gasoline one year. The gasoline wagon has a capacity of 3000 lb. and a maximum speed of 20 m.p.h. (42.)

We use an electric wagon. (16.)

We are using one gasoline driven emergency tower doing combination of emergency and repair work on our city overhead. This truck has been in service now for approximately four months; is of the Frayer-Miller, four-cylinder blower-cooled type, 25-hp, 2-ton capacity and when fully equipped weighs 7310 lb. (19.)

28. *Do you recommend the use of gasoline trolley repair wagons in preference to animal wagons? What is the difference in cost of maintenance?*

We consider either a gasoline or electric motor wagon preferable to animals, especially for emergency work or 24-hour service. (42.)

Would not recommend depending entirely upon gasoline repair wagon, where only one emergency wagon is used. (36.)

We have obtained very good service from our electric wagon and prefer it to an animal wagon. The maintenance and charging cost of the electric wagon is about 2 cents per mile, whereas the animal wagon, counting the time the horses are out of service and all incidentals, amounts to 3 cents per mile. (16.)

I would recommend the use of gasoline-driven repair wagons in preference to animal-drawn wagons for several reasons: first, there is no comparison or limit to the amount of territory which can be covered by gasoline motor-driven wagon as compared with the animal-drawn wagon. In outside construction work, however, where there is open track it is best to use animal-drawn wagons and especially on new work where no car service has been installed; second, by using gasoline-driven wagons a great deal more attention and assistance can be given by the driver to the crew than can be given by the teamster driving horses, and especially so in city work where the horses are apt to become frightened. We have not been operating this gasoline truck long enough to fully determine a comparison in the cost of operating the gasoline tower as against the animal-drawn tower; however, for the four months we have been operating this gasoline truck we have figured it costs an average of 21.48 cents per hour against 13.76 cents per hour for the animal-drawn wagon. (19.)

CAR BODIES.

29. *Has any one had any experience with the use of wood preservatives on car bodies?*

We use the wood preservative known as "Locustine" with good success on the woodwork of our car bodies, as we found that worms eat all kinds of wood that is used in the construction of car bodies, especially ash. For that reason we use the wood preservative and find it is economy to do so, as it not only preserves the wood from deterioration and the ravages of these worms and dry rot, but also against sudden collapse of any of the concealed woodwork, thereby preventing any serious accidents. (16.)

30. *What is the most economical color for use on cars in a hot, sunny climate?*

Light yellow. (23.)
Pullman green. (5.)
Yellow and French gray. (2.)
Orange, olive green or maroon red. (10.)
Chrome colors. (14, 18.)
We are now using Pennsylvania Tuscan red. (43.)
We have just such a climate and after several years' experimenting we decided on Pullman green as the most economical. (16.)
A dark yellow, similar to that produced by a combination of lemon chrome and black, would be most economical, as the heat is reflected and not enough is absorbed to affect the wearing quality of the varnish. (40.)
Olive green. (1.)

31. *If a car body were down hard on the side bearing plates on one side, would not this interfere with the free movement of the trucks on sharp curves, and be liable to cause derailment?*

Would not cause derailment unless dry and cutting. (24.)
Yes. (5, 10, 11, 8, 14, 34, 7, 16, 18, 3, 12, 30, 43, 1.)
With plain rub irons, yes; if spring supported or roller bearings are used, no. (21.)
Substitution of roller side bearings has stopped derailments in one case of this sort. Usually keeping the rub plate well greased will prevent trouble of this kind. (40, 28.)

CAR EQUIPMENT.

32. *What is your experience with, and your estimation of the value of, grooving commutators, to date?*

Grooving commutators reduce injurious sparking very materially, increase life of commutators by permitting the use of a softer carbon brush. Up to date results are favorable. (24.)
Have had very good success with large motors which have good protection from oil; but on small motors have had trouble from oil and carbon dust. (23.)
All of the commutators on our elevated division have been slotted for the past 18 months and we are now about 65 per cent completed on our surface division. The results obtained have been very satisfactory and troubles have unquestionably been materially reduced. We feel that it is a very good thing on commutators on all types of railway motors. (5.)
Very satisfactory. (10, 8, 37, 34, 1, 12.)
My experience with grooved commutators together with imported brushes has been extremely satisfactory on all types of motors, particularly on the older types. We have slotted commutators that have been in service over two years, with practically no indications of wear; whereas the life before slotting was about two years. (42.)
It saves at least one-half of cost in maintenance of commutators and motor carbons. (11.)
We have been grooving commutators for about two years and would not think of discontinuing the practice. (43.)
Necessary in some cases where mica is too hard. (14.)
Satisfactory, provided a soft non-lubricated brush is used. (13.)
The motor equipment on this road when purchased had all commutators grooved. After about two years of operation the commutators were turned off to a point where the grooves were eliminated, and we experienced so much trouble with the commutators in that condition that we found means to groove them again. We know positively that commutator troubles are few with grooved commutators as compared with ungrooved commutators on motors of about 75 hp and the life of commutators is greatly increased. (7.)
Immense advantages arise from the grooving of commutators of armatures. It is possible to use a commutator properly grooved probably ten times as long as if it were not grooved. The improved commutation produced by the grooving of the commutator which includes the use of a high-grade brush is extremely satisfactory. It is also possible to keep armatures and interior of motor shells much cleaner, owing to the small amount of carbon and mica dust. (3.)
After three years of experience of grooving commutators, good results have been obtained, flat commutators and flashing have been eliminated and a longer life assured to the brushes and commutators. (18.)
Commutators can be grooved at a cost of not over 10 cents per commutator, and the grooving increases the life of the commutator from 100 to 150 per cent, as well as increasing the brush life by about 40 per cent. (40.)
Our experience has shown that the grooving of commutators on non-interpole motors of 125 hp and over is very beneficial to the commutation, and reduces maintenance costs through reducttion in temperature of the armature. It is not necessary on small motors, or interpole motors of any size up to 200 hp. (30.)

33. *How does the maintenance cost of interpole motors compare with that of the straight series motor?*

We have 100 elevated cars equipped with interpole motors and we feel that the maintenance costs are less, due principally to the reduction in flashing. The interpole motors with which we have had experience have given very satisfactory service. (5.)
Should say that the maintenance is one-third less. (11.)

34. *What kind of oil has given most satisfaction in lubricating engineer's valve?*

Olive oil. (24, 5.)
Cylinder oil. (10.)
We use a good grade of machine oil. (11, 16.)
Non-fluid oil. (37.)
Arctic machine oil. (16.)
Graphite and light engine oil. (14.)
Red engine oil. (13.)
Air compressor oil. (34.)
We use a good grade of engine oil, and have had no trouble with it. (7).
High-grade graphite grease. (3, 40.)
We obtain best results with lard oil. (18.)
A special preparation having the consistency of grease, but without the latter's tendency to cake. (30.)
Dixon's graphite grease for triple valves. (28.)

35. *In elevated or subway service, what is the maximum difference allowable in the standing brake-cylinder piston travel and running brake-cylinder piston travel, before the wear in the pedestal boxes or other parts of truck should be taken care of?*

The difference between standing brake-cylinder piston travel and running brake-cylinder piston travel in elevated service should be not greater than 4 in. maximum. (5.)
This would depend on the brake leverage ratio. On cars having a brake leverage ratio of ten to one we allow a difference of 1½ in. for 4½ in. standing piston travel, and 2 in. for 6 in. standing piston travel before the wear on the trucks is taken care of. (30.)

36. *What are the causes of broken brushes on 101-B motor, and remedy?*

High mica; groove the commutators. (23, 5.)
We have had broken brushes on many types of motors, but grooving the commutators and the use of French carbon brushes have eliminated this trouble. (43.)
We have had some trouble with broken brushes on 101-B motors, due to poor quality of brush and too high brush tension. With the use of high-grade brushes this trouble has entirely disappeared. (42.)
Use soft brushes and keep brush holders close to commutators. (13.)
The probable cause for the broken brushes on the 101-B motor is the absence of shunts on the brush holders, which produces an undue wear in the brush slots, and in turn such undue movement is given the brush as leads to its being rapidly broken. The remedy, therefore, is to see that the brush holders are equipped with proper shunts and these maintained with good firm contacts. (3.)
Have not experienced any trouble with broken brushes in our 101-B motors. (18.)
Use two brushes per holder in place of one. (40.)
High mica and brittle brushes have been the principal causes of broken brushes. Have found a remedy by slotting commutators and using high-grade brushes. (5.)

37. *What variation from the correct distance may be allowed between axle and armature shaft and still obtain good results in gears, pinions and bearings?*

1/16 in. (24, 21.)
3/16 in. (10, 16.)
Not be more than 1/32 in. (11.)
About ⅛ in. (8, 3.)
3/32 in. on G. E. 73 C. motors. (7.)
3/64 in. (18.)
Should be automatically taken care of by proper inspection on a mileage basis. (30.)

38. *What is proper pressure for pressing cast iron and rolled steel wheels and cast steel gear wheels on the following sizes of axles: 4 in. 4½ in. and 5 in.? (Knees not to be used.)*

Cast Iron Wheels.	*Gear Wheels.*	*Steel Wheels.*
4 in., 25 to 35 tons.	4 in., 35 to 40 tons.	4 in., 35 to 40 tons
4½ in., 30 to 40 tons.	4½ in., 40 to 45 tons.	4½ in., 40 to 45 tons.
5 in., 35 to 45 tons.	5 in., 45 to 50 tons.	5 in., 45 to 50 tons.

(24.)

The following pressure for cast iron wheels:

4 in. axle., 30 to 35 tons allowed	0.013
4½ in. axle, 35 to 40 tons allowed	0.015
5 in. axle, 40 to 45 tons allowed	0.017
Steel Wheels.	
4 in. axle, 35 to 40 tons allowed	0.008
4½ in. axle, 40 to 45 tons allowed	0.010
5 in. axle, 45 to 50 tons allowed	0.012

The gears are pressed on about the same as the steel wheels. Allowances given for fit are what we are using at the present time, but in different grades of iron or steel all vary, as hard wheels take much less than soft ones. (23.)
For cast iron and steel-tired wheels we use 10 tons per inch in diameter of axles. (43, 30.)
Rolled steel wheels on 4 in. axles, 45 tons min., 60 tons max.
Rolled steel wheels on 4½ in. axles, 60 tons min., 75 tons max.
Rolled steel wheels on 5 in. axles, 60 tons min., 75 tons max.
Cast iron wheels on 4 in. axles, 10 tons pres. per 1 in. diam.
Cast steel gears with keys, 35 to 40 tons pressure.
Cast steel gears without keys, 60 tons pressure. (5.)
4 in. cast iron, 40 tons.
4½ in. cast iron, 45 tons.
5 in. cast iron, 50 tons.
Steel wheels and gears, 5 tons less on each size. (10.)
We use only 4-in. axles; 35 tons good practice for chilled wheels, but pass at 30 tons. Solid steel wheels, 45 tons. Solid steel gears require more attention, their elastic limit seems to be reached at about 60 tons, so we press at 45 to 50 tons, as we believe a gear pressed on at 60 tons is more likely to become loose than one pressed on at 40 tons. (21.)
Cast iron, 4 in., 35 tons; 4½ in., 40 tons; 5 in., 45 tons.
Rolled steel wheels, 4 in., 40 tons; 4½ in., 40 tons; 5 in., 45 tons. Cast steel gear where key is used, 4 in., 10 tons; 4½ in., 12 tons; 5 in., 15 tons. (11.)
Twenty-nine tons pressure on wheels on all sizes of axles and 10 tons pressure on gears. (8.)
Cast wheels, 4 in., 40 tons; steel, 4½ in., 45 tons; 5 in., 45 tons. Gears with key, 20 tons; gears without key, 50 tons. (37.)
Twenty-five to 35 tons for wheels on 4 in. and 4½ in. axles, 35 to 45 tons for gear wheels. (13.)
Cast iron and rolled steel wheels and cast steel gear wheels; 4-in., 4½-in. and 5-in. axles are from 35 to 40 tons. (16.)

	Cast Iron Wheels	*Cast Steel Gear Wheels*	*Rolled Steel Wheels*
4 in.	35 tons	35 tons	35 tons
4½ in.	40 tons	40 tons	40 tons
5 in.	45 tons	45 tons	45 tons (3.)

We allow a pressure of 35 to 40 tons for cast iron wheels and cast steel gears for 4½-in. axles. (18.)
Cast iron wheels, 8 tons, and steel wheels, 10 tons per inch of diameter of wheel fit. (28.)
Thirty-five to forty tons gear wheels. Thirty-five to forty-five tons on wheels. (1.)
Standard rule is 10 tons per inch of diameter of journal. (30.)

39. *Owing to the bad riding of cars, excessive wear of brake hangers, and waste of power due to lost end motion of journal boxes on axles having M. C. B. journals, should this type of journal be modified by some device to check the end motion, and what would be the best device to use?*

More shoulder, if possible to obtain, as the only remedy. (24.)
In our experience M. C. B. journals on our heaviest equipment have proven satisfactory. Either a solid check plate held in place by grooves in journal box against end of journal or a journal brass with a hood extending over end of journal should be effective. (5.)
A brass end check plate on end of journal, same as used in the Peckham 14 A XX truck. (10.)
Permit us to observe that we do not agree with the premises of this section, inasmuch as so far as we know bad riding of cars, excessive wear

of brake hangers and waste of power due to lost end motion of journal boxes on axles have never been attributed to the M. C. B. type of journals and by far the greater number of railway cars now in operation are equipped with this type of journal. (21.)

Some modification should be made in the M. C. B. bearing and is being made. Probably the best modification is to cast a hood on the journal bearing wedge and attach an adjustable bronze plate to the hood which forms an end bearing for the axle. The adjustment should be made with shims and the journal boxes should be so constructed that these shims can be put in from the top without removing the wedge. Another modification which is also in successful use is to cast the hood on the journal bearing, but this form of end bearing is not adjustable. The end play of the axle with reference to the truck frame should be limited to ⅛ in. to entirely avoid brake hanger trouble and waste of power due to the wheel flanges grinding on the sides of grooves in brake shoes when brakes are not applied. (33.)

We overcome this trouble by babbitting journal brasses to take up end play at a very light expense, with excellent results. We believe the M. C. B. journal is the best to be had. (7.)

When spool or shoulder becomes worn on end of axle, turn old spool off and shrink collar on end of axle. Let collar be high enough to give journal bearing at least ¾-in. bearing on end. This will modify trouble to great extent. (16.)

Check plate possesses many advantages that are lost by the adoption of the M. C. B. journal. (3.)

Caused by mismated wheels, trucks out of square or worn flanges and trucks not swinging free on the center bearings. Ball-bearing center plates will save power; cars will take curves more freely and will reduce flange wear, which is one of the principal causes for side motion. (18.)

Collarless axle with end thrust bearing is most satisfactory. (30.)

40. *What are the causes of thick and thin wheel flanges, and remedy?*

Trucks not having wheels properly mated. Axles not parallel to each other. Wheels not square and in line with center line of truck. One wheel on same axle harder than the other. A good center bearing which can be properly lubricated and kept in easy working order will tend to reduce wear on flanges materially. (23, 24.)

Continued operation in one direction against special work. Bodies riding heavy on side bearings. Trucks out of square. Remedy—keep trucks square, keep cars shimmed to prevent their riding heavily on side bearings and reverse the cars or wheels operating against special work. (5.)

Difference in hardness of wheels. (10.)

Both variation in tape size and texture of material in tread of wheel. For steel wheels we grind thick flange wheel 0.02 in. to 0.04 in. smaller in diameter. (21.)

Curves in the track; motor crowding the wheels; truck center not square or in trim; wheels that are out of gage and not properly pressed on the axle. (11.)

The principal cause of thick and thin wheel flanges is a difference in diameter between the two wheels on the same axle. The remedy is to take out the pair of wheels before the flange has become too thin for use and turn the large wheel to a smaller diameter than the thin flanged wheel and thus reverse the wearing action. (33.)

Thin wheel flanges on this road are caused mostly by swaying of cars, twisting of trucks, running at high speed. We take up all excessive wear in pedestals, etc., which materially reduces the amount of tire turning to overcome thin flanges. (7.)

When truck is not true one wheel pressed on too far toward center of axle, car body riding lighter on one side bearing than on the other. (16.)

Lack of squareness of truck frames; wheels not being properly pressed on from the center of the axles; wheels not properly mated as to tape size. (Two wheels should not differ more than one tape.) A different density or hardness of metal occurring in two wheels on the same axle; use of brake shoes having a heavily chilled face and these brake shoes not applied to gage; improper distribution of the equipment on car body produces irregular distribution of load. (3.)

Trucks out of square, binding on the side bearings and operating cars on curves, which are longest on one side. Remedy: Square the truck, free movement on the center bearing and turn cars twice a week. (18.)

When one wheel of a pair has a thick flange and the other a thin one, the trouble is usually caused by a difference either in original diameter or in the hardness of the metal. It can usually be overcome by grinding or turning to a smaller diameter the wheel with the thick flange. On one of our branches both wheels of the outside axle on each truck develop thin flanges, due to excessive track curvature. No known remedy for this. (12.)

All of our sharp and thick flange troubles are cared for by turning. Do not resort to the method referred to as a means toward correcting sharp flanges. (5.)

Have not been able to materially correct this trouble. (40.)

41. *What wear should be obtained from cast-iron wheels under 11-ton cars, expresed in terms of (a) car miles; (b) reduction of diameter; (c) percentage of weight?*

a, 45,000 miles; *b*, ⅞ in. to 1⅛ in.; *c*, 15 per cent to 20 per cent. We get: *a*, 25,000 miles; *b*, ⅜ in. to ⅝ in.; *c*, 12 per cent to 13 per cent. (24.)

a, 40,000 miles; *b*, ¾ in.; *c*, 25 lb. This last figure would depend somewhat on the tread of the wheel. (43.)

a, 40,000 miles; *b*, ⅞ in. (5.)

a, 42,000 miles. (10.)

Should say 50,000 miles under good conditions. (11.)

a, 50,000 miles; *b*, 1 in.; *c*, 15 to 20 lb. (8.)

3/16 in. wear. (16.)

(*a*) Depending upon the service, from 40,000 to 75,000 miles. (*b*) 1½ in. reduction in diameter. (*c*) About 10 per cent. (3.)

Cast-iron wheels between 26,000 and 27,000 miles, due to all classes of trouble. This mileage is about half of what should be obtained. (40.)

42. *What is the relative efficiency and maintenance cost of solid steel wheels as compared with steel-tired wheels?*

In our opinion the efficiency of steel-tired wheels other than in the matter of maintenance cost and factor of safety is equal to that of the rolled solid steel wheel. On account of the factor of safety for elevated service and reduced maintenance in renewing worn out and loose tires, the solid steel wheels are most desirable and economical. (5.)

Solid steel wheels best, and maintenance less if steel-tired wheels have cast centers. (37.)

Solid steel wheel most economical, account more mileage, tire does not come loose, and a new wheel can be purchased for about the same cost as a new tire. (34.)

Our experience shows a slight advantage in the matter of car miles obtained in favor of the steel-tired wheels, but not enough, however, to warrant the additional cost of re-tiring. (40.)

43. *What success has been attained toward correcting sharp flange wear of car wheels by reducing, by turning or grinding, the excessive diameter of the thick flange wheel on the same axle?*

Good. Leave soft wheel 1/16 in. larger when turning. (10.)

You cannot entirely eliminate turning, but life of thin flange may be very much increased by grinding its mate 0.02 in o to 0.04 in. smaller. (21.)

Grind the tread of wheel with thick flange close up to flange and with very little taper and increase the taper on the tread of wheel with thin flange. This shifts the wear to the thick flange. (8.)

Always turn both wheels on the same axle. Keeping center and side bearings well lubricated will tend to lessen trouble with steel wheels. (34.)

Both wheels should be turned to standard tread and flange. (28.)

Mismated wheels can be overcome by close inspection, turning cars and mating with wheels of the same flange thickness. (18.)

Turning down the excessive diameter of the thick flange wheel has always been successful with us in correcting sharp flange wear. (30.)

This will usually prove an effective cure for the trouble if taken in time. (12.)

This is our usual method for correcting this difficulty and the results have been entirely satisfactory. (43.)

44. *Is not the present ⅛-in. side clearance between standard journal boxes and the brass and wedge more than is desirable? Would not a better condition be obtained by reducing this clearance to 1/16 in., the journal box being machined to a dimension of 1/16 in. in excess of width of standard brass and wedge?*

One-sixteenth inch is ample if journal boxes are machined. It will improve conditions in that a better alignment of trucks can be maintained, and reduce lost motion in brakes. (24.)

One-sixteenth inch is better, but with journals machined 1/32 in. would be enough. (23. 27.)

Yes. (5, 10, 12, 1, 14, 3, 18, 30.)

We believe that ⅛-in. M. C. B. is correct. (11, 28.)

It is our opinion that the ⅛-in. side clearance between standard journal boxes and the brass and wedge is little enough. It would be found that if this clearance were reduced to 1/16 in. the result would be binding and hot journals, until the wear reached a clearance of ⅛ in. (31.)

The gain would not equal the cost of the extra machinery necessary. (21.)

Clearance should be reduced as much as possible. Believe 1/16 in. is much better than ⅛ in. (7.)

One-eighth inch is too much. Journal box should be machined to a dimension of 1/16 in. in excess of width of standard brass and wedge. (30.)

The maximum width of journal bearings at their centers should be not over 1/32 in. less than the inside width of the journal boxes. This close fit is necessary to avoid tight brakes when car is running with closely adjusted brake shoes. For the same reason the journal boxes should be rigidly connected to each other by the equalizer bars and not carried loosely between pedestals. (33.)

We think 1/16 in. more desirable. (16.)

MISCELLANEOUS.

45. *What is the most feasible and economical means of transmitting 400 amperes 8½ miles over a mountain interurban line, operating conditions being as follows: Headway, 20 minutes. Average speed first mile, 10 miles per hour. Average speed next four miles, 35 miles per hour. Average speed last three and one-half miles, 10 miles per hour. Average stops per mile for the above sections, 2.0, 0.29 and 0.86, respectively. Grades—First three miles, straight and level. Next two miles, straight, average grade 2½ per cent. Last three and one-half miles, 80-ft. radius curves every 200 ft., average grade 4 per cent. Equipment—Eight 25-ton cars, with 160 hp, four motors per car.*

If you have alternating current put in a substation about two miles from the end of the line, use one No. 0000 feeder and one No. 0000 trolley the whole length of the line. If you have not alternating current, put in two 1,000,000-cm. feeders the whole length of the line. This may cost a little more than a booster or storage battery, but will require much less attention and be subject to much less depreciation. (12.)

46. *Should not all city and interurban electric railways adopt standardization as fast as possible?*

All replies, 16 in number, were affirmative.

WEIGHT OF PAINT ON INTERURBAN CARS

In an editorial in the Electric Railway Journal of Sept. 7, 1910, attention was called to the weight of paint and varnish used on city rolling stock. A car builder in the Middle West states that the paint and varnish used to finish six 51-ft. interurban cars which were completed recently weighed nearly 1500 lb. per car. The purchaser insisted that all parts of the woodwork should be filled with white lead before being concealed or given the necessary finishing coats of paint and varnish.

The street railway employees in Warsaw, Russian Poland, went on strike for higher wages on Oct. 1. The day after the strike was declared the police arrested nearly 1000 of the strikers and compelled them to return to work. As a result 100 cars were kept in operation.

The Washington, Alexandria & Mount Vernon Railway is making extensive improvements and beautifying the grounds about its repair shops and power plant at Four-Mile Run. The grounds have been sodded, flower beds laid out, making a most attractive picture from the car windows. It is also proposed to beautify the grounds around the station at Arlington Junc- improved. The work is being done under the supervision of F. E. Cliff, superintendent of the road.

FRIDAY MEETING OF ENGINEERING ASSOCIATION

The meeting of the Engineering Association on Friday morning was held in the Greek Temple. The first order of business was the continuation of the discussion on the report of the committee on heavy electric traction.

HEAVY ELECTRIC TRACTION

The secretary read a letter from E. B. Katte, New York Central Railroad, expressing his disappointment at being unable to attend the convention and discuss the report of the committee on heavy electric traction, of which he was a member. Continuing, the letter said:

"At the time I recommended the clearance diagram included in the report as Fig. 1, which shows limited clearance of permanent way and rolling stock equipment to permit of standard third-rail location, I was not aware that these clearances had not been adopted by the American Railway Engineering & Maintenance of Way Association, although they had been adopted by the American Railway Association.

"It is desirable that the Engineering Association should work in close harmony with the American Railway Engineering & Maintenance of Way Association. I have recently been appointed a member of a committee of that association which will have charge of electrical matters. A meeting of this committee will be held next week at which a third-rail clearance diagram will be considered, somewhat different from the one now before you, and which will afford a greater clearance between fixed objects and rolling equipment.

"I, therefore, suggest that the portion of the report of the committee on heavy electric traction pertaining to standard location of third-rail working conductors be laid on the table until the committee can hold another meeting and further discuss the matter."

On motion, the recommendations for standard location of third-rail working conductors were referred back to the committee for further consideration during the coming year.

Owing to the absence of Martin Schreiber, Newark, chairman of the committee on buildings and structures, consideration of the report of this committee was postponed until later in the morning, and the Question Box was presented for discussion.

QUESTION BOX

William Roberts, Akron, Ohio, referring to question No. 1, said that the Northern Ohio Traction & Light Company had carefully considered the matter of offering a bonus for high-quality coal. He was of the opinion that penalties and premiums should go together. In taking samples of coal for analysis 10 lb. of coal were taken from approximately the center of each of six cars. These samples were mixed together, pulverized and then sent to the chemist. His experience had been that there was not enough variation in the quality of the coal received from one mine to justify either penalties or premiums. He knew of a number of companies that had gone back to the old method of buying coal after trying a contract based on heat units.

A. Wolff, Baltimore, said that in buying coal he demanded a certain standard of heat units, but that the percentage of ash was also important. His specifications required coal containing not more than 7 per cent of ash.

B. F. Wood, Pennsylvania Railroad, thought the tendency in modern power-house operation was to use the cheaper grades of fuel. The Hudson & Manhattan Railroad was burning in its power house at Jersey City No. 3 buckwheat anthracite coal. Where the cheaper grades of bituminous coal were used, some form of automatic stoker which broke up the clinkers was required.

H. Barker, New York, in discussing question No. 2 relating to the use of boiler compounds, said that there were many instances in which it did not pay to install water-treating plants to remove impurities in the water even though the percentage of impurities was very high. Skilfully compounded boiler compounds could be made up to suit almost any conditions of bad water. The speaker thought that where a proprietary boiler compound is specified, the chances were about one in 1000 that the compound of unknown composition would prove suitable for the water in which it was used. Referring to Mr. Roberts' methods of taking samples of coal, the speaker thought that the standard method used by the United States Geological Survey was preferable.

B. F. Wood gave his experience with a boiler plant in Pittsburgh in which soda-ash was used. The soda-ash was fed into the water at a fixed rate, but after one year's operation it was found that boiler tubes were failing at the rate of one a day. An investigation showed that the soda-ash was not being fed at the proper rate. As soon as the difficulty was corrected, no more trouble was experienced from leaking tubes. He thought that wherever soda-ash was used it was necessary to have a system of accurately feeding the proper quantity of soda-ash to the water.

E. O. Ackerman, Columbus, Ohio, in discussing the questions on track construction said that, in his opinion, asphalt pavement should be prohibited in all track work in cities because it cannot be made sufficiently permanent. He thought that a granite block pavement was the most durable. Referring to question No. 13, regarding the use of tie plates on yellow pine ties, he thought that with the proposed standard rails having a wide base, properly secured to the ties, it would not be necessary to use tie plates unless the ties were spaced a long distance apart. In his opinion, screw spikes were an excellent fastening, as they prevented any movement between the rail and the ties. Concerning question No. 15, on the use of grooved rail and T-rail in paved streets, he thought that the grooved rail was not more economical under all circumstances. On lines where there is light vehicular traffic, T-rail was more satisfactory. He did not believe that solid manganese crossings were economical because the points at which the rails intersect will show as much wear if the entire piece is made of solid manganese steel as they would if a manganese center only was used.

M. J. French, Utica, said that he was using a bitulithic pavement on some suburban lines. The binder was a mixture of coal tar and asphalt. A foundation of concrete 6 in. deep was first laid down and on this the top surface, 2 in. thick, was laid and compressed with a 15-ton roller. A hot coating of the liquid binder was poured on the top surface and over this screenings were scattered and thoroughly rolled in. Vehicular traffic was allowed on the street while the pavement was being laid. As soon as the pavement had been laid it was indestructible as far as team traffic was concerned. The track was of 4½-in., 60-lb. T-rail, placed on steel ties. He had been fortunate in being able to lay this track without having to maintain traffic over it, and consequently the concrete had been given an opportunity to take a permanent set. On this line, steel ties had been used at the turn-outs. The ties were of such length as to pass entirely across under the turn-out and they did not require inweaving of the ties.

BUILDINGS AND STRUCTURES

Further discussion on the Question Box was postponed at this time and Martin Schreiber presented the report of the committee on buildings and structures.

A. T. Clark, Baltimore, described the Park Terminal Car House of the United Railways & Electric Company, which is the terminal for five city lines. This car house was fully described in the Electric Railway Journal of Sept. 17, 1910.

The secretary read a discussion on the report sent by night letter-telegram from George Weston, Chicago, Ill.

Mr. Weston said that he agreed generally with the conclusions on pages 4, 5 and 6 of Mr. Schreiber's report. The minimum radius of switch mentioned under track layout, paragraph E, was desirable, but sometimes a smaller radius switch must be used on account of the angle to overcome restricted distances, required clearances, etc., where it is necessary to place turnouts. Under building construction, paragraph F, reference was made to copper and wire glass as satisfactory and permanent materials for light side walls. This was true where the wall was not on the ground floor or where the buildings are not

heated; otherwise, it would seem better construction to use brick or other fireproof material with metal windows and wire glass. In the appendix, page 8, the third line from the top reads "Adjoining property and buildings should be examined and possible damage calculated." This was not always true. In Chicago, for instance, the abutting property owner must take care of and support his own buildings at his own expense. No hard and fast rules could be laid down to govern the arrangement of terminals, each location generally having its own problems. The track and station capacity, the interlocking plants, signals, etc., should be arranged so that the minimum headway required for cars can be maintained at the terminal, making provisions for future increase of travel and consequent reduction of headway.

The title of the report, "Urban and Interurban Passenger Terminals," possibly had restricted its scope to the facilities necessary to handle the people that desired to enter and leave the cars at a particular point and the track, signal and station facilities for handling the necessary number of cars required to go by that point in a given time. It would seem, however, that this subject could be extended to include a study of the advantages that might be derived from providing layover tracks for the storage of extra cars at terminals that were affected by rush-hour travel in order to save dead mileage and to have the cars ready for the return flow of travel in the rush hours in the opposite direction. The question of terminal facilities and the method of operating cars varied in different large cities by reason of the variations in the shape of the cities and the location of the congested business district with respect to the residential sections. Mr. Weston said that these could be summarized as follows:

First—A peninsular city long and narrow with the congested business district at one end like New York.

Second—A circular form where the congested business district is in the center from which the city radiates in all directions, like Indianapolis.

Third—A fan-shaped or semi-circular form generally located on a river or lake front, as Chicago or St. Louis, with the congested business district on the water front, from which the city radiates in the shape of a semi-circle or fan.

It would probably be possible to work out a specific system of car operation for each of the three types enumerated above. Such systems could be applied generally to cities in that class, the entire study to be made from the viewpoints of convenience to the public, the demands of traffic and economy in operation. This would involve the question of operating cars from all points to the business district and return; the operation of through routes from one residence district through the business center to another residence district; the operation of cars, by the zone system, the length of each zone being regulated by the traffic affecting the required headway of cars—operating a wide headway in the outlying district and closer headways in the inner zone districts. In conjunction with the different general plans of operation one should consider the terminal facilities best adapted.

W. V. Dee, Bridgeport, Conn., thought that roof lighting was a subject worthy of the consideration of the committee.

R. V. Collins, New York, discussed automatic switches and signals. In designing intersection points in busy cities, it was found necessary to arrange the interlocking with fewer switch and signal movements than in steam railroad practice because of the extremely short distance between cars and other special conditions. It was necessary also to have the operators throw the switches more quickly than in steam service. The electrical switch-throwing apparatus was harder to protect on an electric railway because it is usually installed underground in paved streets and is liable to trouble from grit and water. Mr. Collins then described an electric switch in the Jersey City terminal of the Public Service Railway. This switch makes about 2000 movements a day. In conclusion, Mr. Collins discussed the requirements which automatic switches and signals have to fulfill in electric railway service.

Mr. Gennet, Pittsburgh, thought the suggestion in paragraph D, section 2, was a good one. The cost of maintenance in terminals for such service was certainly an important one. Experience seemed to justify the use of high-carbon, low-phosphorus, open-hearth steel. In the last few years there had been a considerable development of ferro-titanium, nickel chrome and possibly vanadium steels which might work equally well if it should be possible to obtain grooved rail for special purposes. He protested against the use of second quality rails in terminals where the traffic was heavy and frequent and in other terminals where the cars and locomotives were very heavy.

J. S. Doyle, New York, referred to the welfare quarters which the Interborough Rapid Transit Company had installed.

H. N. Latey, New York, said that cast-iron fittings had been installed in the New York subway toilets because in the original equipment the white marble and brass fittings had been dismantled by thieves who took the brass. Sometimes a water pipe was cut and the water kept on running until the trouble was discovered. With regard to overhead current collection at terminals, wire had been tried at the Williamsburgh Bridge. It was not desirable to use wire where the supports were any great distance apart because of the difficulty of keeping the wire straight. Pans were used at the Brooklyn Bridge.

A. Wolff, Baltimore, was not in favor of using grooved wire on curves, as it was likely to get out of shape.

W. C. Sparks, Anderson, Ind., did not approve of the committee's recommendation for 30-ft. radius curves. The standard radius on his road was 50 ft. He had some curves of 37-ft. radius, but interurban cars 62 ft. long frequently were stalled on these sharp curves.

C. F. Bedwell, Newark, thought that in the design of car houses and terminals more attention should be given to the drainage of surface water in the summer and winter.

William Roberts, Akron, Ohio, thought that in approaches to train sheds solid overhead construction was better than trolley wires, for the reason that it was impossible to maintain a perfect curve on the wire, whereas with the use of a copper bar a perfect curve could be set up and there would be less wear on the trolley wheels and less danger of their coming off.

J. W. Corning, Boston, said that the trolley wire over straight track in the terminals of the Boston Elevated Railway was protected from the ironwork of the terminal by a wooden trough. The trolley wire was supported by ordinary hangers and short-span wires. In the open cut of the Boston subway a grooved trolley wire was first used in 1895. It was supported at intervals of about 8 ft. with special ears. As the wire wore out it was replaced by ordinary No. 00 trolley wire of circular cross-section and no difficulty had been experienced in keeping this construction in good condition.

Martin Schreiber, in closing the discussion on the report of the committee on buildings and structures, suggested that the association accept the report and that the committee should be instructed next year to go over the conclusions and modify them in such a way that they could be adopted next year as recommended practice. On motion the report of the committee was accepted.

STANDARDS

The report of the committee on standards was read by the secretary. Acting President Harvie reminded the members that this was their last opportunity of recording their opinion of the standards proposed before they were submitted to the American Association for final adoption.

The suggestion of the committee on equipment that rolled-steel wheels with rims 3 in. thick be dropped from the proposed standards for rolled-steel wheels was approved.

E. O. Ackerman, Columbus, explained that the rail sections approved by the committee on standards for adoption as recommended practice had been designed to harmonize with the standard wheel treads and flanges already adopted by the association.

M. J. French, Utica, suggested that the 100-lb. A.S.C.E. rail met all requirements where wide tread wheels were in use.

On motion, the rail sections approved by the committee on standards were adopted as recommended practice.

On motion, the section of No. 0000 grooved trolley wire, approved by the committee on standards, was adopted as standard, as was also the table of sizes of wire.

G. W. Palmer, Jr., Boston, explained that the recommendation covering recommended practice in ordering cables was an attempt on the part of the committee on power distribution to establish a uniform practice in ordering cables which would result in the manufacturer furnishing cables having exactly the area of cross-section required in the order. It was, therefore, thought best to specify sizes of cables by stating the number of strands and the size of the separate strands. On motion, the method outlined in the report was adopted as recommended practice.

H. H. Adams, New York, explained that no action need be taken at this time on the recommended specifications for wrought-iron bars and limit gages for round iron, as these subjects had been considered this year by the committee on equipment and would be referred to the committee on standards next year for the proper action.

The recommendations of the committee on standards with regard to specifications for steel axles were withdrawn owing to the action which was taken at the meeting on Wednesday instructing the committee on heavy electric traction to confer next year with a committee from the American Society for Testing Materials.

PRESENTATION TO JOHN W. CORNING

H. H. Adams, New York, referred to the resignation of John W. Corning as secretary of the association, which was announced at the session on Wednesday morning. He said that the progress which the association had made during the past three years was largely due to Mr. Corning's untiring efforts and he expressed the regret of every member of the association that Mr. Corning had found that the work in connection with his duties as electrical engineer of the Boston Elevated Railway had become so pressing that it was impossible for him to continue longer as secretary of the association. The members of the association did not want Mr. Corning to go away from the convention without some small evidence of appreciation of the work which he had done for the association. On behalf of the members he wished to present Mr. Corning with a small token of the esteem in which the retiring secretary was held by his fellow members. He then presented to Mr. Corning a beautiful open-face gold stop-watch and chain. The watch-case will be engraved later with a suitable inscription.

In accepting the gift Mr. Corning expressed his astonishment and delight, and said he had undertaken the duties of secretary in 1907 with some misgivings, but with the hearty co-operation of the other officers and members he had found his task was one of pleasure. He felt very grateful for the many warm friends and acquaintances which he had made during his term of office and he thanked the members for the gift, which he would always prize. The meeting then adjourned until 2.30 p. m.

AFTERNOON SESSION

The meeting was called to order by Acting-President Harvie at 2:45 p. m., and the first order of business was the continuation of the discussion on the Question Box.

G. W. Palmer, Jr., Boston, said that up to the present time his company had used nothing but horse-drawn emergency line wagons. Automobile emergency wagons had been under consideration for some time and the speaker thought that storage-battery wagons were particularly adapted to electric railway service inasmuch as the batteries could be charged at the actual cost of production of electricity and repairs to the motors and other parts of the equipment could be made readily in the railroad shops.

William Roberts, Akron, Ohio, discussed grooving of commutators. The only motor troubles which he had had were on cars having grooved commutators. He thought that the best solution of sparking was to use the right grade of carbon brushes.

H. H. Adams, New York, said that in his opinion if commutators were grooved a much cheaper grade of mica could be used. The tension on the brushes entered into the problem. He had been discussing with some of the manufacturers the possibilities of case hardening the flanges of rolled-steel wheels to prevent excessive flange wear. Some of the manufacturers thought that it was possible, but others thought that it could not be done.

John Lindall, Boston, thought that grooving commutators increased the life of the commutators and reduced trouble from flashing. With reference to the proper pressure for putting on cast-iron and rolled-steel wheels he allowed 8 tons per inch of axle diameter for cast-iron wheels and 10 tons per inch of diameter for solid steel wheels. His experience has been that sharp flanges on wheels were usually due to the truck being out of square or to differences in diameters of the wheels mounted on the same axle.

P. V. See, New York, said that he put steel wheels on axles by pressure and shrinking. The hub of the wheel was heated and was then pressed on the axle under a pressure of about 50 tons. The wheels could not be pressed off without heating, even under as much as 300 tons pressure.

John Lindall, Boston, said that he had never felt that it was necessary to shrink on wheels. He had recently installed a pressure recorder on the wheel press to give a continuous record of the pressure as the wheel went on. The cards obtained in this manner were filed with the wheel records and they served to check the fit of the wheel.

William Roberts, Akron, Ohio, said that heating the wheels while they were being pressed on was very likely to distort them. He thought that a pressure of 25 tons was sufficient for a wheel on a 5½-in. axle.

The secretary read the following letter from C. B. Voynow, Philadelphia:

"As most of the subjects to be investigated by the various committees for the following year are selected by the executive committee after the convention, the members at large often do not know what the subjects are until the preliminary reports are printed and distributed among them a few weeks before the convention. This gives them very little time to get acquainted with the subjects reported, and as the time for discussion at the convention is extremely limited the majority of members are able to take only a perfunctory part in the work of the association. Moreover, the committees do not get the full benefit of co-operation of the members. In order to give each member the opportunity of taking a more active part in the work of the association, I would suggest the following:

"That as soon as a committee has definitely decided upon the scope of a particular subject to be developed and reported at the next convention, a circular should be sent immediately to all the members of the Engineering Association, giving in detail the subjects which it is intended to include in the report and the data required by the committees. A request for such data should be sent not only to member companies, but to all associate members of the Engineering Association; and, further, if there is any new development in the committee work the same should also be reported to all the members.

"Such procedure would be of the greatest value to the association. By keeping the members in touch with the work of the committees it would develop a deeper individual interest and activity among the members. It would give the committees great assistance in developing their reports and when these reports are presented at the convention all those present would be able to take part intelligently in the discussion."

The recommendation contained in Mr. Voynow's letter was referred to the executive committee for action.

The secretary then read the proposed changes in the constitution and bylaws of the association whereby the name was changed to the American Electric Railway Engineering Association and its scope was enlarged to include representatives of electrified sections of steam railways. On motion the proposed changes were adopted.

A motion of thanks to the chairman and members of the several committees which reported this year was made and carried.

The report of the nominating committee was presented by

William Roberts, Akron, Ohio. The following names were proposed for officers of the association:

W. J. Harvie, Syracuse, N. Y., president.

E. O. Ackerman, Columbus, Ohio, first vice-president.

J. S. Doyle, New York, second vice-president.

Martin Schreiber, third vice-president.

Norman Litchfield, New York, secretary and treasurer.

Members of the executive committee: John Lindall, Boston, Mass.; E. J. Burdick, Detroit, Mich.; G. H. Kelsay, Anderson, Ind.; C. B. Voynow, Philadelphia, Pa.

On motion the secretary was instructed to cast the ballot for the nominees and they were declared elected.

W. J. Harvie, the newly elected president, said that in his own behalf he wished to express his appreciation of the extent to which the members of the association had assisted in making the convention this year so successful. He thanked the members for the honor conferred upon him and said that in behalf of the executive committee he hoped that the convention next year would be equally successful.

The meeting then adjourned.

MINIATURE ELECTRIC TRAINS FOR PARKS

Miniature steam trains are a well-known institution of many amusement parks, but no one seems to have built an electric equipment for this service until last season when the Lancaster Iron Works, Inc., of Lancaster, Pa., installed such a train in Hershey Park, Hershey, Pa. As shown in the accompanying illustration the train is made up of four flat trail cars, which carry 18 to 30 people each, and a locomotive. As there is no loop on the Hershey line the locomotive is always placed in the middle of the train for the convenience of the motorman. The power equipment, which consists of two 10-hp motors and one railway type controller, is capable of operating the four trailers at 20 m.p.h. A novelty in the braking apparatus is the use of a combination wheel and track brake.

The Hershey line is of 22-in. gage and is now 1 mile long. It is the property of the well-known chocolate manufacturer of that name who had it installed in the park which was laid out principally for his employees. The line is to be extended about 4 miles more next season when five trains probably will be operated. A railway of this kind can, of course, be made self-contained by the use of storage batteries if the conditions do not permit the ordinary form of power collection. It is hardly necessary to point out that such a miniature electric line is peculiarly appropriate for an electric railway park aside from its superiority to steam in giving freedom from smoke and cinders.

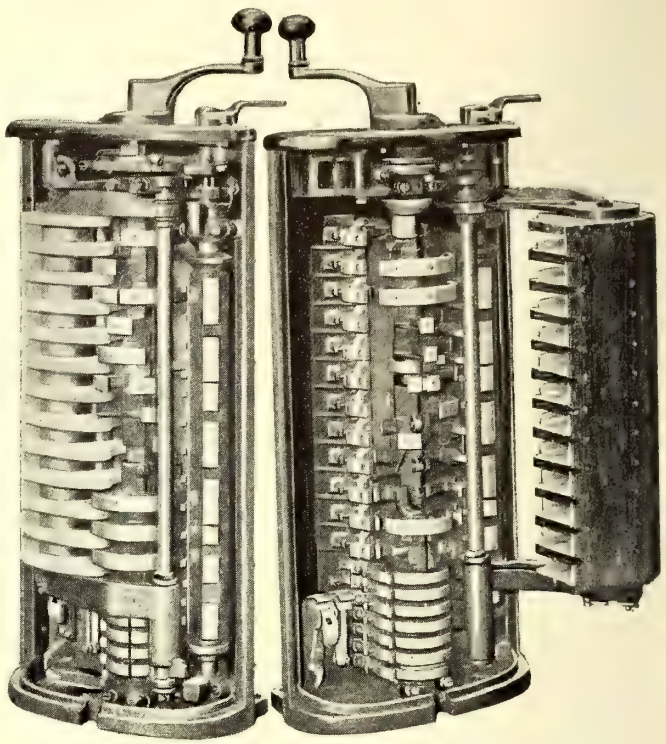


Miniature Electric Train Operated in Hershey Park, Hershey, Pa.

New York's fourth annual electrical show was opened to the public on Monday, Oct. 10, with an electric luncheon given in the restaurant of Madison Square Garden to the representatives of the metropolitan press by the New York Edison Company.

IMPROVED DICK-KERR CONTROLLERS

Dick, Kerr & Company, Limited, London, England, have recently made some improvements in their controllers to meet the heavier requirements of English tramways due to increased speed, the use of top covers for the upper deck and, above, all, to the application of magnetic brakes for service conditions. The alterations have been made without changing the former moderate dimensions of the controllers. The metallic shield



Two-Motor Controller Arranged for Electric Braking

blow-out feature, which was introduced a few years ago, has been made more powerful to secure cleaner contacts and thereby reduce the maintenance.

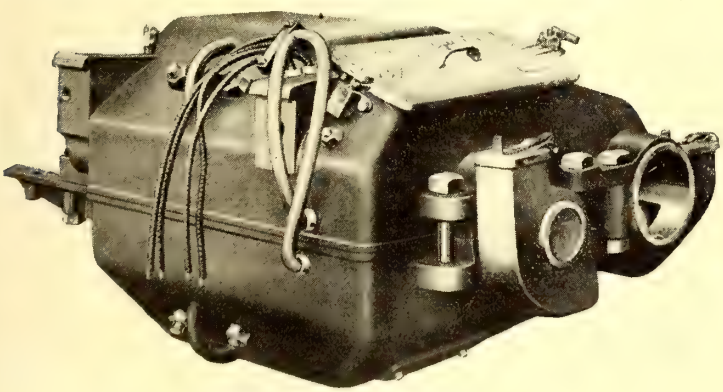
The main frame is of cast iron lined with insulation. The cover is of enameled sheet iron, but has been simplified by using a spring catch instead of hinges and screws. The cover is lined with asbestos throughout, and also with mica opposite the points where arcs are broken. The contact fingers have renewable copper tips, the adjusting screw of the contact fingers being automatically locked by a spring to obviate locking the screw by a lock nut or other device. The segments are of hard-drawn copper tubing and all segment tips subject to burning have short renewable tips. Wood has been entirely eliminated from the construction of the main power cylinder, the shaft being of square section steel throughout, with mica insulation baked thereon, around which the segment castings

are firmly clamped. The reversing cylinder is also strongly constructed, having a round steel shaft with a mica sleeve insulation, around which is fitted the wooden drum carrying the reversing contact plates. The contact fingers are made adjustable to a sufficient extent, so that the contact pressure on the cylinder segments can be varied as desired.

There are 15 notches in all on the braking controllers, four for series work, four for parallel and seven on the brake side; on the non-braking controller the same power notches are provided, but no braking notches.

The novel feature of the braking controller is the combination of the braking and power cylinders on the same shaft. This eliminates the mechanical device previously necessary for throwing over a special brake cylinder when passing from the off position on to the brake notches; where magnetic braking is utilized to any great extent, this is a notable improvement for it insures positive braking action. A separate reversing cylinder is provided, and the usual Dick-Kerr arrangement of interlocking the reversing and power handles is embodied to prevent the switching on of power until the reversing handle has been removed to the ahead or reverse position. It is also impossible for the reversing handle to be removed until the power handle is returned to the off position. The reversing handle is only removable from the controller in the off position.

The power handle is now non-removable from the controller. This feature will help to reduce maintenance cost, prevent the power handle from getting damaged or lost, and secure better and more positive operation of the controller. Another practical point is the arrangement of the motor cut-out switch. This consists of a knob projecting through the back of the controller at the top, which can only be operated by the reversing handle. The turning of the knob either upward or downward through a quarter of a revolution cuts out either motor, or in the four-motor controller a pair of motors, the intermediate position leaving both or all motors connected. Thus a motorman can, in a few seconds, by means of his reversing handle, throw any motor or pair of motors in or out for test; this saves any block in traffic and also obviates the necessity of meddling with the controller in any other way. The cut-out switch is also so interlocked with the reversing cylinder that a motor cannot be cut out except when the reversing switch is in the off position and it is impossible to move the reversing switch except when the cut-out switch is in an operating position. In cutting out either motor a locking lever is raised, which prevents the power cylinder from being moved beyond the last series position. Each motor, when running single, will, therefore, start up as usual on the first series notch of the controller.



Suspension Side of Motor

Electric braking is arranged for with both motors in circuit or with either motor alone. An automatic run-back electric brake can be embodied in the controller, if desired, which comes automatically into operation with the power handle in the off position. This action is entirely independent of the motorman and thus absolutely prevents a car running away backward on any grade. The run-back operates with either motor cut out, as well as with both motors in circuit.

A NEW ALLIS-CHALMERS RAILWAY MOTOR

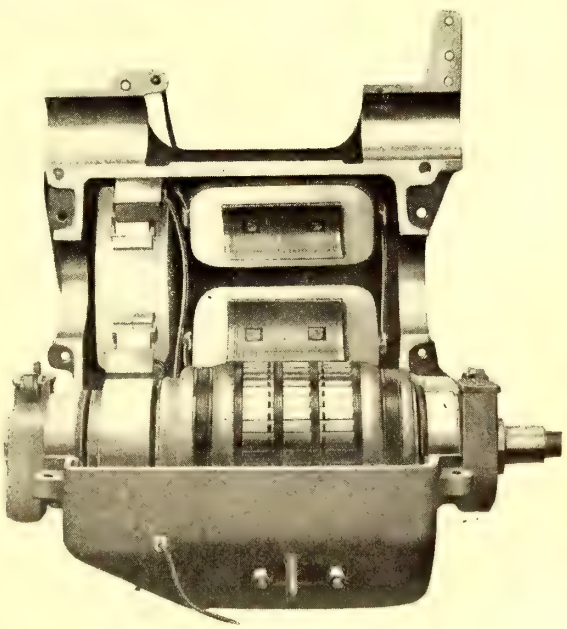
In adding to its line of railway motors Allis-Chalmers Company has recently placed on the market its Type 302. This motor is of the same general type as this company's other railway motors. The field frame is of cast steel and is split horizontally through the armature and axle bearings. It has a large bore at each end to receive the armature-bearing housings. An opening in the top half over the commutator and hand holes at each end of the bottom half are provided for inspection. The top half carries the axle bearings and lugs for the cross-bar suspension.

The pole pieces are made of soft steel punchings clamped between malleable-iron plates and securely riveted. The field coils are of the mummified type. Special insulation is used on these coils and, for final finishing, the whole coil is treated with an insulating varnish by the vacuum process. This construction gives a coil with excellent heat-conducting properties. The armature bearings are in solid housings. The pinion end journal is 3½ in. in diameter by 9½ in. long and the commutator end 3 in. in diameter by 7⅛ in. long. The bearing bushings are cast metal, lined with high-grade babbitt and fit accurately the bore of the housing to which they are securely keyed.

Gears are furnished either in solid or split types as desired. These are 5-in. face and have three-pitch involute cut teeth. The pinions are high-grade hammered steel and are bored taper to fit the taper on the armature shaft, to which they are securely keyed. Gear cases are supplied either in sheet steel or malleable iron.

The armature core is built up of soft-steel laminations which are annealed and varnished after punching. These are secured between end heads, which have rims to support the coil ends and protect the coils. The coils are wire-wound and very carefully insulated. They are secured in place by numerous bands sunk well below the surface of the core. The commutator bars are of hard-drawn copper, mounted on a cast-steel sleeve.

This motor has a continuous capacity of 50 amp at 300 volts and 45 amp at 400 volts with a maximum temperature rise of 75 deg. C. on hourly rating. A two-motor equipment will operate cars weighing 25,000 lb. without electrical load or equipment at a schedule speed of approximately 11 m.p.h. and a maximum speed of about 30 m.p.h. A four-motor equipment on interurban service will operate cars weighing 35,000 lb., without electrical equipment or load, at a schedule speed of about 24 m.p.h. and a maximum speed of about 40 m.p.h. These schedules and speeds are based on straight and level track and 500 volts line pressure.



Motor With Frame Opened

News of Electric Railways

Rapid Transit Educational Campaign in Boston.

The Boston (Mass.) Elevated Railway has begun the publication of a series of rapid transit maps in the daily papers of Boston to acquaint the public in a systematic way with the improvements which have been effected in transportation facilities by the company since it assumed control in January, 1898. The company announces that on account of the consideration to be given by state boards and commissions to the question of further extensions and additions to the rapid transit facilities the present is deemed a proper occasion to show by map and explanatory comment the exact scope and detail of what has been added to the transit facilities of Boston under its administration. In its initial advertisement the company says that while in general it believes the facilities now in use and those to which it is committed are orderly and comprehensive, neither the company nor its directors claim that they are wholly free from defects, nor do they believe that nothing more remains to be done. It believes that intelligent criticism, based upon popular experience, will assist in pointing out specific opportunities for betterment, and welcomes helpful criticism and suggestion, stating that it is always glad to adopt such suggestions so far as they are feasible.

The Legislature of 1910 assigned a number of important investigations to the Massachusetts Railroad Commission and the Boston Transit Commission in connection with proposed transit improvements in the Boston district. Among these were the question of subway construction between Park Street and the South Station; proposed facilities in the way of underground lines to South Boston and Dorchester points; a proposed loop subway from Park Street and Scollay Square under Bowdoin Square and the West End to the Charles River; the question of acquiring a controlling administrative interest in the West End Street Railway and other street railways by the Boston Elevated Railway, and other matters of a broad interest in transportation circles in Eastern Massachusetts. Not a few of the propositions thus referred by the Legislature have already been discussed, either at public hearings before the last General Court, in the press or before the sitting boards; but their merit or defects remain to be formally determined by the commissions so that they can report to the Legislature of 1911. The Boston Elevated Railway is committed to heavy expenditures for additional subway and tunnel lines, and it desires to demonstrate to the public that facilities at Boston have proceeded along logical lines in the last 12 years. In its appearances before various committees and commissions during the last year the company has emphasized the large investment to which it is committed and has pointed out the necessity of careful consideration before embarking upon sweeping additions to the present plans for rapid transit expansion. It feels that if the public acquires a better knowledge of rapid transit evolution in Boston during the last 12 years the present problems will be approached with a more open mind by all concerned.

The initial advertisement, dated Sept. 28, 1910, pointed out that when the company took charge the population of the cities and towns in which it operates was approximately 843,090. Now it is about 1,098,917, or an increase of only about 30 per cent. At the beginning of the period there was invested $25,960,000, while to-day the investment is $81,440,000—an increase of 213 per cent. In January, 1898, there were 304.5 miles of surface track, and at that time only the Park Street loops of the Tremont Street subway were in operation. The size of this subway in relation to the rest of the system was almost insignificant. The initial advertisement showed a complete map of the surface and subway system as of Jan. 1, 1898.

The second advertisement appeared in the morning and evening dailies of Oct. 3, 1910, and showed a map of the Boston system as of June, 1901, when the elevated lines between Dudley Street and Sullivan Square were placed in operation. The company points out that, including the structure, equipment and real estate, the original elevated system cost more than $20,300,000, and that this money would have built 250 miles of surface lines with all necessary equipment with expensive city construction and with paving. The company shows that the surface running time between Dudley Street and Sullivan Square was 45 minutes, and that the original elevated system cut this to 21 minutes; it connected the two great steam railroad stations on the opposite sides of the city, located two large terminals in the heart of the rapidly growing northern and southern suburbs, and embodied every known appliance at the outset for safety and convenience. Attention is called to the use of block signal systems with safety devices and side doors on the cars, and mention is made of the fact that the station designs were the result of a prize competition among architects. Pains were also taken to make the structural design open and light and to introduce architectural effects by the use of archways. As it was not feasible to build an elevated structure through the crowded business center, the Tremont Street subway was temporarily utilized for train service, the company overcoming the almost insuperable engineering difficulties and saving the public the delay of waiting for the opening of the Washington Street tunnel. By these improvements 500,000 people were brought two miles nearer downtown Boston. The company expects to publish about 12 of these educational maps and discussions, and review its accomplishments along the lines indicated in the first two advertisements above mentioned. The maps are attracting widespread popular interest by virtue of their location in the most conspicuous parts of the papers in which they appear.

President of Long Island Railroad on New York's Transit Needs

Ralph Peters, president and general manager of the Long Island Railroad, addressed a letter on Oct. 5, 1910, to Mayor Gaynor, of New York, in regard to the rapid transit needs of the city in which he said in part:

"No doubt it would be a desirable thing to have a subway from every center of business and population in each of the boroughs to the business centers of Manhattan, but it is surprising that those who give proper thought to these matters should advocate such construction without fully realizing the very large sums of money required to build such subways, and the enormous revenues necessary to pay the interest thereon, and to operate and support the subways profitably after construction.

"The subway as a type or form of transportation line can only find justification in the transportation of people to and from densely settled areas, and where there is no available space on the surface for sufficient or rapid transportation lines to handle the traffic. Manhattan with its restricted area, bounded on each side by rivers and extending lengthwise many miles, the entire surface congested, with a dense population and a vast business, could not meet its continued growth without subways. It was logical and proper that such costly methods of providing improved transportation facilities by subways should be adopted for densely congested parts of the Island of Manhattan, in the Borough of Brooklyn, or in the other boroughs.

"It is, however, illogical and wasteful to adopt similar methods for the outlying parts of the Boroughs of Brooklyn, Queens, the upper Bronx, and Richmond, except as it may be necessary to extend the Manhattan subways under the waters to reach these outlaying boroughs, until the crying needs of the densely congested portions are first provided. Ample transportation lines in the open can be provided at far less cost, and in shorter time, affording greater relief to a more extended territory.

"It would be unwise to jeopardize the investment which the City of New York now has in the existing subway, and especially before its system shall be properly completed, by paralleling it with an opposition line that will not be self-supporting, and it would not give the citizens what they want—access to both the east and west sides of Manhattan, with convenient transfers bringing them in and out of three boroughs. You are right in your position that the

proper thing to do is to strengthen the city's investment in the existing subways by making extensions to them which can be profitably operated and will furnish the greatest relief in the shortest time and for the least capital outlay.

"The present subway is a tri-borough route; with its extensions, including the opening of the Steinway Tunnel to Queens, it will be a four-borough route, and will furnish greater convenience and service than any other route that could possibly be constructed.

"It is wise to keep open certain avenues for additional future subway development; but, for the immediate present, the plan to make the much-needed extensions of the existing subways as proposed is the only wise and proper solution of the problem.

"The proposed extensions of the existing subway would be of inestimable benefit to the transportation lines which I represent and the large number of citizens using them daily, and there is room in Queens and Brooklyn for additional surface lines which can be constructed so as to feed the proposed subway extensions. Anything that will benefit the transportation lines of Long Island will be of benefit to the public, the city, and the State.

"I am sure that under your wise and broad-minded direction the city will first build a self-supporting transportation system that will improve the city's credit and with the aid of the Public Service Commission will furnish at the earliest date possible with the smallest expenditure the greatest transportation system possessed by any city in the world.

"In helping to carry out this policy I am at the service of yourself and the commission if I can be of any assistance."

The Columbus Strike

The strike of the employees of the Columbus Railway & Light Company is petering out. Little is said about it, and people are using the cars the same as before the strike was declared. The vigorous prosecution of men accused of rioting and their punishment have put a damper on operations of this kind, and this source of danger to passengers once out of the way conditions will soon become normal.

Arthur Sands was found guilty on Oct. 5, 1910, of throwing stones at a street car during one of the riots that occurred in connection with the strike at Columbus. Policemen and other witnesses testified that they saw Sands throw stones. He denied the statements. On the same day a grocer, accused of having dynamite in his possession, and James N. Orr, a member of the railway employees' association, who was charged with dynamiting a car, were arraigned and pleaded not guilty.

Charles Lewis, who pleaded guilty to throwing stones at cars several days ago, was sentenced on Oct. 4, 1910, to serve one year in the penitentiary. Two Italians were sentenced to indefinite terms in the Mansfield reformatory.

Single-Phase Railway for Sweden

In the electrification of the Swedish railroad between Kiruna and Riksgraensen use will be made of the 15-cycle, single-phase system with an e.m.f. of 15,000 volts at the trolley.

The main transportation over the railroad is represented by the haulage of iron ore to the Norwegian frontier at Riksgraensen. The ore trains are unusually heavy, the total weight being more than 2000 tons. Each train of this weight will be hauled by two locomotives, each equipped with two 1000-hp. motors. These 4000-hp. locomotives will be among the largest ever constructed.

There will be a certain amount of passenger traffic, which will be handled by means of express trains, each of which will be provided with a single 1000-hp. locomotive, designed for a speed of 100 km (62 miles) per hour.

The hydroelectric generating station will be located at Porjus Falls, 120 km (75 miles) from Kiruna and 130 km (80 miles) from Riksgraensen. The station will be equipped with three 10,000-kva, single-phase alternators. The energy will be transmitted at an e.m.f. of 80,000 volts to four transformer substations, where it will be reduced to 15,000 volts.

The contract, which has been let to the Siemens-Shuckert-Werke, Berlin, Germany, and the Allmaenna Svenska Elektriska Aktiebolaget, Westeras, Sweden, calls for the completion and operation of the line in the latter half of 1914. According to the official estimate, the total amount involved in the undertaking—will be about $4,000,000.

Use of Double Trolley Recommended by Council Committee of Milwaukee.—The Railroad Committee of the City Council of Milwaukee, Wis., has recommended to the Council the passage of an ordinance to require all electric railways operating in Milwaukee to use the double trolley system.

Appraisal of the Tacoma Railway & Power Company's Property.—The Tacoma Railway & Power Company, Tacoma, Wash., has retained H. P. Gillette, New York, N. Y., to appraise the physical property of the company. Mr. Gillette will be assisted in this work by Richard T. Dana.

Interurban Extension Increases Land Values.—Indicating the benefit which a suburban electric railway is to the residents of the community through which it runs, specific information has been made public regarding the increase in real estate values along the new Shelbyville extension of the Louisville & Eastern Railroad, Louisville, Ky., showing that the increase has been as much as 33⅓ per cent in some cases. Property which was purchased for $150 an acre before the extension was built is now being sold at $200 an acre.

Date Set for Opening Pennsylvania Railroad Tunnel to New Jersey—The Pennsylvania Railroad has announced that it will open its line under the Hudson River between the terminal station of the company at Thirty-third Street and Seventh Avenue, New York, N. Y., and Harrison, N. J., on Nov. 27, 1910. At Harrison connection is made with the main line of the company. On Sept. 8, 1910, the company opened the section of its line extending from the terminal station in New York under the East River to Long Island.

Street Railway Commission in Toronto.—The special committee of the Council of Toronto, Ont., on street railway matters has decided that it is desirable that the management and operation of the proposed municipal street railway system should be placed in the hands of a commission, and the Board of Control has been requested to consult with the legal department of the city with a view to drafting a constitution for the guidance of the commissioners when they are appointed. It is intended to ask the people to vote $750,000 for the construction of new lines. It has been decided by the special committee on street railway matters not to take any action on the recommendations made in the report of Jacobs & Davies, New York, N. Y., on the underground system until the attitude of the Toronto Railway regarding the sale of its property to the city has been learned. An outline of the system recommended by Jacobs & Davies was published in the Electric Railway Journal of Sept. 10, 1910.

Denial of Motion to Set Aside Court Proceedings in Case of Commission Against Mr. Whitridge.—Justice Bischoff of the Supreme Court of New York has denied a motion by the Public Service Commission of the First District of New York to set aside all proceedings before Justice Brady in the commission's suit to recover penalties from F. W. Whitridge, receiver of the Union Railway, for failure to equip his cars with fenders. The commission held that Justice Brady was interested in the case as a stockholder in the Third Avenue Railroad, which owns the stock of the Union Railway. Justice Brady dismissed the complaint. Justice Bischoff says that at the time of the trial the Third Avenue Railroad had been sold under foreclosure and that the stockholders had no remaining interest in the stock of the Union Railway. The Public Service Commission contended that under a plan of reorganization which had not yet been approved the stockholders of the Third Avenue Railroad might have an opportunity to buy stock in the reorganized road and that a judgment against the receiver might have affected the assets of the new company. Justice Bischoff said that, while he had discussed the question as if first presented on the motion before him, the fact that it was raised before Justice Brady on the trial and disposed of by him made it impossible to review it in the manner sought, but required that it be taken to the Appellate Division the same as any other appeal.

Financial and Corporate

New York Stock and Money Market.

Oct. 13, 1910.

Within the past few days the stock market has shown much improvement in tone and considerable advance in price. Trading has not been heavy and the outside public is notably absent from the market. In the increased activity Interborough-Metropolitan issues have taken their share. Prices for these stocks have shown little change. There has been quite liberal buying of Manhattan Elevated and the price rose to 146 during the week.

The demand for bonds is somewhat improved but is not yet what the dealers in investment securities call satisfactory. The money market is still easy, but rates are stiffer. Quotations today were: Call, 3 @ 3¼ per cent; ninety days, 4⅝ @ 4¾ per cent.

Other Markets.

There has been liberal buying of Rapid Transit stock in the Philadelphia market during the past week. The price after advancing to 21¼ was lower today on profit-taking sales.

In the Chicago market there is still some buying of Chicago Railways certificates, mostly Series 2, and prices have advanced several points. The adoption of the consolidation ordinance has had a distinctly strengthening effect on the traction market.

In Boston there has not been a great amount of trading in tractions. Boston Elevated is the most active of the list, but only small lots are sold. Prices are unchanged.

Traction interest in Baltimore during the week has been limited to the bonds of the United Railways Company. These have been fairly active at former prices.

Quotations of various traction securities as compared with last week follow:

	Oct. 4.	Oct. 13.
American Railways Company	a44	a43¼
Aurora, Elgin & Chicago Railroad (common)	33	33
Aurora, Elgin & Chicago Railroad (preferred)	a89	a89
Boston Elevated Railway	128¾	128½
Boston & Suburban Electric Companies	14¼	14¼
Boston & Suburban Electric Companies (preferred)	72	72
Boston & Worcester Electric Companies (common)	10½	a10½
Boston & Worcester Electric Companies (preferred)	36	36½
Brooklyn Rapid Transit Company	77	77⅝
Brooklyn Rap. Transit Company, 1st pref. conv. 4s	83¾	83¾
Capital Traction Company, Washington	128¾	129
Chicago City Railway	*102¾	*102¾
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a65	a75
Chicago Railways, ptcptg., ctf. 2	a16	a18⅜
Chicago Railways, ptcptg., 3	a8	a9
Chicago Railways, ptcptg., ctf. 4	a5	a5
Cleveland Railway	91½	91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	148½	153¾
Georgia Railway & Electric Company (common)	a117	a118½
Georgia Railway & Electric Company (preferred)	87	88
Interborough-Metropolitan Company (common)	20⅞	20¾
Interborough-Metropolitan Company (preferred)	56½	57
Interborough-Metropolitan Company (4½s)	81½	81
Kansas City Railway & Light Company (common)	24	23½
Kansas City Railway & Light Company (preferred)	80	80
Manhattan Railway	143	143
Massachusetts Electric Companies (common)	a20	a19⅞
Massachusetts Electric Companies (preferred)	a84	a84
Metropolitan West Side, Chicago (common)	a20	a20
Metropolitan West Side, Chicago (preferred)	a62	a70
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	68	69⅜
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a45⅜	a46¾
Philadelphia Company, Pittsburg (preferred)	a42	a43½
Philadelphia Rapid Transit Company	a20⅞	a19
Philadelphia Traction Company	a82	82
Public Service Corporation 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs	a101	a100½
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a58	a58
Third Avenue Railroad, New York	9	10½
Toledo Railways & Light Company	8¼	8¼
Twin City Rapid Transit, Minneapolis (common)	112½	112½
Union Traction Company, Philadelphia	a46	a43½
United Rys. & Electric Company, Baltimore	14⅝	*14⅝
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	57	57
Washington Ry. & Electric Company (common)	a32½	33
Washington Ry. & Electric Company (preferred)	a88½	89
West End Street Railway, Boston (common)	a84½	84½
West End Street Railway, Boston (preferred)	*100¾	100¾
Westinghouse Elec. & Mfg. Company	70½	*70½
Westinghouse Elec. & Mfg. Company (1st pref.)	129	*129

a Asked. *Last sale.

Annual Report of the Kansas City Railway & Light Company

Gross earnings of the Kansas City Railway & Light Company in the fiscal year ended May 31, 1910, amounted to $7,161,042, an increase of $533,065, or 8 per cent over the preceding year. A comparison for two years follows:

Year ended May 31:	1910.	1909.
Gross earnings	$7,161,041	$6,627,977
Operating expenses	4,153,249	3,766,788
Net earnings from operation	$3,007,792	$2,861,189
Other income (net)	17,399	1,218
Gross income less operating expenses	$3,025,191	$2,862,407
Deductions—Fixed and Other Charges:		
Taxes	$477,110	$462,745
Interest on bonded debt	1,356,588	1,378,657
Bond discount and commission (proportion written off)	170,734	143,630
Interest on floating debt	77,230	45,201
Reserve for doubtful accounts receivable	20,693	17,408
Sundries, repairing flood damage, etc	607	3,139
Bond sinking fund provision (Corrigan issue)	55,000	55,000
Total	$2,157,962	$2,105,780
Net income	$867,229	$756,627

In the two years ended May 31, 1910, the company has appropriated $900,000 for depreciation, accruing renewals and other special expenditures and paid dividends on the preferred stock, aggregating $940,750. The balance sheet surplus as of June 1, 1908, was $680,621, and as of May 31, 1910, it was $463,727. Traffic statistics for two years compare as follows:

Year ended May 31:	1910.	1909.
Passengers carried for revenue	111,171,548	104,950,526
Passengers carried on transfers	47,280,535	45,356,172
Gross earnings per car-mile, cents	24.20	22.18
Operating expenses per car-mile, cents	14.38	12.75
Net earnings per car-mile, cents	9.82	9.43
Gross earnings per car-hour	$2.208	$2.036
Operating expenses per car-hour	$1.312	$1.171
Net earnings per car-hour	$0.896	$0.865
Track mileage, between termini, all roads	130.432	129.832
Track mileage, single track, all roads	249.709	249.709

Annual Report of the Lake Shore Electric Railway

Gross earnings of the Lake Shore Electric Railway in 1909 amounted to $919,612, an increase of $52,343, or 6 per cent, over 1908. The total revenue for 1909 exceeded the results of 1907, when gross earnings amounted to $913,161. A comparative statement showing the operations of the Lake Shore Electric Railway, including the Sandusky, Tremont & Southern Railway, for two years follows:

Earnings	1909	1908	Increase
Passenger revenue	$818,263	$792,614	$25,649
Baggage revenue	2,512		2,512
Parlor, chair and special car revenue	6,622	3,870	2,752
Mail revenue	1,968	2,050	*82
Milk revenue	2,238	2,142	96
Freight revenue	58,595	48,338	10,257
Switching revenue	117	61	56
Miscellaneous transportation revenue	43		43
Station and car privileges	2,683	2,705	*22
Parcel room receipts	363		363
Storage	112		112
Rent of tracks and terminals	2,209	2,014	195
Rents of equipment	4,897	8,268	*3,371
Rents of buildings and other property	600	678	*78
Power	12,054	69	11,985
Miscellaneous	6,336	4,460	1,876
Total	$919,612	$867,269	$52,343

Expenses	1909	1908	Increase
Maintenance way and structure	$77,306	$58,034	$19,272
Maintenance equipment	65,089	73,441	*8,352
Operation power plants	70,641	84,892	*14,251
Conducting transportation	175,491	167,212	8,278
General	108,804	107,394	1,410
Total operating expenses and taxes	$497,331	$490,974	$6,357
Net earnings	$422,281	$376,295	$45,986
Other income	25,000	25,000	
Surplus	$447,281	$401,295	$45,986
Interest paid	350,450	326,233	24,217
Net surplus	$96,831	$75,062	$21,769
Per cent of operation	54.08	56.61	*2.53

* Decrease.

Of the total gross earnings for 1909 the Cleveland division, with 60.44 miles of road, furnished a larger proportion than any other division. The contribution of this division toward the total gross revenue was $416,923. The Toledo division, with 62.25 miles of road, furnished $336,434. The Cleveland division showed the largest earnings per mile of road, $6,898. The average for the entire system of 170.13 miles of road was $5,408. Earnings per car mile on the Cleveland division were 33.16 cents.

The operating expenses included maintenance expenditures of $142,395, equal to 15.5 per cent of gross revenue. Conducting transportation costs were $175,491, or 19.1 per cent of the gross revenue, and operation of power plants cost $70,641, or 7.7 per cent of gross.

Traffic statistics compare as follows:

	1909	1908	Increase
Car-miles	3,325,869	3,339,131	*13,262
Income per mile—cents	27.65	25.97	1.68
Oper. and taxes per car-mile—cents	14.95	14.70	0.25
Net earnings per car-mile—cents	12.70	11.27	1.43
Passengers carried	4,951,002	4,788,418	162,584
Earnings per passenger—cents	18.57	18.11	0.46

* Decrease.

The annual report of the Lorain Street Railroad shows gross earnings of $164,471 in 1909, an increase of $21,090 over 1908. Operating expenses and taxes were $88,853 last year, as compared with $90,574 in the previous year.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has submitted a report to the Massachusetts Railroad Commission for the nine months ended June 30, 1910, the fiscal year in Massachusetts having been changed by law. The earnings for the nine months ended June 30, 1910, compare with the earnings for the fiscal year ended September 30, 1910, as follows: Gross income for nine months, $11,383,686, compared with $14,493,853 for the year; operating expenses for the nine months, $7,321,396, as compared with $9,488,483 for the year; net earnings for the nine months, $4,062,290, as compared with $5,005,369 for the year; other income for the nine months, $135,998 (no item of this kind in 1909); total net income for the nine months, $4,198,288, as compared with $5,005,369 for the year; all charges for the nine months, $3,589,342, as compared with $4,163,951 for the year; balance for the nine months, $608,946, as compared with $841,417 for the year; dividends for the nine months, $598,500, as compared with $802,503; surplus for the nine months, $10,446, as compared with $38,941 for the year.

Interborough Rapid Transit Company, New York, N. Y.—In regard to the proposed financing of the Interborough Rapid Transit Company and the election of J. P. Morgan, Jr., George F. Baker, Jr., and Frank A. Vanderlip to the board of directors of the Interborough-Metropolitan Company, an official of the Interborough Rapid Transit Company is quoted as follows: "It is unlikely that any public announcement will be made until full particulars have been settled upon between the Public Service Commission, the Board of Estimate and the Interborough Company in reference to third tracking the elevated lines."

International Traction Company, Buffalo, N. Y.—The committee of bondholders of the International Traction Company, acting under the bondholders' agreement dated June 21, 1910, announces that more than a majority in amount of the 50-year 4 per cent collateral trust gold bonds of the International Traction Company has been deposited under this agreement, and that it has made the necessary arrangements for an advance of the interest due on July 1, 1910, to the holders of certificates of deposit issued for the bonds deposited with the committee.

Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.—The Sterling, Dixon & Eastern Electric Railway and the Lee County Lighting Company have elected the following officers: John I. Beggs, president; Clement C. Smith, vice-president; Robert Camp, secretary and treasurer, all of Milwaukee; E. P. Maxwell, Dixon, Ill., assistant general manager. The vice-president will assume the duties of general manager.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The following committee, upon the request of holders of a large proportion of the first and second mortgage bonds and stock, urges the holders to deposit their securities with the Safe Deposit & Trust Company, Baltimore, Md., or the Cleveland Trust Company, Cleveland, Ohio: John L. Severance (chairman), George A. Craig and John Sherwin, Cleveland; John J. Nellogan, third vice-president of the Safe Deposit & Trust Company, Baltimore, Md.; Hinsdill Parsons, who is associated with the General Electric Company, New York, N. Y., and George T. Bishop, one of the receivers. Depositors may withdraw without expense if dissatisfied with the plan when presented.

Traffic and Transportation

Explanation of Discontinuance of Sale of Tickets by Public Service Railway

The Board of Public Utility Commissioners of New Jersey has forwarded to Joseph Anderson, Sr., a copy of a letter sent to it by the Public Service Railway in response to a complaint filed with the board by Mr. Anderson, in which he took up the matter of the withdrawal from sale of the books of railway tickets. The letter which the company sent in reply follows:

"Gentlemen—Public Service Railway in reply to the letter of complaint of Joseph Anderson, Sr., dated July 5, 1910, respectfully submits the following, assuming that Mr. Anderson refers to Public Service Railway instead of to Public Service Corporation of New Jersey, Public Service Railway being the company that it engaged in operating the street railway system in Jersey City:

"(1) The public demand for tickets at the rate of 21 for a dollar did not warrant the cost of printing, handling and other expenses of issuing and selling the same; the sales of such tickets during a period of six months ending July 1, 1910, yielded more than $24,000 less than the amount received for the same period during the preceding year.

"(2) The largest purchasers of such tickets were the New York Telephone Company, Public Service Corporation of New Jersey and Public Service Gas Company. Not many of such tickets were purchased by other parties. The total of all such sales being less than 4 per cent of the total receipts.

"(3) The Public Service Railway is engaged in installing boxes to register fares paid by passengers on entering its cars, and the use of tickets is inconsistent with the operation of such boxes.

"(4) It is not the practice in other large cities and thickly settled localities, such as New York, Philadelphia, Chicago and Boston, to sell tickets to be used on street cars.

"(5) The ordinances giving consent tc the construction, maintenance and operation of the system of street railways of Public Service Railway in Jersey City, which in legal effect are contracts, authorize the company to collect 5-cent fares."

Statement Regarding Accident on Illinois Traction System.

William B. McKinley, president of the Illinois Traction System, Peoria, Ill., issued the following statement on Oct. 5, 1910, regarding the recent accident on the line of that company:

"The accident was perfectly inexcusable and I cannot imagine how Motorman Lierman forgot his orders as he has confessed to doing. He was one of the most careful men in the employ of the company and had gone on duty perfectly fresh. It was also his first order of the day. It was not as though he had a number of orders to carry out.

"I am informed by C. F. Handshy, general superintendent of interburban lines, that Frank Rowlings, the motorman whom Lierman relieved at Staunton asked Lierman if he had his orders as Lierman was coming out of the train dispatcher's office, and that Lierman replied: 'Yes; I am to meet second No. 73 at Wall's siding.'

"That was but ten minutes before the collision. I cannot imagine how any man could forget his orders in that length of time.

"The road has done everything in its power to safeguard its passengers."

Approval of Freight Contract Asked—The Aldermen of Worcester have petitioned the Railroad Commission of Massachusetts to approve the contract made by the city with the Worcester (Mass.) Consolidated Street Railway whereby the company is to be permitted to act as a common carrier of baggage and freight for 20 years.

Increase in Wages in Atlanta.—The Georgia Railway & Electric Company, Atlanta, Ga., has increased the wages of motormen and conductors in its employ one cent an hour. The new wage scale follows: First three months, 16 cents per hour; second three months, 17 cents per hour; second six months, 18 cents per hour; second year,

19 cents; third year, 21 cents; fourth year, 22 cents; fifth year and thereafter, 23 cents.

Question of Fares to Outlying Sections of Tacoma.—The Municipal Commission of Tacoma, Wash., has voted to place on file the offer of the Tacoma Railway & Power Company regarding fares within the city limits of Tacoma as extended. The company has offered to establish a 5-cent fare limit at the city limits as established following the annexation of Fern Hill and Larchmont if the Municipal Commission will amend the settlement ordinance so that territory hereafter annexed will have no claim to a 5-cent fare pending the life of the company's franchise. The company has also agreed to issue transfers between the lines of the Tacoma Railway & Power Company and the Pacific Traction Company and to remove all tracks from Cliff Avenue, leaving that thoroughfare in shape to be made into a boulevard."

Another Through Route Established in Chicago—The Chicago (Ill:) City Railway has established a through route from Stony Island Avenue on the east, west on Sixty-seventh Street to Rhodes Avenue, south on Rhodes Avenue to Keefe Avenue, southwest on Keefe Avenue to Sixty-ninth Street, and west on Sixty ninth to Western Avenue. A three and one-half minute schedule is followed during morning and evening rush hours. At other times of the day a seven-minute schedule is operated. Ultimately the line is to be extended both east and west. Starting from the corner of Jackson Park, the line now skirts Normal Park and Ogden Park, passing Oakwoods cemetery and the Normal School on the way. On the west it is to be extended to California Avenue.

Proposed Substitution of Signals for Flagmen in Los Angeles.—The Board of Public Utilities of Los Angeles, Cal., has sent to the Council of that city a report regarding the substitution of signals for flagmen at crossings in Los Angeles by the Pacific Electric Railway, in which it says: "We have received ample assurance that the Pacific Electric Railway is arranging to install the apparatus named at all the street and road crossings from Eighth Street, Los Angeles, to Watts as the first installment of that apparatus, but it has no intention to abolish the flagmen at any crossings where they are maintained according to agreement with the Board of Public Utilities until such time as that board may pass upon the adaptability of the automatic flagman and warning signal, authorize its use and abolishment of the human flagmen."

City Attorney of Portland Says City Can Prescribe Fenders.—City Attorney Grant, of Portland, Ore., has presented a lengthy opinion to the Mayor of that city in which he says that there is no legal obstacle to prevent the Council from prescribing for use on the street railways operating in the city any kind of a fender which the members of the Council decide that best meets the requirements in Portland. Mr. Grant says that the precise question of the liability of the city for damages to any person injured by reason of a defect or failure of a fender which had been approved by a city to operate properly has never been decided by the courts, but that in his opinion the city would not be liable. After quoting a number of decisions which bear on the case in point he says: "These cases show conclusively that the doctrine that the city is not liable for acts done in its legislative or governmental capacity, is not only the law in other states, but is the law here and everywhere. This would settle the question, it seems to me. Certainly the city, in prescribing the kind of fender to be used for the protection of the public, is acting in its governmental capacity. It is not interested in the matter in any other way. It derives no revenue, or profit, and has, and can have, no other interest in the matter, except the protection of the life and limb of its citizens. I desire, however, to state to the Council that in any ordinance that is passed it would have no right to specificially designate, by name, any certain or particular fender. The ordinance would have to be drawn so as to cover the specifications of the fender desired by the Council without specifically naming it. A municipal corporation has a dual capacity. One is the right of sovereignty, and while exercising this right the city is not liable. In the other capacity it is exercising a private, or proprietary right, where there is nothing discretionary, or judicial, and in that respect it is liable."

Personal Mention

Mr. F. W. Summers has been appointed chief engineer and master mechanic of the Binghamton (N. Y.) Railway to succeed Mr. J. H. Cole, resigned.

Mr. David S. Bachman has been appointed superintendent of the Schuylkill & Dauphin Traction Company, Williamstown, Mass., to succeed Mr. W. T. Corbusier.

Mr. H. K. Relf has been appointed claim agent of the Oregon Electric Railway, United Railways and the Oregon Trunk Railway, with headquarters at Portland, Ore.

Mr. William W. Handy has been appointed assistant engineer on special work for the Pittsburgh (Pa.) Railways and the Allegheny County Light Company, Pittsburgh, Pa.

Mr. P. P. Kincheloe, Jr., has been appointed assistant chief engineer of the South Covington & Cincinnati Street Railway and the Union Light, Heat & Power Company, with headquarters at Newport, Ky.

Mr. J. J. Martindale has been appointed electrical engineer of the Michigan United Railways, Lansing, Mich. Mr. Martindale was formerly chief engineer of the Northern Construction Company, Jackson, Mich.

Mr. Clarence Wolf has resigned as vice-president of the Philadelphia (Pa.) Rapid Transit Company and as a director of the company. As previously announced, Mr. C. O. Kruger, president of the company, has been elected a director to succeed Mr. Wolf. No successor to Mr. Wolf as vice-president of the company has been elected.

Mr. F. S. Hunnewell, who has been superintendent of the Palmer Division of the Springfield (Mass.) Street Railway for eight years, has been appointed superintendent of the Milford, Attleboro & Woonsocket Street Railway, the Interstate Consolidated Street Railway and the Attleboro Branch Railroad, Attleboro, Mass., effective Oct. 15, 1910.

Mr. P. J. Kearny has been appointed engineer in charge of electric traction on the New York, Westchester & Boston Railway, with headquarters at Mt. Vernon, N. Y. Mr. Kearny was formerly located at New Haven as assistant to the electrical engineer of the New York, New Haven & Hartford Railroad, which is constructing the New York, Westchester & Boston Railway.

Mr. James McM. Smith, formerly general manager of the Southern Michigan Railway, South Bend, Ind., has been appointed manager of the Toledo & Chicago Interurban Railway, Kendallville, Ind., to succeed Mr. A. J. Purington, who, as announced in the Electric Railway Journal of Oct. 8, 1910, has become general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Mr. E. D. Atkins, superintendent of the Worcester & Blackstone Valley Street Railway, Uxbridge, Mass., has been appointed superintendent of the Palmer Division of the Springfield (Mass.) Street Railway, effective on Oct. 15, 1910, to succeed Mr. F. S. Hunnewell, who has been appointed superintendent of the Milford, Attleboro & Woonsocket Street Railway, the Interstate Consolidated Street Railway and the Attleboro Branch Railroad.

Mr. E. P. Shannon, whose appointment as assistant to Mr. John F. Stevens, president of the Oregon Electric Railway, United Railways and the Oregon Trunk Railway, Portland, Ore., was announced in the Electric Railway Journal of Sept. 17, 1910, began his railroad career in 1897 as stenographer to the chief engineer of the Wisconsin Central Railway. Subsequently he was appointed chief clerk to the chief engineer of this company, and continued in this capacity for more than three years. Mr. Shannon then spent 14 months in the purchasing department of the Wisconsin Central Railway. He resigned from the Wisconsin Central Railway to become chief clerk to the general agent of the freight department of the Baltimore & Ohio Railroad in Chicago. After serving seven months in this capacity Mr. Shannon resigned to become secretary, chief clerk and assistant to Mr. John F. Stevens.

Mr. F. M. Weld has resigned as master mechanic of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., to become master mechanic of the Birmingham Railway Light & Power Company, Birmingham, Ala. Mr. Weld began his railway career in 1901 with the Wakefield

& Stoneham Street Railway. Later he was employed as an armature winder with the Haverhill & Amesbury Street Railway, Haverhill, Mass. He also served for a time as master mechanic of the Creighead-Kintz Company in Massachusetts. In 1895 Mr. Weld accepted the position of master mechanic of the Interstate Consolidated Street Railway, Peboro, Mass., and in 1907 he accepted the position of master mechanic of the Evansville & Southern Indiana Traction Company. In 1908 Mr. Weld was transferred from the Evansville & Southern Indiana Traction Company to the Chicago, South Bend & Northern Indiana Railway as master mechanic, both of these properties being controlled by the Murdock interests.

Mr. William H. Forse, Jr., the newly elected president of the American Street & Interurban Railway Accountants' Association, is secretary and treasurer of the Indiana Union Traction Company, Anderson, Ind. Mr. Forse has been an active member of the association. He has served as a vice-president, and is a member of the committee on a standard classification of accounts and form of report. He is also president of the Central Electric Accounting Conference. Mr. Forse was formerly connected with a manufacturing company in St. Louis, Mo. He became connected with the auditing department of the Indiana Union Traction Company in 1903 and two years afterward was elected auditor. In November, 1906, he was appointed assistant treasurer, and shortly afterward was elected secretary and treasurer of the company. Mr. Forse has been an earnest student of accounting subjects, and has written papers and articles in relation to various features of his work. The system with which Mr. Forse is connected is primarily an interurban system. It operates a total of 366 miles of track, which include city lines in several of the communities through which the system extends.



W. H. Forse, Jr.

Mr. George W. Rounds, whose appointment as general superintendent of the Tacoma Railway & Power Company, Tacoma, Wash., was announced in the Electric Railway Journal of Oct. 8, 1910, was graduated from the Massachusetts Institute of Technology in 1889. He became associated with Thomson-Houston Company on railway construction work at Nashville, Tenn., and Concord, N. H., after completing his college work, and remained with the company several years. Mr. Rounds served the Union Street Railway, Dover, N. H., as superintendent after resigning from the Thomson-Houston Company, and in 1896 he became connected with West Roxbury & Roslindale Street Railway, which absorbed the Norfolk Central Street Railway, Dedham, Mass., and was in turn taken by the Norfolk Suburban Street Railway, and then the Old Colony Street Railway. He was connected with this group of companies for about six years as superintendent. In 1902 he became manager of the Canton-Akron Railway, which is now operated by the Northern Ohio Traction Company. After serving about three years with this company he became connected with Stone & Webster, Boston, Mass., going first with the Houghton (Mich.) Street Railway and then with the Terre Haute Traction & Light Company as general superintendent. In 1907 Mr. Rounds was appointed manager of the Savannah Electric Company in charge of the railway department. Early in 1910 he was made general superintendent of the Savannah Electric Company, from which position he resigned to go to Tacoma.

OBITUARY

Benjamin F. Lashar, who was connected with street railroading in Bridgeport, Conn., for 25 years during the period of operation by horses and the early days of electricity as motive power, is dead.

Construction News

An asterisk (*) indicates a project not previously reported.

Construction News Notes are classified under each heading alphabetically by States.

RECENT INCORPORATIONS

Tidewater & Southern Railroad Company, Stockton, Cal.—Application for a charter has been made in California by this company to build an electric railway to connect Stockton, Modesto and Turlock. At Atlanta a branch line will be constructed to Ripon. Capital stock, $1,000,000. Incorporators: John A. Mehling, J. A. Coley, K. C. Brueck, George E. Minges, George F. Schuler, Bryon A. Bearce and T. J. Wisecarver. [E. R. J., July 2, '10.]

Uncompahgre & Gunnison Valley, Montrose, Col.—Incorporated in Colorado to build a 29-mile electric railway to connect Montrose and Delta via the west side of the Uncompahgre River, along Spring Creek mesa and California mesa to Olathe and through Sharano and Coal Creek Valley. J. M. Pepper, Montrose, is interested. [E. R. J., Oct. 1, '10.]

***Billings (Mont.) Traction Company.**—Incorporated in Montana to build a street railway in Billings. Capital stock, $100.000. Incorporators: A. W. Patterson, C. J. Eddy and John A. Connolly.

***Trenton-Mercer County Traction Company, Trenton, N. J.**—Application for a charter has been made in New Jersey by this company to build a railway in Mercer County. Capital stock, $10,000. Incorporators: George W. MacPherson, Rankin Johnson, New York, and Oscar T. Crosby, Warrentown, Va.

***East Pubnico Amusement Company, Halifax, Nova Scotia.**—Chartered in Nova Scotia to build a 4-mile electric railway from Halifax across the Northwest Arm (a branch of Halifax Harbor) to the amusement park at East Pubnico, 4 miles from Dartmouth. Surveys have been made, rights-of-way obtained and construction will begin at once. Officers: Daniel Hawksmarth, president; J. F. George, secretary, and G. C. McClure, 20 Prince Street, Halifax, chief engineer.

London & Northwestern Railway, London, Ont.—Chartered in Ontario to build a 114-mile interurban railway to connect London and Sarnia via Hyde Park, Melrose, Lobo, Poplar Hill, Park Hill and Grand Bend. Preliminary arrangements have been completed and construction will soon be started. Capital stock, $500,000. Daniel A. Stewart, London, is interested. [E. R. J., Apr. 14, '09.]

Greenville Railway & Light Company, Greenville, Tex.—Chartered in Texas to build a 3-mile electric railway in Greenville. Capital stock, $300,000. Incorporators: S. A. Price, Albert Emanuel and H. L. Warren. [E. R. J., Aug. 20, '10.]

Puget Sound, Chelan & Spokane Railway, Tacoma, Wash.—Incorporated in Washington to build about 1200 miles of electric railway and to develop about 30 hydroelectric properties in Washington, aggregating more than 300,000 hp. Capital stock, $25,000,000. W. K. Palmer Company, 717-720 Dwight Building, Kansas City, Mo., has charge of all its engineering work and will supervise construction. [E. R. J., Oct. 1, '10.]

FRANCHISES

***Fort Bragg, Cal.**—Thomas Bourns has asked the City Council for a franchise to build an electric railway in Fort Bragg.

Sacramento, Cal.—The Northern Electric Railway, Chico, has asked the Board of Trustees for a new franchise to extend its tracks in Sacramento.

Elgin, Ill.—The Elgin Traction Company will ask the City Council for a 20-year franchise to build an electric railway in Elgin. J. P. Sayer, promoter. [E. R. J., July 23, '10.]

St. Louis, Ill.—The Southern Traction Company, East St. Louis, will ask the Municipal Assembly for a franchise to use the Municipal Free Bridge and to extend its railway over certain streets in St. Louis.

Troy, Ill.—The St. Louis & Eastern Traction Company, East St. Louis, will apply to the City Council for a franchise to build its railway through Troy. This proposed railway

will connect Granito City and Greenville via Collinsville, Troy, St. Jacob, Highland, Pierson and Pocahontas. A. W. Crawford, Hillsboro, is interested. [E. R. J., Sept. 3, '10.]

Milford, Mass.—The Milford & Uxbridge Street Railway, Milford, has asked the Council for a franchise to extend its tracks in Milford.

Springfield, Mass.—The Berkshire Street Railway, Pittsfield, has been granted a franchise by the Board of Aldermen to connect the Pittsfield Street Railway on the south side of the park in Springfield and at Coltsville. The franchise states that grooved rails shall be used in place of the T-rail.

Saginaw, Mich.—The Saginaw-Bay City Railway has asked the City Council for a franchise to build a loop and extend its tracks in Saginaw.

Duluth, Minn.—The Duluth Street Railway has been granted a franchise by the Council to extend its track on Grand Avenue in Duluth to Fond du Lac via Ironton, Smithville and New Duluth.

Union, N. J.—The Public Service Railway, Newark, will apply for a franchise to the Council to build its railway on Stuyvesant Avenue in Union.

Suffern, N. Y.—The North Jersey Rapid Transit Company, Paterson, N. J., has asked the Council for a franchise to build its tracks in Suffern.

Waterloo, N. Y.—The Geneva & Auburn Railway has been granted an extension of time of its franchise by the Council permitting the substitution of new track in West Main Street in Waterloo.

Chattanooga, Tenn.—D. J. Duncan and associates have been granted a franchise by the City Council to build an interurban railway in Chattanooga. This is part of a plan to build an interurban railway between Chattanooga and Cleveland. [E. R. J., July 9, '10.]

Austin, Tex.—The Austin Electric Railway has accepted the terms and conditions of the franchise granted by the County Commissioners to build an extension of its tracks in South Austin.

***Kenosha, Wis.**—J. K. Orvis will ask the City Council for a franchise to build an electric railway in Kenosha. It is planned to continue this proposed railway to Lake Geneva.

TRACK AND ROADWAY

Glendale & Eagle Rock Railway, Glendale, Cal.—This company has perfected its Verdugo Park branch by adding turnouts, switches and putting in 2 miles of feed wire for additional power.

Los Angeles-Pacific Railway, Los Angeles, Cal.—This company is reballasting its entire line to Hollywood and to Venice.

Visalia (Cal.) Electric Railroad.—This company has begun work on the 3-mile extension of its tracks to Woodlake. The grading contract has been awarded to Buckman & Sons, Visalia.

Denver & Greeley Interurban, Greeley, Colo.—This company is reported to be considering plans for building an electric railway to connect Denver, Fort Lupton and Estes Park. J. D. Houseman, general manager. [E. R. J., July 17, '09.]

Atlanta & Carolina Railway, Atlanta, Ga.—This company has resumed the construction of its proposed railway to connect Atlanta and Augusta, and with a possible extension to Columbia or Charleston, S. C. James W. English, Atlanta, president.

Fairburn & Atlanta Railway, Fairburn, Ga.—This company has applied for authority to the railroad commission to issue $75,000 of common capital stock and $50,000 of first mortgage bonds. The construction of the road from Fairburn to College Park is progressing rapidly, and it is thought that by the first of the year cars will be in operation. This line runs from Fairburn to Union City to College Park.

St. Clair Traction Company, Belleville, Ill.—This company, recently incorporated, has made surveys for its proposed 7-mile electric railway between Belleville and Freeburg. It will begin construction when the necessary capital has been secured. E. L. Thomas, Belleville, president. [E. R. J., Sept. 17, '10.]

Illinois Traction System, Champaign, Ill.—This company, it is reported, will begin building interurban lines out of Atchison next spring. It is proposed to build an interurban railway to St. Joseph, going up the Kansas side of the Mississippi River; another line to Leavenworth and one to Topeka.

Alton, Jacksonville & Peoria, Jerseyville, Ill.—This company has begun work on the extension of its line from Alton to Godfrey. It is expected to have the railway completed by Jan. 1.

***Springfield, Ill.**—Press reports state that a new electric railway will be built soon to connect Cantrall, Athens, Petersburg and Sweetwater. Officers: Honer J. Tice, Greenview, president; George L. Harnsberger, Springfield, vice-president, and Samuel E. Prather, Springfield, secretary and treasurer.

Evansville & Eastern Electric Railway, Evansville, Ind.—This company is reported to have surveys under way for building an extension of its railway to New Albany.

Evansville, Mt. Carmel & Olney Electric Railway, Evansville, Ind.—This company advises that it will begin on Nov. 1 the construction of its proposed 65-mile interurban railway to connect Evansville, Ind., and Mt. Carmel and Olney, Ill. Officers: Aden Knoph, Olney, Ill., president, and E. Q. Lockyear, Evansville, Ind., secretary. [E. R. J., July 2, '10.]

Atchinson Railway, Light & Power Company, Atchinson, Kan.—This company has been authorized to increase its capital stock from $900,000 to $1,500,000. The stock is to be sold, and the money thus derived is to be used for improvements and extensions.

Kentucky & Tennessee Traction Company, Hopkinsville, Ky.—This company, recently incorporated, advises that progress is being made with the preliminary arrangements and contracts will soon be let for building its proposed 25-mile railway to connect Hopkinsville, Salubria, Sulphur, Mineral Springs, Pembroke, Trenton and Guthrie. It is the intention to extend the line into Nashville, Tenn., and to the coal fields of Christian and adjoining Counties north of Hopkinsville, and ultimately it will reach Evansville, Ind. Charles Van den Burgh, Hopkinsville, general manager. [E. R. J., Oct. 1, '10.]

Milford & Uxbridge Street Railway, Milford, Mass.—This company is considering plans for building a 11-mile extension of its line from Uxbridge to Whitinsville, East Douglas and Manchaug. This extension would give a direct street railway connection with Boston. Surveys are now being made.

Berkshire Street Railway, Pittsfield, Mass.—This company has filed with the railroad commissioners a petition asking that the board give its approval to an extension of the company's railway southward from Great Barrington through Sheffield to Ashley Falls.

Lake Michigan & Kalamazoo Railroad, Kalamazoo, Mich.—Incorporated in Michigan to build an interurban railway from Kalamazoo to Benton Harbor. Capital stock, $25,000. William C. Klumb, Kansas City, secretary and treasurer, and John H. Notley, Kalamazoo, attorney. [E. R. J., Oct. 1, '10.]

Lake Michigan & Kalamazoo Railroad, Kalamazoo, Mich.—This company advises that it will begin construction when it has succeeded in securing financial backing. Rights-of-way have been acquired between Benton Harbor and Coloma. Seven miles of grading have been completed. The line will connect St. Joseph, Benton Harbor, Coloma, Watervliet, Hartford, Lawrence, Paw Paw and Kalamazoo. Capital stock, $25,000. Officers: William A. Blake, Coloma, president; William C. Plumb, Paw Paw, secretary, and John H. Notley, Kalamazoo, treasurer. [E. R. J., Oct. 1, '10.]

Mexico (Mex.) Tramway—This company has received concessions for a period of 99 years from the Mexican government for the construction of two electric interurban railways. One will connect Mexico City and Pueblo, a distance of 129 miles, and the other will be a 32-mile line connecting Mexico City and Toluca. Construction will be begun at once. It is expected to have the both lines completed within 3 years.

Granite City Railway, St. Cloud, Minn.—This company, it is said, will extend its tracks to the Northern Pacific station and also on St. Germain Street in St. Cloud this fall.

St. Paul Railway Promotion Company, St. Paul, Minn.—This company has begun surveying for its proposed network of interurban lines radiating from St. Paul to Mankato, Eagle Lake, Faribault, Northfield and other Southern Minnesota cities. W. L. Sontag, St. Paul, general manager. [E. R. J., Oct. 8, '10.]

Metropolitan Street Railway, Kansas City, Mo.—This company has decided on plans for constructing a new line in Kansas City, Kan., to extend from Twelfth Street and Minnesota Avenue south to Orville Avenue, west on Orville to Thirteenth Street to Central Avenue.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—This company is making plans for building an extension of its track from Twenty-sixth Street to the state hospital with a view to building a double-track electric railway to River Street in St. Joseph.

Nebraska Traction & Power Company, Ralston, Neb.—This company, with the Commercial Club as a financial backing, proposes to extend its railway to Lincoln, thus giving Omaha its first interurban electric railway.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company has begun active work on the construction of the Corning branch. It is expected to have the road between Elmira and Corning completed this fall.

Long Island Railroad, Long Island City, N. Y.—This company has filed plans with the State Public Service Commission for the elimination of all crossings on the Flushing main line between the creek and Broadway, Flushing, L. I. The plans call for the elevation of the road over Lawrence and Main and its depression under Union, Bowne, Parsons, Wilson and Boerum, and overhead at Broadway. Twenty-second is to be diverted or closed. The cost is estimated at $1,077,000.

***Wilson, N. Y.**—S. M. Conent, president of the Conant-Bryant Company, is promoting the building of a 2-mile electric railway to connect the New York Central Railroad station in Wilson with Island Lake Park and Sunset Beach on Lake Ontario.

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio—This company, which is building a proposed 60-mile electric railway to connect Wheeling, Cadiz, Uhrichville and Cleveland, recently organized by electing the following officers: R. P. Scott, president; W. W. Wright, vice-president, and W. A. Holmes, treasurer.—[E. R. J., July 2, '10.]

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company is making plans to double track its line as far as Willoughby Park immediately and through to Willoughby within a short time. The company contemplates double tracking its entire line in the spring.

***Youngstown, Ohio.**—Press reports state J. R. Curtiss and George H. Carpenter are considering plans for building a proposed electric railway between Painesville and Youngstown. Rights-of-way have been secured and actual work will be started in the near future.

Oklahoma Union Traction Company, Tulsa, Okla.—This company has increased its capital stock from $100,000 to $400,000. It expects to build a bridge across the Arkansas River and extend its railway to West Tulsa in the near future. L. Cox, superintendent.

Guelph, Ont.—On Sept. 26 the ratepayers of Guelph carried by large majorities two by-laws, one granting a franchise to the People's Railway and the other authorizing the city corporation to subscribe for $85,000 worth of stock in the company. According to the franchise the entire railway connecting Guelph with Berlin, Elora, Fergus, Arthur, Hespeler and Puslinch Lake is to be completed by July, 1912. A. W. Bugg, secretary of the company, states that the contractors will commence work at once grading the right of way on the line between Guelph and New Germany, while the line from Berlin to New Germany is under way. At a meeting at Berlin on Sept. 19 a permanent board of directors of the company was chosen as follows: George Clare, Preston; J. G. Reiner, Wellesley; J. C. Holman, New Dundee, and Andrew Steele, Fergus, George Wanless, W. J. Moody, David Moody, William Pieper and W. A. Bugg, Berlin.

Toronto & York Radial Railway, Toronto, Ont.—This company, it is said, has had surveys made near Mimico for the purpose of double tracking a portion of its line.

***Berlin, Pa.**—H. G. Kaylor, Johnstown, and associates are said to be making surveys and considering plans for building a proposed electric railway to connect Berlin, Somerset and Garrett.

***Pittsburgh, Pa.**—H. M. Rodgers and C. B. Reeves are said to be making preliminary arrangements and will soon begin the construction of a proposed electric railway to connect Pittsburg, Wellsburg and Wheeling.

West Penn Railways, Pittsburg, Pa.—This company is reported to be considering plans for building an extension of its railway from Fayette City to Donora.

Memphis (Tenn.) Street Railway.—This company, it is reported, will construct at once a double track cross-town line on Cleveland Street in Memphis.

Cache County Amusement Company, Logan, Utah.—This company, recently incorporated to build an interurban railway to connect Wellsville, Hyrum, Logan, Hillville and Providence, has organized by electing the following officers: Job White, president; J. E. Wiscomb, vice-president; Leo Nielsen, treasurer, and W. J. Phillips, secretary. George A. Hansen is the additional director.—[E. R. J., Sept. 24. '10.]

Sheridan Railway & Light Company, Sheridan, Wyo.—This company will start construction at once on its proposed 13-mile interurban railway from Sheridan, Wyo., to the Government reservation near the city. Ernest Boehme, West Alzer Avenue, Sheridan, is the engineer in charge of the work. Emanuel & Sullivan, Dayton, Ohio, promoters. [E. R. J., Sept. 10, '10.]

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company has purchased a site in Live Oak upon which it will build a new depot.

Pacific Electric Railway, Los Angeles, Cal.—This company will build a 6-story depot and hotel building at Long Beach. The structure will be 135 ft. x 175 ft. of reinforced concrete construction. Plans are under way to begin work within the next few weeks.

Illinois Traction System, Champaign, Ill.—This company will build a new addition to its station on Ninth Street and Monroe Street in Springfield. The building will be one story, of brick construction, and will be used for office purposes.

Northern Illinois Light & Traction Company, Ottawa, Ill.—This company has begun work for the construction of its new repair shops near Ottawa. The structure will be 50 ft. x 300 ft. The steel for the building will be furnished by the Joliet Steel Company. L. W. Hess, general manager.

Beech Grove Traction Company, Indianapolis, Ind.—This company will receive bids at once for building a car house in Indianapolis. The structure will be of brick construction, one story, 60 ft. x 80 ft. C. F. Schmidt, Ætna Building, Indianapolis, secretary.

Wichita Railroad & Light Company, Wichita, Kans.—This company is said to have awarded the contract to the Sanders Brothers Manufacturing Company for building its new repair shops in Wichita. The structure will be 62 ft. x 300 ft. The frame will be of heavy steel and the walls will be of brick. It will be so constructed that additions may be made at any time. Estimated cost is about $30,000.

POWER HOUSES AND SUBSTATIONS

Holley Electric Railway, Springville, Cal.—This company has recently bought a site near Springville on which it will build a power plant.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—This company advises that it has recently placed contracts for one Hamilton Corliss cross-compound engine, 1500-hp. 80 r. p. m., to be direct connected to a 1000 kw G. E. generator; Stratton steam separator; Cochrane oil separator and Wheeler & Edwards condenser and air pump. It is also erecting two 420-hp. Sterling boilers with superheaters. It is the intention to replace its present steam header with a 15 header designed for superheated steam.

Ottumwa Railway & Light Company, Ottumwa, Ia.—This company is building a new power plant on South Jefferson Street in Ottumwa. The structure is 112 ft. x 34 ft. of brick and concrete construction.

Manufactures & Supplies

ROLLING STOCK

Second Avenue Railroad, New York, N. Y., is in the market for 200 new motor equipments.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has ordered two closed cars of the Jewett Car Company.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., is reported to be considering the purchase of 20 new cars.

United Railways & Electric Company, Baltimore, Md., has ordered from The J. G. Brill Company 60 30-ft. 8-in. semi-convertible pay-as-you-enter cars, mounted on Brill No. 27, GE-1 trucks.

Boston (Mass.) Elevated Railway has asked for bids for 100 semi-convertible surface cars. Mention was made in the Electric Railway Journal of Aug. 20, 1910, of the fact that this company was considering the purchase of this equipment.

United Railroads, San Francisco, Cal., has placed an order with the Standard Motor Truck Company for 160 type 6-50 trucks. These trucks will be used on the 80 cars on order with the Jewett Car Company. GE-210 four-motor equipments have also been specified for these cars.

Galveston-Houston Electric Railway, Galveston, Tex., has ordered, through the Stone & Webster Engineering Corporation, ten interurban passenger and two express cars from the Cincinnati Car Company. The passenger cars are 52 ft. over all, and will seat 54 passengers. They are for single-end operation, and have smoking compartments. They will be mounted on Baldwin M. C. B. trucks, having Symington ball-bearing center plates and steel wheels with a wheelbase of 6 ft. GE-73 equipments, with automatic relay type M control, will be used. The air brakes will be of the Westinghouse A. M. M. type. The equipment of the express cars will be similar, but they will be designed for double-end operation.

Tri-City Railway, Davenport, Ia., which was noted in the Electric Railway Journal of Sept. 17, 1910, as having purchased seven double truck closed pay-as-you-enter cars from the Cincinnati Car Company, has specified the following details for these cars:

Bolster centers, length, 19 ft.	Curtain material...Pantasote
Length of body...30 ft. 8 in.	Destination signs....Hunter
Over vestibule....43 ft. 8 in.	Fenders ..... Providence
Over posts at belt..8 ft. 4 in.	Gongs..two 14 in. foot gongs
Sill to trolley base..8 ft. 5 in.	Hand brakes,
Height from top of rail	operated by 12 in. handles
to sills.....30 in.	Heaters ..... Consolidated
Body ..... composite	Headlights ..... Dayton
Interior trim..quartered oak	Motors 4 GE-80
Underframe ..... composite	Push button signal...Consol.
Bolsters, body..built-up steel	Roofs.....Monitor deck
Bumpers,	Sanders,
Faced with 6 in. x ⅜ in.	2 per car, air operated
steel plate	Seats, Hale & Kilburn, rattan
Car trimmings..solid bronze	Step treads, C.C. Co. compos.
Couplers.....C. C. Co. radial	Trucks.....Standard 0-50
Curtain fixtures,	Ventilators,
Nat. Lock Washer Co.'s	ordinary deck sash

TRADE NOTES

W. H. Schott Company, Chicago, Ill., has moved its office to suite 1805-09, 39 Jackson Boulevard, Chicago.

Kean, Taylor & Company, New York, N. Y., announce that Richard L. Morris has become associated with them in charge of their bond department.

Massachusetts Chemical Company, Walpole, Mass., has appointed Charles A. Baldwin manager of its New York office, to succeed Henry E. Cozzens, who has resigned.

Burton W. Mudge & Company, Chicago, Ill., have elected Robert D. Sinclair as secretary and treasurer. Mr. Sinclair was connected previously with the First National Bank of Chicago for many years.

W. H. Finley, signal engineer of the Chicago Great Western Railroad, at Chicago, has resigned to become associated with the Chicago sales office of the Union Switch & Signal Company, Swissvale, Pa., effective Oct. 15.

Shur-On Trolley Guard Company, Buffalo, N. Y., has been incorporated, with a capital stock of $25,000, to manufacture all kinds of appliances for electric cars. The incorporators are H. J. Tiedt, F. J. Nolan and H. J. Young, of Buffalo.

P. H. Wilhelm, who has been connected with the American Steel & Wire Company for some time, has been appointed general railway representative of the Boston Wove Hose & Rubber Company, Boston, Mass. Mr. Wilhelm's headquarters will be at Boston.

Scofield Engineering Company, Philadelphia, Pa., has been retained by the Browning Manufacturing Company, Cleveland, Ohio, to design and supervise the construction of a cantilever material handling bridge, which is to be built near Lockport, N. Y. Plans are in progress and work will start immediately.

W. W. Wheatley, Chicago, Ill., representative of the Edison Storage Battery Company and the Federal Storage Battery Company, has associated with him in this representation Lucien Wheatley. W. W. Wheatley was formerly general manager of the Kansas City Railway & Light Company. Lucien Wheatley has been president of the Charleston City Bank, of Charleston, Ill.

Canton Culvert Company, Canton, Ohio, reports a recent sale of several hundred lineal feet of 60-in. diameter "Acme" (nestable) corrugated galvanized No-Co-Ro metal culverts to a prominent engineering and contracting concern in New York City for use as an intake from a crib to an electric power house on the bank of the Connecticut River. Upon investigation the engineer in charge found it a practical and simple matter, by reason of the characteristic construction of the "Acme," to calk the lateral flange points with an inexpensive waterproof cement, making the culvert sand-suction tight, and also facilitating installation through the convenience of setting up the culvert in 20-ft. break joint lengths on the river bank, transporting these on a scow and lowering them for divers to join these together under the water. This is a feature worthy of consideration by engineers having similar projects in view.

ADVERTISING LITERATURE

Economy Oil Cup Company, Augusta, Ga., is mailing a circular which illustrates and describes the economy oil cup.

Western Electric Company, New York, N. Y., has issued booklet T-206 describing its composite telephone and telegraph system for railway service. This system has been devised for the purpose of enabling telephone and telegraph messages to be transmitted simultaneously over grounded telegraph lines. The book contains 54 pages, and is profusely illustrated.

Wheeler Condenser & Engineering Company, Carteret, N. J., has issued a 24-page pamphlet entitled "Condenser for Small Central Stations," in which is reprinted a lecture delivered before the Missouri Gas, Electric & Street Railway Association. It contains a number of useful tables, charts and curves relating to the operation and economy of condensing machinery.

George Carson, claim agent of the Seattle Electric Company, following the inauguration of his series of meetings and lectures for the benefit of trainmen of the street railway service, looking toward minimizing the accidents on the line and the consequent reduction of claims for injury against the company, is conducting an accident campaign in the public schools of Seattle, where addresses for the benefit of teachers and pupils alike are being given.

The Charleston Consolidated Railway & Lighting Company, Charleston, S. C., has let the contract to the Gadsen Construction Company, of Savannah, Ga., for constructing the foundation for the new power plant in Charleston. The structure will be 120 ft. x 120 ft. The equipment of the new plant will consist of 300-hp. Babcock & Wilcox boilers, 1-1000 kw turbine generator in addition to the one in the old plant now being used, 2-2000 kw turbine generators, 3-500 kw railway motor generators, 2-100 kw exciters, 1-35 kw motor generator. All of the above machinery has been ordered, together with the necessary equipment. The plant when completed will cost about $200,000.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, OCTOBER 22, 1910 No. 17

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 22, 1910.

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The Engineer as a Citizen

The meeting held at the United Engineering Societies Building on Monday, at which engineers were invited to discuss the engineering and transportation features of the proposed tri-borough subway in New York, was a step in the right direction. Engineers and transportation men, as citizens, have as much interest in public matters as any class of persons in the community, and when the questions are of an engineering or transportation character they are often more interested than other citizens in seeing that the proper plan is followed. As they are better fitted to understand these problems than their neighbors there is every reason why they should express their opinions. In fact, it is a duty which they owe the public. We trust that the meeting, which was held under the auspices of the American Institute of Electrical Engineers on Monday, will be but the first of many which will be held not only in New York, but in every other locality whenever municipal undertakings of an engineering character are being considered.

Proportions of Long Platform Cars

A prominent car builder, in discussing possible methods of reducing car weights at one of the meetings of the Engineering Association last week, suggested that closer attention should be paid to the relation between platform overhang and truck-center distance. The underframe of a car may be considered as a continuous beam supported at two points over the trucks. For minimum deflection the summation of the moments of loading between and outside of the bolsters should be equal. If this condition does not exist, either the body framing or the platform framing must be made stronger and heavier than otherwise would be necessary. The concentration of apparatus hung under the car body as near to the bolsters as the clearances of the trucks will permit also relieves the framing of vertical bending stresses and allows lighter construction to be used. Single-motor trucks with the pony wheels placed under the platforms afford an opportunity for lengthening the distance between bolsters and bringing the electrical and air-brake equipment hung under the car nearer to the points of support.

Service at Railroad Stations

There remains an opportunity in not a few cities for the improvement of street railway service in connection with traffic to and from steam railroad stations. Many companies seem tacitly to assume that those who arrive by train and who would naturally patronize the local trolley system are bound to do so without special appeals, but in view of the acute competition among cabmen it is evident that additional efforts to reach the stranger at the railroad station are needed. The question to be solved is how best to tell him what car he must take and what changes, if any, he must make to reach his

destination. Many strangers who arrive in a city overrate the trouble of securing this information, and either walk or engage a carriage at from ten to twenty times the cost of a car fare. The posting of a map of the company's lines at several points in the station would be of assistance in this connection. The distribution of timetables and the erection of suitable signs might also be of assistance. If permission cannot be secured to use the steam properties for this purpose, illuminated signs outside the station would undoubtedly help in many cases. A great deal can also be done in connection with the distinct marking of cars. The fact is undeniable that a considerable volume of traffic awaits the work of the publicity department in connection with service between the more important business and residential centers and the railroad stations. At present, through ignorance of facilities, many fares are lost by the local railway company to the hackman and the taxicab operator.

Methods of Carrying the Peak Load

The papers and reports presented at Atlantic City were so numerous and covered such a variety of topics that they will afford food for thought for a long time. The power station engineer will naturally be most interested in the report of the committee on power generation, which was an important one in many particulars, but the point which will strike him most forcibly will probably be Mr. Stott's study of the peak load problem. The peak has been the pet horror of every operating engineer since the beginning of electrical distribution, and methods of carrying it economically have been studied at great length. The five methods of carrying the peak considered are storage batteries, purchased power if available, hydroelectric power if available, gas engines, and the deliberate use of steam turbines adapted to carry the extra load. Considering the peak by itself, the fixed charges as shown by the diagram of the committee are by far the most important item, and it is this fact which in the last resort furnishes the criterion of judging the possible merits of relief. The storage battery calls for no plant capacity, but the report states that for peak use only the fixed charges upon it are too heavy to admit it as an economical solution of the problem. Purchased power, whether hydroelectric or not, usually carries a heavy maximum demand charge which is in effect a fixed charge and again gives a high peak value of cost. The peak power derived from gas engines seems at present to be open to the same objection. The investment per kilowatt is large, and while fuel charges are small the gain does not offset the loss for peak use. The point of view of the committee is that the deliberate installation and operation of steam turbines big enough to carry the peak is the best way out of the difficulty. If low-pressure turbines can be added to a reciprocating plant and the boiler investment can be kept down by adding grate surface or forced draft or both to already existing boilers, the investment cost per kilowatt of extra capacity available for the peak is very greatly reduced. The steam turbine has certainly proved a wonderfully economical and flexible means of obtaining power. It has been through troublous times in the earlier part of its career, has successfully passed difficulties that once seemed threatening, and has now established itself as the standard prime mover for electrical work. It is gratifying to find that its usefulness can be stretched, as it were, to meet the most exacting requirements of peak load in the way that the report indicates.

THE INTERURBAN AT BAY

Several unfortunate accidents which have occurred on interurban roads recently have led to the hasty suggestion that if happenings like these cannot be prevented it is best to discontinue operation of the roads. But the destruction of the properties would benefit no one and would remove an excellent and much desired public service. The real question, then, is not one of retention or abolition, but whether improvements or changes, radical or simple, are required in order to produce conditions that will make travel on interurban systems reasonably safe. A short review of the financial problems confronting interurban roads and the history of their origin may be of assistance in considering the situation.

These lines derive, as a rule, about 90 per cent or 95 per cent of their gross revenue from passenger business. They supply a frequent service at rates which steam railroad authorities contend are unprofitable. For local travel they provide trains every hour or thereabouts to many communities that previously were dependent for connecting transportation facilities upon the one, two or three trains a day furnished by steam railroads. But they also give service between many communities which were previously without any except the vehicle method of connection.

When many of these roads were built far less was known of their real cost of operation than at present, and it was supposed that they could flourish with a basic passenger rate considerably less than that charged by the steam railroads. But the old game of cut rates is one at which two can always play. And the steam railroads, deriving less than a quarter of their operating revenues from passenger business and but a fraction of this from the local business in which there was competition with the electric lines, occupied points of vantage in the struggle. With through passenger traffic untouched, with freight rates undisturbed and just now in a fair way to be advanced, the steam railroads have left to the interurban lines a residue of business whose real profitableness in many cases is open to question. Of course, these considerations do not apply at all, or at least they do not apply with noticeable force, in localities where the density of interurban traffic is so great that gross revenues are sufficiently large to yield with careful management proper returns.

The low rates at which the interurban roads invited traffic had another unfortunate effect. They encouraged bargaining on the part of the municipal, town and village authorities which in some instances led to the incorporation in franchises of rates as low as 1 cent a mile. Discriminatory extorted rates of this nature are in the interest of neither the companies nor the public and under such laws as exist in Massachusetts may be revised.

The point that we make is that the interurban roads have sought a business which was largely ignored or neglected by steam railroads and that, through early mistakes and force of circumstances or public opinion, they have been driven to accept the lowest possible rates for it. Instead of securing good rates for what is really a service of incalculable convenience to the public, and for terminal facilities that are remarkably good in many cities, these roads have appeared to be in the position in certain sections of the country of offering a poor thing and receiving poor pay for it.

When a wreck occurs there is a loud public outcry in favor of

mechanical or other additional precautions. Those who are really concerned with the daily operation of the hazardous interurban systems wonder where the fault lies. Is it with the lack of block signals, with the single-track instead of double-track investment, with the operation of over-frequent units at high speed, with the training and discipline of the men, with the management, with weak rules, or where?

The answer to this question is a vital one, which the railways, with their present and future at stake, ought to find. If greater capital investment or larger operating expenses are required in order to insure greater safety of operation, and the properties, with reasonable capitalization and good management, cannot meet these requirements, their rates ought to be increased. The public is desirous of good service and service cannot be of high standard unless the danger of accident is reduced at every point to the minimum. It is better that the public should pay higher rates in order to secure the right quality of service than that low rates should prevail without that full measure of protection of lives which is the first duty of the company.

The hazards of interurban operation are unusually serious and the responsibilities are correspondingly great; the need of excellence in operation should be considered by each company with a full understanding of the facts.

ACTION ON INTERURBAN RULES

While the discussion on the report of the committee on interurban rules in Atlantic City last week was disappointing and the action taken to refer the revised rules back to the committee for further consideration was not accompanied by definite instructions, the year's work has not been altogether wasted. If it served no other useful purpose, the report presented this year directed attention to the difficulties involved in adapting the American Railway Association standard rules to meet the average conditions of electric interurban railway operation. Those companies which have been in doubt as to the relative merits of the Denver rules and the modified steam rules will now have an opportunity to compare the two codes paragraph by paragraph. The opponents of the steam rules will have something tangible to criticise and those who favor the steam rules will have something to defend. The opinions and arguments on both sides, hitherto vague and indefinite, can be crystallized and made ready for the real test of strength which probably will come sooner or later.

It was better, perhaps, that the association did not put itself on record at this time as approving either code in preference to the other. In fact, we do not believe that the final settlement of matters of this kind, which vitally concern every member of the association, should properly be left to a viva voce vote taken at any meeting. A large enough number of membership companies is not represented, nor can such a vote be considered as indicative of the carefully considered judgment of all of those present.

The association has now two codes before it: the Denver code, which was formally adopted by the association a year ago and is still the standard of the association, and the modified A. R. A. code presented this year. That some changes could well be made in the Denver code is admitted, even by its most ardent partisans. The revision of the interurban rules is one of the most important matters to be undertaken during 1911 by the Transportation & Traffic Association, and the committee in charge of the work during the coming year will be in a better position to obtain results than any other, on account of the work which has already been done. It will be impossible for it to accomplish very much, however, unless it receives more help from the membership at large than its predecessors have had in the past. On the other hand, if the committee begins work promptly and secures from each member company of the association operating interurban cars a carefully considered criticism of the two codes which have been presented to the association, its work will be greatly lightened. Under these circumstances it may easily be possible, by the time of the 1911 convention, for the association to prepare a code for adoption by letter ballot which will answer the needs of the majority of its members.

A RETROGRESSIVE EFFECT

It is a significant and striking commentary upon the retrogressive effect of the new Cleveland ordinance that the gross earnings of the Cleveland Railway appear to have made substantially no increase from 1906 to 1910. The figures given by Mr. Davies in his paper before the Accountants' Association at the Atlantic City convention last week and published in the issue of the Electric Railway Journal for Oct. 15, 1910, page 843, are the authority for this statement. In the six months ended Aug. 31, 1906, passenger earnings amounted to $2,944,934 and gross earnings from operation to $3,011,575. For the corresponding period of 1910 the figures were, respectively, $2,974,460 and $3,065,888. The increase in each case is so small as to be practically negligible. It was 1 per cent in passenger earnings and 1.8 per cent in gross earnings from operation. If we contrast this slender showing with the usual rate of increase expected in properties of this character, the paralyzing effect of the Cleveland developments is seen in clearer light. During a similar period, but counting in full years and starting with 1905 and ending with 1909, a group of ten companies whose earnings were compiled by American Street Railway Investments increased in gross earnings 27.9 per cent. A group of 20 companies whose operations were smaller in amount increased 30.8 per cent in gross earnings.

While the revenues remained stationary in Cleveland more passengers were carried. During the six months of 1906 there were carried 62,334,042 revenue passengers and 24,009,806 transfer passengers, a total of 86,343,848; and in the half year of 1910 the corresponding results were: Revenue passengers, 86,848,832; transfers, 29,108,231; total, 115,957,063. Thus many more passengers had service in 1910, but as the car-mileage failed to keep pace with the increase in traffic it appears that the service was not so plentiful this year as in 1906. That was inevitable under the conditions that were produced. With a developing city the normal rate of increase in population causes a gain in street railway gross earnings and, under ordinary conditions, it is accompanied also by consistent additions to track and equipment.

If, as shown, the Cleveland Railway has been disappointed in its reasonable anticipation of steady increase in gross revenues, we unhesitatingly assert that the same conditions which produced that effect have also prevented the enjoyment by the public of extensions that would have followed, in the natural course of events, the development of the business.

FREIGHT SERVICE OF THE SCIOTO VALLEY TRACTION COMPANY

The Scioto Valley Traction Company established its freight business on Dec. 5, 1905, shortly after the opening of the road for passenger service. When the line was built its projectors had anticipated the development of a freight business, but did not make any such provision for its care as has been found necessary with the increasing appreciation of the value of the service on the part of residents of the district served. Shortly after the inauguration of the freight business J. O. Bradfield was appointed general freight agent. He was experienced in steam railway practice, but had not been connected with any electric railway properties. He has continued to follow largely existing steam railway practice.



Scioto Valley Traction Company—Freight Motor Car with Two Trailers

When the freight service was started general merchandise was handled almost exclusively. An advertisement was placed in the newspapers published in the various cities and towns on the line announcing that the service would be started on the date given. In the ensuing six months business was solicited almost continuously, but it was found then to be unnecessary to solicit merchandise business, as the merchants were quick to appreciate how valuable the service afforded by the electric line would be to them and their customers. The work of solicitation since the preliminary period has been confined largely to carload business, although an effort is made to visit once a week all of the seven towns from which the principal business is secured.

The first tariff issued by the company was based on the rates of competitive steam roads as nearly as these rates could be learned. The tariffs of the steam roads were not then open to inspection as at present, but, from his experience, Mr. Bradfield was able to arrive at substantially the same rates. The official classification was used, although a good many exceptions were stipulated and are still provided in the existing tariff.

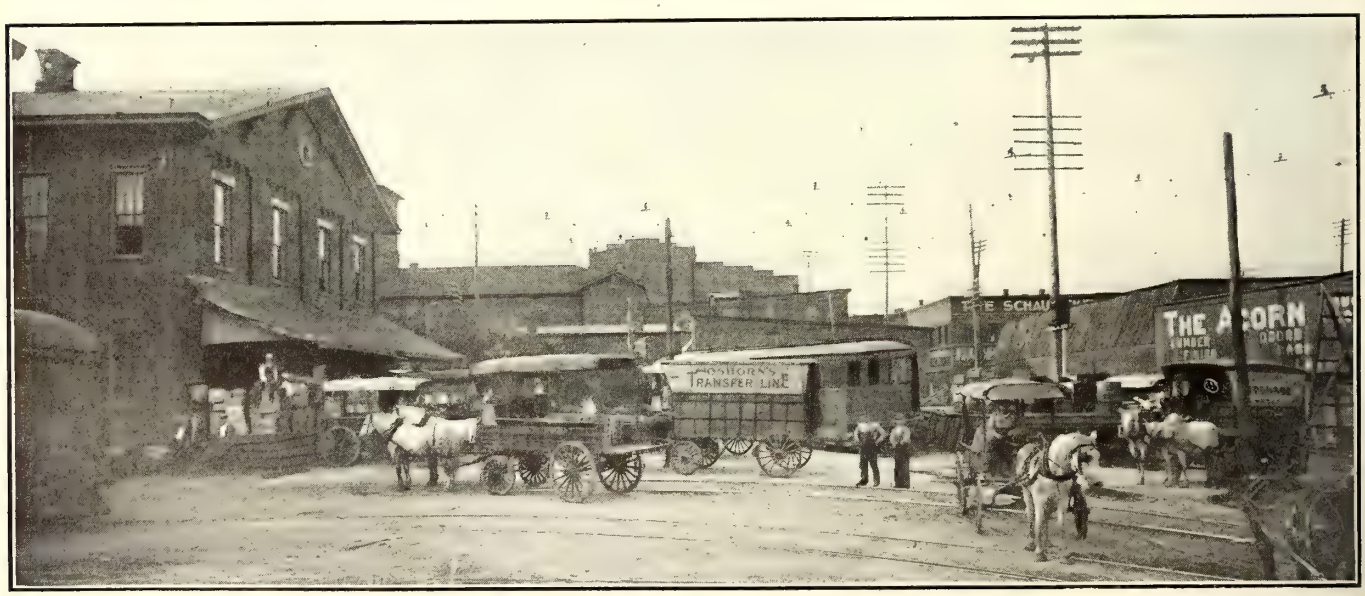
COMPETITION

The steam railway competition which the Scioto Valley Traction Company has to meet is with the Hocking Valley Railway, on the Lancaster division, and the Norfolk & Western Railway, on the Chillicothe division. The freight rates still remain practically the same as on the steam roads.

Household goods, for instance, are carried by the steam roads at the first-class rate. The Scioto Valley Traction Company charges three times the first-class rate for less than carload lots of household goods, and its agents are instructed to inform applicants of the lower steam rate, as the business is not especially desired.

The last tariff, effective on June 7, 1909, contains the special instructions to agents shown in the cut published on page 870.

The territory tributary to the Scioto Valley Traction Company is south and southeast of Columbus, Ohio. The line from Columbus to Obetz Junction is double track and from the latter point the lines branch, reaching territory which has proved to be favorable for freight development. Lancaster, at the southern terminus of the Lancaster division, has a population of 15,000. Circleville and Chillicothe, on the Chillicothe division, have respectively 10,000 and 18,000 population. Circleville is 27 miles from Columbus and Chillicothe is 50 miles.



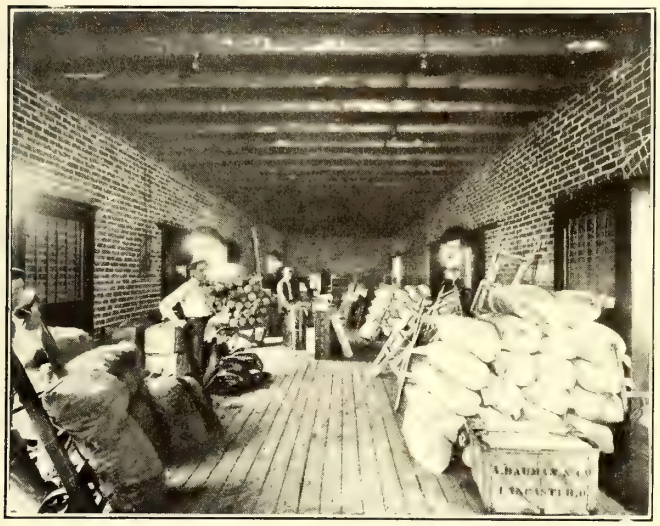
Scioto Valley Traction Company—Yard at Columbus Freight Yard

The usual arrangement of operation of the freight cars

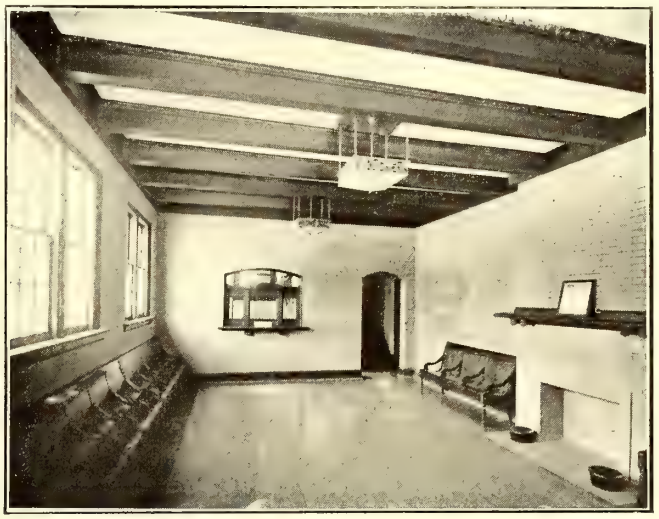
provides for two cars on each division twice a day. Under the present arrangement four trains consisting of one motor car each leave Columbus daily, two at 9:30 a. m. and two at 5:30 p. m. On the return trips freight is received at Chillicothe until 10 a. m. and 3 p. m. respectively, and at Lancaster until 1 p. m. and 8 p. m.

ORGANIZATION OF THE FREIGHT DEPARTMENT

The organization under the general freight agent may be indicated briefly as follows:



Scioto Valley Traction Company—Interior of Freight House at Lancaster, Ohio



Scioto Valley Traction Company—Interior of Waiting Room, Circleville Station

At Columbus a freight agent, freight cashier, bill clerk, one platform receiving clerk, one platform delivery clerk. These men are employed exclusively by the freight department.

Lancaster division: Groveport, one freight and ticket agent combined; Canal Winchester, one freight and ticket agent combined; Carrol, one freight agent, a drayman who meets the train and uses such part of his time as may be necessary to attend to the freight business at that point; Lancaster, one freight and ticket agent, one clerk and one warehouse man.

Chillicothe division: Lockburn and Duvall, one man at each point to give part of his time, as at Carroll, on the Lancaster division; Asheville, a freight and ticket agent; Circleville, freight and ticket agent combined and one clerk; Kingston, freight and ticket agent combined; Chillicothe, freight and ticket agent combined and one clerk.

Freight is handled at all of the regular passenger stops. Where there are no agents freight is handled at the owner's risk, and must be prepaid. Shelter sheds have been built at all passenger stops, and regular shippers have learned that if the shipment is sent from a prepay point it must be prepaid.

DEVELOPMENT OF INDUSTRIES

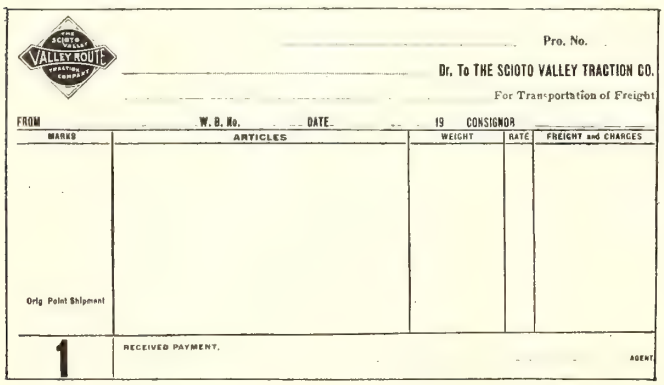
Every effort has been made to encourage industries that would add to the freight traffic of the company, and substantial results have followed from the efforts of the company in this direction. A typical instance is that of the Jefferson Spring Water Company. The water in Columbus had caused trouble, and with the encouragement of the officers of the company certain interests in Columbus located a fine spring of water near Jefferson, 19 miles from Columbus. This spring was leased and a bottling station was built adjacent to the spring. Directly after this company had started operation it began to ship, in less than carload lots, 25 carboys at a time, and the business developed rapidly with the sale of water in carboys and later of half-gallon bottles in cases, until the company started to ship full carloads. In 1907 two cars were used exclusively for the water service. During the summer of that year, when the water situation in Columbus aroused particular agitation, the shipments aggregated 6 or 7 carloads a week. Each carload contained 500 to 800 carboys or the equivalent. These cars bear the name of the water company, and are run with regular freight trains as trailers. The company has



Scioto Valley Traction Company—Exterior of Circleville Freight and Passenger Station

enlarged its business by shipments to more distant cities than Columbus, and by manufacturing ginger ale and carbonated waters.

Strawberries, melons and other fruits have been handled with advantage to the company and the producers and the consumers. When the freight service was started and traffic possibilities were under consideration, it was apparent that some business would be secured from fruit growers if the proper service was afforded. Farmers in the territory had been in the habit of picking berries in the afternoon and traveling all night in order to have their produce in the markets in Columbus early in the morning. After trips over the dusty roads, however, the condition of the berries was frequently impaired. Because of the improved facilities offered by the traction company, it is believed by Mr. Bradfield that an increase of 100 per cent has taken place in the acreage of tributary country devoted to the cultivation of small fruits. During the first season the company handled 3500 bushels of berries, the majority of which were strawberries; in the following season, that of 1907, about 6500 bushels were carried, and in 1908, about 10,000 bushels. In 1909 and 1910, owing to weather conditions, the crop of berries was not as good. During the berry season last year a trail car was sent to Canal Winchester, which is in the center of a good berry district, attached to the regular freight car leaving Lancaster at 8 p. m. The company has had the same experience with cantaloupes, and hauled to Columbus last year 3000 or 4000 barrels of these melons.



Pro. No.

Dr. To THE SCIOTO VALLEY TRACTION CO.

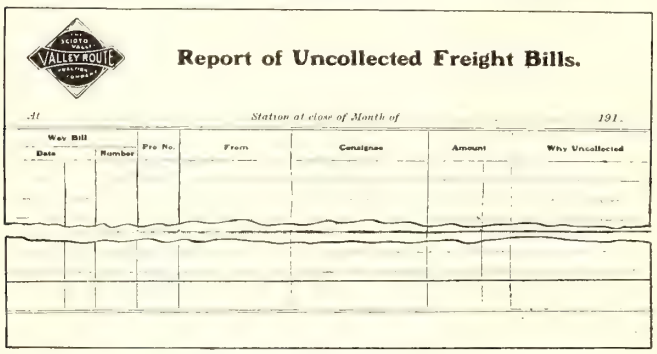
For Transportation of Freight

FROM W. B. No. DATE 19 CONSIGNOR

MARKS	ARTICLES	WEIGHT	RATE	FREIGHT and CHARGES
Orig Point Shipment				

1 RECEIVED PAYMENT. AGENT

Scioto Valley Traction Company—Part I. of Expense Bill



Report of Uncollected Freight Bills.

At Station at close of Month of 191.

Way Bill Date	Way Bill Number	Pro No.	From	Consignee	Amount	Why Uncollected

Scioto Valley Traction Company—Form of Report for Uncollected Freight Bills

On the Chillicothe division there are several large canning factories which put up mostly tomatoes, corn, peas and beans. In June and July special service is furnished by the company for this business, and this has been developed by the consignment of special cars during the season when the peas are picked and shelled and also later when the sweet corn and the beans are gathered. These cars are operated between Kingston, where vegetables are grown, and Chillicothe, where the canning plants are located. This special service enables the canning companies to shell the peas and beans before shipment, and the quick service afforded by the special car is an advantage that could not be secured by wagon service or any service that would be afforded by a steam line. For this car the company has a minimum charge of $25 a day for 6 hours. During this day six or seven trips would be made. If the car is kept longer than the time specified $3 an hour extra is charged, and a fraction of an hour is considered as one hour. The peas and beans are handled in a passenger car from which the seats have been removed in part, enabling it to carry improvised holders by the use of which both the car and the vegetables are protected. The corn is handled in ordinary gondola cars at carload rates. A further extension of this character of service has been made possible by the development of farms for the cultivation of tomatoes at Canal Winchester. Last year 50 carloads of tomatoes were hauled at carload rates from Canal Winchester to Circleville. Fifteen or 20 carload lots of pumpkins were hauled between the same towns.

The milk business of the company has increased month by month. When this was started it was a very slight factor in the total business, but it has improved to such an extent that it is believed now that the company will be justified in starting a special milk train in a year or thereabouts. Revenue from the milk business is not included in the statement of gross earnings from freight, published elsewhere.

Special Instructions to Agents.

No. 1—All freight received for points where no Agents are maintained must be prepaid and will be handled at owner's risk only, which will be noted on bill-of-lading.

No. 2—Household goods and perishable freight must be prepaid or guaranteed.

No. 3—All shipments must be accompanied by proper shipping bill or bill-of-lading and receipted for at owner's risk of damage by fire, water, leakage, etc.

No. 4—Where shipments are unclaimed for twenty-four (24) hours, Agent at destination will so notify Agent at original point of shipment, who should notify consignor.

No. 5—Shipments for unknown consignees at Columbus, Lancaster, Circleville, and Chillicothe should bear the street address on the package. Such address should appear on billing covering same.

No. 6—In billing shipments to prepay points, bill on the next station beyond where Agent is maintained, but show the proper destination on the body of the manifest.

No. 7—Freight for prepay points will be handled on day trains only unless special arrangements are made between the forwarding Agent and consignee.

No. 8—Memo way-bills must not be issued except in cases of absolute necessity.

No. 9—Way-bills covering car-load shipments must be made on separate bills and hard copies of each sent to this office.

No. 10—No freight will be forwarded on passenger trains without authority from this office except cut flowers and moving picture films. They may be forwarded on any passenger car, exclusive of No. 111.

No. 11—Agents will not deliver any shipment billed "To the or ler and notify" without the surrender or original bill-of-lading, properly endorsed, unless authority is received from this office.

No. 12—Agents will not accept shipments for transportation billed as merchandise. The contents of all packages must be ascertained and billed accordingly.

No. 13—Agents will accept no shipment for transportation, charges collect, unless in their judgment it is worth more than the freight charges; otherwise, it must be guaranteed by responsible shipper.

J. O. BRADFIELD,
General Freight Agent.

Scioto Valley Traction Company—Instructions to Agents

FREIGHT EQUIPMENT

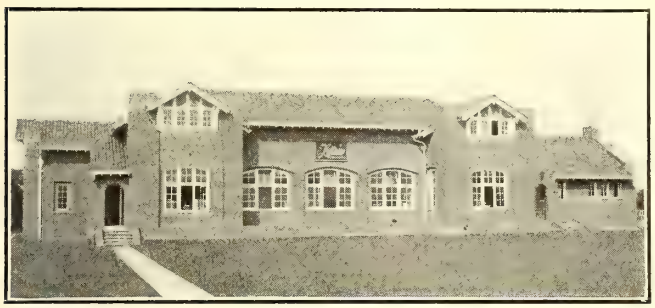
The equipment in use for the freight service exclusively consists of three baggage motor cars and nine freight trail cars. The freight trail cars are used for general merchandise. They are attached to the motor cars, and are also used generally for the carloads. The amount of business usually justifies the shipment of about six fully loaded trail cars a week to Lancaster, and about the same number in this period to Circleville. The company has five gondola cars, which are used for construction, but are employed occasionally for freight service to and from the smaller stations on the lines. Regular platform scales have been provided at Columbus and Lancaster and Circleville, and portable scales are used at the other stations. Proper sidings are provided at all stations for handling carload and less than carload business. Each freight train is operated by a conductor, a motorman and a brakeman. The company up to the present time has not developed any extensive interchange of traffic with other electric lines, but this class of business is constantly increasing. A considerable volume of carload business has been handled. This has consisted of shipments of grain, household goods, hay, straw, lumber, mill

work, brick, sand, gravel, drain tiles, etc. No coal has been hauled, but the carload business has included several shipments of horses and other live stock.

The forms used for reports to the general freight agent and F. K. Young, the auditor, are practically identical with those in use by steam lines. The practice in billing is substantially the same as that followed by steam lines, but carbon copies are made of nearly all reports, instead of tissue copies. The form of expense bill in use at the larger stations is indicated in the accompanying illustration. Of the three copies made for each shipment, No. 1 is issued for the receipt for the consignment, No. 2 is the receipt for the shipment as filed with the local office, and No. 3 is issued as the delivery ticket for the drayman. Mr. Bradfield has also inaugurated the practice of having the agents telephone the general freight office systematically regarding goods that are over or short. At a certain period of the day all the agents on the lines telephone the general freight office at Columbus regarding all discrepancies of this nature. If there are no discrepancies a note to that effect is made. A record of the report from each station is kept, and rapid comparison of the reports in each case makes it possible to straighten out mistakes of this nature immediately. Where goods are carried over or cannot be found the regular form following the steam railroad standard is provided for the report.

OPERATION OF FREIGHT SERVICE OF THE SCIOTO VALLEY TRACTION COMPANY.

	Gross freight revenue.	Gross freight pounds.	Freight car miles.	Freight revenue per car-mile.	Aver. daily freight car-miles
December, 1905	$1,121.91	923,097	6,835	$0.1641	262.88
June, 1910	5,082.21	4,947,055	14,628	.3474	562.6
Year ended—					
Dec. 31, 1906	31,228.78	28,512,909	103,897	.3006	340.64
March 31, 1907	34,412.59	32,641,429	105,025	.3276	343.22
June 30, 1908	43,764.89	39,715,104	128,836	.3396	419.66
June 30, 1909	48,033.57	52,209,835	137,957	.3482	450.55
June 30, 1910	50,934.27	57,129,759	151,882	.3353	496.34



Scioto Valley Traction Company—Plant of Jefferson Spring Water Company

The accompanying table gives a record since the establishment of the freight service of the following: Gross freight revenue; gross freight in pounds; freight car mileage; freight revenue per car-mile; the average daily freight mileage. During the 27 days in which business was done during December, 1905, the total gross freight revenue was $1,121.91 and it has increased rapidly since that time, reaching the maximum for any one month of $5,481.26 in June, 1909. The record of several other months has reached nearly this total. The largest amount of gross freight carried in any one month was recorded in November, when a total of 7,576,142 lb. was reported. The freight car mileage has varied materially. The freight revenue per freight car-mile has extended from 16.41 cents in December, 1905, to 41.14 cents in September, 1908. No attempt has been made to separate the expense as between passenger and freight, but the management expresses its conviction that the freight business yields its share of the profit required to make the enterprise a success.

The total number of claims received from December, 1905, to July 31, 1910, was 404. They were as follows: Claims for loss, $345.49; claims for damage, $651.23; claims for switching and drayage, $275.60; claims for overcharge in revenue, $224.58; total, $1,496.90. The total amount of claims which has been declined, reduced or withdrawn was $259.39. The total amount asked for damage to baggage, one claim, was $13.75. No claim has been made for loss to baggage.

Mr. Bradfield states that, in his opinion, of the total business in less than carloads between local points on the lines the company handles 90 per cent and the steam roads the balance.

Frank A. Davis, president and general manager, in discussing the results of the freight service in the light of the experience of the company, states that, in his opinion, higher freight rates are justified by the promptness with which a shipment is delivered by the company.

CONSTRUCTION OF PARTIALLY COMPETITIVE LINE APPROVED IN WISCONSIN

The application of the Milwaukee & Fox River Valley Railway Company for a certificate of public convenience and necessity has been granted by the Railroad Commission of Wisconsin. The certificate authorizes the construction of the proposed interurban line in its entirety from Milwaukee to Cedarburg, Plymouth, Chilton, Stockbridge, Appleton, Kaukauna, Menasha and Fond du Lac. During the proceedings before the commission the principal objector to the issue of the certificate was the Milwaukee Northern Railway, which operates an interurban line between Milwaukee, Cedarburg, Port Washington and Sheboygan.

An application for the certificate was filed by the new company on March 13, 1908. It stated that the company was capitalized at $75,000, of which $25,000 was common stock and $50,000 preferred. Of the total stock $40,200 has been subscribed and $25,850 paid in. The proposed right-of-way had a width of 66 ft. throughout its entire length. The right-of-way for a distance of approximately 8 miles was owned and construction was in progress.

At the hearing on the application on April 14, 1908, the Milwaukee Northern Railway filed its objections, stating that public convenience and necessity did not require the construction and operation of the proposed line and also alleging certain irregularities. Objection was filed by the Fond du Lac & Northeastern Railway Company on May 5, 1908, to the issue of the certificate. This company charged that its contemplated line would occupy at certain points the same territory as the proposed line of the new company. In a decision rendered on July 3, 1908, the commission denied a motion for an order dismissing the application and ordered the case to a hearing on its merits.

Amended applications and objections were filed and hearings followed. An abstract of the decision, so far as it touches points of general interest, follows:

"Various estimates were introduced with respect to the probable volume of the passenger business. Like all other estimates, more or less uncertainty exists with respect to them. We think the testimony fairly shows that there is great promise of a large development of local passenger business in the territory between Cedarburg and Milwaukee and along the east shore of Lake Winnebago, and that there will be the usual local movement between all other points, especially the points between Plymouth and Cedarburg. Because of the existing facilities on the steam and electric lines in the Fox River Valley south to Fond du Lac and thence to Milwaukee, we apprehend that no great reliance should be placed upon the immediate development of through passenger business between Milwaukee and the Fox River Valley.

"Statements of the amount of grain and other farm products and live stock produced in the various townships at best afford little definiteness in regard to the quantity of these products which the proposed railway may convey to market at a profitable rate. The objector placed much stress upon the relatively great increase in the investment in equipment, stations and

terminals, and the increased cost of operation, which would result from the attempt to do a regular freight business. We do not believe that the record is conclusive upon this point. It should be added, however, that in our judgment the estimates of the freight business do not constitute the decisive factor with respect to the proposed line.

"This suggests that the differences in the estimates of the cost of operation of the proposed line are relatively small, compared with the differences existing among the various estimates of the cost of construction. It is clearly impossible for any man or body of men to ascertain in advance with substantial accuracy the results of operation of a project of the magnitude here involved. Doubtless, actuated primarily by motives of economy, the engineering work of the petitioner was somewhat loosely done, and in many respects the objecting Milwaukee Northern Railway appears to be in possession of a more detailed knowledge of the engineering features of the project than the petitioner. After carefully considering the different estimates of the cost of construction, the volume of traffic and the revenues to be derived therefrom, we are of the opinion that, while the project doubtless involves many uncertainties, these uncertainties do not create a risk of such magnitude as to justify this commission in denying promoters and investors the privilege of assuming it. We are inclined to the view that these risks are no greater than the risks which have been assumed many times heretofore in the projection of new railways which have since become useful and profitable institutions. There can be no question regarding the public service which the proposed line may perform in behalf of the territory through which it expects to operate; and no one can tell exactly what the financial results will be of operating a new railway through a territory the greater part of which has never before enjoyed the facilities of a near-by line.

"It was one of the purposes of the statute under which this application is made to insure the public against the undertaking of unusually hazardous enterprises. It was doubtless contemplated to prevent the projection of lines for speculative purposes and through which the innocent purchaser would be made to suffer losses. The proposed line has been investigated at every point with sufficient thoroughness to take it out of the class of purely speculative ventures and place it upon a basis of reasonably sound business promotion. The uncertainties with respect to the probable results of operation of the project are no greater than the uncertainties which generally exist in new ventures of this character, and they are not great enough to warrant this commission in withholding the certificate which will afford investors the opportunity of trying out their scheme.

The chief, and in a large sense the only, objector in this proceeding is the Milwaukee Northern Railway. The keystone of its objection is the threatened invasion of its profitable field in Cedarburg and some of the territory between Cedarburg and Milwaukee. The Cedarburg business is doubtless important to the Milwaukee Northern. But since the whole of that part of this business which is in controversy here amounts to only a fractional part of 1 per cent upon the investment in the objector's line, it can scarcely be said to be vital. If this business were in reality vital, and the life of the objector depended upon it, we should be in duty bound to deny the certificate to the applicant. Attributing an exaggerated importance even to the estimated figures representing the inroads which it is supposed the proposed line will make upon the revenues of the Milwaukee Northern, it is clearly demonstrable that the financial success of the Milwaukee Northern is no way dependent upon that part of the receipts from traffic at Cedarburg which is in question here.

"Historically speaking, the convenience and necessity law was probably enacted to meet exactly the situation which this petition has created, and to avoid the losses and excessive burdens upon the public which have resulted from needless paralleling of railways, of which the history of railways in the United States affords many convincing illustrations. There is reason to believe that it was a matter of common knowledge on the part of members of the legislative committee, if not of the Legislature, that such a contingency would arise in this particular locality. The Legislature doubtless intended that, through the administration of this law, destructive competition and rate wars, and competition in all forms injurious to the public interest, should be prevented. The Legislature could not have desired to eliminate all competition absolutely. If this had been its desire, what would have been simpler than to say it in so many words? The law does not say that it shall be made the instrument for eliminating all competition in any form whatsoever at every point. If such a construction were to be placed upon the law, it would in most, if not in all, cases be impossible for any railway to be constructed in the future to enter any city in which there is an existing railway, because it is axiomatic that in the railway world, within proper limitations, every railway competes with every other railway, largely independent of the exact geographical location of the competitors.

"The possibility of a rate war between the project and the objector was repeatedly touched upon in the proceedings. Such a possibility unquestionably exists, and a rate war would with certainty cut deeply into the revenues of the existing as well as of the proposed line. We assume, however, that it is fully within the power of this commission to prevent such a rate war and to compel the competitors to charge a rate which is reasonable under all the circumstances in the case. This power is clearly lodged with the commission.

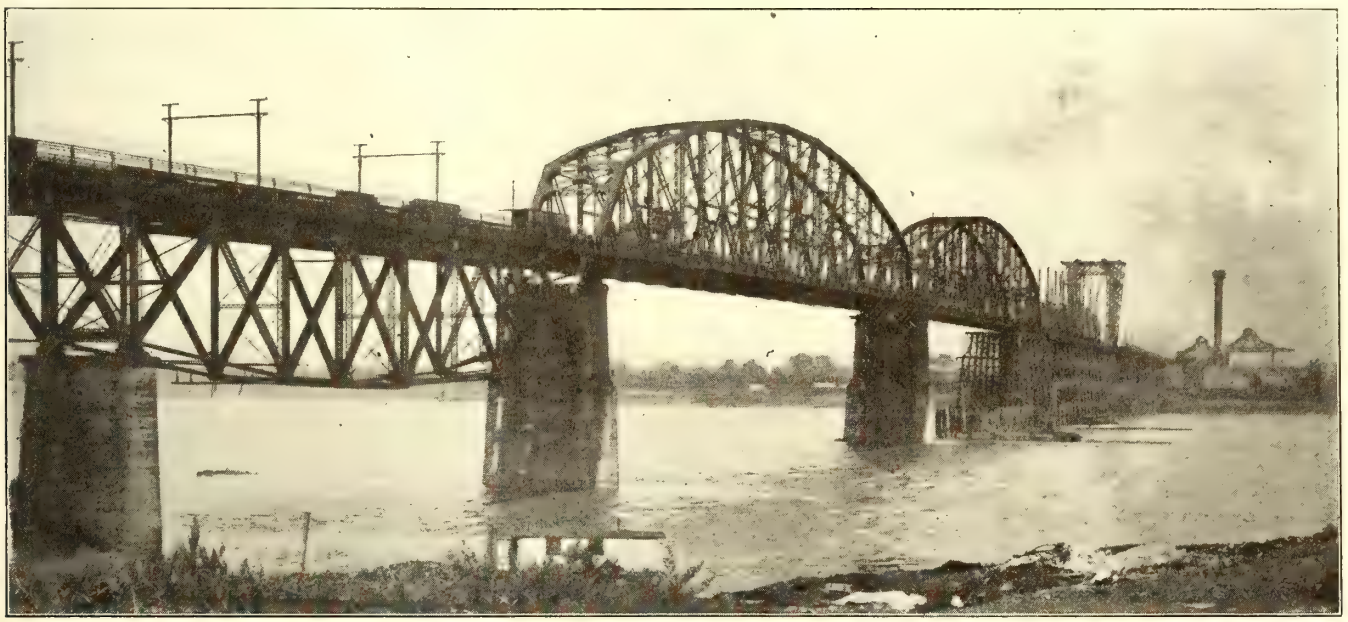
"Closely associated with the importance of the Cedarburg business to the objector is the possibility of the construction of only that part of the petitioner's proposed line extending from Milwaukee to Cedarburg. As the law now stands, the commission has no authority to authorize the construction of a portion of a proposed line after having determined that public convenience and necessity require the construction of the entire line. It follows that if the statute is to have an efficacy in accomplishing the purpose of its enactment, it must be held that authority to construct a line as an entirety does not imply authority to construct only a part of such line and to abandon the remainder; otherwise the prime purpose of the law might be defeated in many instances. We should never permit the certificate of authority to be used as a subterfuge to attack or weaken the investment of the Milwaukee Northern Railway by allowing a line to be built from Milwaukee to Cedarburg. We would neither approve the plans and specifications for such a line nor authorize its operation. It seems prudent to make these observations here in order that the investors in the project may be fully advised, in advance of their undertaking, of the extent of the obligation to which the petitioner or its successor will be held in the premises. Counsel for the petitioner fully realizes the gravity of the situation in which the objector's investment might be placed if perchance under the authority of the certificate a competing line, with Cedarburg as its northern terminus, should be constructed from Milwaukee, and with commendable justness and fairness he proposed to accept the certificate with limitations.

"We do not deem it essential to incorporate in the certificate any limitation of the character suggested, as the certificate will, by its terms, limit the authority thereby granted to the construction of the line as a whole.

"The power of the commission, which it will not hesitate to exercise properly when the occasion arises, to prevent rate wars, and to refuse approval of plans and specifications and authority to operate only that portion of the line between Cedarburg and Milwaukee, and the stipulation voluntarily entered into on the part of the petitioner to build south of Plymouth and north of Elkhart and north of Cedarburg and south of Cedarburg, mile for mile, remove the principal grounds of opposition urged by the objector, which, in our judgment, constitute the strongest objections which were raised against the project from the point of view of protection contemplated in the public convenience and necessity law to existing railway enterprises."

OPENING OF THE McKINLEY ELECTRIC BRIDGE

Regular service over the McKinley Electric Bridge and the new St. Louis terminal tracks of the Illinois Traction System was begun on Monday, Oct. 3. The Illinois Traction System, with nearly 600 miles of interurban road in Illinois, is now operating local and limited cars across its new bridge and through the wholesale section of St. Louis to the heart of the hotel and commercial district of that city. An illustrated description of the construction features of the extensive terminal project which makes this interstate service possible was presented in this paper for Jan. 22, 1910. The McKinley bridge was designed and built to furnish two tracks with carrying capacities of 10,000 lb. per lineal foot of track and two paved driveways, each 14 ft. wide, with carrying capacities of 3000 lb. per lineal foot. The structure includes three river spans, each 523 ft. long, and five shore spans, two of which are 250 ft. long and three 150 ft. long. The approach on the Missouri side passes over a freight terminal property of 24 acres owned by the Traction System, and over the first story of a 2-story interurban passenger station at the intersection of the bridge approach with Broadway. Two and one-half miles of double-track line laid with 125-lb. rails on 12-ft. centers connect the



New McKinley Bridge Over Mississippi River

Broadway passenger station with a terminal property located at Twelfth and Lucas Streets, St. Louis, one and one-half blocks north of the Jefferson Hotel. At the latter site a large passenger station and office building, 12 stories in height, will be erected. An express warehouse at this location is now under way. This fireproof structure was described in this paper for Sept. 24, page 462. The express terminal is 262 ft. long by 88 ft. wide and two stories high.

The service just inaugurated includes limited trains between Springfield and St. Louis, 100 miles, every two hours between 4:45 a. m. and 6:45 p. m.; sleeping-car service daily between St. Louis and Peoria; local cars between St. Louis and Springfield on a 2-hour headway between 5 a. m. and 10:30 p. m., and a local street-car service in St. Louis and across the bridge to Venice and Granite City. The existing service into East St. Louis will not be discontinued. The office car of H. E. Chubbuck, vice-president of the Illinois Traction System and the Western Railways & Light Company, on Sept. 29, was the first interurban equipment to cross the bridge into St. Louis.

At a luncheon given recently by the representatives of the Illinois Traction System, and attended by the mayors of St. Louis and surrounding towns, and representatives of 38 organizations in St. Louis, plans were laid for ceremonies in November to celebrate the inauguration of the enterprise.

COST OF ELECTRICAL PRODUCTION IN A PLANT WITH RAILWAY LOAD

The power plant of the Hyde Park Electric Light Company, in one of the suburbs of Boston, has the distinction of supplying more electrical energy for street railway service than any other central station in Massachusetts. The return of the company for the year ended June 30, 1910, was recently filed with the Board of Gas and Electric Light Commissioners, and it shows that of a total energy sale and distribution of 4,103,384 kw-hours, 88.5 per cent, or 3,636,390 kw-hours, were supplied to electric railway feeders. The total output of the plant at the busbar for the year was 4,357,648 kw-hours. The plant is under the management of the Old Colony Street Railway Company.

The return shows that the maximum load upon the station occurred on Jan. 14, 1910, the peak output being about 3439 amp. The maximum load on the day of least output during the year was 1300 amp, the date being Aug. 8, 1909. The station equipment consisted of nine boilers of an aggregate rating of 1350 hp, operating at 115 lb. steam pressure, and five reciprocating engines driving five d.c. 500-volt generators and two alternators. The total generator capacity was 1775 kw. The two largest generators in the station were rated at 850 kw and 525 kw, and were each driven by a direct-connected cross-compound engine. The station payroll includes three engineers, three firemen and two coal passers. The cost of manufacture at the busbar was as follows for the year:

COST OF PRODUCTION (NET AT SWITCHBOARD), HYDE PARK, 1910.

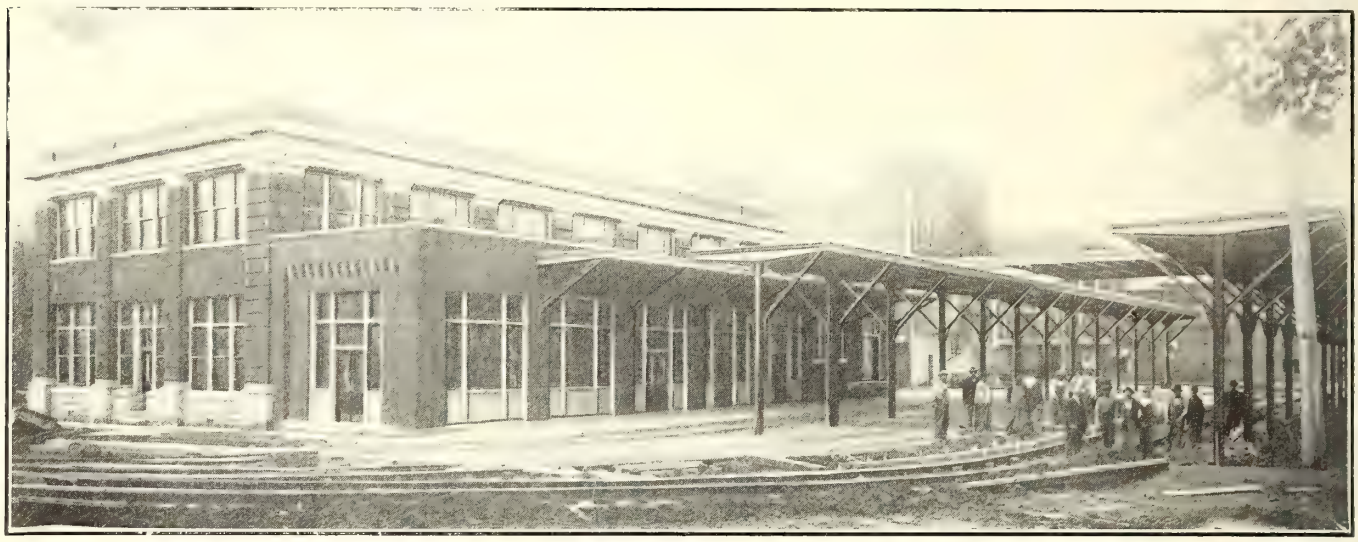
Fuel	$34,228.04	or 0.78 cents per kw-hour
Oil and waste	746.45	
Water	707.63	
Wages at station	9,609.76	or 0.22 cents per kw-hour
Station building repairs	607.44	
Steam equipment repairs	2,966.14	
Electric equipment repairs	652.71	
Minor station tools	776.19	
	$50,294.36	or 1.15 cents per kw-hour

The coal burned was bituminous at $3.94 per ton and No. 3 buckwheat at $3.17 per ton.

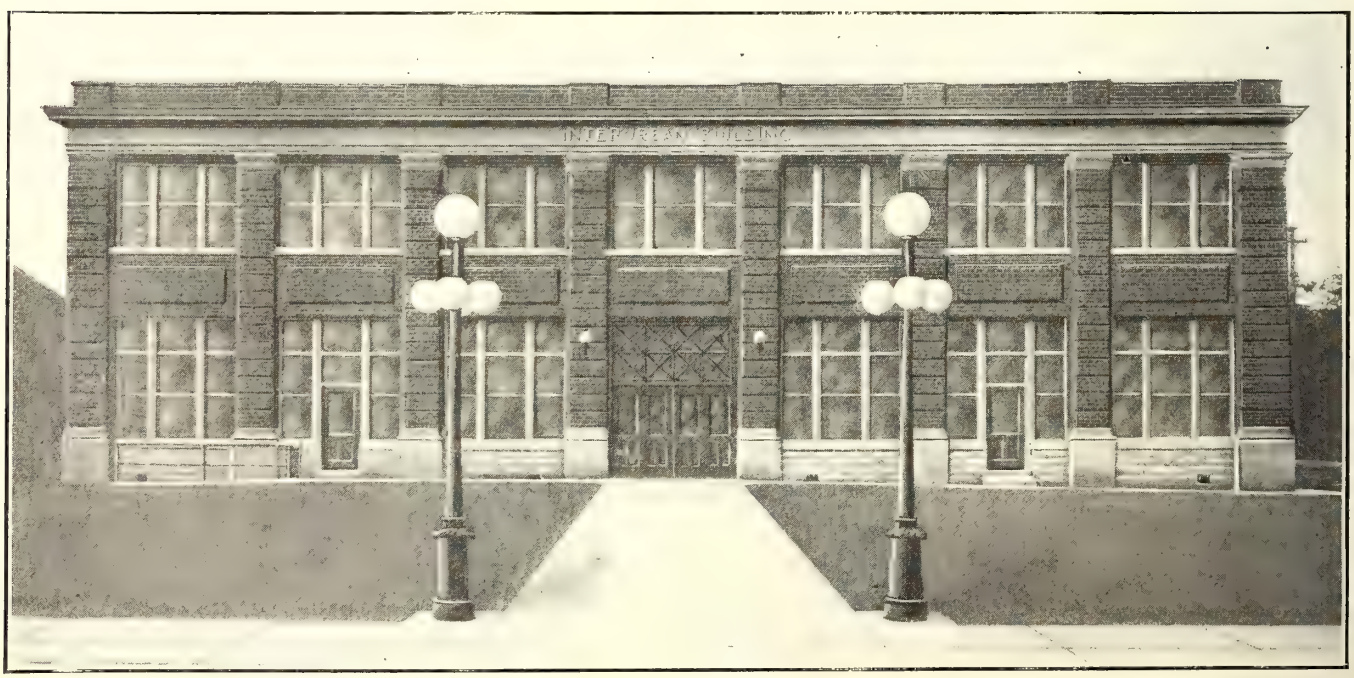
An electric railway system to connect all parts of Bermuda is projected by a Canadian company which is now seeking a charter. The cost of the system is estimated at $1,000,000, the length of the road is to be 30 miles. The company's manager says that all equipment for the line is to be purchased in the United States.

NEW PASSENGER STATIONS OF THE OHIO ELECTRIC RAILWAY

Lima and Springfield, Ohio, are two of the most important junction points on the interurban lines of the Ohio Electric Railway. From Lima this company's lines extend north 72 miles to Toledo, northwest 40 miles to Defiance, west 60 miles to Ft. Wayne and south 75 miles to Springfield. Likewise, Springfield is the terminus of lines radiating in four directions, and offers direct routes to Indianapolis, Cincinnati, Columbus and Lima. By reason of the importance of these two junction points, the company has just constructed especially attractive station buildings, which provide commodious waiting rooms, large track space under cover and ample headquarters for the operating officials.



Ohio Electric Railway—Covered Platforms at the Rear of Lima Station



Ohio Electric Railway—Front Elevation of New Station at Lima.

LIMA INTERURBAN STATION

The new station at Lima, known as "The Interurban Building," is located one block east of the most important business corner in the city, and is readily accessible from the steam railway depot. Sufficient property has been purchased to permit of a generous extension of the building, and also to lay out attractive grounds in keeping with the neighboring residence district. The accompanying engraving shows the ground and track plan at the Lima station. The building, which is 100 ft. x 71 ft. in ground dimensions, is set back 75 ft. from the street line. The space between the front of the building and the street has been sodded.

The track facilities provide for passing cars around the building and onto the street again without wyeing. Intending passengers will enter the station from the street side, pass through the waiting room and into a shelter which faces the loading tracks. Four tracks, each 200 ft. long, extend across the full length of the block at the rear of the station. Island platforms have been built between each pair of tracks, and all of the platform space is protected by umbrella sheds. The entire platform has been paved with concrete. Reference to the ground plan of the new Lima terminal will indicate the flexibility of the operation which the track lay-out will afford.

A plan view of the first floor of the new Lima station is presented herewith. On this floor the space is subdivided to form the following rooms: General waiting room, 25 ft. x 55 ft.; waiting concourse, 20 ft. x 69 ft.; ticket office, 12 ft. 6 in. x 20 ft. 4 in.; baggage room, 15 ft. x 20 ft. 4 in.; lavatories and retiring rooms for men and women, 13 ft. 10 in. x

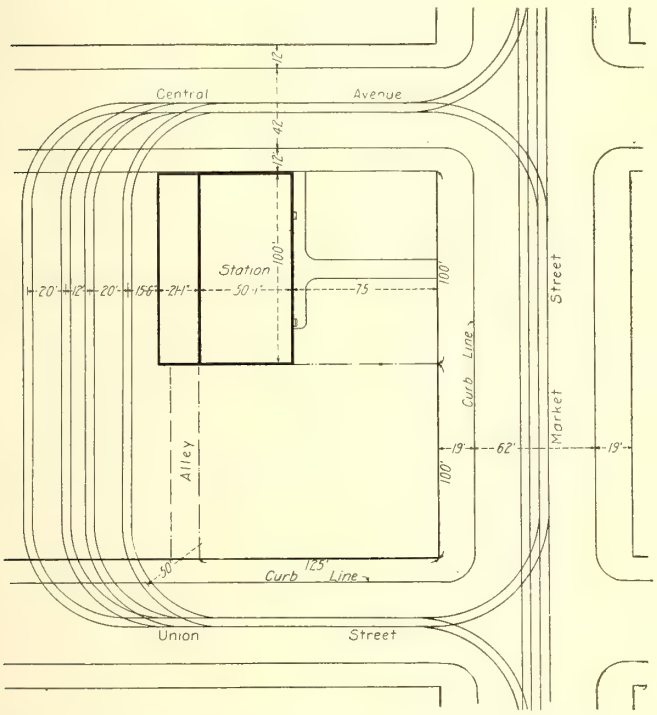
46 ft.; a store, 21 ft. x 27 ft.; electric light office, 21 ft. x 27 ft.; restaurant, 46 ft. x 28 ft.

The second floor contains 12 offices and an undivided space 21 ft. x 64 ft. The offices will be assigned to the following members of the operating staff: Superintendent, chief clerk, dispatchers, cashier, storekeeper, district passenger and freight agent, claim agent. Toilet rooms of generous size are provided on both floors of the new building.

The new Lima station is constructed of dark red brick and ornamented with white stone. The floors are supported by structural steel frames, which include 15-in., 38-lb. I-beam stringers and 8 in. I-beam connections carrying a reinforced concrete floor. On top of the concrete are 2-in. x 2-in. beveled nailing strips placed on 16-in. centers. These strips carry a 7/8-in. matched floor. The space between the concrete and the floor boards is filled with cinders. The ceilings are made of stiffened metal lath tied to the floor beams and covered with plaster. The first floor has a head room of 14 ft., and the offices on the second floor have a head room of 10 ft. 6 in.

SPRINGFIELD TERMINAL STATION

The ground plan of the Springfield station is of particular interest because of the unique way in which the tracks and

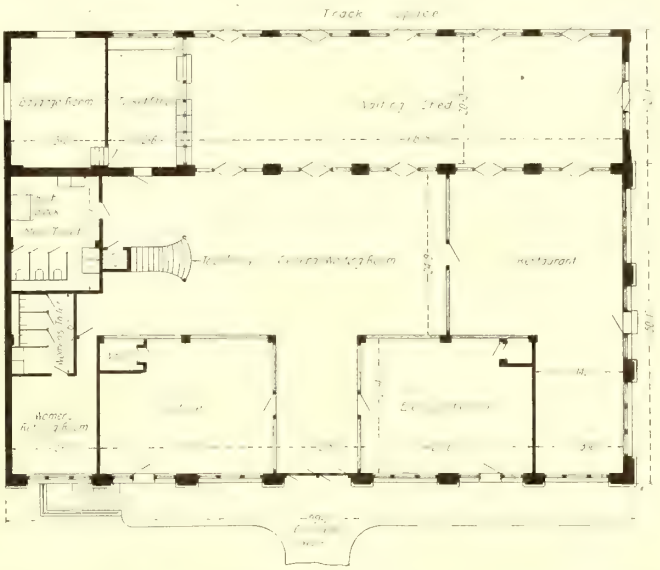


Ohio Electric Railway—Ground Plan of the Lima Station

building have been located. The company's property is a rectangular-shaped corner lot 198 ft. on each side. Double-track interurban lines pass both sides of the property, and the cars operate around the curves at the corner. The new station building, which is approximately triangular in plan, has been set exactly at the corner of the lot, and the tracks have been placed at the rear of the building. This arrangement, as illustrated, affords easy curves for the cars passing by the station and confines the loading to company property. As at Lima, four loading tracks are provided, and the platform space is covered with umbrella sheds of the design here illustrated.

The Springfield station is a structure of similar wall design to the Lima Interurban Building earlier described, and in general has the outline of a right-angle triangle with 100-ft. sides. The diagonal side of the triangle faces the four loading tracks.

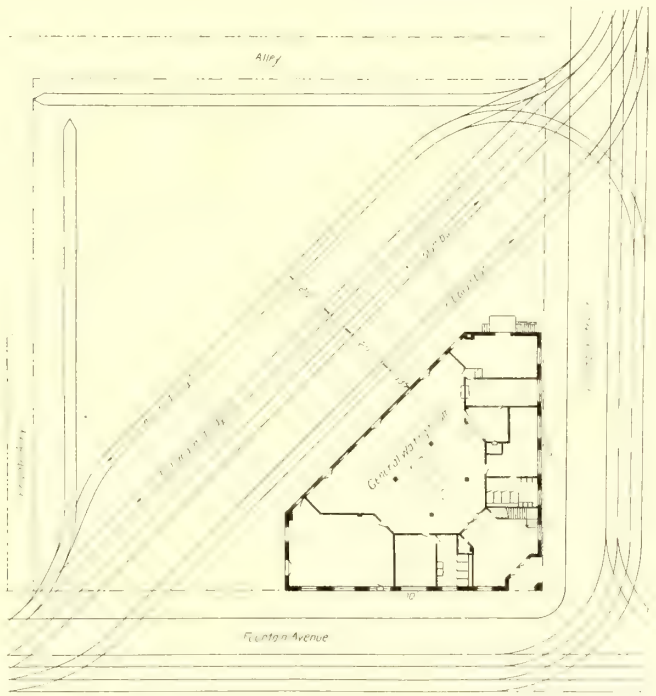
A plan of the first floor of the Springfield station is reproduced herewith. It will be noted that the subdivisions of the first floor provide a large entry way leading directly from the street into a general waiting room. The entrance hall is approximately 14 ft. x 30 ft. in floor dimensions, and the general waiting room has a frontage of 88 ft. on the track side of the building and an extreme depth of 56 ft. It is amply lighted by windows on the track side of the building, and by a skylight directly in the center of the ceiling. Grouped about the waiting room on the street sides of the building are the following rooms: Restaurant, 28 ft. x 42 ft.; women's waiting room, 15 ft. x 20 ft.; women's toilet room, 13 ft. x 20 ft.; entrance hall on the corner, 14 ft. x 30 ft.; men's toilet, 12 ft. x 20 ft.;



Ohio Electric Railway—First Floor Plan of the Lima Station

men's waiting room, 25 ft. x 20 ft.; a ticket office, 13 ft. x 17 ft.; parcel room, 11 ft. x 28 ft., and a baggage room, 15 ft. x 28 ft. The restaurant and baggage room are close to the track side of the building.

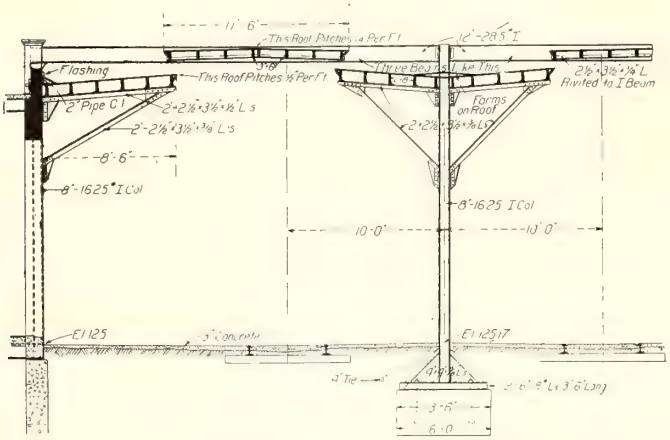
Springfield is the operating headquarters of the Ohio Electric Railway, and so, in the new terminal station, generous



Ohio Electric Railway—Ground Plan of the Springfield Station

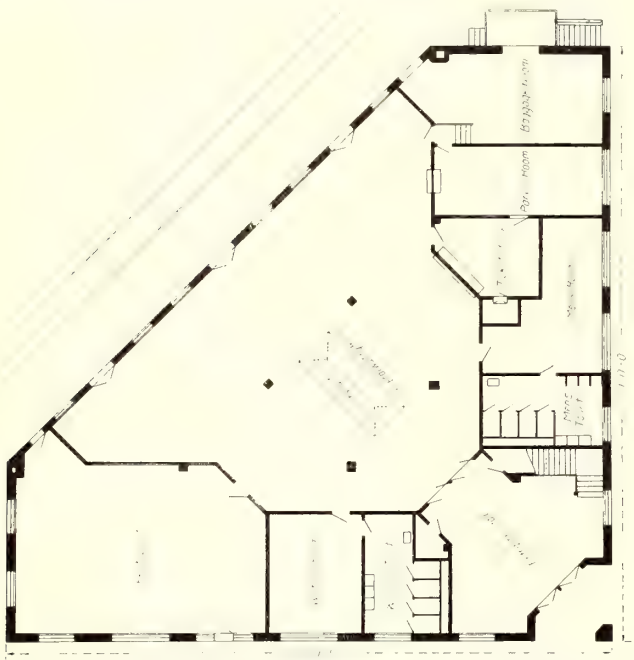
accommodations have been provided for the operating officers. The building is three stories high. On the second floor are suites of offices for general manager, superintendent of transportation, chief engineer, power station engineer and general freight and passenger agent. In addition, rooms are provided for the dispatcher, ticket stock, draftsmen, chief clerks and

stenographers. These suites of offices are lighted from both the street and track sides of the building. The third floor of the Springfield station will be set apart for the use of the auditing department. On this floor are an office, 15 ft. x 20 ft.,



Ohio Electric Railway—Section of One Half of Platform Covering at the Lima and Springfield Stations

for the auditor; a vault, 10 ft. x 10 ft.; a retiring room for the women, 10 ft. x 10 ft.; women's toilet room, 20 ft. x 11 ft. In addition to these subdivisions are two large undivided spaces. One, 21 ft. x 71 ft., will be occupied by the clerks in



Ohio Electric Railway—First Floor Plan of the Springfield Station

the auditing department, and the other, 27 ft. 6 in. x 54 ft., will be used as a storeroom for the auditing department. The third-floor rooms have daylight illumination on all sides.

Birmingham, England, employs 1523 men on its street car lines. Motormen and conductors on the city cars work six days of 10 hours each per week. Motormen start at 12 cents an hour for the first year and rise to 12½ cents for the second and to 12 2/3 cents for the third year; the latter is the maximum wages. Conductors start at 10 cents an hour, advancing to 11 cents the second and 12 cents the third year. Uniforms are furnished to motormen and conductors. Motormen get $4.86 extra every three months when they have had no avoidable accident. Including uniform and holidays paid for, it is calculated that the minimum wage of a motorman is about $7.60 and the maximum about $8.50 per week, and for the conductors about $6.40 is the minimum and about $7.90 the maximum.

PAPERS PRESENTED BEFORE THE MUNICIPAL TRAMWAYS ASSOCIATION

Among the papers presented before the ninth annual conference of the Municipal Tramways Association, held in Bradford, England, Sept. 21-23, were the following: "English Tramway Progress" (presidential address), by C. J. Spencer, general manager, Bradford Corporation Tramways; "The First Decade of Municipal Tramway Working," by S. Flint, chairman Leicester Corporation Tramways Committee; "Comparative Durability of Brake Shoes and Tires," by J. W. Dawson, assistant engineer, Bradford Corporation Tramways; "Tramways in Relation to Town Planning," by A. Baker, general manager, Birmingham Corporation Tramways.

Mr. Spencer said that during the past year there were in operation 2526 miles of route over which 2,659,981,136 passengers were carried. The ratio of net receipts to total capital outlay was 6.47 per cent and to net capital outlay (eliminating amounts expended on the construction or purchase of old lines and superseded constructions), 7.06 per cent. The average ratio of operating expenses to gross receipts was 63.64 per cent. There were carried 9.1 passengers per car-mile. The total investment in municipal tramways was £47,134,754. A total of £280,225 was paid toward the reduction of taxes. During the year the municipal tramways put aside 3½ per cent for sinking fund, reserve and renewal accounts, whereas privately operated street railways put aside only 1.05 per cent for the same purposes.

Mr. Flint presented some statistics of the growth of municipal tramways in England between 1899 and 1909 as follows:

	1899.	1909.
Number of undertakings	6	84
Number of miles of track	52	2,422
Number of cars	197	7,986
Number of miles run	3,374,806	197,938,433
Number of passengers	38,432,470	1,933,118,206

At the end of 1909 the capital invested in the 84 undertakings was £40,436,350. The net profit after subtracting operating expenses, interest, sinking fund, income tax and sundries was £974,944. The latter amount was apportioned partly to a reserve fund and partly toward reduction of taxes. Most of the municipal tramways had made money and where that was not the case it appeared that the power costs were very high or that the population was too small for the amount of track in operation. The prices of power varied from 0.96d. to 2¾d. per kw-hour.

Mr. Dawson's paper dealt with experiments undertaken to ascertain the comparative durability of various grades of brake shoes and their wearing effect upon steel tires. Twenty grades of shoes were tried. These included gray cast irons, white irons, chilled metal and insert shoes. In service tests one standard shoe and one with which it was to be compared were fitted to the wheels at one end of the car and two similar shoes were put at the other end. The same grade shoe was placed in diagonal positions on the track so that one shoe of each type acted upon the same axle and so made equal the retarding effort per axle. To obtain accurate comparative results of shoe wear and differences of tire wear it was necessary that each shoe should give the same retarding effort. To do this the pressure applied to each shoe had to be in inverse proportion to its coefficient of friction. This object was secured by means of a brake rigging designed by Mr. Dawson which was adjusted by links between the supplementary brake beams in proportion to the respective frictional coefficients of the shoes. As the result of experiments and a number of calculations Mr. Dawson concluded that from the standpoint of cost it was immaterial whether the shoes or tires had the greater wear. The individual shoes of each class were found to vary considerably in durability. The rate of wear of soft gray iron was more uniform than of the other shoes, but their wearing effect on the tire differed greatly. Shoes of the same grade but from different founders did not have the same frictional coefficient, durability, or wearing effect upon the tire. The tests for hardness demonstrated conclusively that shoes of equal hardness were not necessarily equal in durability, frictional coefficient or

in their effect on the tire. Chemical analyses were made of the tested shoes by F. W. Richardson, Bradford city analyst. However, metals which had the same chemical contents did not necessarily have the same properties because the various constituents combined differently in accordance with the materials used, the methods of founding and the rate of cooling. Mr. Dawson concluded that if in addition to chemical and physical tests a microscopical research was made of the structure of service shoes the combinations of their constituents would be revealed. Such a test would indicate the particular structures producing the different characteristics of the shoes and probably would enable the drawing up of standard specifications.

Mr. Baker made a strong plea for the better provision for tramway tracks when new streets are laid out. Preferably, the tracks should be laid in a reservation. At from $500 to $1,000 per acre, an addition of 6 yd. to the width of the road would cost only from $1,000 to $2,000 a mile and there would be considerable saving annually in repairs and maintenance. He was skeptical of the commercial value of the trackless trolley cars.

DISCUSSION ON ELECTRIC TRACTION AT THE BERNE CONGRESS

The eighth convention of the International Railway Congress was held this year at Berne, Switzerland. This congress meets every five years and includes in its membership many of the principal steam railroad companies in this country and in Europe. At each of the last four meetings there have been papers on the subject of heavy electric traction. The subject was considered first at the meeting held in 1895. At that time the congress passed resolutions stating substantially that there were no serious technical difficulties in the way of operating electric motor cars by the overhead system, but that the construction of electric locomotives for hauling heavy trains was still undeveloped. At the sixth congress, which took place in Paris in 1900, a resolution was passed declaring that the success attained in electric traction warranted its application on steam railroads under certain special conditions, but that it was impossible to consider the art far enough advanced for cases where heavy trains were to be operated over long distances at high speeds. The seventh congress, held in Washington in 1905, stated that electric traction should be looked upon as a useful auxiliary to steam traction for handling of certain kinds of traffic with profit and economy. It was impossible in a general statement to define those cases best suited for electric operation.

At the eighth congress, held, as stated above, in Berne this year, there were four reports on electric traction, all of which have been abstracted in this paper. These reports were presented by Prof. B. Gleichmann for Germany, George Gibbs for America, A. Hruschka for Austria, and Prof. Wyssling for Switzerland and all other countries excepting Germany, America and Austria-Hungary. In the absence of the American representative, the three members of the committee from Europe united in submitting the following to the congress as their personal conclusions:

1. The kind of current must not be selected on account of its adaptability to certain individual cases, but on the basis of its applicability to complete railway systems.

2. Electric traction affords the possibility of obtaining considerable economy in cost as compared with steam traction, especially where hydroelectric power is available. The use of electric traction will increase the capacity of a line without additional trackage.

3. A study of the conditions existing in the countries (Germany, Austria and Switzerland) referred to in the reports indicates that single-phase current is best suited for traction on main lines, although direct current and three-phase current have been found applicable under certain conditions.

4. The most favorable periodicity for single-phase current appears to be within the limits of $\frac{40}{3}$ and $\frac{50}{3}$; the potential of the contact wire should be from 10,000 volts to 15,000 volts.

The conclusions adopted by the congress by unanimous vote were:

1. Technically electric traction has made such great progress in recent years that it now affords a satisfactory solution of the problem of traction on main lines, either by electric locomotives or by motor cars.

2. Various systems are available and the selection of one or another depends on its respective suitability in each case.

3. Railway systems which propose to introduce electric traction on their lines should take steps to facilitate the interchange of rolling stock as far as possible.

SUMMARY OF DISCUSSION

The following is a summary of the discussion which took place on this subject at the meetings of the second session of the congress:

Mr. Krasny, engineer, Imperial & Royal Austrian Railways, proposed that the executive committee of the congress should call an international meeting to work out the fundamental principles governing the interchange of rolling stock on lines of international communication. He pointed out, also, that the income from electrified lines must not only cover the expenses of operation but also the cost due to the obsolescence of material rendered useless by electrification.

Mr. Niccoli, Italian State Railways, gave some data concerning three-phase locomotives. He said that the electrification of the lines near Genoa had proved profitable owing to the possibility of running heavier and faster trains. He mentioned other lines which would soon be electrified by the three-phase system, and added that tests with the single-phase system were to be made on the Turin-Pinerolo line.

Mr. Hruschka, Austria, pointed out that single-phase apparatus was suitable in all cases because single-phase locomotives could be run on sections equipped for three-phase and direct-current operation.

Prof. Merczing, Russia, presented some data on the hydroelectric possibilities of Russian rivers in connection with the electrification of Russian railways.

Mr. Jullian, engineer, French Southern Railways, gave some information concerning the electrical equipment of his company's lines. The system selected was 12,000 volts, 16 2/3 cycle, single-phase current. The type of electric locomotive would be decided upon only after experiments with several designs.

Mr. Graftio, engineer, Russian ministry, believed that it would be dangerous to give preference beforehand to any one system, such as single phase, as being the only good one. Considerations of an economical character, as well as the safety and reliability of traffic, might force one to use different systems in various cases. On two Russian lines, for instance, the study of electrification had shown that the single-phase system would be more expensive than the three-phase system; in a third case the most desirable system to use was direct current, including the partial use of a third rail. It was impossible to speak of the general electrical equipment of the railway system of such a country as Russia because the local conditions and classes of traffic differed so very much throughout that immense country that the use of various systems was inevitable.

Paul du Bois, engineer, Paris-Orleans Railway, said that up to the present time extended operating data were available only on the operation of three-phase and direct-current lines. A comparison of the figures presented in the reports showed that in reality the three systems did not differ very much from one another in regard to the cost of equipment and operation. The operating expenses with electric traction were less than steam traction. However, 3 per cent per year was too small an allowance for depreciation.

Mr. Mazen, engineer, French State Railways, agreed with Mr. du Bois. Direct current was more economical for dense traffic. Direct-current rolling stock was not as heavy and was more reliable than single-phase cars. As every system had its

advantages for certain conditions, the Congress would not be justified in recommending any one of them exclusively.

Messrs. Gleichmann, Wyssling and Hruschka opposed the assertions of Messrs. Mazen, du Bois and Graftio. They laid stress on the fact that as the subject under discussion concerned a general decision the point was not to consider the advantages of various systems, but to determine what system offered the most favorable solution for the electrical equipment of main lines. According to these speakers, also, the unity of systems was a matter of interest in simplifying international communication. The single-phase system complied with all the desired conditions.

Mr. van Lonen-Martinet, Holland, believed that the experiments so far carried out with the single-phase system were insufficient to justify its acceptance as the universal one. There was still a lack of practical experience as to the results with contact wires with 10,000 volts and upward.

Mr. Mazen thought that it would be positively dangerous for an international association to take a decided standpoint in favor of one system of electric traction. In his opinion the Congress could do no more than acknowledge that considerable progress had been made in that art. Further, Mr. Mazen proposed to waive the conclusions reached by the reporters, and on his part offered resolutions of more general character.

Prof. Wyssling expressed his consent to more general resolutions, but asked that the conclusions of the three reporters be placed upon the minutes. As previously noted, this request was carried out. The general meeting of the Congress afterward unanimously accepted a set of resolutions along the lines proposed by Mr. Mazen before the second section of the Congress.

MEETING TO DISCUSS NEW YORK SUBWAY SITUATION

A public engineering meeting was held, under the auspices of the American Institute of Electrical Engineers, at the Engineering Societies' Building on the evening of Oct. 17 to discuss the New York subway situation, and a paper on this subject was presented by Frank J. Sprague, past-president of the American Institute of Electrical Engineers. This paper was begun by Mr. Sprague at the request of the papers committee of the American Institute of Electrical Engineers, but its scope broadened and he concluded that it would be better to present it at a public meeting at which all engineers and others interested in the route and design of a new subway in New York could express their views.

MR. SPRAGUE'S PAPER

Mr. Sprague began his paper by saying that the subway question in New York has arrived at a critical period on account of the issue of plans and specifications by the Public Service Commission, First District, upon the whole or part of what is known as the tri-borough system. He then described briefly the history of rapid transit in New York, beginning with the award of the contract for the present subway to John B. MacDonald, the assignment of this contract to the Rapid Transit Subway Construction Company, the operation of the system by the Interborough Rapid Transit Company, and the lease by the latter company of the Manhattan elevated system. This system now includes 25.63 miles of route and 81.94 miles of track and possesses 590 motor passenger cars and 327 trail passenger cars. The investment, exclusive of the expense of the old Board of Rapid Transit Commissioners and the present Public Service Commission, is nearly $93,000,000, or something over $1,132,000 per mile of single track.

HISTORY OF RAPID TRANSIT PLANS

Mr. Sprague then referred to the passage of the Elsberg law limiting new rapid transit franchises to 25 years and its subsequent repeal, after experience had shown that under this law no capital could be secured to construct new rapid transit systems. He then described the subsequent proposals of the Interborough Rapid Transit Company for further extensions, the present and proposed system of the Hudson & Manhattan Railroad and the construction of the "bridge loop" and the extension along Fourth Avenue in the borough of Brooklyn.

According to Mr. Sprague, the "bridge loop" has been constructed as a four-track subway from the terminus of the Williamsburg Bridge and part way along Delancey Street and Center Street toward the present Brooklyn Bridge, and at Walker Street has tracks at grade branching sharply to the east to connect with two tracks of the new Manhattan Bridge. The section of this subway already built has been constructed with city funds. As yet no operating tenant has been secured, although it is understood that temporary leases will be made with the Brooklyn Rapid Transit Company. The present estimated cost of construction of this short section of city subway, comprising 1⅛ miles of four-track route along Center and Delancey Streets and ¼ mile of two-track route on Canal Street, a total of 5 miles of single track, is about $10,000,000. The cost of the Fourth Avenue section, about 3.9 miles of route, a short part of which is six-track, is $17,500,000. That is, these two tenantless and segregated subways have required in amount one-half the aggregate of city bonds which were issued against the construction cost of the present subway system with its 25.63 miles of route and its daily capacity of 800,000 passengers.

On Sept. 1, 1910, the Public Service Commission issued plans for what is known as the tri-borough route. (A map of this route, of the "bridge loop" and of the Fourth Avenue line was published in the Electric Railway Journal for Sept. 10, 1910, page 412, with a statement of the conditions under which bids must be presented.)

TRI-BOROUGH SYSTEM A MISTAKE

Mr. Sprague believes that, "measured by the essentials of route and method of construction, equipment and operation, and by the inexorable laws of finance," the tri-borough system was mistakenly conceived and unwisely promoted and thinks that if this construction as now planned is persisted in the result will be far-reaching disaster. He pointed out that the alternative plan of the Interborough Rapid Transit System of having a west side route south of Forty-second Street and an east side route north of Forty-second Street has a logical development and would practically double the present capacity of the present subway in the shortest time and with the least possible capital expenses. On the other hand, the tri-borough route south of Forty-second Street practically parallels the existing subway for a distance of 4 miles within a block on one side or the other. It doubles the service to the Grand Central Station, but ignores the new Pennsylvania station. It passes the entrance to the Steinway tunnel, but has no physical connection with it and no right of transfer. It has no connection, physical or otherwise, with the Williamsburg Bridge. It also parallels existing rapid transit lines of the Bronx, and the service supplied in Brooklyn is not adequate.

Mr. Sprague also considers the proposed physical design of the tri-borough system an error. It is of larger section than the present subway, which will increase the cost at least 30 per cent and will introduce many engineering difficulties. The object of this increased size is, presumably, to permit the admission of standard steam railroad cars, but the experience of transportation managers in England and on the Continent is absolutely against this dual system of operation. Mr. Sprague thinks it would be folly to permit a certain upsetting of schedules in such a subway by the entrance of irregularly timed and dissimilarly equipped cars, commanded by foreign crews, especially on a route with the enormous congestion of traffic which characterizes New York conditions. He also believes that the plan proposed in this subway of constructing solid partitions between the tracks to afford forced ventilation is a mistake. The piston system of ventilation finds its extreme illustration in the deep tunnels of the Center London Railway, where the cars, as nearly as is practicable, fit the circular shell of the tube. Yet even in this tunnel there is more or less churning of the air. Again, all air has to be taken from the street surface, where in hot and dusty weather it is neither in temperature nor purity the best to be had. Finally, if the air is to be accelerated as well as the train, more power will be

required. Mr. Sprague thinks, therefore, that it would be more desirable to omit the partitions and by external power force into the tunel air taken at a reasonable height above the street. He also criticises the specifications for equipment and schedules.

The estimated cost of the tri-borough system, exclusive of the present Fourth Avenue section in Brooklyn, is about $110,000,000, exclusive of extras and fixed charges on dead capital while waiting operating. The equipment would cost from $30,000,000 to $35,000,000 in addition.

PROPOSED PLAN

Assuming that the commission cannot make a satisfactory arrangement with the Interborough Rapid Transit Company for the extension of its route, south from Forty-second Street on Seventh Avenue and north of Forty-second Street on Lexington Avenue, Mr. Sprague believes that the commission should throw over the tri-borough plan and call for bids on a new route largely along the route proposed by the Interborough for its extensions. Such a route above the Harlem River would have branches on Mott Street and River and Jerome Avenues like the Interborough and tri-borough plans. Continuing down Lexington Avenue, past the Grand Central Station, it would cross the city somewhere between Thirty-sixth and Fortieth Streets. Thence it would run down Seventh Avenue past the Pennsylvania station to the Battery. It would connect at Canal Street with the "bridge loop," with which a physical connection could be made so that trains could be operated over the Williamsburg Bridge to Fulton Street and Atlantic Avenue and out Fourth Avenue. The subway should be continued up Seventh Avenue to Times Square, where a connection could be made with the present subway.

Such a system as an independent proposition would be an active and dangerous competitor to the Interborough, and later, if it should be desired, could be combined with the present Interborough system. This subway should be constructed of dimensions similar to those of the present subway and with alternative bids of construction and operation by private capital or construction alone with city funds.

DISCUSSION

W. J. Wilgus, consulting engineer, New York, said that the specifications for the tri-borough subway should be radically revised because of the enormous expenditure under the present plan. The route should lend itself to continuous train operation to eliminate any change of cars in local traffic, and it should harmonize with the present subway line to avoid duplication of facilities. Not only should the design be economical, but the construction and operation contracts should be handled simultaneously to insure an immediate return on the investment. The absence of trackage connections between the three different parts would mean the creation of congestion points like that at the Brooklyn Bridge terminal. As thus laid out, the tri-borough subway would be seriously handicapped in competing with the existing system for traffic to Brooklyn. With Mr. Sprague, he believed that the lower west side of Manhattan had been neglected by the tri-borough plan. Experience had shown that the duplication of transit facilities does not increase the value of real estate as much as does the building of a line in virgin city territory. Thus the tri-borough route not only would have to compete with an existing system, but incidentally it would deprive the city of increased income from taxation on improved real estate. The subways ought to be spread out, not segregated in a narrow strip on the east side of Manhattan Island. The Pennsylvania Railroad terminal under the present plan was absolutely isolated from the rest of the city's rapid transit system. Mr. Wilgus submitted a modified tri-borough route similar to the one proposed by Mr Sprague, except for a Forty-second Street cross-connection, a track connection at Canal Street and some minor changes. The cross-section of the proposed subway, although costing 30 per cent more, due to its greater size, really would not accommodate steam railroad cars while unnecessarily large for the standard subway cars. This fact was shown by a study of the roof and platform clearances. Improved ventilation could be obtained for much less expense than by building an extra large section. He did not see why there should be an extra expenditure of $37,000,000 for this purpose when there was such a crying need for rapid transit in other sections of the city. Modifications were still possible in the uncompleted sections, and if carried out would save $35,000,000 to $40,000,000.

L. B. Stillwell, consulting engineer, New York, said that nothing was more important than to have a question of this kind discussed by engineers speaking as public-spirited citizens. There was no reason why they should sit on the fence to see these problems settled by real estate men and newspaper reporters. He indorsed the technical criticisms of Messrs. Sprague and Wilgus, saying that the tri-borough route was manifestly faulty and stupid in the points brought out by them. It ought to be integral with the Interborough system or obviously compete with that system. Regarding ventilation, it had been assumed that partitions between tracks would improve ventilation, but no conclusive tests had ever been made on that point. He thought it absurd also that this tunnel should be laid out at much greater expense simply to accommodate foreign cars. Local traffic schedules should never be interfered with by outside trains. It would certainly be unwise to decrease the earning power of the subway for such a purpose. It seemed to be the fashion nowadays to build subways on what might be termed the A B C system. "A" dug a hole in the ground on the basis of cost plus 15 per cent; "B" then equipped that hole with tracks, cars, etc., also at cost plus 15 per cent; and then for three or four years the city would have to defer the evil day when it would have to make a contract with "C," who would offer 1 per cent instead of 5 per cent for the operation of that hole. In conclusion, Mr. Stillwell said that the first level of Broadway should be reserved for a moving platform, as that system offered the best medium for distributing the largest number of people at short intervals, while the adjoining streets should be used for high-speed through lines.

W. S. Murray, electrical engineer, New York, New Haven & Hartford Railroad, agreed with the preceding speakers except that he was inclined to favor a larger subway section because of the convenience that would be afforded to commuters who could go directly to their places of business in the city without change of cars. It seemed to him also a most unwise arrangement to place an alien line in the city, that is, one which could not be combined in the general plan of the present underground tracks throughout Manhattan.

Robert E. Dowling, president City Investing Company, New York, favored the Seventh Avenue route from Forty-second Street south, as suggested by Mr. Sprague. He disagreed with Mr. Murray about the great desirability of having commuters come into the city without change of cars. Speaking from a New York taxpayer's standpoint, he did not see why the city should spend $30,000,000 more than necessary simply to save a transfer to non-taxpaying commuters. A wider subway would cause much greater inconvenience to property owners along the line and would eventually cost the city a great deal of extra money.

C. K. Thompson, New York, said that the expense of operating the subway below the water line would be very great and also a burden on adjoining property. As to the profile of the subway, with its severe physical conditions, he said that it seemed to be in line with a general impression that a subway without grades or curves was no good.

The meeting closed with a few brief remarks from Mr. Sprague in which he expressed his satisfaction with the reception accorded to his paper.

CHAIRMAN WILLCOX'S COMMENTS ON THE DISCUSSION

When William L. Willcox, chairman of the Public Service Commission, First District, had his attention called to the paper read by Mr. Sprague and the ensuing discussion thereon, he gave out the following statement:

"Before commencing to advertise for bidders the commission gave several public hearings on the various features of the tri-borough system. The commission would have been very glad

to have had Mr. Sprague, Mr. Wilgus, and the other gentlemen appear at those hearings to express their opinions. In view of the fact that they did not choose to appear at those hearings, it is unfortunate that they did not withhold their remarks until after the bids were in, and then, if they had any criticisms to make, to appear before the commission on the question of whether or not the bids should be accepted. A delay of a few days would have made little difference, unless it was deemed important by them to discourage bidders in advance of the closing of bids."

It is stated with respect to the criticism that the tri-borough subway would be too large for the present subway equipment and too small for standard steam railway cars, that it would accommodate the cars used in suburban service on the Pennsylvania, Long Island, New York Central and New Haven Railroads. The clearances are too small only for Pullman cars and other extra heavy equipment. It was never intended that cars of the latter type should be run through the tri-borough subway; the increase in size was proposed simply to permit suburban cars to enter the city.

McCALL FERRY PLANT BEGINS OPERATION

The large hydroelectric plant which the Pennsylvania Water & Power Company has been building for a number of years at Holtwood, Pa., better known as McCall Ferry, was placed in operation on Oct. 14 and electrical energy was transmitted over its lines to Baltimore, Md. At present two wheels are in operation and all of the energy is being transmitted to the Consolidated Gas, Electric Light & Power Company, of Baltimore. The United Railways & Electric Company of Baltimore is also expected to use some of this power but as yet no contract has been made.

The hydroelectric development of the Pennsylvania Water & Power Company is located on the Susquehanna River about 10 miles northwest of the boundary line between Pennsylvania and Maryland, and about 20 miles from the tidewater of Chesapeake Bay. The dam across the river is approximately half a mile in length and is said to be the second longest dam in the world. It is built of solid concrete with an average height of 55 ft. and a width at the base of 65 ft. The downstream face is provided with the usual curve, and to allow for expansion and contraction layers of compressible material are introduced at intervals of 40 ft.

The power house, which is also built of solid concrete and connects the eastern end of the dam to the shore, is 500 ft. long. Provision is made for 10 units, with a total maximum rating of 135,000 hp. Elaborate precautions have been taken to guard against ice. The normal flow of the Susquehanna River is westward, thus carrying most of the ice away from the power house. In addition a wing dam, having three submerged arches through which the water enters the forebay, is built at right angles to the main dam, between which and a rock fill above floating booms are provided so as to divert such ice as is carried to the east over the spillway. Any ice which enters the forebay despite these safeguards, as well as ice which may form there, is diverted through three ice chutes built into the power house.

The water wheels are of the vertical type, each capable of developing 13,500 hp when operated at 53 ft. head and with 85 per cent gate opening. Two wheels are mounted on a single shaft of forged steel, and the entire weight is carried on a roller bearing supported by a casting set into the masonry. The arrangement for operating the gates consists of a vertical shaft made of pipe carried on a step and held at the top by a bearing attached to the wall. The maximum velocity of flow of the concrete openings is 6 ft. per second, and all changes of direction of flow have been made as gradual as possible so as to conserve the head. The draft tubes of the upper and lower wheels come out together below the level of the standing tail water, so that it is possible to get at the upper turbine by closing the head gates. When the lower turbine requires attention, stop logs may be used to cut off the tail race and the draft tubes drained by electric pumps. The water wheels were built by the I. P. Morris Company, of Philadelphia. Each wheel is coupled to a 7500-kw, three-phase, 25-cycle General Electric generator operating at 94 r.p.m.

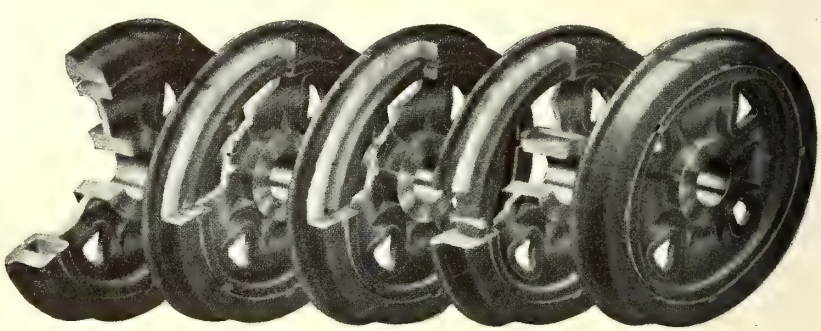
The hydraulic plant is now completed for an initial installation of 50,000 hp and an ultimate installation of 100,000 hp. The power house, gate house and transformer house are finished for six units, including rheostat and switchboard galleries, compartments for transformers and other apparatus. At the head works foundations, etc., are completed, the only work required to prepare the power house for the full installation of 100,000 hp being the completion of the superstructure.

Transmission line No. 1 is complete and ready for service. There are 500 steel towers, ranging in height from 40 ft. to 60 ft., carrying two 70,000-volt circuits each of three aluminum cables. The company owns title to a right-of-way 100 ft. wide and 40 miles long, extending from the Susquehanna River to the city of Baltimore, and a private telephone line is installed the entire length of the transmission system. The substation at Baltimore has been ready for operation for several weeks, and the transformer and auxiliary apparatus installed is sufficient to handle 40,000 hp. The equipment in the Baltimore substation was supplied by the Westinghouse Electric & Manufacturing Company.

The contractor for the installation was the Empire Engineering Corporation, which worked under the supervision of John A. Walls, chief engineer of the Pennsylvania Water & Power Company.

NEW STEEL-TIRED WHEEL

The new McConway steel-tired wheel made by the McConway & Torley Company, shown in the accompanying cut, embodies novel ideas in the manufacture of wheels of the built-up type. It has a rolled-steel tire and a cast-steel center with a cast-iron hub. The peripheral face of the wheel center and the inner circumference of the tire form an annular space divided into eight segments. This division is effected by the spacing wedges used for the temporary union of the tire to the center in the assembling of the wheel preparatory to casting therein the permanent locking. The locking wedges are in pairs, with points opposed, and when the metal has cooled the temporary spacing wedges are removed; the locking wedges are then driven home and intimate contact is obtained. This operation closes the space—or practically so—between the points of each pair of permanent locking wedges and doubles the space between the butts. At these enlarged spaces are the "sprag" notches in the inner flanges of the tire into which steel sprags or billets are fitted; thereupon the final closers are cast in place, so completing the circle of locking wedges which are under practically the same compression as if the tire were shrunk. As the sprags are embedded in the circle of cast-iron wedges and engage the tire through the notches in the flanges, they prevent the tire from turning on the hub.



Different Stages in the Make-up of the McConway Wheel

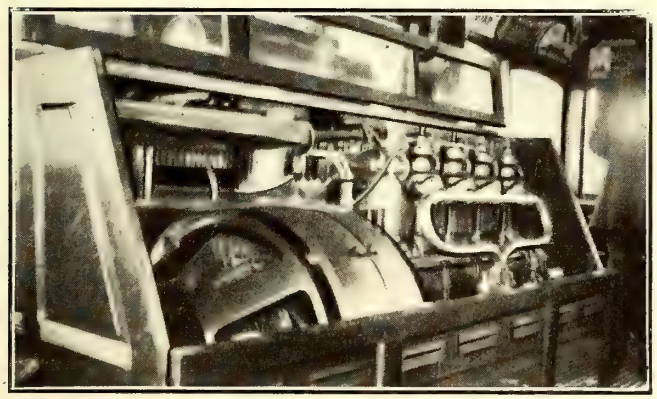
GASOLINE-ELECTRIC CAR WITH NOVEL CONTROL

Point Shirley, Mass., is a community with about 1000 people located about 1½ miles from Winthrop, which has a population of over 50,000. Both places are along Winthrop Beach, which



Trial Trip of Gasoline-Electric Car at Winthrop Beach

is a popular resort with Bostonians. When Point Shirley was the center of activities at Winthrop Beach a horse car line connected it with Central Square, East Boston. Later a steam railway known as the Winthrop Beach Shore Line extended its tracks to the Point, but the tracks were washed away in 1885 and were not replaced. During this year, however, the Point Shirley Street Railway Company was formed by Charles Ridgeway. The construction of the line between the Point and Winthrop was begun in August and completed in 14 days.



Engine and Generator at Side of Car

Owing to the great distance from a suitable power station it was impracticable to use ordinary electric cars. As a result, Herbert Ridgeway, treasurer of the company, designed the gasoline-electric car hereinafter described and illustrated.

The car body is similar to the surface cars of the Boston Elevated Railway Company. It is 30 ft. long over all and is carried on a single truck having a wheelbase of 6 ft. 6 in. It weighs 16,500 lb. complete with all apparatus. The accompanying plan and elevation of the car show the arrangement of the seating and the machinery. It will be observed that one side of the car has a continuous longitudinal seat, but that the other side is broken up in the center for the installation of a generator and engine instead of placing the latter under the car or at one end. This equipment takes up a space equivalent to five seats. The available seating capacity is 21.

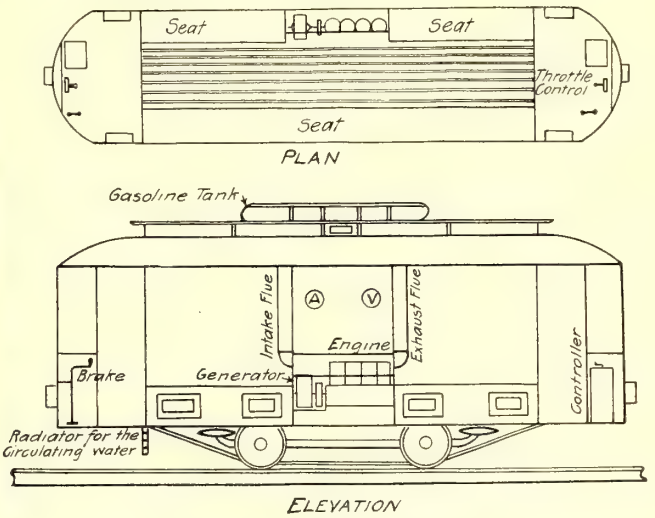
The prime mover is a four-cylinder, four-cycle, 40-hp gasoline engine, built by Blount & Lovell, of Boston. This engine is directly connected to a 30-kw Westinghouse d.c. compound-wound generator rated at 125 volts at 500 r.p.m. The motor is of the Westinghouse series type. The speed of the car is controlled by varying the impressed voltage. This is done through altering the engine speed by keeping the spark advanced and running on the throttle. By this method of control resistance losses are eliminated and the controller is reduced simply to a two-way switch for reversing the car. The speed may be varied from ½ m.p.h. to 25 m.p.h. An ammeter and voltmeter are mounted over the engine.

The car lighting is by the Apple system, in which a low-voltage d.c. generator is driven by the flywheel of the



Gasoline-Electric Car for Point Shirley

engine. This generator delivers energy to a storage battery which feeds 20-watt tungsten lamps. The Apple generator has an automatic cut-out to take it out of circuit when the engine stops running or when the battery voltage is greater than that of the generator. The storage battery also supplements the Bosch low-tension ignition system.



Plan and Elevation of Car

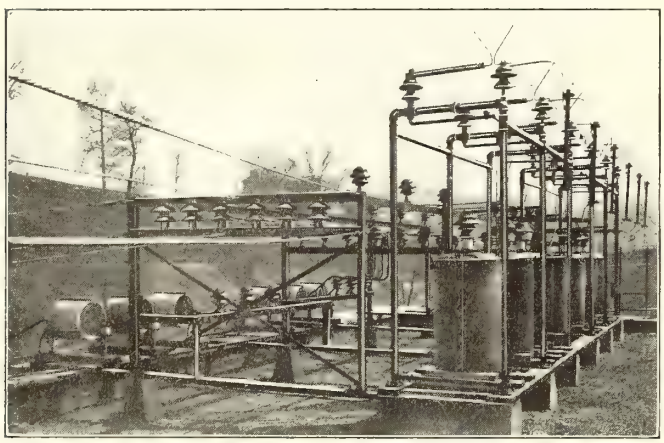
The gasoline tank is carried on the top of the car and is connected to the engine through two copper flues. One flue is used as an intake for the air to the carburetor and the other as an outlet to the muffler. A fan under the car, which draws the air through the radiator, is driven by a chain belt from the flywheel. In winter the hot gases from the exhaust will be used for heating the car.

The whole power outfit is encased in glass so that the passengers are not annoyed by flying grease. The vibration caused by the engine is so small as to be unnoticeable to the passengers and the exhaust also is perfectly muffled. During September the company carried 19,000 passengers in one power car and two trailers. A second power car is now under construction. At Point Shirley the company has built a combined car house and waiting room and a 500-gal. tank for storing gasoline.

A syndicate of capitalists has been granted a concession by the Peruvian Government to develop water-powers on the Chancay River and build an 80-mile electric railway connecting Ancon and Huacho. The address of the syndicate may be obtained from the Bureau of Manufactures, Washington, D. C.

ELECTROLYTIC LIGHTNING ARRESTERS

Many devices have been invented to protect electric equipment from abnormal voltage on the line. The most recent is the electrolytic lightning arrester, which depends upon the safety-valve action of a film on an aluminum plate. The Westinghouse type consists of nested aluminum trays filled with electrolyte and submerged in oil. The horn-gaps, which are between the arresters and the line, break down on over-voltage. If this voltage amounts to over approximately 330 volts per tray a free passage through the film from tray to tray and



Electrolytic Lightning Arresters

thence to the ground is provided. When the voltage drops to normal, which is below the critical voltage of the tray, the apparent resistance of the film reasserts itself and the flow of the current is cut down so that the horn-gaps disrupt the arc and all further flow of current ceases.

The nested trays are placed in oil-filled, welded-steel tanks, which for 22,000 volts and above are built with cast covers and outdoor terminals. The complete arrester consists of four tanks mounted on an insulated platform for ungrounded neutral service, and three tanks grounded for grounded neutral service. For 13,200 volts and under the arrester is arranged for indoor service only, as the horn-gap setting is so small that much more effective service is obtained when the arrester is housed.

Since, when the electrolytic type of arrester is allowed to stand without current passing through it, the film on the plates dissolves, it is necessary periodically to pass current through the arrester in order to keep the film in the best condition. This prevents an abnormal rush of current when the arrester discharges after long idleness. The rate of dissolution of the film depends upon the kind of electrolyte used and the temperature. There are two kinds of electrolyte made by the Westinghouse Electric & Manufacturing Company; one requires that the horns be bridged daily to pass current through the arresters, and the other requires that the horns be bridged only every seventh day. When arresters are bridged at normal voltage a bluish, crackling static arc indicates the normal condition of the arrester. If the arc is reddish and fluffy, and rises high on the horns, it is evident that the bridging of the horns has been deferred too long a time, and it will take a short period before the arc comes down to normal.

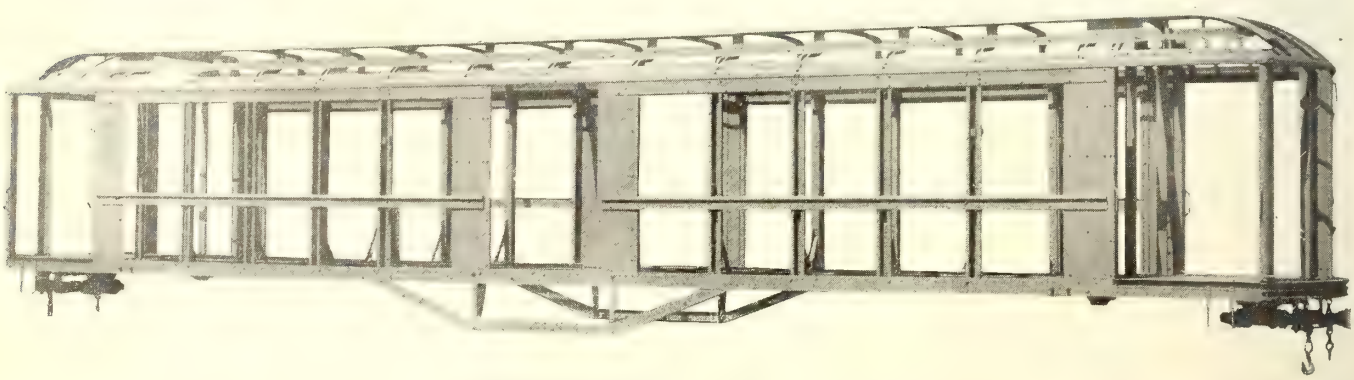
The horn-gaps and bridging device are mounted on a 2-in. pipe frame, to which is also attached the transfer switch used for interchanging a ground and phase tank on ungrounded neutral arresters. The bridging device is very simple and can be operated from either end.

As the voltage increases the trays in the arrester also increase. Hence, for a higher voltage, if the trays were all built in a continuous structure it would be very awkward to handle and require considerable overhead room when installed indoors. For this reason, on all arresters above 13,200 volts the tray structure is built up into sections containing not over 50 trays, which slide into place, one above the other, between guides supported by a base casting fitting closely the bottom of the tank. The electrolyte is poured into the trays with a measuring cup. When a section of trays is filled the electrolyte is plainly visible so that each tray can be checked. All parts of the supporting frame directly in contact with the trays are made of porcelain to prevent danger due to burning supports.

STEEL CARS FOR THE NEW YORK SUBWAY

The Pressed Steel Car Company at the present time is building at its shops in McKee's Rocks, Pa., 175 all-steel cars for the Interborough Rapid Transit Company's subway service. The general design of these cars was developed by the car equipment engineering department of the Interborough Rapid Transit Company. A complete description of the design, illustrated with drawings of the framing, was published in the Electric Railway Journal of June 18, 1910, but it is of interest to refer again briefly to the principal features in connection with the view of the skeleton framing which is reproduced herewith.

By a careful consideration of the functions of each member and proper distribution of the metal the weight of a complete car body without electrical equipment has been reduced to 28,540 lb. This is exceptionally low for a steel car 51 ft. long over platforms, seating 44 passengers, and intended for use in such severe service as is found in the New York subway. The use of Hedley anti-climber rolled sections for the platform end sills contributes largely to this low weight. It is interesting to note that all interior lining has been eliminated. Owing



Framing of Steel Cars for New York Subway

to the fact that doors 4 ft. 2 in. wide are provided in the center of each side the girder construction in the sides below the windows is dropped 26 in. below the door sills in the center. The center sills are 6-in. I-beams stiffened laterally by pressed steel diaphragms which also serve to support the corrugated floor sheets. These sheets are formed of No. 22 gage galvanized steel. In the aisle between the seat risers a layer of car Karbolith 1 1/16 in. thick is placed on the floor sheets and on top of this is a layer of Carborundum-Karbolith surfacer ¼ in. thick. Back of the seat risers the corrugated floor sheets are left bare. The seat frames are formed entirely

of light sheet steel pressed to the required shapes. The seat cushions and backs, which are upholstered with woven rattan, are being furnished by the Heywood Brothers & Wakefield Company.

The center side doors are operated pneumatically while the platform side doors are operated manually. All entrance and exit doors, which are of pressed steel, were made by the Forsyth Brothers Company. The cars are equipped with Westinghouse electro-pneumatic brakes and are mounted on Hedley cast-steel side frame trucks furnished by the American Locomotive Company.

ELECTRIC TRUCKS FOR THE SHORE LINE ELECTRIC RAILWAY AND SOUTHERN PACIFIC COMPANY

At the recent exhibit of the American Street & Interurban Railway Manufacturers' Association the Baldwin Locomotive Works exhibited the two motor trucks shown in the accompanying illustrations. These trucks are quite different in design and carrying capacity, as they are intended for street and electrified steam railway service respectively.

The truck for the Shore Line Electric Railway represents the latest development of the short wheel-base truck with outside-hung motors, as built by this company. This truck is designated as class 54-18 F2, indicating a design with 54-in. wheel base and a carrying capacity of 18,000 lb. on the center plate. The truck is intended for city passenger service, on a standard gage line, and can be used on curves of 35 ft. radius. The maximum speed is 35 m.p.h. The cars have a seating capacity of 40 passengers each.

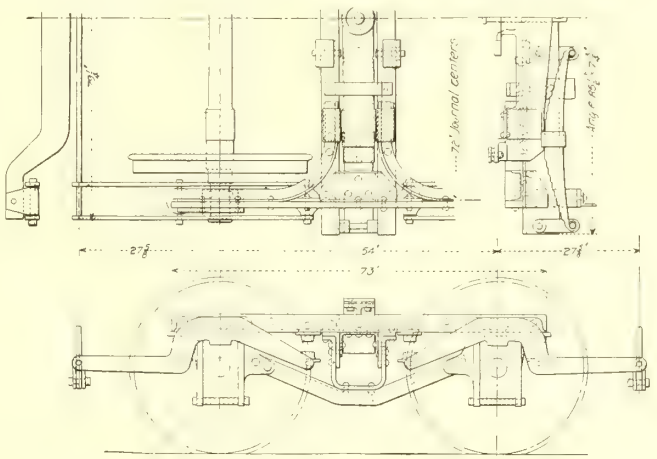
This truck has independent double equalizing beams mounted on each box, and the motors are suspended directly on these beams. The truck frame has two spring supports on each beam. With this arrangement not only is the truck frame relieved of strain due to the weight of the motors, but the motor reactions actually assist in supporting the frame; and the tendency to tilt the frame, when the motors are developing torque, is greatly reduced. Furthermore, the spring base is long so that the truck rides steadily when passing over uneven places in the track.

The new Shore Line trucks have forged iron side frames, 1¼ in. wide by 3½ in. deep. These frames are placed vertically, in which position they are best able to resist strains. Lateral stiffness is secured by 2½-in. x 3½-in. angles, which are riveted to the side frames and transoms. The latter consist of heavy angles. The truss members are composed of 3-in. x 3-in. angles and these are riveted to the pedestals. The structure of the truck thus consists chiefly of commercial sizes of iron and steel and is remarkably rigid and light. The angle iron braces uniting the side frames and transoms have sufficient stiffness to prevent "diamond pointing" even under severe service conditions.

The truck bolster is of cast steel and is supported at each end on a half elliptic spring. These springs are suspended from the transoms by wrought-iron swing links. A satisfactory construction is thus secured without the use of a spring plank. The journals are 3¾ in x 7 in., designed in accordance with American Electric Railway Association standards. The wheels are 34 in. in diameter, of solid forged and rolled steel with rims 2½ in. thick. They were supplied by the Standard Steel Works Company. Each truck is propelled by two GE No. 216 motors.

The second truck is for the Alameda electrification of the Southern Pacific Company. It is one of an order for 130 motor and 120 trailer trucks, all of which are being built in accordance with drawings and specifications furnished by the railway company. The illustration shows one of the motor trucks. This design is of the equalized pedestal type with inside-hung motors and is suitable for a center-pin load of 35,000 lb. The track gage is standard and the truck wheel base 84 in. The operating conditions approximate those found in steam railroad service. The builders' class designation is 84-35 S.

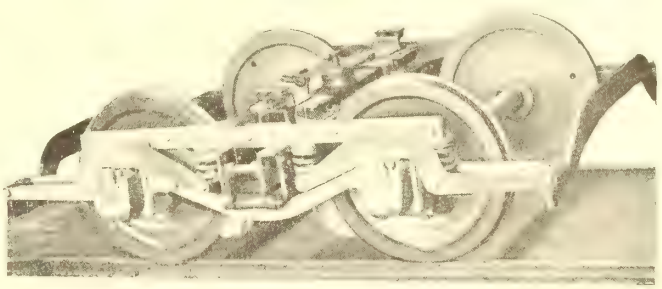
This truck has forged side frames and pedestals and channel iron end frames. The side frames are 2½ in. x 4 in. and are finished all over. The transoms consist of 10-in. channels, which are secured to the side frames by heavy cast-steel gussets. The equalizers are cut from steel boiler plate, the ends being punched while hot by means of a special die. The bolster is of cast steel. It is swing suspended and is supported at each end on a triple elliptic spring. The brakes are inside hung, the shoes being suspended from lugs cast on the transom gussets. The brake levers and shoe hangers are straight, without set, and the live levers are connected by suitable links with a radial transverse beam supported on cast-steel guides. The brakes are released by coil springs placed above the side frames. Each spring is slipped over a piece of 1½-in. pipe, which holds it in place and prevents chattering. The axles are of Taylor iron with 5-in. x 9-in. journals. The wheels are steel-tired with cast-steel centers. They were manufactured by the Standard Steel Works Company and were mounted hot under a specified wheel fit pressure. The diameter over the tires is 36½ in.



Part Plan and Side Elevation of Truck for Shore Line Electric Railway



Truck for Southern Pacific Railroad



Truck for Shore Line Electric Railway

The Baldwin Locomotive Works believe that for high-speed service conditions, such as are found on electrified steam lines, the equalized pedestal type of truck is in a class by itself, and is daily proving its superiority. The Southern Pacific design is of special interest because of the extent of the installation and the growing interest now being manifested in the electrification of steam railway terminals and suburban lines.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE.

Indiana.—Statutory Regulations—Violation—Negligence—Accidents to Trains.

In an action against a railroad for injuries to a motorman of an electric car received in a collision with a passenger train at the crossing of a railroad track, a complaint which alleged that the railroad negligently failed to bring the train to a stop before entering on the crossing, and without first ascertaining that there was no car approaching and about to cross, that, on the contrary, the railroad ran its train at full speed across the crossing, while the car was approaching in full sight and about to cross, stated a cause of action as against a demurrer under Acts 1905, c. 169, making it an offense for an engineer to run his locomotive across the tracks of any other railroad without first coming to a stop, etc.

Where the injury to a motorman operating cars across the tracks of a railroad, sustained in a collision between his car and a train at a crossing, was the result of the negligence of the railroad and an accident for which neither the railroad nor the motorman was responsible, the railroad was not liable unless the injury would not have happened had it not been negligent. (Louisville & Nashville Ry. & Lighting Co. et al. v. Hynes, 91 N. E. Rep., 962.)

Kansas.—Master and Servant—Injury to Servant—Negligence of Master.

In an action for personal injuries received by one of the crew of an electric car which had been derailed, while he was picking up the tools that had been used in replacing it, by being struck by another car, held, that the evidence justified a recovery on the theory that the plaintiff was injured while engaged in work requiring his presence upon the track under such circumstances that he was not under an absolute duty to keep an outlook, and that the motorman of the approaching car, in view of what he saw, could have anticipated that some one might be in a place of danger, and ought to have stopped or sounded a warning. (Ray v. Kansas City-Western Ry. Co., 109 Pacific Rep., 172.)

Kentucky.—Care Required in Operation—Contributory Negligence.

Where a person familiar with city streets, in passing a street car as it was turning a street corner, failed to make sufficient allowance for the swinging of the car, and in turning, the rear end struck his wagon, causing his injury, he was guilty of negligence precluding a recovery. (Louisville Ry. Co. v. Ray, 124 S. W. Rep., 313.)

Kentucky.—Competency of Motorman.

In an action against a street railroad company for injuries in a collision with plaintiff's carriage, there was evidence that the motorman served an apprenticeship of 15 days before being given a car, that he had served as motorman for about four and one-half months, and there was no evidence tending to show that this length of service did not qualify him to perform the duties of motorman, and the only evidence tending to show incompetency was evidence that he might have been negligent on the occasion of the accident. Held, that this evidence was not sufficient to show incompetency, and that the court did not err in refusing to submit to the jury the question of the motorman's incompetency. (Doll v. Louisville Ry. Co., 128 S. W. Rep., 344.)

Massachusetts.—Contributory Negligence—Acts in Emergency.

Where a female passenger reasonably anticipated injury from an explosion in an electric car, accompanied by a slight outburst of flame, she was not chargeable with contributory negligence in unnecessarily attempting to escape the danger, though it appears that if she had remained in her seat all danger would have been avoided. (Steverman v. Boston Elevated Ry. Co., 91 N. E. Rep., 919.)

Massachusetts.—Operation of Cars—Rights in Highway—Collision with Car—Questions for Jury—Negligence—Contributory Negligence.

A street railway company is not entitled to the exclusive enjoyment of a portion of the highway where its rails are laid, but the rest of the traveling public may also go on it without unreasonably interfering with its cars, though the latter are entitled to a certain preference by reason of their inability to turn out.

On learning of the approach of a car, other travelers should leave the rails at once if reasonably practicable; but travelers in the vehicles need not be constantly watching for the approach of a car from behind, and may reasonably assume under ordinary conditions that its driver will exercise common prudence to avoid a collision with others exercising their rights as travelers with ordinary care.

In an action against a street railway company, it appeared that plaintiff was driving a heavy wagon after dark in a broad street, and that a portion of the way outside of tracks was covered with ice and snow, and the footing for his horses was better between the rails, where there was no ice, and where he had been driving at a walk for about five minutes, when a car going in the same direction ran into him and caused the injuries for which he sued. Held, that plaintiff's due care and defendant's negligence were questions for the jury. (Callahan v. Boston Elevated Ry. Co., 91 N. E. Rep., 388.)

Massachusetts.—Management of Cars—Injuries to Travelers—Speed at Crossings—Street Railroads—Operation—Injuries to Person on Track—Questions for Jury.

The demand for rapid transportation by street railway companies does not relieve them from compliance with the law of the road, subject only to the modifications that the path of the car is fixed, while travelers, either on foot or in vehicles, may use the entire way, so far as it has been fitted and opened for public travel.

The rule that where a highway crosses a steam railroad at grade a traveler who neglects either to look or listen for approaching trains before crossing, but passes on and is injured, cannot recover does not apply in favor of street railroads.

A street railroad is required to regulate the speed of a car, and, if necessary, to sound the gong, that travelers using due care while passing upon the track from intersecting driveways or streets may not be imperiled by collisions.

Evidence that plaintiff, driving toward a street railroad, some distance before he reached the track, could see 300 ft. up the track, and see that there were no cars approaching, but as he approached nearer his view was obstructed, justified the jury in finding that to again look and listen, where he knew that any further observation would have been prevented till he arrived so near the track that he could not turn back, was uncalled for.

Whether plaintiff, driving toward a street car track, having observed the track some time before he reached it, at a distance of 300 ft. from the crossing, properly acted on his judgment that if a car came at the usual rate of speed he had ample time to go over, or whether he should have stopped, alighted, and ascertained before attempting to cross if a car was coming, were questions of fact, and not of law. (Horsman v. Brockton & P. St. Ry. Co.; Davis v. Same, 91 N. E. Rep., 897.)

Michigan.—Injury to Passenger—Inference of Negligence—Burden of Proof.

There is an inference of negligence, requiring no further proof, but open to rebuttal, where an electric car containing passengers, and under the control of the carrier's servants, continues its course till it collides with a standing car ahead of it, with such force as to push such car ahead 75 feet.

Plaintiff's burden of proof as to negligence of defendant, in an action by a passenger against a carrier for injury from collision of cars, does not shift, even where a presumption of negligence exists from the collision; but the presumption is to be weighed with defendant's evidence, and if as a whole the evidence does not preponderate for plaintiff, he cannot recover. (Sewell v. Detroit United Ry., 123 N. W. Rep., 2.)

Michigan.—Injuries to Street Sweeper—Contributory Negligence—Negligence After Accident—Discovered Peril.

Where, notwithstanding the noise in the street from passing vehicles, etc., plaintiff, a street sweeper, worked on the track of a street railway in such position that he could not see cars approaching him from the rear, and relied solely on his sense of hearing for safety, he was guilty of negligence precluding a recovery for injuries sustained in a collision with a car approaching from that direction.

Where a street railway motorman, as he was about to strike plaintiff, a street sweeper, reversed the motor to make a quicker stop, and the car, after striking plaintiff, moved forward for some distance, and then stopped and began to move backward because the motor was still reversed, without any intervening act on the part of the motorman, plaintiff could not recover under the doctrine of discovered peril for injuries sustained by being rolled backward while under the fender on the theory that defendant's motorman was negligent in backing the car after plaintiff was struck. (Stenzhorn v. City Electric Ry. Co., 123 N. W. Rep., 621.)

Michigan.—Carriage of Passengers—Street Railroads—Care Required—Taking On or Letting Out Passengers—Duty to Stop Car—Injury to Passenger—Negligence of Conductor.

The degree of care required of carriers of passengers upon street cars in securing the safety of passengers entering or alighting is the highest care or the care which a very prudent person would have used under the circumstances.

It is the duty of a street car company to stop to take on or let off passengers, the time of stoppage being such as to enable the passenger to reach a place of safety, either on the street or in the car before it is started, and the company is liable for injuries to a passenger caused by a disregard of that duty.

A street car stopped for the sole purpose of taking plaintiff as a passenger. He was encumbered with a heavy grip, and there was snow on the ground and car steps. The conductor was standing on the rear platform waiting for plaintiff to get on. Plaintiff had his grip in his right hand, and had hold of the railing with his left hand. When he had either one or both feet on the first car step, and before he had time to reach the platform, the conductor started the car, and he was thrown to the ground. It did not appear that his fall was caused by anything except the starting of the car. Held, that the conductor was negligent as a matter of law. (Beattie v. Detroit United Ry., 122 N. W. Rep., 557.)

Missouri.—Duty of Motorman—Precautions as to Vehicle on Track—Duty to Use Light at Night.

The motorman of a street car must use ordinary care to discover persons or vehicles on the track, and in a populous section of the city cannot expect a clear track, and, if he discovers a vehicle on the track, he should give notice so as to afford the driver an opportunity to get off the track, and if such driver does not do so, and it becomes apparent to the motorman that he does not intend to get off, it is the motorman's duty to stop the car rather than run into and injure him, and the car should be kept under control so that it may be so stopped.

A street railway company must keep lights on its cars at night to enable its motormen to see ahead a sufficient distance to discover persons on the track. (Clover v. Joplin & P. Ry. Co., 124 S. W. Rep., 43.)

Missouri.—Collision of Car with Boy—Negligence—Evidence—Humanitarian Doctrine.

Evidence in an action for collision of a street car with a boy six years old, who in front of a schoolhouse, at the hour of dismissing school, ran diagonally across the street in front of the car, with his back partly turned toward it, held sufficient to show that he was in a position of peril, which the motorman saw, or by the exercise of reasonable care should have seen, in time to have avoided striking him, with consequent liability of the railroad company under the humanitarian doctrine. (Edwards et. al. v. Metropolitan Street Ry. Co., 127 S. W. Rep., 605.)

Missouri.—Broken Trolley Wire—Injuries to Pedestrians—Care Required—Damages—Excessiveness.

Where a broken trolley wire carrying a current of electricity fell into a public street and struck and injured a pedestrian, while under the control and management of defendant street car company, such facts were sufficient to raise a presumption of negligence, and to cast the burden on defendant to show that the wire was on the street without fault of its servants or agents.

Where, in an action for injuries to a pedestrian by a broken trolley wire that fell into the street, the petition, evidence, and instructions did not proceed on the doctrine of res ipsa loquitur, an instruction that if the wire charged with a deadly current of electricity was negligently permitted by defendant to break in two, and if defendant negligently permitted the wire to become old and worn by continued use to the extent of impairing and weakening its tensile strength so that it became inadequate for use, and by reason of such defective condition it was negligently permitted to break, was not objectionable as authorizing a finding of negligence from the mere breaking of the wire.

A railroad company must use the utmost care of an ordinarily prudent person engaged in the same line of business to maintain its overhead trolley wires in a safe condition.

Plaintiff, while standing at a street corner, was struck and injured by a heavily charged trolley wire which broke as the car approached. Prior to the accident plaintiff was a strong, able-bodied man. After the accident his face showed that he had received a charge of electricity. His injuries were so severe that he remained unconscious for 10 or 12 days; his lip was cut to the teeth and he had a white line resembling an electric burn from ear to ear; his eyesight and hearing were affected; his hair turned gray, and from November 20 to March 23 he had aged to to 15 years. He was unable after the accident to perform any kind of manual labor, and was a wreck physically and mentally. Held, that a verdict for $9,500, from which plaintiff remitted $2,000, was not so excessive as to show that it was the result of passion and prejudice. (Booker v. Southwest Missouri R. Co., 128 S. W. Rep., 1012.)

Missouri.—Carriage of Passengers—Care Required—Passengers—Contributory Negligence—Regulation—Ordinances—Validity.

A carrier of passengers is not an insurer, but must exercise the utmost care and diligence of a cautious person so as to safely tranport them, and it must allow reasonable time for passengers to enter and leave its cars with safety in the exercise of ordinary care.

A passenger attempting to board or alight from a moving train is generally guilty of contributory negligence, precluding a recovery for the injuries received, though the carrier was guilty in the first place in not stopping its train a reasonable time for the passenger to enter or leave it in safety, subject to some exceptions where the car is moving so slowly that the passenger's act may not be contributory negligence as a matter of law.

An ordinance regulating street railways by providing that conductors shall not allow women or children to leave or enter the cars when the same are in motion is valid.

An ordinance regulating street railways by providing that conductors shall not allow women or children to leave or enter cars while in motion modifies the common-law rule of negligence of carriers and contributory negligence of passengers, and a street car conductor who permitted a female passenger to attempt to alight while the car was in motion was negligent, for which the street railroad was liable, unless the passenger was guilty of contributory negligence in leaving the car under the circumstances. (Johnson v. St. Joseph Ry., Light, Heat & Power Co., 128 S. W. Rep., 243.)

New York.—Street Railroads—Injury to Person on Track—Negligence,

Where a person seeing a rapidly approaching street car signaled it to stop and then attempted to cross the street in front of it, to board it on the other side of the street, as was necessary, and was struck and killed, he was negligent, precluding a recovery. (Flynn v. Joline et al., 119 N. Y. Sup., 785.)

New York.—Imputed Negligence—Negligence of Parent.

It is not, as a matter of law, negligence for a mother of a child, 3½ years old, to permit the child, accompanying her to a store on the opposite side of the street, to leave the store and start across a street on which cars are operated while she is waiting for her change for a toy bought for the child; but the question is for the jury. (Zwirn v. Joline et al., 122 N. Y. Sup., 231.)

New York.—Collision with Automobile—Evidence of Negligence.

Negligence on the part of receivers operating a street railroad cannot be inferred from the mere fact that a street car came into collision with an automobile. (Moore v. Joline et al., 123 N. Y. Suppl., 117.)

New York.—Operation of Cars—Care Required—Obligation of Pedestrians.

A motorman operating a car in the usual direction must keep a close lookout and take prompt measures to avoid endangering travelers and to extricate them from any peril, and a motorman operating a car in the opposite direction must proceed cautiously, give frequent warnings, and, until the contrary appears, assume that a pedestrian on the tracks is not aware of the approach of the car from such direction, and a motorman operating such a car at a speed precluding a stop in less than 100 feet, while he could not see ahead more than 30 or 40 feet, was guilty of negligence.

It is not negligence per se for one late at night to leave the sidwealk because of the darkness cast over it by shade trees and use the car tracks, but he must keep a close lookout for cars without anticipating that cars will be run contrary to custom.

Whether a pedestrian struck by a street car while walking on the track was guilty of contributory negligence held, under the evidence, for the jury. (Shipley et al. v. Metropolitan St. Ry. Co., 128 S. W. Rep., 768.)

New York.—Injury to Person Attempting to Board Car—Contributory Negligence.

A person at night signaled a rapidly moving electric car to stop at a highway crossing. The car ran past the crossing and then stopped. He then started to run to catch the car, which commenced to back, and it ran against him. He had an unobstructed view of the lighted car, and he could have seen it had he looked. He knew that the car had a superior right of way beyond the crossing. He neither looked nor listened. Held, that he was guilty of contributory negligence as a matter of law, for he could not assume that the motorman would not do his duty and return the car to the crossing. (Engler v. International Ry. Co., 122 N. Y. Suppl., 841.)

Pennsylvania.—Collision with Vehicle—Question for Jury—Negligence of Motorman—Contributory Negligence.

Where the condition at a crossing where a collision between an electric car and a vehicle occurred was such that the motorman saw, or ought to have seen, the team when it crossed, at a distance great enough to have stopped his car and avoided the collision if the car had been under control, his failure to control his car calls for explanation, and the question of his negligence is for the jury, in view of whatever special or accidental feature of the time or place might excuse him.

Where decedent drove a four-horse team attached to a heavy oil wagon out of a private lane onto a public highway on a hill, and was struck by an electric car while crossing the second track of a double track railway on the highway, and it appeared that decedent stopped the team not more than eight feet from the first rail of the first track, and both he and his companion looked both ways and agreed that no car was in sight, and it appeared that they had a clear view of 560 feet to the top of the hill in the direction from which the car came, and that they were also in clear view of the motorman from such point, the questions of the motorman's negligence and decedent's contributory negligence are for the jury.

Decedent's negligence could be determined as matter of law only if the evidence were undisputed that in attempting to cross the tracks he drove in front of the approaching car when it was so close that the motorman could not reasonably have been expected to stop the car in time to prevent the collision.

The absence of a burning headlight, or failure to sound a gong or ring a bell on a car which collided with a team, is not material evidence of negligence of the railway company where it does not appear that the absence of such warnings contributed to the accident. (Mackey v. Philadelphia & West Chester Traction Co., 76 At. Rep., 201.)

Texas.—Contributory Negligence of Child.

In determining whether the question of a child's contributory negligence should be submitted to the jury in an action for personal injuries, the test is not whether reasonable men would agree that an ordinarily prudent child would have acted as plaintiff did, but whether they would differ on that question. (Citizens' Ry. Co. v. Robertson, 125 S. W. Rep., 343.)

Texas.—Instructions—Requests—Contributory Negligence.

Where, in an action for injuries to a street car passenger while alighting from a moving car, defendant proved that plaintiff stepped off the car with her back the way the car was going, a charge predicating contributory negligence on the fact that she alighted from the car while in motion covered the facts grouped in a requested charge that if she attempted to alight without following the motion of the car, and a person of ordinary care would not have so acted, she was guilty of contributory negligence, submitted the issues raised by the evidence.

To prove the contributory negligence of a street car passenger suing for injuries while alighting from a moving car, the burden is on defendant to prove not only that the passenger stepped off the car in motion, but that a person of ordinary prudence would not have so acted, and a charge that if the passenger stepped off the car while moving, not following its motion, she was guilty of negligence, unless a person of ordinary care would have done so, was properly refused because it required the passenger to show that a person of ordinary prudence would have acted as the passenger did to acquit her of contributory negligence. (Barnes v. Dallas Consol. Electric St. Ry. Co., 128 S. W. Rep., 367.)

Wisconsin.—Master and Servant—Safety of Place to Work and Appliances—Assumption of Risk—Infirmity of Fellow Workmen—Liability Therefor—"Vice Principal."

An employer must provide a reasonably safe place to work and reasonably safe appliances to work with, and he is liable for the proximate consequences to the servant from omission so to do.

An employee assumes the ordinary risks of the business which he knows, or, as an ordinary careful and intelligent man, ought to anticipate.

The likelihood of human infirmity in his fellow workmen is one of the risks assumed by an employee.

A master is not liable for negligence of a fellow servant in the common employment.

A distinct and independent employee to whom is delegated the duty to disconnect and make safe electric wires on which others must work is ordinarily a vice principal, and not a fellow servant with the linemen and other like workmen. (Massy v. Milwaukee Electric Ry. & Light Co., 126 N. W. Rep., 544.)

Wisconsin.—Alighting from Moving Car—Negligence.

While alighting from a moving street car does not, in all cases, constitute negligence as matter of law, yet an adult man of ordinary intelligence, laboring under no fright or excitement, and confronted with no exigency, who alights from a street car which to his knowledge is moving at the rate of six miles an hour is negligent. (Fosnes v. Duluth St. Ry. Co., 122 N. W. Rep., 1054.)

Wisconsin.—Action for Death—Negligence of Motorman—Failure to Show—Direction of Verdict—Duties of Motorman—Performance—Care Required.

Plaintiff's deceased, a laborer, was a passenger on a street car, carrying with him his shovel. He alighted from the car at the end of the line, and after going a short distance discovered that he had forgotten his shovel, and started back toward the car, which had started on its return trip. He boarded the moving car, walked rapidly past the conductor, through the car, shouted, "Stop, I want my shovel!" in Polish, stood in the vestibule with his back to the motorman, reached into the car for his shovel, when the motorman increased the speed of the car, and deceased fell off, sustaining injuries from which he died. Held, in an action against the street car company, that as the shovel had been left on the car by the negligence of deceased, in boarding the car he could demand nothing except that when the car reached its next regular stopping place he be let off, and as he was standing apparently in a safe place there could be no reasonable inference that any injury would happen to him merely by an ordinary increase in speed, and hence no negligence on the part of the motorman was proven, and a verdict was properly directed for defendant.

Great diligence is required of a motorman in the performance of his duties, which necessarily prevent him from keeping a close watch in his rear, since, when his car is moving, he must keep a close lookout ahead, so that he may be able to control his car immediately upon the appearance of danger to any one. (Bukowski v. Milwaukee Electric Ry. & Light Co., 125 N. W. Rep., 912.)

News of Electric Railways

Chicago Consolidated Traction Ordinance Passed

The City Council of Chicago has passed an ordinance permitting the rehabilitation of the principal lines of the Chicago Consolidated Traction Company and allowing the purchase of the property of the company as contemplated in the reorganization plan by the Chicago Railways at a valuation of $3,968,539 placed on the property by Bion J. Arnold. The city is to get 55 per cent of the net income of the company, the same proportion that it receives under the ordinances granted to the Chicago City Railway and the Chicago Railways. Briefly, the ordinance runs for 17 years, expiring simultaneously with the Chicago Railways franchise of 1907. Nothing therein is to be construed as being a grant to the Chicago Railways extending beyond Feb. 1, 1927, but the new ordinance is amendatory of, and supplemental to, the ordinance of Feb. 11, 1907. The purchases by the Chicago Railways include for use until rehabilitation is complete 128 miles of track, 172 cars, 3 power houses; the rest of the Consolidated Traction Company's 187 miles of track and 344 cars are either outside the city limits or must be abandoned. All rights of the city with respect to the purchase of the system of the Chicago Railways as provided in the ordinance of 1908 apply to the new ordinance. The 128 miles of track of the Chicago Consolidated Traction Company on the West and Northwest sides are to be reconstructed and maintained at the highest practical efficiency and in full accordance with the provisions of the Chicago Railways ordinance of Feb. 11, 1907. Reconstruction and rehabilitation are to be prosecuted under the direction of the board of supervising engineers, and with all due diligence and the cost thereof is to be determined, paid for and certified in accordance with the provisions of the ordinance of the Chicago Railways of 1907. Two hundred and fifteen new double-truck cars are to be placed in operation "at the earliest practicable moment." The Chicago Railways is to pave, repair, sweep, sprinkle and clear from snow the right of way and one foot on either side the outer rails. On single-track lines this space is to be at least 8 ft. wide and on double-track lines it is to be 16 ft. wide.

J. M. Roach, president and general manager of the Chicago Railways, is reported to have made the following statement in regard to the work to be carried out to the lines of the Chicago Consolidated Traction Company:

"We are now getting steel rails in orders of 20,000-ton lots and have enough ties on hand to lay three miles of track. Enough more have been ordered in advance so that they will be here before the present supply is used. These are the big things in street-car construction and inability to obtain them can cause an unavoidable delay. There will not be any wait on their account.

"Frost is the only thing that will stop us. It is impossible to lay concrete such as is required for the foundations of the tracks in frosty weather. We are planning now to keep working until Nov. 20, 1910. Usually we plan to stop Nov. 1, but this is an emergency which demands special effort. If the mild weather keeps up until late in the autumn we may work much longer and accomplish much more.

"The big trunk-line streets will be cared for at once as much as possible. The others and the extensions will be taken up next spring. Work on outlying streets is much faster. There is less traffic to interrupt, fewer pipes and wires underground and excavation is easier. In a few days we will start putting men at work and at least 3,000 will be employed. Work will go on as fast as possible. Little can be done at night to any advantage and we probably will not attempt it.

"We are now receiving cars on an order of 350. About 250 are still to come and will enable us to replace the small cars on the lines of the Consolidated Traction Company. The new cars are of the semi-steel type, seating 40 passengers, such as are now used on West Twelfth Street. In addition we have a large number of rebuilt cars, such as are on North Clark Street, numbered above 1100."

Columbus Strike Declared Off

The employees of the Columbus Railway & Light Company, Columbus, Ohio, who were on strike, have declared the strike off, according to a statement in the *Ohio State Journal*. The company has not granted the men any concessions, but the men, it is understood, expect the company to promise to take back as many men as there are positions vacant. The first vote to declare the strike off was taken on Oct. 15, 1910. The proposal was then defeated after much disorder and bickering by a vote reported to have been 181 to 34. More of the men than indicated by this vote, however, realized that the end of the strike was at hand, and they prevailed over the others at the subsequent meeting.

Two more convictions on the charge of throwing stones at cars during the strike have been secured and one man has been sentenced to a term of two years in the penitentiary on the same charge. So far, the prosecution has been successful in every case tried on this charge. Motions for new trials in both cases were denied. In one of the cases, however, time was given to prepare a plea for mercy, and on Oct. 14, 1910, the offender was sentenced to an indefinite term in the Mansfield reformatory and to pay a fine of $50.

On Oct. 14, 1910, Ernest Flynn was found guilty of throwing stones at cars at the corner of Leonard Avenue and Jefferson Avenue. He was among the first men arrested and the prosecution made a strong case against him because he attempted to escape by flight.

The depositions of James O'Ryan and Edward O'Ryan, brothers, in relation to the case of James H. Orr, were taken before Commissioner Armstrong on Oct. 13, 1910, because the men had arranged to go to Florida and could not be present at the trial. Orr was indicted on the charge of dynamiting a car on Main Street. The O'Ryan brothers, who live in a house adjoining that of the accused, testified that they were awakened by the explosion and heard Orr jump out of bed. They later found him on his porch to ascertain the cause of the noise. They said that he had slipped on his trousers over his pajamas and they were sure that he could not have been at the scene of the explosion. Orr is a member of the local union of street railway men.

George W. O'Leary, indicted as George W. Brady on the charge of firing shots that wounded two women and a girl during the riots, has filed, through his attorneys, eight affidavits sustaining his contention for a continuance of his case. Most of them relate to the fact that several of his witnesses, men who operated cars during the strike, cannot be found. He claims that he can produce witnesses to show that he did not carry any revolver and that the shots which hit the women came from behind a billboard in the neighborhood.

Meeting of Railway Commissioners.—A call has been issued for the twenty-second annual convention of the National Association of Railway Commissioners, to be held in the hearing room of the Interstate Commerce Commission, Washington, D. C., on Nov. 15, 1910.

Public Service Commission Exhibit.—A budget exhibit of the city of New York is being held at 330 Broadway, Manhattan, under the direction of the budgetary publicity committee of the board of estimate and apportionment. It includes an exhibit designed to show the work of the Public Service Commission for the First District.

Report on Earnings in Toledo Made Public.—Nau, Tanner & Rusk, Cleveland, Ohio, who were retained some time ago by the City Council of Toledo, Ohio, to report to the city regarding the receipts and expenditures of the Toledo Railways & Light Company for the last eight years, have filed their report with the city and it has been made public.

Municipal Railway Proposed for Los Angeles.—By resolution introduced by Councilman Gregory, the Council of Los Angeles has requested the Board of Public Works to

report the feasibility of and the most practicable route for the construction of a municipal railway from the business center of Greater Los Angeles to the harbor district at Wilmington and San Pedro.

Proposed Municipal Line in Toronto.—Before Dec. 31, 1910, Toronto will give notice of its intention to take over that portion of the Mimico branch of the Toronto & York Radial Railway which is within the city limits. The franchise to this part of the line expires on Dec. 31, 1911. The length of track is 1 1-10 miles. Application is to be made to the Legislature of Ontario at the coming session for power to assume possession of the Mimico line of the Toronto & York Radial Railway.

Nominations of the New York Railroad Club.—The nominating committee of the New York Railroad Club has submitted the following list of nominations for officers of the club during the ensuing year. For president, H. S. Hayward; for first vice-president, Frank Hedley; for second vice-president, W. J. Harahan; for third vice-president, Eugene Chamberlin; for treasurer, R. M. Dixon; for executive member (three years), George Wildin; for member finance committee (three years), Charles Shults. Under the rules of the club, ballots must be in before noon of Nov. 18, 1910.

Decision in the Peoria Water Case.—Judge Sanborn of the United States Circuit Court handed down a decision on Oct. 4, 1910, in the case of the Peoria Water Company versus the Peoria (Ill.) Railway Company. It is said that the decision grants the plaintiff an injunction against the railway company restricting the latter from so using its current as further to damage the mains and property of the Peoria Water Company by electrolysis, and that the Illinois Traction Company, which controls the Peoria Railway Company, will appeal the case to the Supreme Court. Previous references to this case have been published in the Electric Railway Journal of July 3, 1909, page 43; March 21, 1908, page 469; June 22, 1901, page 722, and June, 1899, page 390.

Boston Elevated Railway Files Plans for Sullivan Square Changes.—In connection with the construction of its elevated extension to Everett and Malden, the Boston (Mass.) Elevated Railway has petitioned the Massachusetts Railroad Commission to approve plans for the alteration of the Sullivan Square terminal station at Charlestown which will make it possible to handle the traffic expected when the line is completed. The company proposes to build a new loading platform on the west side of the present station building, and to separate in-bound from out-bound traffic by ramps and an overhead bridge, with suitable divisions which will confine loading of trains to one part of the station and unloading to another. A surface car loop will supersede the present stub tracks on the west surface platform of the station, and the tracks are to be arranged so that trains can be sent back to the city proper without going to Malden if desired, in a similar manner to the handling of trains at Dudley Street terminal in connection with the Forest Hills extension. The board will give a hearing upon the proposed changes.

Bids Wanted for Material for Invercargill.—The Invercargill Corporation Tramways, Invercargill, New Zealand, invites tenders for supplying the equipment for an electric railway in Invercargill, the contracts to be divided into the following sections: Contract No. 1, power house plant (erected complete); Contract No. 2, rails, fishplates and bolts, points and crossings, special work and bonds; Contract No. 3, car bodies; Contract No. 4, electric car equipment; Contract No. 5, car trucks; Contract No. 6, overhead material; Contract No. 7, wires and cables; Contract No. 8, steel poles; Contract No. 9, tower wagon; Contract No. 10, dog spikes; Contract No. 11, street lighting plant. Specifications may be obtained at the Town Hall, Invercargill, New Zealand, and from W. Coward & Company, 9 Finsbury Pavement, London, E. C.; Alfred Dickenson & Company, Central House, New Street, Birmingham, and Gresham House, Old Broad Street, London, E. C.; R. W. Cameron & Company, 23 So. William Street, New York; R. W. Hunt & Company, 1121 The Rookery, Chicago, Ill. One pound must be deposited for a copy of each section of the specifications. This deposit will be returned on the receipt of a bona fide tender. Tenders close in Invercargill at 4 p. m. on Jan. 9, 1911. Scott Symington is tramway engineer at Invercargill.

Financial and Corporate

New York Stock and Money Market

Oct. 18, 1910.

The general tone of the stock market has improved to such a marked degree within the past fortnight that at the present writing there is a sentiment of optimisim that looks forward to normal business after election. Within the period mentioned prices have materially advanced and the volume of business has more than doubled. Interborough-Metropolitan, the leading traction issue, continues to be active at slightly advanced prices.

The money market has stiffened up a bit, but there is still an abundance of funds in the banks and rates are not excessive. Quotations to-day were: Call, 3 to 3½ per cent; 90 days, 4¾ to 5 per cent.

Other Markets

In the Philadelphia market there continued to be considerable activity during the week in Rapid Transit shares, but prices have advanced only fractionally with liberal profit taking by small holders.

In the Chicago market the certificates of the Chicago Railways have been traded in freely during the week, especially Series 2, at an advance, with several points advance in Series 1. There has also been some trading in Metropolitan Elevated preferred at advancing figures.

In Boston, Massachusetts Electric issues, especially the preferred, have been quite active. Prices for both issues have advanced. There has also been some trading in Boston Elevated.

There has been practically no trading in traction shares in the Baltimore market during the week. The bonds of the United Railways continue active at former figures.

Quotations of various traction securities as compared with last week follow:

	Oct. 13	Oct. 18.
American Railways Company	a43¼	a43¼
Aurora, Elgin & Chicago Railroad (common)	33	a48
Aurora, Elgin & Chicago Railroad (preferred)	a89	87
Boston Elevated Railway	128½	128½
Boston & Suburban Electric Companies	14¼	14¼
Boston & Suburban Electric Companies (preferred)	72	72
Boston & Worcester Electric Companies (common)	a10½	*10½
Boston & Worcester Electric Companies (preferred)	36½	36½
Brooklyn Rapid Transit Company	77⅝	79
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83¾	84½
Capital Traction Company, Washington	129	*129
Chicago City Railway	*102¾	102½
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a18⅜	a19¾
Chicago Railways, ptcptg., 3	a9	a10
Chicago Railways, ptcptg., ctf. 4	a5	a6
Cleveland Railway	91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	153¾	155½
Georgia Railway & Electric Company (common)	a118½	a120½
Georgia Railway & Electric Company (preferred)	88	87
Interborough-Metropolitan Company (common)	20¾	22⅝
Interborough-Metropolitan Company (preferred)	57	58⅝
Interborough-Metropolitan Company (4½s)	81	81¼
Kansas City Railway & Light Company (common)	23½	a23½
Kansas City Railway & Light Company (preferred)	80	a80
Manhattan Railway	143	143
Massachusetts Electric Company (common)	a19⅞	a20½
Massachusetts Electric Companies (preferred)	a84	a85
Metropolitan West Side, Chicago (common)	a20	a23
Metropolitan West Side, Chicago (preferred)	a70	a70
Metropolitan Street Railway	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	69⅜	67½
Northwestern Elevated Railroad (common)	a20	*20
Northwestern Elevated Railroad (preferred)	a43½	a43¼
Philadelphia Company, Pittsburg (common)	a46¾	a46½
Philadelphia Company, Pittsburg (preferred)	a43½	a43
Philadelphia Rapid Transit Company	a19	a19¼
Philadelphia Traction Company	82	82
Public Service Corporation 5 per cent col. notes	a95	a94½
Public Service Corporation, ctfs.	a100½	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a58	58
Third Avenue Railroad, New York	10¼	10⅜
Toledo Railways & Light Company	8¼	8¼
Twin City Rapid Transit, Minneapolis (common)	112½	112½
Union Traction Company, Philadelphia	a43½	a43¼
United Rys. & Electric Company, Baltimore	*14⅝	*14⅝
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	57	60
Washington Ry. & Electric Company (common)	33	33
Washington Ry. & Electric Company (preferred)	89	89
West End Street Railway, Boston (common)	84½	84½
West End Street Railway, Boston (preferred)	100¾	*100¾
Westinghouse Elec. & Mfg. Company	*70½	72
Westinghouse Elec. & Mfg. Company (1st pref.)	*129	*129

a Asked. *Last sale.

Report of the Hudson & Manhattan Railroad

A report to the stockholders of the Hudson & Manhattan Railroad contains the following comparative statement of income:

	Quarter Ended Sept. 30, 1909.	Dec. 31, 1909.	March 31, 1910.
Gross revenue—passenger fares	$361,398	$550,764	$620,529
Miscellaneous revenue from railroad operations:			
Advertising	$9,108	$15,033	$18,265
Other car and station privileges	3,184	5,741	7,983
Sale of power	627	1,188	1,726
Miscellaneous transportation revenue	45	82	27
Other miscellaneous revenue	37	93	496
Total miscellaneous railroad revenue	$13,001	$22,137	$28,047
Total railroad revenue	$374,399	$572,901	$648,576
Operating expenses of railroad:			
Maintenance of way and structures—			
Actual	$23,213	$32,612	$34,512
Reserve	27,100	25,498	14,527
Maintenance of equipment—			
Actual	6,294	12,029	10,524
Reserve	19,866	17,572	7,400
Traffic expenses	4,006	3,706	13,35,
Transportation expenses	100,445	168,675	151,991
General expenses	15,172	17,230	28,797
Total operating expenses of railroad	$196,096	$277,322	$261,110
Net revenue from railroad operation	$178,303	$295,579	$387,466
Hudson terminal buildings:			
Gross rentals	$302,660	$318,946	$319,929
Miscellaneous income	5,152	5,450	6,242
Total revenue from Hudson terminal buildings	$307,812	$324,396	$326,171
Less assumed leases in other buildings	5,970	5,988	5,787
	$301,842	$318,408	$320,384
Less maintenance and operating expenses—			
Actual	$88,444	$87,685	$81,985
Reserve	21,704	20,251	10,000
Total operating expenses of terminal buildings	$110,148	$107,936	$91,985
Net revenue from Hudson terminal buildings	$191,694	$210,471	$228,399
Income Greenwich and Tenth Street properties (net)	898	1,324	1,074
Total net revenue from outside operations	$192,592	$211,795	$229,473
Total net revenue from all operating sources	$370,895	$507,374	$616,938
Deduct taxes accrued on properties operated	45,930	54,000	54,000
Operating income (revenue over expenses and taxes)	$324,965	$453,374	$562,938
Add non-operating income	2,463	2,106	833
Gross income	$327,428	$455,480	$563,771
Income deductions:			
Interest on total bonds outstanding	$680,790	$686,550	$714,320
Less interest chargeable to construction	364,350	286,235	201,505
Balance, being interest on capital employed in operation and chargeable against income	$316,440	$400,315	$512,815
Interest on car purchase agreement	....	....	7,092
Rentals, city of New York	6,422	6,615	6,614
Rental tracks, yards and terminals	21,917	29,851	33,208
Amortization of debt discount	162	243	2,996
Total income deductions	$344,941	$437,024	$562,725
Net corporate income carried to surplus account	*$17,513	$18,456	$1,046
Percentage of railroad operating expenses vs. railroad revenue	52.38	48.41	40.26
Percentage of railroad operating expenses, exclusive of depreciation	34.03	37.35	36.88
Number of car-miles operated (active)	916,086	1,599,369	1,507,704
Total revenue per car-mile from railroad, cents	40.87	35.82	43.02
Operating expenses per car-mile, cents	21.41	17.34	17.32
Net revenue per car-mile, cents	19.46	18.48	25.70
NOTE—Depreciation included in above operating expenses and set up in amortization reserves	$68,670	$63,320	$31,928

*Deficit.

W. G. McAdoo, the president, states in the report in part:

"The uptown section from Hoboken, N. J., was opened for business on Feb. 26, 1908, and the downtown section on July 19, 1909. It was not, however, until Aug. 2, 1909, that full service was established between Hoboken, N. J., and the Hudson terminal, New York City.

"As showing the rapid growth of traffic, the total number of passengers carried in August, 1909, was 2,662,237, or an average of 85,846 per day; whereas the number of passengers carried for March, 1910 was 4,398,017, or an average of 141,871 per day. The total number of passangers carried for the quarter ending March 31, 1910 is 12,410,573, indicating a total traffic for the year 1910, on the basis of the present operation, of more than 49,000,000 passengers. These figures may be exceeded, as the monthly traffic from the date of the opening of the road has shown a steady increase.

"The operation by the Pennsylvania Railroad of its through Western and Southern service to its new terminal at Seventh Avenue and Thirty-second Street, New York, will not, in the opinion of your officers, adversely affect your company. On the contrary, when the new high-speed line to Newark is in operation, your company will receive a larger business from the Pennsylvania Railroad Company than it now does.

"Your board of directors has believed from the beginning that it was highly important to so construct your system of tunnels that large capacity for present and future traffic would be provided. Consequently, all grade crossings have been eliminated, commodious terminal facilities have been provided, and in all the features of your system large provision has been made for the future. The platforms of all stations have been built to accommodate 8-car trains. In this respect your system has a larger provision than the New York subway, because the length of the local platform in the subway is sufficient only for 5-car trains, except at express stations. Your system is, in effect, a 4-tracked railroad, and its total capacity, based upon 8-car trains operated on a minute and one-half headway during the rush hours, is 220,000,000 passengers per annum. At the present time your company is using less than one-fourth of its estimated capacity. This reserve is an asset of real value, because your company is able to take care of future growth for many years to come without additional expenditure.

"In the construction of your system, the terminal stations have been made large enough to receive two additional tunnels under the Hudson River at Cortlandt and Fulton Streets, New York. It was necessary to construct the headings for these tunnels before the completion of the Hudson terminal in order that the new tunnels may be built without disturbing operation. This involved additional outlay, upon which the company cannot receive any immediate return, but it is a wise provision for the future and is an element of value.

"Your terminal station below grade has been designed and constructed upon a scale which will enable it to take care comfortably of the maximum estimated traffic of your system. It has five tracks and six platforms, with a loop operation, so that trains may be despatched upon the most frequent possible headway and with a minimum of time for loading and unloading. Passengers are discharged from one platform and taken in from another, thus avoiding collision between incoming and outgoing passengers and reducing to a minimum the time within which a train may be loaded and unloaded. This station has a concourse below grade, containing approximately two acres of floor space. Here are ticket offices for the trunk line railroads, baggage facilities, waiting rooms, telephone and telegraph facilities, and all the other accessories of a first-class railroad terminal. In addition, booth space has been provided for various small shops and trades, a large percentage of which have been rented on a profitable basis.

"Above the terminal station there have been erected two 22-story office buildings, containing approximately 25 acres of rentable floor space. These buildings were opened for business on May 1, 1908, since which they have been highly successful. About 87 per cent. of the entire office space has been leased—much of it for a long term of years—to an exceptionally high grade of tenants.

"Upon the opening of these buildings, it was deemed wise for the company to assume leases of certain tenants

who were taken from other office buildings. There seems to have existed a great deal of misinformation about these assumed leases. I may say that no more intelligent thing has been done by your management than the assumption of these leases. By so doing, your company secured tenants for long terms of years, thus filling up the buildings, and at comparatively small cost. The total cost to your company for leases so assumed will amount, for the year ending May 1, 1911, to less than $24,000 gross. When unoccupied space belonging to your company in other buildings is rented, at market prices, there will be a further reduction of $10,000 per annum in your company's liability on assumed leases.

"The gross rent roll from the Hudson terminal buildings for the year beginning May 1, 1910, will approximate $1,400,000. At the minimum schedule of rentals for the terminal buildings, $200,000 of space remains unrented. In the opinion of your management, this will largely be disposed of during the coming year. Our experience with the Hudson terminal buildings is that rentals are being constantly made outside of what is commonly called the rental season.

"An interesting test of the capacity of the tunnels was had on Feb. 28, 1910, when a heavy fog hung over the Hudson River for the entire day. Notwithstanding the small amount of equipment available, approximately 195,000 people were carried by the tunnels that day, with a maximum of only 137 cars in service. There was, of course, congestion during the rush hours, which would not have occurred if the company had been in possession of more cars, but, in spite of that, the business was cared for with ease and despatch. The results are highly creditable to the operating department. At the same time, it demonstrates that your system, as laid out, constructed and equipped, has fully measured up to expectations.

"There is an element of great strength in your property, in the fact that you have a short haul and a great density of traffic.

"As important portions of your system are still under construction, and the operated portion represents only a part of the total capital expenditure and capacity, interest charges on bonded debt have been apportioned between operation and construction. There is now being charged to operation interest on a total of $45,028,000 bonds, and there is being charged to construction the interest on $19,647,000 of bonds. With the extension of service over those parts of the line now under construction, the amount of interest charged to operation will be increased and that charged to construction will be reduced, so that the charge of interest to construction will progressively disappear. It is a universal practice to charge to construction the cost of money during the period of construction, and the division of this charge between operation and construction has been made on a basis which, in the opinion of your management, is sound and conservative.

"Complying with the suggestions of the Public Service Commission of New York, we established, over a year ago, the practice of charging off and setting up depreciation and amortization reserves, with the result that, at March 31, 1910, in addition to actual expenditures, maintaining the property up to the highest point of efficiency, we had absorbed in operating expenses and set up a reserve of $257,368. Although a better showing of net earnings might be made by less conservative methods of accounting, we believe that future results will reflect the wisdom of the policy which has been adopted."

American Railways, Philadelphia, Pa.—The directors of the American Railways have formulated an answer to the proposed plan of readjustment which was suggested by the Interstate Railways. The answer of the American Railways had not been made known up to Oct. 17, 1910, but it was intimated that it is not wholly favorable to the proposed plan.

Atchison Railway, Light & Power Company, Atchison, Kan.—The stockholders of the Atchison Railway, Light & Power Company have voted to authorize an increase in the capital stock of the company from $900,000 to $1,500,000 to provide for improvements and extensions.

Chicago (Ill.) Consolidated Traction Company.—Judge Peter S. Grosscup, of the United States Circuit Court, has entered a decree directing the sale of the property of the Chicago Consolidated Traction Company and its eight underlying companies. Under the terms of the decree each property will be sold separately. The sale will be held under the direction of Special Master Henry W. Bishop, who is required to advertise the properties four weeks before considering bids. The sale will be held at a date which remains to be fixed. The appraised valuation of the properties is about $4,000,000, while the debts of the corporations aggregate $6,687,642.

Chicago & Southern Traction Company, Chicago, Ill.—Joseph E. Otis and Matthew Slush, president of the Chicago & Southern Traction Company, have been appointed receivers of the company. Interest on the $2,500,000 of first mortgage bonds of the company is in default.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been postponed from Nov. 16, 1910, to Dec. 15, 1910.

Gainesville Railway & Power Company, Gainesville, Ga.—Judge W. T. Newman in the United States District Court, issued an order on Oct. 14, 1910, addressed to H. H. Dean, receiver of the property of the North Georgia Electric Company, directing him to purchase certain machinery necessary to the conduct and maintenance of the railway. The amount involved is not specified, but the court order shows that S. Fahs Smith, Boston, who purchased the property of the company at the receiver's sale, has entered no objection to the purchase being made.

Hudson River & Eastern Traction Company, Ossining, N. Y.—The Hudson River & Eastern Traction Company has applied to the Public Service Commission of the Second District of New York for authority to issue $50,000 of additional common stock and $850,000 additional first mortgage bonds, to complete the construction of its line from its present terminus in the Camp Woods, Ossining, to White Plains, a distance of approximately 14 miles, exclusive of sidings.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Nov. 10, 1910, has been fixed as the date for the sale of the property of the Indianapolis & Cincinnati Traction Company under foreclosure. Mention of the decree ordering the sale of the property was made in the Electric Railway Journal of Oct. 8, 1910, page 672.

Melbourne Tramway & Omnibus Company, Ltd.—Traffic receipts for the year ended June 30, 1910, were £593,423, an increase of £15,192 over the preceding year. The number of passengers carried was 70,305,906, an increase of 2,111,854.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe in the United States Circuit Court has made an order giving permission to the District Attorney to proceed against Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, for the collection of the State franchise tax.

Philadelphia (Pa.) Rapid Transit Company.—The petition requesting E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., to become a director of the Philadelphia Rapid Transit Company follows: "The undersigned stockholders of the Rapid Transit Company and the Union Traction Company take this method of presenting their request to you that you enter the board of the Philadelphia Rapid Transit Company, with such associates as you may select, in order to give this property not only the great practical advantage of your large experience in business and as a financier, but also because of the full measure of public confidence which will result from the participation of yourself and associates in the direction and control of the company. This move is made with the knowledge and assent of the present officers and directors, and with the assurance that sufficient vacancies on the board will be available to enable the interest which may come in with you to control the policy and business of the company. There is no enterprise which touches so closely the general welfare of a city and the convenience and comfort of its citizens as the local transportation problem. This is especially true in Philadelphia by reason of the close relations between the company and the city under the contract of 1907. We believe that nothing will do so much to rehabilitate the company in public opinion, and so add to the prosperity of the city,

as a management which will be recognized as having for its first consideration the city's interest. We turn to you as the citizen who, in our opinion, can accomplish most along these lines, and we appeal to your well-known civic pride to give to this public service corporation, and through it to the city, the benefit of your personal and business interest and association."

Public Service Corporation of New Jersey, Newark, N. J.—Potter, Choate & Prentice, New York, N. Y., are offering the unsold portion of $1,500,000 of 3-year collateral 5 per cent notes of the Public Service Corporation of New Jersey, due Oct. 1, 1913, at a price to yield 5½ per cent. The total amount outstanding is $4,000,000. These notes are secured by $5,000,000 of Public Service Corporation of New Jersey general mortgage 5 per cent bonds, due Oct. 1, 1959. It is understood that more than two-thirds of the notes have been sold.

St. Albans (Vt.) Street Railway.—The bondholders of the St. Albans Street Railway have appointed a committee consisting of Francis H. Dewey, Worcester; F. H. Mills, Boston; George C. Whitney, Worcester, and Arthur M. Taft, Worcester, to assist in reorganizing the company.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—The sale of the property of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, which was to have been held on Oct. 3, 1910, has been indefinitely postponed.

Washington, Alexandria & Mt. Vernon Railway, Washington, D. C.—The stockholders of the Washington, Alexandria & Mt. Vernon Railway have approved a joint agreement for the consolidation of the Washington, Alexandria & Mt. Vernon Railway, the Washington, Arlington & Falls Church Railway and the Washington-Virginia Railway.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland as receiver of the Yonkers Railroad to issue receivers' certificates to the sum of $160,000 bearing interest at 6 per cent, payable in not exceeding two years from date. The proceeds are to be used to buy an additional engine, relay and renew tracks on Warburton Avenue, relay and renew tracks on Park Avenue and Palisade Avenue, and pay for placing the tracks on McLean Avenue.

Dividends Declared

Auburn & Syracuse Electric Railway, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Binghamton (N. Y.) Railway, 2½ per cent.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Connecticut Railway & Lighting Company, New Haven, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Dallas (Tex.) Electric Corporation, 3 per cent, first preferred; 1 per cent, second preferred.

East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Ft. Smith Light & Traction Company, Ft. Smith, Ark., quarterly, 1¾ per cent, preferred.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana (Cuba) Electric Railway, quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

Macon Railway & Light Company, Macon, Ga., 3 per cent, preferred; 1½ per cent, common.

Mexico (Mex.) Tramways, quarterly, 1¾ per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Montreal (Que.) Street Railway, quarterly, 2½ per cent.

Railways Company General, New York, N. Y., quarterly, 1 per cent.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, 1¼ per cent, quarterly.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

Youngstown & Ohio River Railroad, Youngstown, Ohio, three-quarters of 1 per cent, preferred.

Traffic and Transportation

The Indiana Accidents

The Indiana Railroad Commission has decided that while under the commission law of 1907 it could compel the trainmen involved in the recent interurban wrecks to testify at hearings, after requiring them to testify they could not be prosecuted in the criminal courts on charges of involuntary manslaughter. In the matter of summoning and examining witnesses the law provides "that such evidence or testimony shall not be used against such person (witness) in the trial of any criminal proceedings, nor shall any such witness so compelled (by the commission) to testify against himself be thereafter prosecuted for any crime concerning which he has been compelled to give testimony." The commission has further discovered that the law seems to overlook interurban electric railways and the members are inclined to believe that the prosecuting officials cannot sustain the charges of involuntary manslaughter against the trainmen because the Indiana statute relating to interurban railways does not make it a criminal offense for an interurban trainman to disobey orders in the operation of his car, although it is criminal for the operator of a train on a steam railroad to disobey orders. Two of the trainmen involved in the Tipton wreck on the line of the Indiana Union Traction Company and the conductor involved in the Kingsland wreck on the line of the Ft. Wayne & Wabash Valley Traction have been arrested and were to have been arraigned on Oct. 11, 1910. The commission is preparing its report on the Kingsland and Tipton wrecks and will probably advocate publicity hereafter in connection with all accidents. The commission believes that the law which regulates the making of investigations so binds the members of the commission that the report of the investigation cannot be made public until it is found that the electric railways have failed to follow the recommendations of the commission. Heretofore the reports of investigations made by the commission have not been made public until issued in the annual report so as to prevent the information contained in them from being used to prejudice cases against the railroads for damages.

Order Regarding Switch Targets and Lights in Michigan

The Michigan Railroad Commission has adopted the following order regarding the use of switch targets and lights at all main line switches of interurban railroads owned and operated by the Detroit United Railway in Michigan outside of cities and villages, where the movement of cars is slow:

"It having come to the knowledge of the Michigan Railroad Commission that there are a number of switch stands at main line switches of interurban railroads owned and operated by the Detroit United Railway in Michigan that are not provided with targets and lights, the commission after having given this matter careful consideration is of the opinion that all main line switch stands should have targets and lights as an additional safeguard for the safe operation of cars on said Detroit United Railway's interurban railroads.

"Therefore, it is hereby ordered, that the said Detroit United Railway within 90 days from service hereof cause to be placed and thereafter effectively maintained targets and lights on all main line switch stands on its interurban railroads owned and operated in Michigan that are not now so equipped, and

"It is further ordered, that the targets provided for in this order shall be prominent and show only when set for side track."

Service Between Ogden and Willard.—The Ogden Rapid Transit Company, Ogden, Utah, has placed in operation its new interurban line between Ogden and Willard.

Fender Recommendation in Portland.—The street committee of the City Council of Portland, Ore., has voted to recommend the use of the Nelson automatic fender on street cars operated within the limits of Portland.

Request for Increase in Wages Refused.—The Berkshire Street Railway and the Pittsfield Electric Street Railway, Pittsfield, Mass., have refused the request of the employees of the companies for an increase in wages at this time.

Freight Service Over the Northern Electric Railway.—The Northern Electric Railway, Chico, Cal., has commenced a daily 2-car freight service from points in Butte County to Sacramento in conjunction with the Western Pacific Company. It is proposed to transport grapes directly to the San Francisco markets by routing the cars over the new road.

Freight Service Between Louisville and Shelbyville.—The Louisville & Eastern Railway, Louisville, Ky., announced that freight and express service on the line from Louisville to Shelbyville would be started on Oct. 17, 1910. The management of the company is highly pleased with the passenger traffic over the new line from Louisville to Shelbyville.

Petition Against Rochester, Syracuse & Eastern Railroad.—Residents of Port Gibson have petitioned the Public Service Commission of the Second District of New York to require the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., to stop its limited cars at Port Gibson and to require the company to place the name "Port Gibson" on timetables, etc.

Employment of Traffic Expert Recommended in New Haven.—The committee on railroads and bridges of the City Council of New Haven, Conn., has recommended to the Council that an appropriation of $2,000 should be made by the Council to defray the expenses of retaining an expert to study street railway traffic conditions in New Haven and report its findings to the Council.

Schenectady Railway Asked to Make Additional Stop.—The Public Service Commission of the Second District of New York has served upon the Schenectady Railway the complaint of residents of Schenectady, Ballston Spa, and other places against the company asking that passenger cars on the Saratoga Division be required to stop at a point known as Dry Bridge, about two miles northeast of Ballston Spa.

Accident on Boston Elevated Railway.—At 7:31 p. m. on Oct. 15, 1910, an inward-bound Western Avenue car of the Boston (Mass.) Elevated Railway tipped over at the corner of Charles Street and Cambridge Street. Four persons were killed and about thirty taken to hospitals. The car was in charge of Motorman J. J. Walsh, who was killed, and Conductor J. L. Purcell. Motorman Walsh had been employed by the company since Jan. 15, 1901.

Suburban Passenger Development at Louisville.—Owing to the rapid development of the business of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company out of Louisville to New Albany and Jeffersonville, the Pennsylvania Railroad has lost the larger part of its suburban business and has provided a "dinky" service between the three cities. In order to make a stronger appeal it is reported that the company will institute a half-hourly service.

"Through the West Virginia Hills."—The Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has issued a folder entitled "Through the West Virginia Hills," in which is described and illustrated the territory through which the company operates. A feature of the publication is a map showing the lines of the company in Marion, Harrison and Lewis Counties, West Virginia. The cover is decorated with a half-tone which shows a car of the company about to take a siding at a particularly picturesque point along the company's line.

Strike in New Jersey.—After being on strike 36 hours dating from Oct. 11, 1910, the conductors and motormen in the employ of the Riverside Traction Company, Trenton, N. J., returned to work with the understanding that a sliding scale of wages of from 21 cents an hour to 24 cents an hour would be established; that five recently discharged employees would be reinstated; that they would be permitted to use stools between towns and that further grievances would be settled by arbitration. The company absolutely refused to treat with the union or its representatives, and the agreement which has been made is with a representative committee of the employees.

The Trolley Trail.—The Pacific Electric Railway, Los Angeles, Cal., has published "The Trolley Trail" as a souvenir to be given to visitors to Southern California. The publication was first distributed at the recent meetings of the bankers at Los Angeles. Across the upper part of every page of the booklet is an etching of a scene along the Pacific Electric Railway, while across the lower part of every page is a half-tone illustration. The scenes presented cover a trip from the various beaches, the harbor and Catalina, to the summit of Mount Lowe, including Pasadena, San Gabriel, Alhambra, Glendora, Covina, Santa Ana and other points on the Pacific Electric Railway.

New Transfers in Brooklyn.—On Oct. 15, 1910, the Brooklyn (N. Y.) Rapid Transit Company placed in operation the new transfer system designed especially to compel passengers who transfer to travel in one general direction. An extended reference to this change in the transfer system of the company was published in the Electric Railway Journal of Sept. 24, 1910, page 483. The Public Service Commission adopted a resolution for a hearing on Oct. 19, 1910, on the complaint of John J. A. Rogers against the Brooklyn Heights Railroad, the Sea Beach Railway and the Nassau Electric Railroad, three companies in the Brooklyn Rapid Transit system, because of the new scheme of transfers.

Detroit United Railway Increases Limited Service.—The new schedules on the interurban lines of the Detroit (Mich.) United Railway, which went into effect on Oct. 4, 1910, contain many changes, due to increase in the number of limited cars. On the line to Jackson the limiteds leave Detroit at 8:15 a. m. and every two hours to 6:15 p. m., giving six instead of four fast cars. For Port Huron the limiteds leave at 7 a. m. and every two hours to 7 p. m., making seven daily, while for Flint the limiteds leave at 7:35 a. m., 9.35 a. m., 12:35 p. m., 2:35 p. m. and 4:35 p. m. Starting with the first, alternate limiteds will run through to Saginaw. No change has been made with the Toledo limited service.

Hearing on Freight Petition at Boston.—The petition of the Boston Elevated Railway for the right to carry baggage, express matter and freight on its cars within the limits of Boston was opposed by only one person at the public hearing given on the matter by the City Council on Oct. 14, 1910. James H. Brennan, who opposed the application, characterized the scheme as the forerunner of a great electric railway express trust. Secretary Eastman, of the public franchise league, appeared before the committee to offer suggestions for restrictions in the granting of the petition and to state that the franchise league will later make further suggestions on the matter. He said that though no official action has yet been taken by the league the members are inclined to favor the petition.

Pittsburgh Restrained from Enforcing Overcrowding Ordinance.—Judge Macfarlane has granted the Pittsburgh (Pa.) Railways a preliminary injunction to prevent the city from entering suits against the company for alleged overcrowding of cars as defined in two ordinances passed by the Council recently. In granting its order the court said in part: "This is a plain case for granting a preliminary injunction to preserve the status quo until final hearing of the case. To refuse to do so would deprive the defendant of the right to challenge the ordinances and thus deny it the equal protection of the law." Judge Frazer has decided that the recent transfer ordinance passed by the City Council is void. The city sued to recover $100 penalty for violation of the transfer ordinance.

Settlement of Controversy Over Baggage at Santa Monica.—The suit brought by Santa Monica against the Los Angeles-Pacific Railway to force that company to carry baggage on passenger tickets will not be heard by the Interstate Commerce Commission. The City Council has decided to accept the settlement proposed by the company and will request that the action be dismissed. The request follows the agreement of the Southern Pacific Railroad to place Santa Monica as a place of destination in its ticket offices throughout the country and the subsequent agreement of the Los Angeles-Pacific Company to check baggage and carry passengers on interstate trips. For some time Santa Monica has been dependent on electric traction for communication with Los Angeles, the former steam road having been rebuilt and equipped with electricity.

Personal Mention

In the daily edition of the Electric Railway Journal for Oct. 14, 1910, a biography and portrait were published of Mr. A. W. Brady, the newly elected president of the American Electric Railway Association, and in the Electric Railway Journal of Oct. 15 a biography and portrait were published of Mr. W. H. Forse, Jr., the newly elected president of the American Electric Railway Accountants' Association. Portraits and biographies of Mr. W. J. Harvie, the newly elected president of the American Electric Railway Engineering Association; Mr. H. C. Page, the newly elected president of the American Electric Railway Transportation & Traffic Association; Mr. Harry V. Drown, the newly elected president of the American Electric Railway Claim Agents' Association, and Mr. Norman Litchfield, the newly elected secretary of the American Electric Railway Engineering Association, are now given.

Mr. Harvie was graduated with the degree of electrical engineer from Syracuse University, Syracuse, N. Y., and entered the railway field in 1899 in the overhead department of the Syracuse Rapid Transit Railway. In 1900, he was employed by the Syracuse, Lakeside & Baldwinsville Railroad in various capacities in the car shops and power houses, and in 1901, he became connected with the Syracuse & Suburban Railroad as electrical engineer. In the fall of 1901, Mr. Harvie was employed by the Andrews-Stanley Syndicate of Utica on construction work on the Little Falls extension, which that company was building.



H. C. Page



W. J. Harvie



H. V. Drown



N. Litchfield

In 1902, he was appointed electrical engineer of the Utica & Mohawk Valley Railway in charge of power installation, which comprised one of the earliest 20,000-volt transmission lines with substations to be installed in the East. Later, his jurisdiction was extended to the mechanical department of the Utica & Mohawk Valley Railway and then to the Oneida Railway, the electrification of the West Shore Railroad being under his direct supervision. In 1908, Mr. Harvie became chief engineer of the Syracuse Rapid Transit Railway, as well as of the Utica & Mohawk Valley Railway and the Oneida Railway, which title covers the mechanical and electrical departments, but not the maintenance of way. The Syracuse Rapid Transit Railway, the Utica & Mohawk Valley Railway and the Oneida Railway cover city, suburban and interurban work and operate from Syracuse to Little Falls and include the electrified West Shore Railroad, the whole comprising a mileage of 251 miles.

Mr. Page is about 46 years of age. He began his railway career some 25 years ago as a conductor with the Lynn & Boston Street Railroad, which he served for three years. He was rapidly promoted with this company, and finally was placed in complete charge of the schedule arrangement and car dispatching. When the Boston & Northern Street Railway was formed Mr. Page was retained by it and was promoted from time to time until he became general superintendent, having charge of 405 miles of track. In this capacity Mr. Page was particularly successful in his handling of the employees and his arrangement of the schedules. In 1903 he became general manager of the Berkshire Street Railway, Pittsfield, Mass., and remained with that company until June, 1905, when the property passed into the hands of the New York, New Haven & Hartford Railroad. At the same time the Springfield Street Railway was also taken over by the New York, New Haven & Hartford Railroad, and Mr. Page was appointed general manager of the Springfield Street Railway. In November, 1907, Mr. Page was elected vice-president of the Springfield Street Railway, and continued in this capacity until September, 1909, when he was appointed general manager of the Worcester Consolidated Street Railway and affiliated companies to succeed Mr. E. G. Connette. In 1907 Mr. Page was elected president of the New England Street Railway Club. He has always been active in the affairs of that organization.

Mr. Drown was born at Spartansburg, Pa., on Oct. 18, 1876. His first railway work was with the Consolidated Traction Company, Pittsburgh, Pa., which has since been merged with the other companies in the Pittsburgh Railways Company. He entered the claim department of the Consolidated Traction Company in 1898 and served in various positions. In March, 1901, Mr. Drown became connected with the Cincinnati Traction Company as assistant claim agent, and on March 1, 1903, he entered the employ of the Aetna Insurance Company, as an adjuster in the Pittsburgh district. On April 1, 1903, he became connected with the Rhode Island Company, Providence, R. I., as claim agent. In February, 1907, Mr. Drown accepted the position of assistant general claim agent of the Public Service Railway. On Aug. 1, 1907, he was made general claim agent of the company. At present, Mr. Drown is claim agent of Public Service Railway, Public Service Gas Company and Public Service Electric Company.

Mr. Litchfield is engineer of car equipment of the Interborough Rapid Transit Company, New York, N. Y. Mr. Litchfield is 31 years of age, and is a graduate of Stevens Institute of Technology with the degree of M.E. His entire professional career has been devoted to electric railways, and in particular to car equipment. He has been connected with the Interborough Rapid Transit Company since the commencement of operation of the New York subway system, and prior to that time was employed under Mr. L. B. Stillwell in the preparation of the plans for the equipment of the road and in the supervision of the experimental cars. Before he became connected with the Interborough Rapid Transit Company, Mr. Litchfield served an apprenticeship in street and elevated railway car equipment in the shops of the Brooklyn Rapid Transit Company.

Mr. R. A. Smith has been appointed assistant manager of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to succeed Mr. Joseph B. Stewart, resigned.

Mr. T. O. Brown, who is connected with Redmond & Company, New York, N. Y., has been elected president of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., to succeed Mr. C. C. Tegethoff, resigned.

Mr. W. C. Forbess, general passenger and claim agent of the Northern Texas Traction Company, Fort Worth, Tex., has been appointed assistant manager of the company and not general superintendent as was previously announced.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Gough Street Railroad, San Francisco, Cal.—Incorporated in California to build an electric railway from the corner of Gough Street and McAllister Street, extending south along Gough Street to Haight Street, there to connect with existing lines. Capital stock, $60,000. Incorporators: A. J. Pon, David Livingston and Charles Loesch. [E. R. J., Oct. 1, '10.]

Pittsburgh, Steubenville & Wheeling Railway, Pittsburgh, Pa.—Incorporated in West Virginia to build an electric railway to connect Pittsburgh and Wheeling via Mount Lebanon, Ridgeville, Millers Run, Reising, McDonald, Midway, Burgettstown, Cross Creek, Avells and Independence. Incorporators: W. H. Hildebrand, Pittsburgh; H. G. Young, John C. Bond, Homer Gray and V. H. Stewart, all of Charleston. [E. R. J., Aug. 13, '10.]

FRANCHISES

Vancouver, B. C.—The Municipal Council has approved the plans of the British Columbia Electric Railway, Ltd., Vancouver, for building several miles of extension of its tracks in Point Grey.

San Francisco, Cal.—Thomas W. Forsythe, representing the United Railroads, San Francisco, has been granted a franchise by the Board of Supervisors for the proposed extension of the Masonic Avenue line to Pacheco Street in San Francisco.

Atlanta, Ga.—The Atlanta & Carolina Railway has been granted a renewal of its franchise by the County Commissioners to extend its railway from the city limits in Atlanta out Confederate Avenue, through Fulton County. Surveys are nearly completed and contracts for grading will soon be let.

Troy, Ill.—The St. Louis & Eastern Traction Company, East St. Louis, has been granted a franchise by the City Council to build a railway through Troy. The franchise calls for the beginning of the work within one year from date and the completion and operation of the line is required within two years. This proposed railway will connect Granite City and Greenville via Collinsville, Troy, St. Jacob, Highland, Pierson and Pocahontas. A. W. Crawford, Hillsboro, is interested. [E. R. J., Oct. 15, '10.]

Burlington, Ia.—The Rock Island Southern Railroad, Monmouth, will ask the City Council for a franchise to build its tracks in Burlington. This company is securing the right-of-way for an extension of its line between Monmouth and Burlington via Macomb and Oquawka. A bridge will be built across the Mississippi River at Oquawka. Moline, Ill., and Burlington, Ia., will be the terminals.

Covington, Ky.—The Covington, Big Bone & Carrollton Railroad has asked the City Council for a franchise to extend its tracks in the lower section of Covington. The company plans to build a 22-mile railway to connect Covington and Big Bone. M. J. Crouch is interested. [E. R. J., June 18, '10.]

Charlotte, N. C.—It is stated that Paul Chatham, representing the Charlotte Rapid Transit Company, will apply to the Board of Aldermen for a franchise to build a railway over and along East Fourth Street in Charlotte. [E. R. J., Aug. 27, '10.]

San Antonio, Tex.—The San Antonio Traction Company has asked the City Council for a franchise to extend its line to the East End of San Antonio. Construction will begin as soon as the franchise is granted.

Provo, Utah.—A. J. Evans and S. L. Chipman, representing the Utah & Salt Lake Electric Railway, have been granted a 100-year franchise to build an electric railway through Provo. This is part of a plan to construct a railway from Salt Lake City to Payson via Sandy, Draper, Murray, Lehi, American Fork, Pleasant Grove, Provo, Springville and Spanish Fork. Franchises have been granted from all cities in Utah County, except Spanish Fork. [E. R. J., Sept. 17, '10.]

Madison, Wis.—The Chicago & Wisconsin Valley Railway, Madison, has been granted a franchise by the Common Council to build an interurban railway from Wausau to Madison via Stevens Point and Portage. Allen T. Russell, Chicago, general manager. [E. R. J., Sept. 24, '10.]

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—This company is said to be planning to extend its lines for about 22 miles, provided the necessary appropriation is obtained. The bids are to include the delivery of material in the spring of 1911.

Phoenix (Ariz.) Railway.—This company is said to have announced that it will spend about $135,000 in Phoenix and vicinity on improvements and extensions of the line before July 1, 1911.

Texarkana Gas & Electric Company, Texarkana, Ark.—This company is said to be preparing plans for building several extensions of its railway in Texarkana. The extensions will total about 5 miles. W. L. Wood, general manager.

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company has completed and placed in operation the 75-mile extension of its railway connecting Vancouver, New Westminster and Chilliwack.

Fairview Interurban Railroad, Delta, Col.—This company, recently incorporated, advises that it is now grading and construction will begin in the near future on its proposed 25-mile electric railway to connect Delta and Fairview Coal Mine with a branch to Cedaredge, California Mesa and Montrose. Capital stock, authorized, $250,000. Repair shops will be located at Delta and the power house will probably be at Fairview Mine. Power for lighting purposes is being contemplated. Incorporators: Charles G. Montz, 1154 Clarkson Street, Denver; Mudge Zeigler, Henry Zeigler and Watson Z. Zeigler. [E. R. J., Oct. 8, '10.]

Uncompahgre & Gunneson Valley Railroad, Montrose, Col.—This company, recently incorporated, advises that construction will be commenced about Mar. 1, 1911, on its proposed 50-mile electric railway to connect Montrose, Olathe, Delta and Cedaredge. Capital stock, authorized, $50,000, to be increased later. The power station will be located 6 miles northwest of Montrose. Officers: F. B. Townsend, 1795 Gilpen Street, Denver, president; I. N. Pepper, Montrose, vice-president; S. A. Sprague, 223 Main Street, Montrose, secretary, and G. A. Frost, treasurer.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—It is stated that this company will soon build an extension of its tracks from La Junta to Pueblo. Surveys are being made. J. F. Vail, general manager.

Irwinton (Ga.) Railway.—This company has awarded contracts for the immediate construction of its proposed 3½-mile electric railway to connect Irwinton and McIntyre. George H. Caiswell, Irwinton, secretary. [E. R. J., Dec. 4, '09.]

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—This company announces that it expects to soon erect a new bridge over Silver Creek, near New Albany.

Tri-City Railway, Davenport, Ia.—This company has secured right-of-way and will begin work at once on the 1-mile extension of its railway on Twenty-seventh Street in Davenport.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company announces that it will build an 18-mile extension of its railway from Waterloo to Dike via Cedar Falls. The line will eventually be extended from Diké to Grundy Center and Marshalltown.

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—This company has completed surveys and work will soon be begun on the section of its proposed railway between Glasgow and Hodgenville. This is part of a plan to build a 50-mile electric railway to connect Hodgenville, Glasgow, Lincoln Farm and Mammoth Cave. J. M. Richardson, president. [E. R. J., Oct. 8, '10.]

New Orleans Railway & Light Company, New Orleans, La.—J. W. Barkdull, New Orleans, is said to be negotiating with this company to extend its railway 16 miles from New Orleans to Greenwell Springs.

Winnipeg (Man.) Electric Street Railway.—This company proposes to build a half-mile double-track extension on Notre Dame Avenue in Winnipeg.

***Winnipeg, Man.**—A. F. Lewis, St. Paul, and associates are said to be interested in a plan to build an electric railway from St. Paul to Winnipeg.

***Hagerstown, Md.**—Press reports state that a new electric railway is soon to be built from Hagerstown to Mercersburg via Clear Spring, a distance of about 25 miles.

Hagerstown (Md.) Railway.—This company is said to be negotiating for an extension of its tracks from Williamsport across the Potomac River into Berkeley County to connect North Mountain, Tomahawk, Glengary and other points.

Berkshire Street Railway, Pittsfield, Mass.—This company has awarded the contract to Fred T. Ley & Company, Springfield, for building its Elm Street extension in Pittsfield. Work will begin at once.

St. Paul Promotion Company, St. Paul, Minn.—This company, recently incorporated, advises that construction will begin early in the spring of 1911 on its proposed network of interurban lines radiating from St. Paul to Farmington, Northfield, Faribault, Mankato and other Southern Minnesota cities. Capital stock, authorized, $100,000. Officers: Phil W. Herzog, president; B. C. Goodkind, vice-president; H. C. Strucken, 810 Metropolitan Building, St. Paul, secretary; James Kasson, treasurer, and W. L. Sontag, 810 Metropolitan Building, St. Paul, general manager. [E. R. J., Oct. 15, '10.]

***Caldwell, N. J.**—William Kerris, Pine Brook, and associates are said to be considering plans for building a proposed 11-mile electric railway to connect Caldwell and Penville.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—Press reports state that this company has awarded the contract to the Canadian Construction Company, Quebec, Can., for building its proposed electric railway to connect Cleveland and Zanesville via Elyria, Barberton, Orrville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., July 10, '09.]

Muskogee (Okla.) Electric Traction Company.—This company has placed in operation the 2-mile extension of its tracks from Muskogee to the Fair Grounds.

Chambersburg & Western Electric Railway, Chambersburg, Pa.—This company has completed surveys for its projected 7½-mile railway from Chambersburg to St. Thomas. It is said to have secured $100,000 of capital for construction purposes. R. M. Ramsey, Chambersburg, president. [E. R. J., Sept. 10, '10.]

Clarion & East Brady Electric Railway, Clarion, Pa.—This company advises that it will ask at once for bids for the grading of the first section of its line to Reidsburg, a distance of 6 miles, at once. This proposed 30-mile railway will connect Clarion, Reidsburg, Sligo, Rimersburg and East Brady. Capital stock, authorized, $1,000,000. Bonds authorized, $1,000,000. The power house will be located near Clarion and the company will furnish power for lighting. G. E. Arnold, Clarion, president. [E. R. J., May 21, '10.]

Buffalo & Lake Erie Traction Company, Erie, Pa.—This company has submitted plans for building a 900-ft. bridge over the Twenty-mile Creek.

McKeesport, Clairton & Westmoreland Railway, McKeesport, Pa.—This company, it is said, has decided to build an extension of its tracks in McKeesport and Mifflin amounting to 10 miles.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—This company announces that it will extend its Elm Street tracks to the General Fireproofing Works in Ohio at once. Surveys have been completed and most of the right-of-way secured. M. E. McCashey, Youngstown, general manager.

El Paso (Tex.) Electric Railway.—This company is reported to be considering plans for building a 10-mile extension of its line to Ysleta.

Citizens' Railway, Waco, Tex.—This company has placed in operation the extension of its Sanger Avenue line in Waco.

Ogden (Utah) Rapid Transit Company.—This company has completed and placed in operation the extension of its railway from Ogden to Brigham.

***Roxbury, Utah.**—The Commercial Club, Roxbury, has indorsed a proposition for the building of an interurban railway to connect Roxbury and St. Anthony.

Seattle (Wash.) Electric Company.—This company has begun work on the new extension of its line on North Fortieth Street, Wallingford Avenue, and other streets in Seattle.

South Morgantown Traction Company, Morgantown, W. Va.—This company is surveying for a 12-mile extension of its tracks to the old Fairmount Fair Grounds.

SHOPS AND BUILDINGS

Marion, Bluffton & Eastern Traction Company, Bluffton, Ind.—This company, together with the Bluffton, Geneva & Celina Traction Company, is considering plans for the erection of a union interurban depot in Bluffton. The structure will be 1 and 2 stories, with basement, and of brick construction.

Frederick (Md.) Railroad.—This company, it is said, will erect car houses, workshops and paint shops in Frederick. The structures are to be fireproof, of brick construction, supported with iron girders.

Michigan United Railways, Lansing, Mich.—This company is preparing plans and will soon let contracts for building a new car house in Jackson. The structure will be 180 ft. x 132 ft., with brick walls and saw-tooth roof. A. W. McLimont, general manager.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—This company has made plans for a freight and passenger station at Savannah which will be built at once by Wethey & Sherman. It will be a 2-story brick building, with a frontage of 39 ft. on Main Street, the site being the same as now used by the company as a shelter.

East Pubnico Amusement Company, Halifax, Nova Scotia.—This company will build stations at Tusket and Port Wade. G. C. McClure, 20 Prince Street, Halifax, chief engineer.

Pittsburgh (Pa.) Railways.—This company is having a number of repairs made on its car house on Seymour Street, Pittsburgh. New tracks are being laid, which will be used for the storage of the open cars during the fall and winter.

Seattle Everett Traction Company, Seattle, Wash.—This company, it is said, has practically completed arrangements to begin work on its new passenger and freight station in Everett. The structure will be a 2-story brick building with a single story annex for the express department.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company is planning to build a 1-story brick car house, 114 ft. x 180 ft., with steel trusses, fire windows, composition roof, steam heat, plumbing and wiring, in Sheboygan. It will also erect a 2-story brick office building, 70 ft. x 40 ft.

POWER HOUSES AND SUBSTATIONS

Twin City Rapid Transit Company, Minneapolis, Minn.—This company will soon build two new steel stacks at its power house at the east end of the Tenth Avenue bridge in Minneapolis. The estimated cost is about $50,000.

Public Service Railway, Newark, N. J.—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company for two 5000-kva, 13,200-volt, 3-phase, 60-cycle, 1800-r.p.m. turbo-generators. These will be installed in the new power house of the company at Perth Amboy, N. J.

East Pubnico Amusement Company, Halifax, Nova Scotia.—This company will build a power house on Grafton Street and a substation on Albermarle Street, Halifax. G. C. McClure, 20 Prince Street, Halifax, chief engineer.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—This company is constructing a new substation near Yellow Creek. The estimated cost is about $12,000.

Wilkes-Barre (Pa.) Railway.—This company, it is said, will soon build a new power house on either the Plymouth or Nanticoke route, outside of Wilkes-Barre. Thomas A. Wright, Wilkes-Barre, general manager.

Manufactures & Supplies

ROLLING STOCK

Macon Railway-Light Company, Macon, Ga., expects to place an order in the near future for eight new cars of the prepayment type.

Calgary (Alta.) Street Railway, reported in the Electric Railway Journal of July 9, 1910, as considering the purchase of 12 new cars, is now in the market for these cars, which will be of the prepayment type.

Edmonton (Alta.) Street Railway has ordered a snow sweeper and six passenger cars from the Ottawa Car Company. The motor equipment and air brakes for these cars have been ordered from the Canadian Westinghouse Company.

Galesburg Railway & Light Company, Galesburg, Ill., noted in the Electric Railway Journal of April 30, 1910, as preparing specifications for several new cars, has ordered six 33-ft. 8-in. closed, single-truck, pay-as-you-enter cars from the Danville Car Company. They are to be equipped with GE-88 motors. Curtis trucks and Brill fare boxes also are specified.

Invercargill Corporation Tramways, Invercargill, New Zealand, invites tenders until Jan. 9, 1911, for supplying the equipment for an electric railway in Invercargill. It asks bids for car bodies, electric car equipment and car trucks. Specifications may be consulted in America at the office of R. W. Cameron & Company, 23 South William Street, New York, and R. W. Hunt & Company, 1121 The Rookery, Chicago, Ill.

East Shore & Suburban Railway, Richmond, Cal., has recently received three new double end cars from the Danville Car Company. The specifications of these cars follow:

Length of body.....36 ft.	Curtain fix.....C. S. Co.
Over vestibules.....48 ft.	Curtain material..Pantasote
Width over sills....8 ft. 6 in.	Headlights..Anderson-Smith
Sill to trolley base..9 ft. 4 in.	Motors.....4 G. E. 67
Interior trim,	Seats .....Brill
oak, old mission finish	Seating material.....rattan
Air brakes.....National	Trucks,
Axles.....4½ in.	Brill No. 27—M. C. B.—1
Bumpers.....channel iron	Wheel base.....6 ft.
Car trimmings,	Wheels.....33 in.
malleable iron and bronze	

TRADE NOTES

J. F. Mingea, assistant purchasing agent of the Hicks Car & Locomotive Works, Chicago, Ill., has accepted a position with the Hall & Sisson Lumber Company, Chicago.

Strauss-Bascule Concrete Bridge Company, Chicago, Ill., has abandoned concrete work and the reference to it in its name, and hereafter the name of the company will be the Strauss-Bascule Bridge Company.

Dr. K. G. Frank, New York, representative of Siemens & Halske A. G. and Siemens Schuckertwerke G.m.b.H., Berlin, Germany, has removed his offices to Room 408 in the West Street Building, 90 West Street.

Northern Engineering Works, Detroit, Mich., report the recent shipment of two 10-ton, 60-ft. span electric traveling Northern cranes to the Detroit Bridge & Steel Works, and two 7½-ton cranes to the Lenoir Car Works, Lenoir, Tenn. The company has also shipped four 55-ft. electric traveling Northern cranes to the Kewanee Boiler Company, Kewanee, Ill., for installation in the addition being built at its plant. These cranes are alternating-current Northern type E design, ranging in capacity from 5 to 15 tons.

ADVERTISING LITERATURE

Barber Car Company, York, Pa., has issued a 12-page booklet, describing and illustrating the features of the new center-entrance Barber cars.

Wright Wrench & Forging Company, Canton, Ohio, is mailing a folder in which are discussed the merits of the quick adjustable Wright wrench.

Walter A. Zelnicker Supply Company, St. Louis, Mo., is mailing list No. 116 of new and second-hand rails, equipment and machinery which it has on hand for quick shipment.

Locke Insulator Manufacturing Company, Victor, N. Y., has issued a loose-catalog in which are listed and illustrated its various types of high-tension insulators, brackets, clamps and pins.

Hayes Track Appliance Company, Geneva, N. Y., has issued a pamphlet containing views of the Hayes derail as installed at various points on the lines of the Cincinnati Southern Railway.

Crocker-Wheeler Company, Ampere, N. J., has issued bulletin No. 123 in which it describes a line of field-weakening adjustable-speed motors. It contains many illustrations of actual applications to machine tools.

Burton W. Mudge & Company, Chicago, Ill., have issued a folder describing and illustrating the Garland car ventilator for interurban, street, elevated and subway cars with monitor deck, and high or low arched roofs.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a booklet in which attention is called to the merits of its Silica-Graphite paint. A number of views are included of structures, the steelwork of which is protected with Silica-Graphite paint.

L. J. Wing Manufacturing Company, New York, N. Y., has issued bulletin No. 8, describing and illustrating its type A motor-driven fan, type A belt-driven fan, skeleton fan, and Wing disk fan. The bulletin also contains dimension and rating tables for Wing disk fans, and price lists.

Under-Feed Stoker Company of America, Chicago, Ill., has issued the October number of the "Publicity Magazine," which is devoted to the interests of the Jones stoker. It contains a description of the Jones stoker and numerous illustrations showing some of the larger installations of this apparatus.

Speer Carbon Company, St. Marys, Pa., has issued a 22-page catalog in which are described its various grades of carbon brushes for different types of motors and generators. It also contains a number of curves in which are summarized the results of an elaborate series of tests of Speer carbon brushes. Several views of the company's laboratory are also shown.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has just made a distribution of sections for its perpetual catalogue No. 3001. There are 24 sections in the new distribution covering a wide range of topics. Among the apparatus described are meters, circuit breakers, arc lamp accessories, static protective apparatus, switchboards and series Tungsten street lighting systems.

Northwestern Expanded Metal Company, Chicago, Ill., is distributing a booklet which contains designing data for the use of expanded metal for reinforcing concrete culverts, sewers, bridges, tanks and walls. This booklet is a consolidation of its designing data pamphlets Nos. 7 and 8 and a part of No. 6, and supersedes all data on reinforced concrete culverts, sewers and bridges previously issued by the company.

Electric Storage Battery Company, Philadelphia, Pa., has issued bulletin No. 126, which is devoted to oil insulators used for insulating battery tanks, and bulletin No. 127, which briefly describes and illustrates some of the company's automatic regulating apparatus. The company has also issued bulletin No. 125, which describes the installations of the chloride accumulator on the system of the Gulfport & Mississippi Coast Traction Company.

American Steel & Wire Company, Chicago, Ill., has published a 234-page catalog and handbook entitled "Electrical Wires and Cables." It is conveniently and logically divided into nine sections, the first of which contains in descriptive and tabulated form general engineering data relating to copper, iron and aluminum electrical conductors. The following seven sections constitute the catalog portion of the book, in which is given, not only a complete list of all bare and insulated electrical wires and cables manufactured by the company, but also some general information regarding standard specifications and the uses and construction of conductors. The final section has been compiled with considerable care for use as a dictionary of electrical terms. The book concludes with a very complete index, having conveniently arranged cross references to materials used specially for electric light, electric railway and telephone and telegraph work.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, OCTOBER 29, 1910 No. 18

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 29, 1910.

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Transfer Changes in Brooklyn

Until recent changes were made it was a matter of common public knowledge that many passengers on the lines of the Brooklyn Rapid Transit System could travel by the judicious or daring juggling of transfers from starting point to destination and return for a single fare. This condition, although contrary to the spirit of right, developed so that it became a menace to the company. A modification of rules was announced, to take effect on Oct. 15, the general result of which was to require transfer passengers to travel in one general direction. A prompt complaint regarding the new system was made to the Public Service Commission for the First District and that body has begun a series of hearings which, it is to be hoped, will develop, for the benefit of the clear understanding of the fair-minded, the meaning of the company when it explains that the governing reason for the change is the prevalent abuse of the transfer system. Chairman Stevens, of the Public Service Commission for the Second District, who is a careful and able student of electric railway conditions, told an audience in Detroit early in the present year that "the great problem with traction companies in New York is the abuse of the transfer system." The Brooklyn Rapid Transit Company now has a unique opportunity to demonstrate the truth of this statement in a way that will convince the public that transfer use is legitimate, but transfer abuse is illegitimate. The Public Service Commission is charged with a duty to consider the complaint upon which the present proceedings are based, but a prior duty rests with the company to make a strong presentation of the facts which support its position.

The Last Act of the Strike

It is plain to all that the strike of conductors and motormen of the Columbus Railway & Light Company, now ended, was unfortunate for the employees, the company and the general public. It cost the employees their wages and loss of permanent places; it cost the company a large sum in depleted revenues and increased expenses; and what it cost the public in actual outlay of money by the State of Ohio and the city of Columbus, in loss of trade by merchants, and through the disturbance of transit facilities, is incalculable. If the strikers had won, they would have maintained the organization whose strained desire for masterful domination of the men and their relations with the company was the real issue in the strike. That is presumably all they would have gained, as no other issue was considered of importance. Having lost, the men have neither their organization nor, unfortunately, their places. Columbus is a city in which the relations between the railway and its employees, until the commencement of differences this year, were believed to be unusually agreeable. Into this situation organizers from another city injected their demoralizing influence. Without places of livelihood at stake, without the inter-

est of residents in the community, these men were in the main responsible for turning a peaceful city into chaos. For 12 weeks and three days, although on a diminishing scale, sympathizers promoted unrest and anarchy. Compared with the population of Columbus and with the customary throngs of visitors in the city the number of men who struck, and in whose ostensible behalf so much trouble has ensued, amounts to but a fraction; and as a serious indictment of the easy government of a large city this fact, that a few men could produce riots as serious as those which marked the early progress of the strike, is entitled to consideration. To the consistent attitude of the company in announcing a position at the start from which it never receded and in continuing to do its best to operate the cars, whether with or without the help of the public authorities, is due the final act of the strike, its formal end by resolution of the union representing the unfortunate men.

Seating Arrangement of Prepayment Cars

Many new and unusual problems have been encountered as the result of adopting the prepayment method of fare collection on cars. Successful operation of cars of this type during rush hours depends very largely on the speed of loading and unloading and to attain this end some cars have been built with excessively long platforms. The length of the platform, however, is not the only factor which affects the loading speed. If the passengers inside of the car cannot be induced to move forward and leave the entrance passageway clear the progress of the entering passengers is very slow. The object sought is to have the passengers continually move forward and leave by the front exit door, but convenience sometimes requires that they be allowed to leave by the rear exit also. The seating arrangement adjoining the rear platform has been found in at least one instance to have an important effect in forcing the passengers forward in the car and keeping the rear entrance reasonably clear. In the first cars of the prepayment type which were ordered by a city system longitudinal seats only were provided. The congestion of standing passengers near the entrance proved a serious objection, and it could not be overcome by the use of signs requesting the passengers to move forward and leave by the front door or by the conductor's vocal reiteration of this request. The second lot of cars ordered had cross seats in the center and longitudinal seats for four passengers in each corner. The congestion in the wide aisle between these end seats was as bad as in the longitudinal seat cars, but when the seats were shortened by half and another cross seat was put in on each side the small aisle space which remained was kept clear without difficulty. An entering passenger had only to force his way through four or five standing passengers in this restricted area instead of pushing against a compact mass of 15 or 20 persons. The narrow space acted as a funnel to keep the standing load constantly moving toward the front end, and much less trouble with overcrowding has been experienced since this change was made. This solution of the problem was not the result of theorizing but of careful observations of the spirit and actions of the passengers who used the cars night and morning. It is quite probable that circulation in prepayment cars would be promoted in many cases by a more generous use of signs. All cars of this type are lettered on the outside, but many are not lettered on the inside. If large signs should be carried within the car they might often be of great assistance.

POWER STATION EXPENSES

One of the puzzling questions which sometimes arise in power station economics is the segregation of the respective expenses when both lighting and railway service is supplied from the same station, and even from the same generators. No matter whether the power thus furnished is sold separately or used by the same operating company, it is still desirable to form a definite idea of the cost of production, and the considerations involved are somewhat intricate. The simplest case, perhaps, is that in which the railway power is sold to an operating company. Here the vital problem is to make the sale yield a reasonable profit, to do which some plan for segregating the cost must be formulated. In cases where the railway power requires the addition of certain generators to be operated separately it is obvious that the operating and fixed charges against these can be figured much as if they were in a separate station. In effect they are, since extra boiler capacity is probably also installed, and if needful the steam supplied can be closely evaluated. Such an arrangement involves no interrelation between the loads on the two services, and simply can be dealt with by itself.

When, however, the whole service comes from the same set of busbars the trouble begins. On the one hand the introduction of railway load tends to help the general load factor by giving load all through the day, and on the other it may increase the difficulties of station regulation and produce a peak of an irregular and troublesome character. The daily curve of a railway load is a function of many things and varies greatly from place to place. It is quite safe to say, however, that it does not produce a peak proportionate to the total increase of output. In other words, a well-handled railway load gives a considerably better load factor than a normal lighting load. Hence, owing to the diversity of the demand, the station that carries the combined load will very generally have an improved load factor and be able to produce the total power more cheaply than before. How shall this factor in the expense account be allowed for, if at all? If the expenses are divided in direct proportion to the output used for each purpose, the lighting output receives unearned benefit from the improvement in load factor. If there were any simple relation between load factor and cost, this error could readily be corrected, but there is no such simple and definite relation, so one must resort to empirical methods. The exact scheme of proper subdivision is hard to figure out. The matter is one of common-sense convenience rather than of logical consistency, for it would clearly be finical and foolish to attempt to credit each one of many kinds of lighting service, for instance, with its own proper effect on the load factor. But when no intricate subdivision is attempted and the classification resolves itself merely into the separation of two radically different kinds of load the situation is simplified.

Plainly any betterment of operating economy due to the addition of an output that improves the load factor should be credited to that output and not used to help out something else. Now, in the case of mixed railway and lighting service it is quite feasible to get the average load curves due to each separately, and hence to sum these and obtain the improvement in general load factor due to the addition of railway load, or the injury to the load curve in the rare cases where it might occur. Now, if the total operating expenses are analyzed through the year it is not difficult to determine and to

express graphically the variation of cost per unit as a function of the load factor. This done, the segregation of the lighting and railway charges can be accomplished with some degree of fairness. The expense should be divided in proportion to the respective outputs, and then the railway load should be credited or debited with the gain or loss due to its effect on costs as shown by the cost-load factor curve. This is not quite the same thing as taking the costs as inversely proportional to the separate load factors, but is really a further step in the same general direction. The difference is due to the effect of the diversity factor, which cannot be predicted without knowledge of the time relations of the two load curves involved, and hence must be formed by experience. This whole matter of the diversity factor has been greatly neglected, although it is a most vital matter in central station economics of all classes. Even users of energy who are in apparently exactly the same class show extraordinary differences in actual use. Unless one takes account of this the consumer gets very much the short end of the bargain. Take, for instance, the case of a large group of residences using merely light. If each consumer is held for his individual demand justice is apparently satisfied, but, as a matter of fact, the station demand for the group will regularly be very much less than the sum of the individual demands, and since it is the group demand that is a factor in station expense, it is that which affects the expenses. The same principle holds in all classes of service, and in the case here under discussion, where the purpose is a straightforward segregation of expenses, the division should be made fairly upon the actual facts.

WELDING IN THE REPAIR SHOP

A most interesting development in electric railway shop practice is the increasing popularity of welding. It is remarkable to see how its field has spread from the simple repair of broken shafts and motor housings to such unexpected applications as the strengthening of blow-hole castings and the addition of metal patches to flattened wheels. Three distinct methods of welding are now available—the reaction, oxy-acetylene and electric processes. All of them can be made to give satisfactory results even in the hands of comparatively unskilled laborers.

So far as effectiveness and reliability are concerned there is little to choose between these three methods, and it is difficult to compare them on a net cost basis owing to the miscellaneous and variable character of the work done. Even the cost of repairing the same type of motor housing may vary within wide limits according to the character and location of the fracture. Consequently an elaborate, final comparison between the three systems is quite impracticable. In general, however, the cost per weld by the reaction and oxy-acetylene methods does not greatly exceed the cost of the welding chemicals, because the other charges are comparatively small. The cost of electric welding is likely to be more deceptive, because the master mechanic is prone to assume that he is getting current for nothing.

It should be pointed out here that the high amperage and low voltage required for electric welding can be obtained either through resistances or through a motor-generator set. The rheostatic scheme is rather crude and wasteful compared with a motor generator. It ought to prove cheaper to use the latter apparatus in shops where much welding is done and where the cost of current is an appreciable factor. The reaction process has the greatest flexibility, because the necessary equipment can be set up almost anywhere without piping to tanks or wiring to power sources. It is therefore particularly useful for welding heavy articles, on the principle that it is easier to bring a horse to water than vice versa. On the other hand, the oxy-acetylene and electrical processes lend themselves more readily to the quick and convenient welding of small pieces in isolated places. Quite a few welding failures in all of the processes mentioned have been traced to the use of low-grade scrap for make-up metal. The metal added for a weld should consist of such materials that the welded portion will be even stronger than the rest of the structure.

THE LOCATION AND CONTROL OF STOREROOMS

In planning a large shop it is natural for the designers to place the several departments in the order which will best facilitate the dismantling and the later reassembling of the cars to be maintained therein. However, in some designs not enough care seems to be given to the logical location of the storerooms. In one installation recently visited the stockroom is so placed that many of the employees have to walk over 500 ft. each way to get their supplies. Under these circumstances there is a great loss of labor time by both the messengers and their co-workers who are in need of the material to finish the jobs. Of course, it is possible for each machinist to draw out at beginning work such articles as he may expect to use during the day and then to return the tools at night. Nevertheless, some trips to the storeroom are unavoidable, as for the exchange of checked tools and for emergency articles. It follows, therefore, that the storeroom should be located as centrally as possible, provided that supplies can be delivered to it conveniently and that its intermediate position offers no hindrance to the easy movement of work from one shop section to another.

Where the area covered by a shop is so large that even a centrally located general storeroom necessitates long trips for supplies from the departments farthest removed from the storeroom, the use of small auxiliary storerooms for each department saves time in drawing supplies and is not open to objection on the grounds of duplication of stock. The armature shop, for example, uses few, if any, of the supplies required in the truck shop, and the same thing is true in other departments. These departmental storerooms need not occupy valuable floor space, as they can be located in some convenient but out of the way corner or gallery. This plan has been followed in many large steam railroad repair shops and manufacturing establishments and has resulted in economy of both time and space.

The experience of some companies has shown that it is more desirable to have the control of all the storerooms, both in the main shops and elsewhere, in the hands of a general storekeeper than in those of the several department managers. The tendency in separately operated storerooms is to carry too much stock, and besides each depot is sure to have an independent supply of utensils which are used by more than one department. These disadvantages are minimized when the supply service is concentrated under one man who has a broad knowledge of the stock conditions throughout the system. Moreover, the storekeeping accounts can be kept with greater accuracy by a specialist than by half a dozen different men to whom such work is only an incident in their duties.

REHABILITATION OF THE SECOND AVENUE RAILROAD, NEW YORK

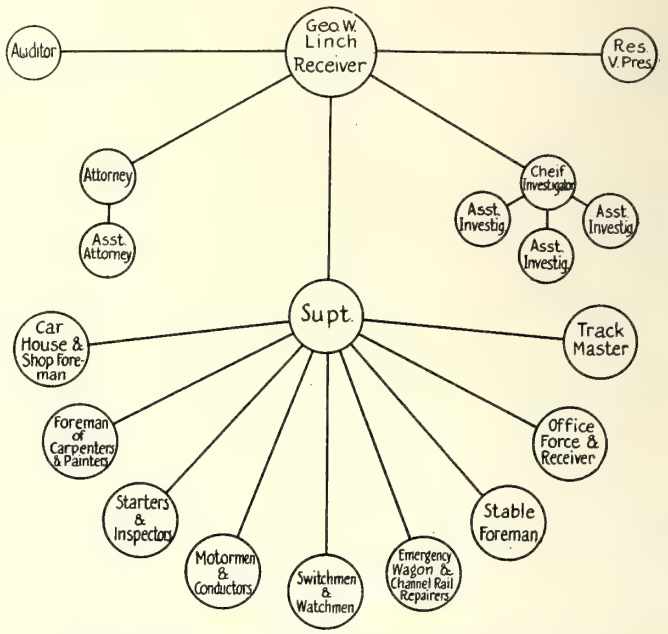
The Second Avenue Railroad is one of the smaller surface street railway companies in New York City now being operated independently. It was absorbed by the Metropolitan Street Railway through a lease made in 1898, and a few years later it was converted from horse to electric operation. The Metropolitan Street Railway Company went into receivers' hands in September, 1907, and in April, 1908, defaulted on the dividend payments to the Second Avenue Railroad which were stipulated in the lease. On the application of the Guaranty Trust Company, George W. Linch was appointed receiver of the Second Avenue Railroad in September, 1908, and took possession of the property on Nov. 12 of that year. Since he has had charge as receiver the Second Avenue Railroad has been operated independently of the Metropolitan system. The property now being operated consists of a double-track conduit system on Second Avenue and the Bowery from 129th Street to Chatham Square and a double-track conduit system on First Avenue from 125th Street to Fifty-ninth Street, together with several short loops and branches, all of which are shown on the accompanying map. Between 129th Street and Twenty-third Street on Second Avenue the tracks are located under the structure of the Manhattan Elevated Railway and from Grand Street to Chatham Square on the Bowery they are also under the elevated structure.

When the receiver took charge of the road in the fall of 1908 the rolling stock equipment, track and buildings were in need of extraordinary repairs. The car bodies and trucks required complete overhauling and painting and inadequate motor equipment caused an abnormally large number of pull-ins. Out of a total of 130 cars in service, as many as 64 pull-ins were made in one day, principally on account of electrical trouble. In February, 1908, while the property was still in the hands of the Metropolitan receivers, the car house and shops at Second Avenue and Ninety-sixth Street were almost totally destroyed by fire and they had not been repaired up to the time Mr. Linch was appointed separate receiver of the company. Much of the track was in bad condition and several pieces of special work were practically worn out.

The receiver faced the problem of immediately making such repairs to the track and equipment as would permit schedules to be maintained with reasonable regularity and reduce the excessively high cost of operation.

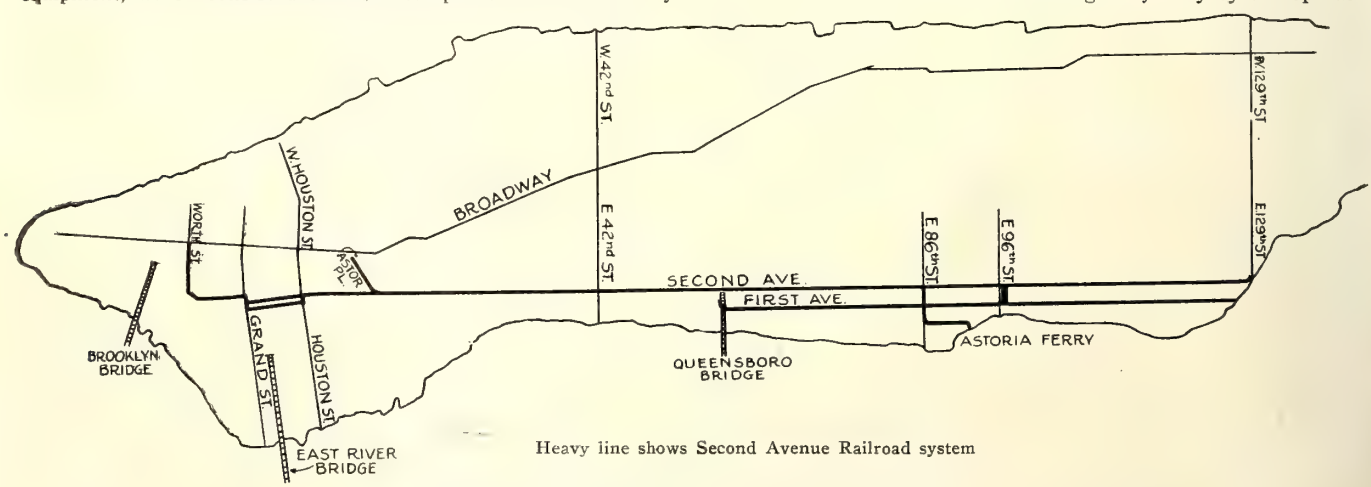
REHABILITATION OF CARS

The first work undertaken was the rehabilitation of the car equipment, which consisted of old Metropolitan Street Railway standard double-truck open and closed bodies mounted on Brill maximum traction trucks equipped with two GE-1000, 35-hp motors. As rapidly as possible the car bodies were thoroughly overhauled and the woodwork repaired. They were then painted blue and buff, the standard colors formerly used by the Second Avenue Railroad before its absorption by the Metropolitan system. Many of the motors were quite old and no longer fit for hard service, but they were repaired as well as possible, considering their condition. The motors were not of adequate power to propel the cars up the grades encountered at several places, and burned out armatures and fields, hot bearings and armature troubles continued to occur frequently. The power consumption also was abnormally high. Recently the receiver placed an order with the General Electric Company for 200 complete new equipments of GE-216 motors and control. When these motors are received and installed it is believed that the electrical troubles which have been principally responsible for the high ratio of operating expenses will be greatly reduced. This expectation is based on the results obtained with a trial equipment of these motors which has been in service for some months on one of the company's cars and is showing a marked reduction in power consumption per car-mile.



Second Avenue Railroad—Organization Diagram

Under the terms of an order issued by the Public Service Commission of New York, First District, the company was required to equip all of its cars with automatic wheel guards. To comply with this order, a new type of wheel guard which is attached to the truck frame was designed jointly by the operating and shop departments, and 250 cars have been equipped with this type of guard. The construction details of the guard have been patented. No new cars have been purchased nor have any cars been rebuilt for prepayment operation. Four single-truck conduit scraper cars and two single-truck sand cars have been built in the company's shops.



Second Avenue Railroad—Map Showing Route

POWER SUPPLY

The Second Avenue Railroad buys all of its power from the Metropolitan Street Railway and the Third Avenue Railroad. It claims to have an equity of $750,000 in the Ninety-sixth Street power station of the Metropolitan Street Railway, but has no part in the management or operation of the station. Direct current is supplied from the substations of the two companies from which power is purchased and it is distributed through cables and ducts which are owned and maintained by the Second Avenue Railroad Company. All current which is purchased is metered at the substations. A total of nearly 9,500,000 kw-hours is required per year for heating, lighting and propelling the cars and supplying power and light in the shops and the car house.

TRACK REHABILITATION AND CONSTRUCTION

Extensive repairs to the company's tracks were made during the summer of 1909 and the early part of 1910. The First Avenue division, which was electrified only a few years ago, was in good condition and it has required only light repairs. The track on the southern end of the Second Avenue line below Twenty-third Street and a section on Second Avenue between Sixtieth Street and Eighty-fourth Street required complete renewal of the running rails, joints, paving and in some places of the slot rail. Temporary repairs were made to the track during the winter of 1908-1909 by inserting "dutchmen" under the rails on the yoke bearings, but this was followed later by complete renewal of the worst pieces of track. For all renewal work 9-in., 122-lb. No. 438 Lorain rail has been used and the joints have been made with 12-bolt joint plates. A number of the crossings and curves have been renewed with manganese steel and new cross-overs have been installed on Second Avenue at Sixty-sixth Street and 116th Street.

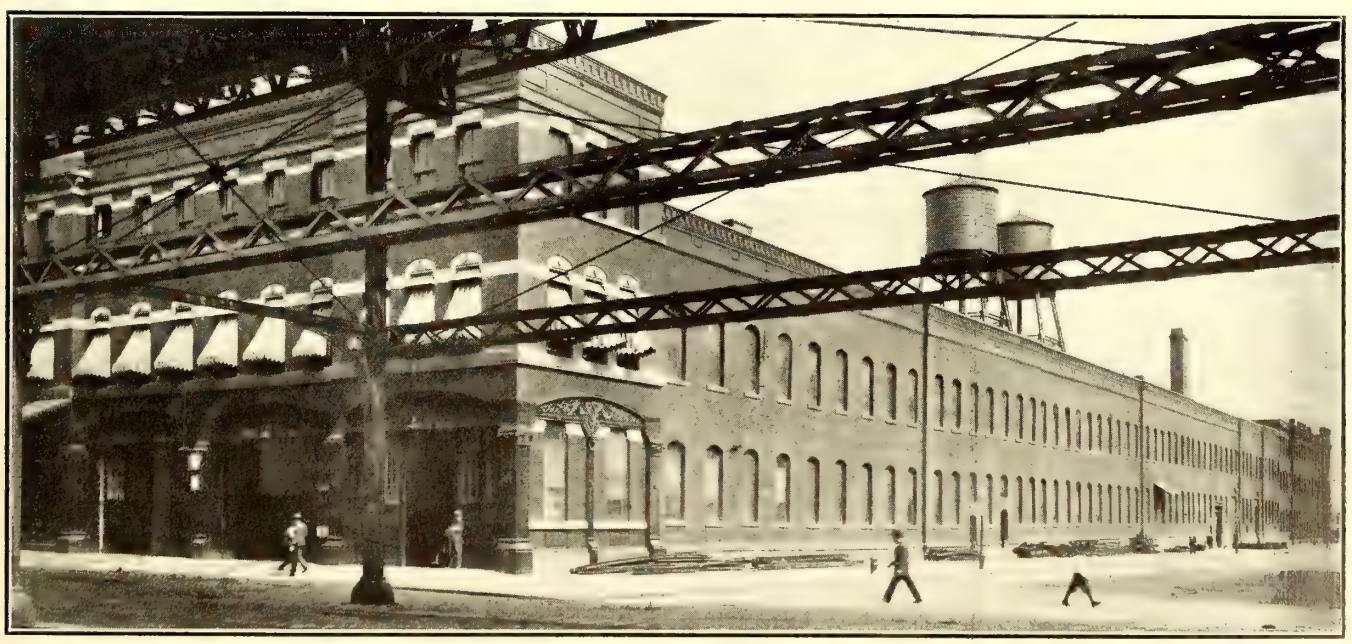
The present downtown terminal of the Second Avenue line is at Bayard Street and the Bowery, near Chatham Square. The company owned a franchise for a horse car line extending from the Bowery west on Worth Street to Broadway, and during the past summer a double-track electric-conduit line has been built on Worth Street so as to provide a new terminal at Broadway. This new construction comprises about 0.8 mile of track.



Second Avenue Railroad—View of Car House from First Avenue and Ninety-sixth Street

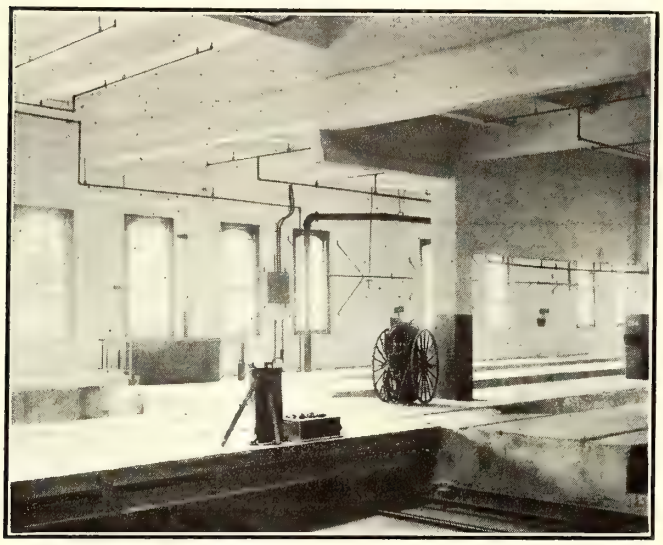
NEW CAR HOUSE AND SHOPS

The old car house and shops of the Second Avenue Railroad and the barn of the First Avenue horse car line covered the entire block, 700 ft. by 200 ft., bounded by First and Second Avenues and Ninety-sixth and Ninety-seventh Streets. The east end of the building, fronting on First Avenue, was a three-story structure with brick walls and wooden floors and framing. When the First Avenue line was changed to electric operation a transfer pit and table were installed on the first floor and this end of the building was converted into an inspection and storage shed for the cars of this division. The Second Avenue Railroad car house and shops comprised a two-story structure with concrete floors and steel framing, fronting on Second Avenue and extending back on Ninety-sixth and

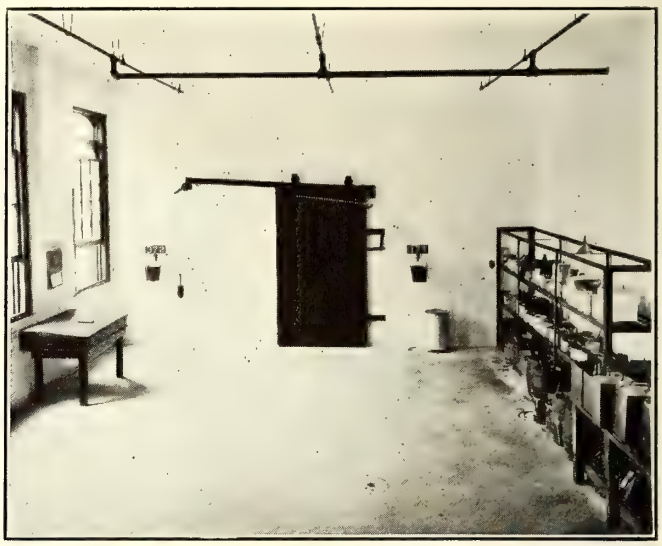


Second Avenue Railroad—View of Car House from Second Avenue and Ninety-sixth Street

Ninety-seventh Streets about 500 ft. The fire in February, 1908, which destroyed the Second Avenue car house, left only the side walls of this section of the building standing, but the First Avenue section of the building was not seriously damaged. In the spring of 1909 the receiver of the Second Avenue Railroad had plans drawn for a new two-story, reinforced-concrete, fireproof car house to be built on the site of the old building.

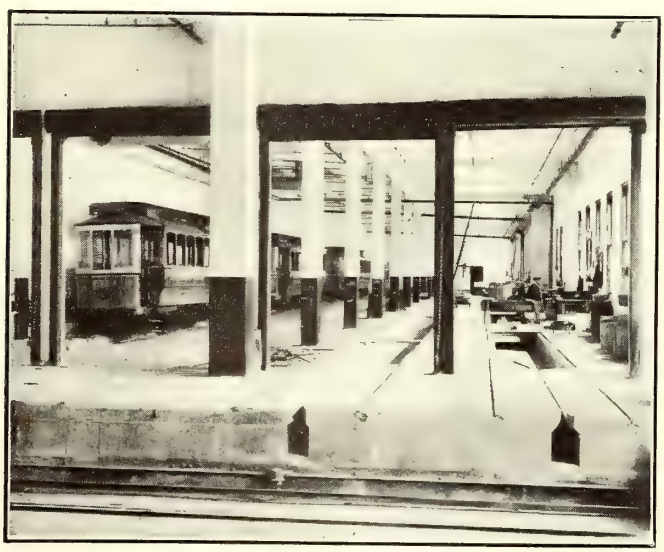


Second Avenue Railroad—Transfer Table and Chemical Engine



Second Avenue Railroad—Interior of Fireproof Paint Storage Room

The new building was completed in February, 1910, and now affords ample storage and shop facilities. The ground floor is used for storage and inspection of cars in service, while the second floor is used for storage and also provides room for a large carpenter shop and paint shop. Each floor of the building is divided into three sections by two transfer table pits 24 ft. wide, which extend across the entire width of the building. Two transfer tables are operated in each pit. The first-floor tracks are all equipped with channel rail in each conduit, so that cars may be moved without using jumpers. The channel rails, however, carry current only while the transfer table is directly opposite the end of the track, as the current is supplied to the

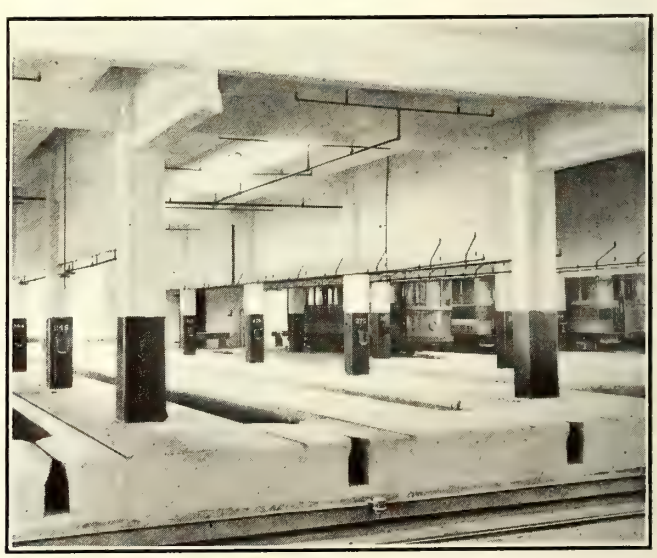


Second Avenue Railroad—Carpenter Shop on Second Floor. The Cars Here Are Moved by Jumpers

channel rails through shoes on the end of the transfer table. On the second floor none of the track conduits have channel rails, and all cars are moved with jumpers connected to the transfer tables. All storage tracks on both the first and second floors are laid on a level grade.

Cars are raised or lowered between the first and second floors by two Reedy electric elevators with a capacity of 20 tons each. These elevators run in fireproof shafts and the openings on each floor are enclosed by steel rolling doors which close by gravity unless held open by securing the operating chain.

The shop facilities comprise an armature room, a blacksmith shop, a machine shop, an impregnating room and a boiler-room on the first floor along the Ninety-sixth Street side of the building; a carpenter shop 304 ft. x 47 ft. on the second floor along the Ninety-sixth Street side, and a paint shop also 304 ft. x 47 ft. on the second floor along the Ninety-seventh Street side. The carpenter and paint shops each contain four tracks with shallow pits below. At the east end of each shop are storerooms 33 ft. x 22 ft., which are cut off from the remainder of the building by heavy fire walls and fireproof doors. In the boiler room on the first floor of the building are installed two boilers for heating the building. One of these boilers has been converted into a high-pressure unit for supplying steam to the impregnating plant in the adjoining room. The impregnating plant is of the



Second Avenue Railroad—Second Floor, Showing Curtain Walls and Overhead and Aisle Sprinklers

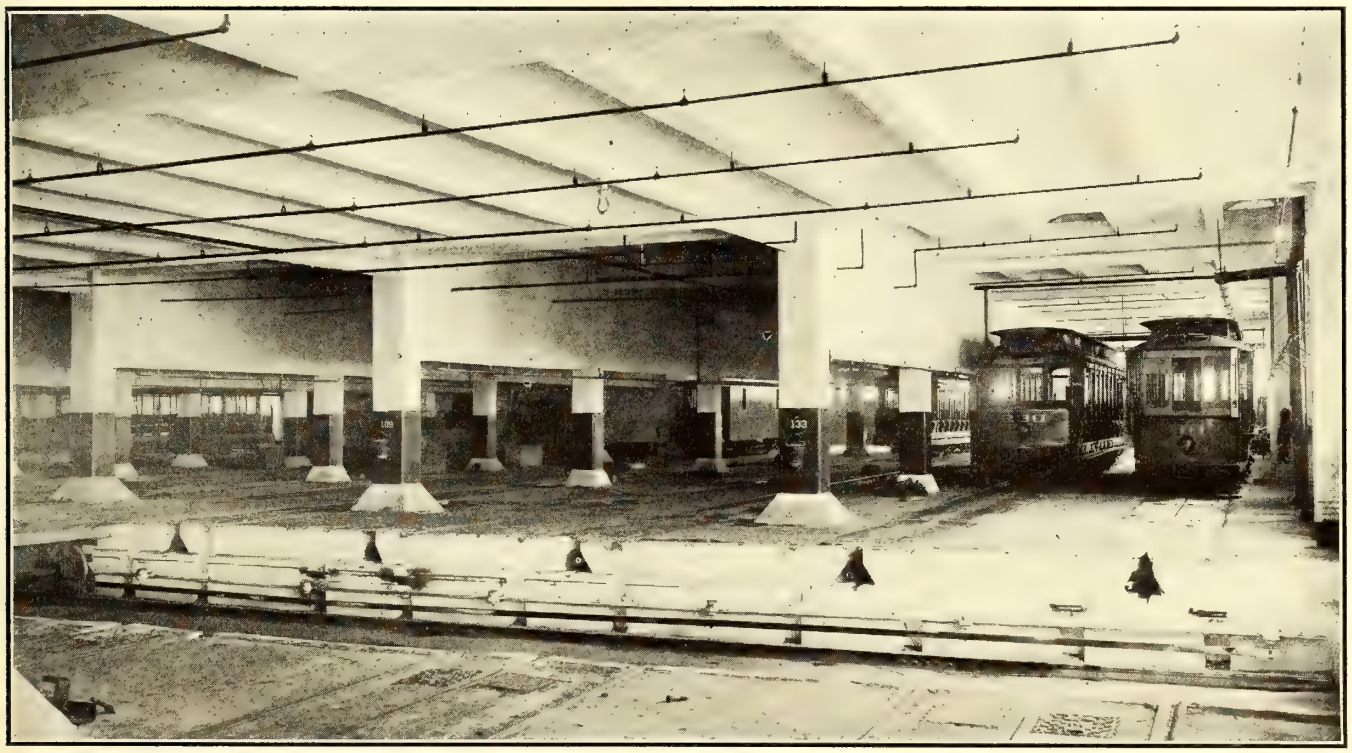
steam-jacketed type made by the Buffalo Foundry & Machine Company.

In the front of the building beside the main entrance track on Second Avenue is a large sand-drying and storage room, in which are placed two stove driers. Quarters for the emergency crew occupy the corner of the building on Second Avenue and

Ninety-sixth Street. All lighting and power circuits in the building are controlled by two switches in this room. By opening these switches current is cut off in all parts of the building, so that in case of fire the firemen would not be exposed to danger from electric shock.

FIRE PROTECTION

The interior of the building is constructed throughout of reinforced-concrete posts, girders and floor and roof slabs. Between each bay of two tracks a curtain wall is carried down between the columns from the ceiling to the height of the car eaves. The transfer table openings at the end of the paint and carpenter shops are closed with steel rolling doors. The principal dependence for protection against a fire originating in a car is placed in the elaborate system of automatic sprinklers which has been installed throughout the building. A row of sprinkler heads is mounted along the bottom of each curtain wall and a row of ceiling sprinklers is placed over the center of each track. Nearly 4000 Rockwood sprinkler heads are used in the building. The system is supplied with water from two 20,000-gal. storage tanks and four pressure tanks mounted on the roof. In addition to the sprinkler equipment, a fire pail is hung on a hook on each column in the building. The columns are all numbered and all pails are numbered in accordance with the columns on which they are placed. Two hand chemical engines also are in readiness for instant use. The building is now being wired for a Manhattan fire-alarm equipment, which will be connected to the city fire-alarm system. An inspector is employed whose only duties are to examine every fire pail and other piece of fire apparatus each day and to test the sprinkler system thoroughly every morning. These fire-protection devices have resulted in reducing the insurance rate on the building and contents from $1.05 to 26 cents.



Second Avenue Railroad—Transfer Table and Pit on Ground Floor, Showing Contact Blocks for Making Conductor Rails in Conduit Alive

OPERATION

The Second Avenue Railroad at present is operated in three divisions. The first division is from 129th Street and Second Avenue to Bayard Street and the Bowery, a distance of 7.2 miles. The second division includes the line on First Avenue from 125th Street to First Avenue and Fifty-ninth Street, terminating at the west end of the Queensboro Bridge, a distance of 3.3 miles. The third division includes the line from the Astoria Ferry at Ninety-second Street and East River down First Avenue to Eighty-sixth Street, west to Second Avenue, south on Second Avenue to Stuyvesant Place, through Stuyvesant Place and Astor Place to Broadway. The length of this route is 4.6 miles. Transfers are exchanged with the Metropolitan crosstown lines at Twenty-third Street and Thirty-fourth Street only.

During April, 1910, when the largest number of passengers was carried, the company operated a maximum of 57 cars on the Second Avenue division, 14 cars on the First Avenue division and 28 cars on the Astoria Ferry and Astor Place division. The average headway on the Second Avenue division during the middle of the day was 3½ minutes and during the rush hours was 2 minutes; on the First Avenue division 5 minutes during the middle of the day and 4 minutes during the rush hours, and on the Astoria Ferry division 4 minutes during the middle of the day and 2 minutes during the rush hours.

The accompanying table gives the principal operating statistics of the Second Avenue Railroad as reported to the Public Service Commission of the First District of New York for the year ended June 30, 1910. The revenue per car mile is nearly one-third lower than the average of the Third Avenue Railroad and Metropolitan Street Railway systems. As will be seen from the table, the ratio of operating expenses to operating revenue is also very high. This can be accounted for largely because of the fact that it has not been possible to put the rolling stock in proper operating condition up to the present time and the constant breakdowns have not only disarranged the schedules but have required an abnormally large number of cars and crews to be kept in readiness for service. When the new motor equipments which have been ordered are installed a much better showing is expected.

STATISTICS OF OPERATION OF SECOND AVENUE RAILROAD FOR YEAR ENDED JUNE 30, 1910

Revenue car miles	3,465,352
Cash passenger fares	14,921,441
Transfers collected	989,438
Operating revenue	$829,402
Operating expenses	$719,256
Revenue per car mile, cents	22.97

DISTRIBUTION OF TRAFFIC

Like most of the other surface railway lines in New York, the Second Avenue Railroad does a somewhat larger business in summer than in winter. This is due partly to pleasure riding

and partly to the fact that many people in hot weather take the surface cars in preference to using the subway or elevated roads. The following table gives by months the fare passengers carried by the Second Avenue Railroad from July, 1909, to July, 1910, inclusive:

NUMBER OF FARE PASSENGERS CARRIED BY MONTHS FROM JULY, 1909, to JULY, 1910, INCLUSIVE

Month	Number Passengers
July, 1910	1,694,123
June, 1910	1,534,679
May, 1910	1,387,438
April, 1910	1,235,884
March, 1910	1,187,502
February, 1910	1,011,939
January, 1910	1,074,085
December, 1909	1,226,528
November, 1909	1,296,257
October, 1909	1,430,342
September, 1909	1,467,616
August, 1909	1,557,982
July, 1909	1,562,362

DESIGN OF CARS FOR CHICAGO STREET RAILWAYS

The second annual report of the Board of Supervising Engineers, Chicago Traction, includes considerable interesting information about the design of the new street cars of the Chicago City Railway and the Chicago Railways Company.

PAY-AS-YOU-ENTER CARS

On November 24, 1907, the Chicago City Railway Company installed a complete service of pay-as-you-enter cars on its Cottage Grove Avenue line, which carried the heaviest travel on the South Side of the city. This service was the first general use and practical test of the efficiency of the "P-A-Y-E" car in the United States. The following figures will illustrate the practical results of the "P-A-Y-E" service from an operating standpoint:

	Receipts	Car Hours	Receipts per Car Hour
Nov. 24, 1907, to Jan. 31, 1909	$1,808,321.52	702,395	$2.57
Nov. 24, 1906, to Jan. 31, 1908	1,686,712.17	796,843	2.12
Increase	$121,609.35	94.448*	.45
Per cent	7.2	11.9*	21.2
Per cent increase or decrease all lines	2.8	3.0*	6.0
Per cent increase or decrease due to P-A-Y-E cars	4.4	8.9*	15.2

* Decreases.

ACCIDENTS.

Falling at curve, falling in cars, from cars, boarding, leaving, or flipping cars:

Nov. 24, 1907, to Jan. 31, 1909	1,280
Nov. 24, 1906, to Jan. 31, 1908	1,821
Decrease	541, or 31.9 per cent

It will be noted in the above statement that after allowance has been made for the general increase in business the "P-A-Y-E" car shows: (1) Closer collection of fares; (2) reduction in car hours, which means greater rapidity in receiving and discharging passengers as well as economy in operation; (3) increased receipts per car hour, and (4) a most beneficial reduction in the number of accidents.

DESIGN OF STANDARD CAR

About the first of the year the board took under consideration the practicability of securing a type of car which would eventually become the standard type of car operated on all surface lines within the city. The situation briefly as to size of cars at that time was: The Chicago City Railway Company's new pay-as-you-enter cars were 9 ft. wide over all and 48 ft. 3 in. long. This was the widest and roomiest car in operation on any of the lines in the city. The width of double-truck cars in operation varied from 8 ft. 9 in. to 8 ft. 3 in. The objectionable feature of this variance primarily was that it was contemplated in the installation of through routes that cars of one company would travel and be housed in the territory of another company. To make this condition ideal it was admittedly of the greatest importance that as soon as possible all cars so operated should be of standard size. This would also mean, of course, that the repair parts would be interchangeable and the repair pits in the car houses of one company would readily accommodate the cars of the other company, so that the service could be carried on uninterruptedly.

On Feb. 13, 1908, comparative average performances of cars were submitted, with the relative speed of the different types. The statement shows an increase in scheduled speed of 16 per cent over what it was in 1906 and 9.34 per cent over what it was in 1907. The statement follows:

	Schedule Speed in Miles per Hour
COTTAGE GROVE AVENUE LINE.	
January, 1906—Cable operation	7.68
January, 1907—Some single-truck and double-truck cars	8.13
January, 1908—All double-truck cars	8.89
Increase since 1906, 16 per cent.	
Increase since 1907, 9.34 per cent.	
INDIANA AVENUE LINE.	
January, 1906—Cable and electric operation	7.76
January, 1907—All electric equipment	8.14
January, 1908—All double-truck cars	8.64
STATE STREET LINE.	
January, 1906—Cable operation	7.60
January, 1907—Electric operation single-truck and double-truck cars	8.25
January, 1908—All double-truck cars	8.81
WENTWORTH AVENUE LINE.	
January, 1906—Electric operation double-truck cars	8.88
January, 1907—Electric operation double-truck cars	8.86
January, 1908—Electric operation double-truck cars	8.92

Early in 1908 the board made a careful study to assist in designing new cars for the Chicago Railways Company. The pay-as-you-enter car, in operation in Chicago and other cities, was carefully investigated and this design was believed to be a practical type to adopt as standard for Chicago. Among the reasons leading to its adoption may be mentioned the following:

Reduction in accidents, since passengers getting on or off the car are under the eye of the conductor or motorman.

Increased comfort to passengers, as conductor remains upon rear platform and does not have to elbow his way through a crowded car.

Elimination of the confusion incident to loading and unloading the old type of car. On the P-A-Y-E car entering and leaving passengers are separated by railings, and the front platform is for "exit only."

Better running time, as the elimination of confusion at loading and transfer points enables the car to get under way more quickly.

The collection of all fares, as the passenger must pay when entering the car.

The Board of Supervising Engineers, after discussing the various types and dimensions of cars submitted, determined upon the following general dimensions for the new cars for the Chicago Railways Company:

Type of car to be double-end pay-as-you-enter.

All cross seats to be not less than 36 in. in length, all of which shall be cushioned.

The center aisle to be not less than 23 in.

Height of car from top of rail to top of trolley board to be not less than 11 ft. 8 in. nor more than 11 ft. 10 in.

Length over corner posts to be not less than 32 ft. nor more than 32 ft. 5 in.

Length of platform to be 8 ft. 4½ in.

Length of car over all to be not less than 48 ft. 9 in. nor more than 49 ft. 2 in.

Width of car over all to be not more than 8 ft. 9 in.

Truck centers to be 20 ft. to 20 ft. 5 in.

It also was provided that the cars should be constructed in accordance with general specifications to be prepared by the chief engineer of the work. Various designs were submitted by the car builders embodying their ideas as to details of construction. These plans and drawings were analyzed and their suitability studied. After careful consideration as to weight and strength, a plate girder type of under frame was decided upon, and a detail specification was prepared by the rolling stock division of the board covering a car embodying the best features of the various designs submitted by the car builders. This detail specification provided for a car having dimensions within the above requirements and a seating capacity for 40 passengers. The details of the car framing were studied with regard to strength and finish, due regard being given to keeping

the weight of the car down to a minimum. Novel features called for in the detail specification which deserve mention are: (1) steel sash (2) use of cast-steel body bolsters (3) operation of push buttons from trolley voltage.

Careful attention was given to the trucks, and several cities were visited to study the action and riding qualities of various makes and designs of this important equipment. The Chicago Railways Company had in service at the time of the investigation a set of trucks which had given good service and which possessed good riding qualities. Investigation of other types of trucks showed none superior in weight, low cost of maintenance or riding qualities; hence it was decided to adopt the truck which had proven so satisfactory in the local service. The notable feature of this truck is the great length of spring base in proportion to wheel base, which gives ease in riding.

Probably the most interesting feature of the rehabilitation of the rolling stock of the Chicago Railways Company was the purchase of 50 all-steel cars. These steel cars are built to the same general dimensions as the 600 wooden cars previously described and possess the following points of advantage over the wooden cars: (1) Long life—the use of steel throughout will make these cars practically indestructible; (2) fireproof—there being practically no wood used in their construction there is nothing for fire to attack; (3) low maintenance cost—the parts subject to mechanical injury by contact with wagons or otherwise, being of steel, will not break, but will bend; they can be readily straightened and the car quickly returned to service.

These new steel cars were described in detail and illustrated in the ELECTRIC RAILWAY JOURNAL for Aug. 28, 1909, page 312.

TRUCK AND WHEEL GUARDS

In accordance with a resolution of the board, truck wheel guards have been developed and applied to the street cars operating in the city of Chicago.

This truck wheel guard consists of boards about 1 in. x 6 in. placed vertically and extending all around the truck. These boards are securely fastened together and firmly anchored to the truck frame. They are so assembled as to be V-shaped at the ends of the truck, so that objects struck will be sheared off and thrown clear of the wheels. The V-shaped ends of the guard are provided with a facing of rubber belting to prevent the bruising of an object by the sharp corners of the boards of which the guards are made. The boards along the side of the truck guard the wheels at these points. The guards are carried as close to the top of the rail as track conditions will permit, in order to prevent the smallest child from going under the wheels, this distance being between 2 in. and 3 in. Typical applications of the "H-B" fenders on Chicago P-A-Y-E cars are shown in the report.

MOTOR EQUIPMENT

A four-motor equipment was decided on, due to superior traction, with all wheels driving. The four-motor equipment is less liable to cause delays than a two-motor equipment, since the loss of a motor always leaves two motors for getting over the line, while with a two-motor equipment the loss of one motor overloads the other so that the car makes very slow speed, causing delay.

In determining the service to be performed by the motor equipments observations were made on one of the heavy trunk lines of the Chicago Railways Company, viz., Madison Street. It was found that the stops per mile averaged about seven and that the average duration of stops was about six seconds. A schedule speed of nine miles per hour was assumed. The acceleration and braking were taken at about 1.5 miles per hour per second. Based on the service requirements, 40-hp quadruple motor equipments were chosen. The motor was designed by the manufacturer in accordance with the views of the chief engineer of the work and the engineer in charge, and on the basis of the service requirements as hereinbefore stated.

CAR VENTILATION

During the year covered by the report the subject of the ventilation of cars received considerable study and attention. Under the supervision of the city Department of Health tests were made of a number of ventilating devices. The Commissioner of Health stated that the principle of having the fresh air enter the car at the ceiling by means of deck sash, forcing the foul air down to the breathing zone, was improper from the health standpoint, and that the ventilation of a street car should be accomplished along the following lines:

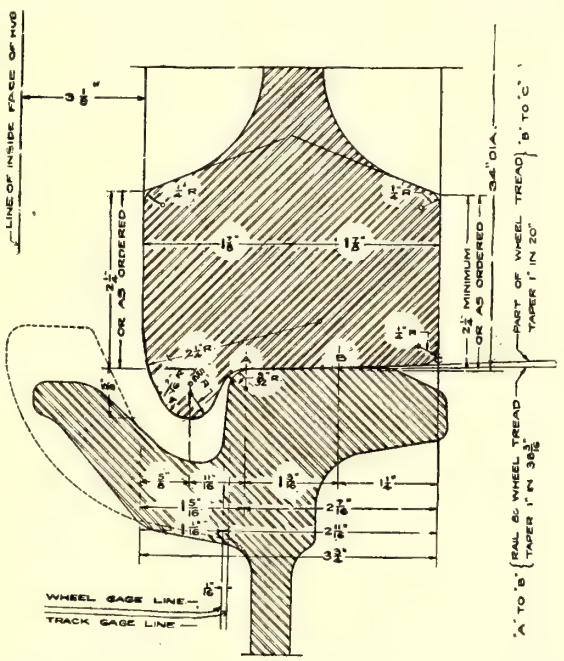
(1) The fresh air should be taken into the car below the seat level and passed over heaters.

(2) The fresh air should enter the car at multiple points.

(3) The foul air should be taken out at the ceiling.

It has also been stated by the Commissioner of Health that not less than 28,000 cu. ft. of fresh air per hour should be taken in through the intakes (located below the seat level) and passed over the car-heating apparatus before entering the breathing zone of the car body. It is estimated that the above amount of fresh air entering through the intakes, together with the amount which will leak in through opened doors and around the cracks of doors, windows, etc., will make the total amount of air per hour admitted to the body of the car approximately 38,000 cu. ft., which will provide for an air change about once every one and one-half minutes. The above figures are based on a cubic capacity of car body of approximately 1000 cu. ft.

Experience with the new P-A-Y-E cars in Chicago, in which



Rail Head and Wheel Flange Used by Surface Railways in Chicago

smoking is allowed on the front platform, has also shown the necessity of providing some means to take the smoke out of the front vestibule. This has been made one of the requirements of a ventilating system for Chicago P-A-Y-E cars; also a franchise requirement states that "the cars shall be kept heated at a temperature of 50 deg. Fahr. as nearly as practicable."

After many succeeding consultations with the city health authorities it was determined that good ventilation would consist of the passage through the car of 350 cu. ft. of fresh air per hour per passenger for the maximum carrying capacity of the car. The majority of the cars will hold either 75 or 80 people in the body of the car, sitting and standing; consequently the requirements of the Health Department necessitate the introduction into the car of a constant flow of air at the rate of from 26,000 to 28,000 cu. ft. per hour.

As the result of tests an automatic type of ventilator was installed on 250 cars and subsequently an additional 350 cars were ordered equipped with a mechanical ventilating device. The tests of the various ventilating devices have shown that most of them have considerable merit and that all of them under certain conditions have ability to fulfil the requirements of the Department of Health.

CAR WHEELS

To the subject of car wheels careful thought and attention have been given. The wheels in use at the time this subject was taken up were of cast iron, and while they had been designed with reference to long life and minimum wear on the track and expensive special work, the fact that flat spots developed easily in them caused great annoyance to persons living along the car lines. These cast-iron wheels were comparatively heavy, weighing about 570 lb., because of the strength required and also because they had a wide tread to minimize the wear on special work. Rolled-steel wheels were in use in other cities and a few were running in Chicago. Investigation showed that flat spots scarcely ever occurred on these wheels, and when they did develop they soon were rolled out automatically in the operation of the car. The steel wheel, therefore, obviates the chief objection to the cast-iron wheels in that it is practically noiseless. Steel wheels can also be made much lighter than those of cast iron. Their life is greatly in excess of the cast-iron wheel, thus effecting a large economy. These and other facts influenced the Board of Supervising Engineers after thorough investigation to decide upon the exclusive use of steel wheels for both railroad companies as rapidly as the cast-iron wheels could be replaced. Accordingly contracts were entered into by both the Chicago City Railway Company and the Chicago Railways Company for rolled-steel wheels for all present cars, new cars and requirements till 1911.

In the design of a steel wheel the chief points that had consideration were contour of tread and flange, depth of flange, width and thickness of rim and weight of wheel. The contour of the tread and flange of the standard wheel are shown in the cut on page 905. The weight of these steel wheels will average about 500 lb. for the 1⅞-in. thickness of rim and 525 lb. for the 2¼-in. thickness of rim. The chemical composition of the wheel was so adjusted that the steel in the wheel would be somewhat softer than that in the rail, so that the wear in service would come largely on the wheel, thus prolonging the life of the rails.

HEARING ON NEWBURYPORT FARES

The Massachusetts Railroad Commission gave a hearing at Boston on Oct. 19 upon the petition of the Mayor and Aldermen of Newburyport for a readjustment of fares on the lines of the Citizens' Electric Street Railway, the Boston & Northern Street Railway, and the Haverhill & Amesbury Street Railway. The petitioners' case was conducted by Arthur Withington, City Solicitor of Newburyport, and the companies were respectively represented by the following counsel: Guy Murchie, Boston; Bentley W. Warren, Boston, and S. W. Emery, Haverhill. The petitioners contended that the existing fares are excessive, and urged that every passenger boarding a car upon any of the above roads in Newburyport be entitled to a free transfer on any one of the other lines to the end of the first 5-cent fare limit of the latter. A reduction in the present 10-cent fare to 5 cents was also asked on the Haverhill & Amesbury Street Railway between Market Square, Newburyport, and the Massachusetts-New Hampshire State line, between the towns of Salisbury and Smithtown. The cars of all three companies are now run to Market Square, Newburyport.

Chairman Hall said to the petitioners that their demand of an inter-company transfer was only another way of saying that they wanted the present fare cut in two. The petitioners contended in regard to the desired establishment of a 5-cent fare to Smithtown that the original franchise grant forced the company from a moral point of view to charge only 5 cents for this service. Chairman Hall said that the Massachusetts Supreme Court had declared that a conditional franchise is not a binding agreement, and endeavored without success to obtain a statement from the petitioners as to their view of the moral effect of an agreement which time showed to be financially impossible. Chairman Hall stated that the board had no jurisdiction over that portion of the Haverhill & Amesbury line which is in Smithtown, since it is without the State.

Bentley W. Warren, for the Boston & Northern Street Railway, stated that the only line of this system which had been mentioned is the branch formerly known as the Georgetown, Rowley & Ipswich Street Railway, which was built for the sole object of accommodating travel from outlying districts south of Newburyport into the city. Cars entering the city on this line run for a short distance over the tracks of the Citizens' company. The line was never profitable and paid practically nothing in dividends. The condition of the property was bad when the Boston & Northern purchased it. Mr. Warren said that the proposition to exchange transfers with the other companies would never have been considered for a moment, and if insisted upon the line would not have been built. There was no reason why the line should be required to carry further losses. It had proved to be a boon to the localities through which it passed, but it could not stand any dilution of its scanty revenues. A 5-cent fare was maintained on the line from Market Square, Newburyport, to Dummer Academy, which was 4.8 miles distant.

Samuel W. Emery, for the Haverhill & Amesbury company, referred to the petitioners' claim that a 5-cent fare is charged on the Amesbury & Hampton Street Railway for a longer ride than between Newburyport and Smithtown. The company had tried both a 6-cent and a 10-cent fare between Smithtown and Amesbury, but the patronage fell off so much that the results were less satisfactory than with the original 5-cent fare, which had been restored. Mr. Emery said that the company would much prefer to charge a 10-cent fare if it were possible between these points, just as that rate prevailed between Newburyport and Smithtown.

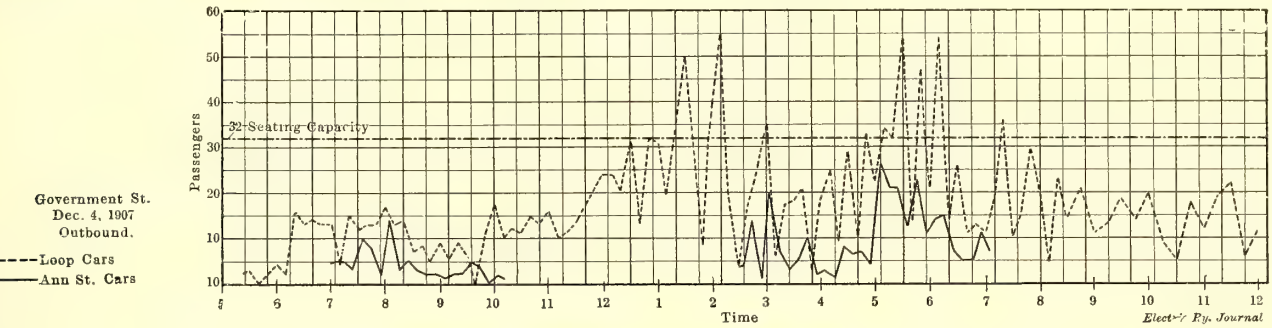
President D. A. Belden, of the Haverhill & Amesbury Street Railway, stated that previous to July 10, 1909, the fare between Newburyport and Smithtown was 5 cents, the distance being 5.17 miles. On that date the fare was raised from 5 to 10 cents, 5 cents being charged to Salisbury Square and 5 cents from the latter point to Smithtown. Simultaneously with the increase a workingman's limited ticket was issued giving 50 trips between Smithtown and Newburyport at a cost of $3.75, or 7.5 cents per trip. Up to Dec. 1, 1909, only 10 of these books had been sold, and in view of the fact that the majority of people in the Smithtown district received low wages and did not appear to be able to invest $3.75 in tickets at any one time, and also because of competition on the Boston & Maine Railroad, the company inaugurated an unlimited ticket book containing 12 trips at the price of 90 cents, or the rate of 7.5 cents per trip, but with the evident advantage of reduced investment expense. Between Dec. 1, 1909, and Oct. 1, 1910, 715 of these 12-trip tickets were sold. Mr. Belden said that in the last 10 years the Haverhill & Amesbury company had accumulated a deficit of about $110,000. Chairman Hall said that if the revenue of the company between Smithtown and Newburyport had been all profit it would still be impossible to pay a 6 per cent dividend. Mr. Belden stated that in October, 1908, with the 5-cent fare in force, it was estimated that 11,729 passengers traveled between Smithtown and Newburyport, giving a revenue of $586.45; while in October, 1909, with the 10-cent fare operative, 8947 passengers were carried, with a corresponding revenue of $894.70. Thus there was a gain in the month of about $310, with a loss in the number of persons carried. Mr. Belden said that the company could not afford to lose any revenue in Newburyport through the use of inter-company transfers.

Guy Murchie, for the Citizens' Electric Street Railway Company, contended that it was impracticable to extend local transfers on the Newburyport system further. The system was in general Y-shaped, and transfers were given at all necessary points. The company had about 12 times as much trackage in Newburyport as the other roads and it would not be feasible to arrange a fair distribution of earnings per passenger upon such a basis. The company should not be obliged to reduce its income. It paid 5 per cent dividends in the last two years with a surplus of only $5,000, which was perilous in view of the possible cost of a single serious accident.

The board took the case under advisement.

TRAFFIC NOTES FROM MOBILE

During the year 1909 the Mobile (Ala.) Light & Railroad Company operated a total of 58.2 miles measured as single track and carried 12,670,930 passengers, composed of 10,791,569 revenue and 1,879,361 transfer passengers. The respective numbers of revenue and transfer passengers for 1908 were 11,102,571 and 1,902,203, and for 1907 were 11,925,160 and 1,938,494. The decline in traffic since 1907 was due to a falling off in Mobile industries, notably in the lumber market. However, it appears that the traffic for 1910 will be greatly improved, judging by the business for the first four months of the calendar year.



Mobile Traffic—Curves Showing Comparative Use of Through Cars and Trippers

An important factor in the increase shown so far was the annual reunion of the Confederate veterans, which this year was held in Mobile on April 26, 27 and 28. The camping grounds were chosen on ground adjacent to Monroe Park, the company's amusement resort, and to the baseball grounds of the Mobile Club of the Southern League.

The park and ball grounds mentioned are located directly opposite the car house and shops of the company, thus making it easy to have available the maximum number of cars and to minimize dead mileage. Monroe Park is on the shore of the Mobile Bay and is quite an elaborate resort. It is opened about the middle of April. The park attractions include theatrical performances, band concerts, deer enclosure, roller coasters and a host of minor concessions.

By referring to the figures previously given, it will be observed that in 1909 about 17 per cent of the passengers rode on transfers. To minimize transfer abuse, the company has the tickets printed in six different colors and the management arbitrarily decides from day to day the shade to be used.

TRAFFIC CURVES

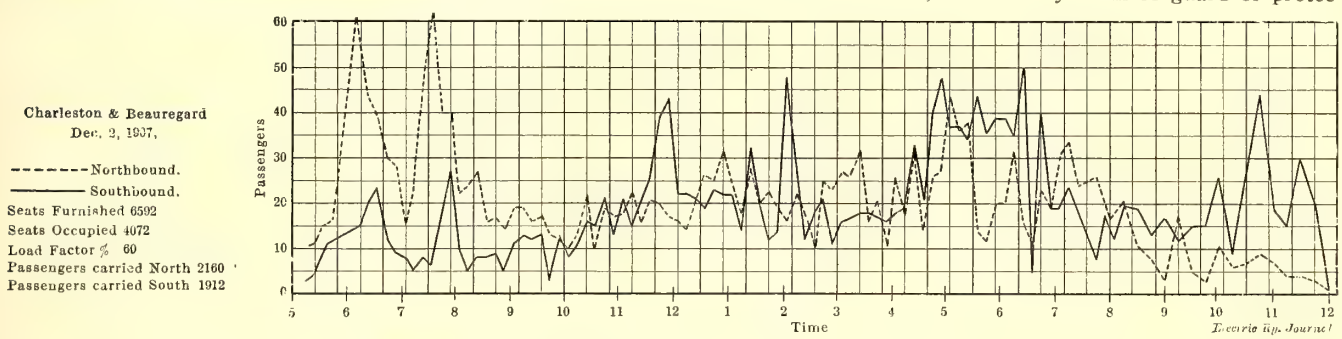
The Mobile management has found it worth while to prepare traffic curves from time to time, as these betray peculiarities in travel in a much more striking manner than simple tabulation. Curves which show the relationship between the seats furnished and the seats used have been found particularly valuable in arguments with the municipal authorities, newspapers and private citizens as to the character of service offered. Thus, the curve reproduced to cover the operation of the Charleston and Beauregard line on Dec. 2, 1907, shows the seat-use factor to have been as low as 60 per cent.

The second set of curves shows the inbound and outbound travel on two lines, one of which made a complete loop, while the other, known as the Ann Street line, ran during certain hours over the same tracks for 1¾ miles and was then turned back. By comparing the two traffic curves with the horizontal line expressing the 32-passenger capacity of the loop cars, it was found that the latter were being overloaded, whereas the 30-passenger Ann Street cars were being underloaded On looking into the cause of this unequal loading, it was found that many people who could have used the trippers preferred to wait for the other cars because their companions were going beyond the limits of the Ann Street line. At this time a 10-minute schedule was given except when the Ann Street cars were run every 5 minutes. The experiment then was tried of starting the Ann Street cars 2 minutes ahead of the loop cars, but this brought no relief. It was finally decided to run the Ann Street cars over the full loop route during the morning and evening rush hours.

The fact that the Ann Street cars had longitudinal seats, while those on the loop line had transverse seats, evidently was not the reason for the favoritism shown, as in another instance the same effect occurred where the through cars and the trippers were of exactly the same type.

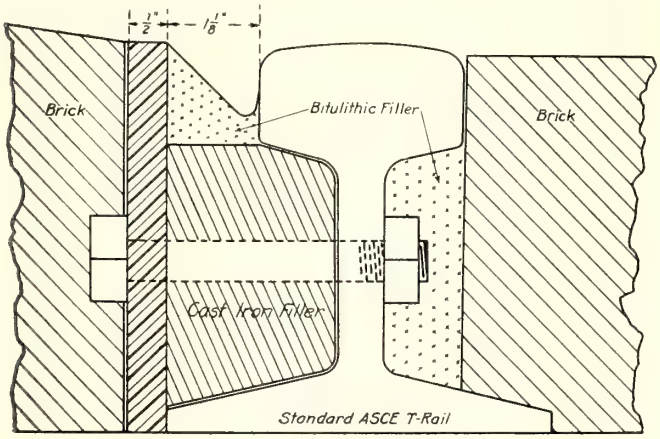
STEEL GUARD FOR PAVING LAID AGAINST T-RAIL

Even in those cities where traffic regulations to divert the vehicular traffic from the street railway tracks are enforced the wear on the pavement between and adjoining the rails ordinarily is more rapid than in the main roadway, particularly where T-rails are used, without any form of guard or protection. The common practice of paving against T-rails is to carry the paving bricks or other paving material under the head of the rail. This tends to depress the pavement 1 in. or more below the top of the rail, and, in addition, the pavement is usually crowned from ½ in. to 1 in. above the top of the rails in the center of the track. With this construction there is always a marked tendency for the pavement to wear out quickly for a distance of about 6 in. or 8 in. from the inside of each rail. To overcome this common defect, which adds greatly to the cost of maintaining the pavement, the Citizens' Railway, of Waco, Tex., has adopted the ingenious construction shown in the accompanying engraving. This construction permits the use of a T-rail and provides a wide groove. A flat bar of steel ½ in. thick is used as a guard. It is held in place with bolts inserted through cast-iron spacer blocks, placed at inter-



Mobile Traffic—Ratio of Seats to Passengers, etc.

vals of 5 ft. along the rail. The blocks fit under the head of the rail and are sufficiently thick to provide the necessary flangeway. The guard bar is supported vertically on top of the ties. With this construction the bricks or other paving material can be brought up flush with the guard bar without using an excessive crown in the center of the track. The space between

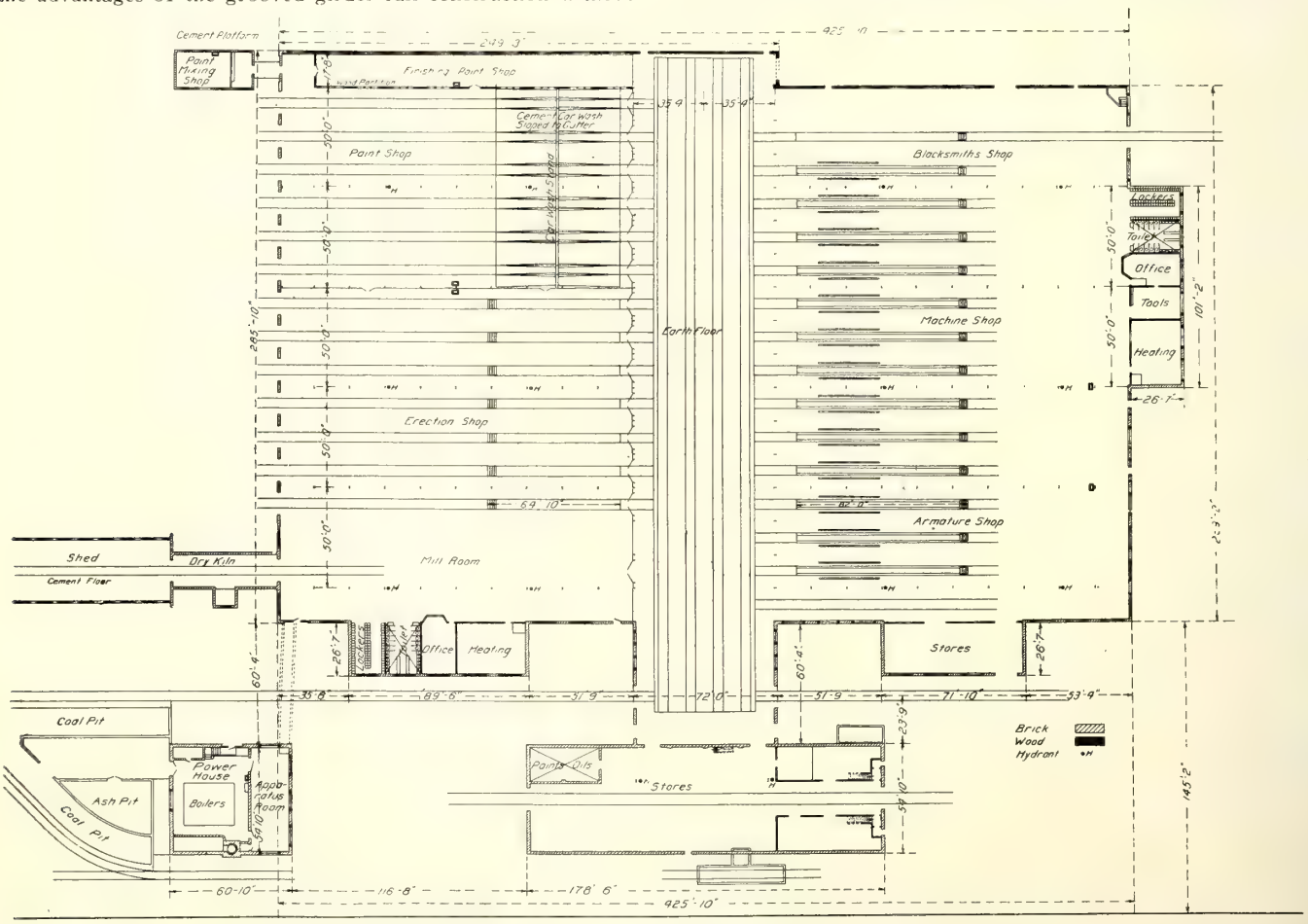


Steel Guard for Paving

the running rail and the guard is filled with bitulithic or other similiar filler, leaving a grove of sufficient depth to clear the wheel flanges but not deep enough to injure the tires of vehicles. This form of guard construction is said to have all the advantages of the grooved girder rail construction without the disadvantages. The cost is considerably less than the excess cost of girder rail over ordinary T-rail. The standard A. S. C. E. T-rail sections can be used in brick pavement, whereas with the ordinary form of construction special high T-rails are required in order to provide room for the bricks under the head of the rail.

NEW SHOPS OF THE MONTREAL STREET RAILWAY

The Montreal Street Railway has just begun the construction of a car building and car maintenance plant which will cost about $1,000,000. The location is in the suburb of Youville, where the company owns a plot of ground large enough to take care of all probable extensions. The installation will comprise a shop structure approximately 425 ft. 10 in. long x 269 ft. 2 in. wide; a lean-to for stores 178 ft. 6 in. x 54 ft. 10 in. wide, and an isolated power house 60 ft. 10 in. x 54 ft. 10 in. from which heat and power will be transmitted to the shops by means of a tunnel. All of the buildings are to be constructed of Laprairie plastic bricks and Montreal limestone. The floors of the various shops and storerooms will be of cement and the pits will be of concrete. As shown in the accompanying plan, the main building will be divided into two sections by a transfer table pit. The first section of the building will contain a paint shop, erection shop and mill room with office, toilet and locker rooms alongside the last-named shop; the rear section will contain the blacksmith shop and armature shop with auxiliary storeroom and a second series of utility rooms. Pits will be provided throughout the main building except in the paint shop, where a portion of the floor will be sloped to drains for car washing. There will be no partitions between the several shops except one of corrugated galvanized iron between the paint and erecting shops and a similar partition with galvanized iron swinging track doors will extend alongside the transfer table pit at the rear of the paint, erection and woodworking shops. To minimize the danger of fire, the paint mixing quarters have been placed in a small isolated building near the paint shop. It will be observed from the plant that the dry kiln and woodshed also are practically separated from the mill room. The main storeroom contains a special fireproof section for paints and oils as indicated. Water for fire-fighting and other purposes will be available from a large number of fire hydrants located as shown on the accompanying general plan.



Plan of the Montreal Street Railway Company's Shops Now Under Construction

APPLICATION FOR REHEARING IN THIRD AVENUE REORGANIZATION CASE

Formal application has been made to the New York Public Service Commission for the First District by the Third Avenue Railway Company and the committee representing holders of the consolidated mortgage 4 per cent bonds of the Third Avenue Railroad Company for a rehearing of the plan for reorganization, which was disapproved by the commission. An abstract of the opinion in which the commission disapproved the plan was published in the issue of the Electric Railway Journal for Aug. 13, 1910, page 262. A rehearing is asked on the ground that the order of the commission denying the application is "unjust and unwarranted and should therefore be abrogated and changed."

An abstract of the grounds upon which the application for a rehearing is based follows:

"First.—That the commission misapprehended the law and the authority conferred upon it by assuming that it was authorized to proceed under the law so as to give a retrospective operation and impair existing contract obligations and rights, contrary to the provision of Section 10 of Article I of the Constitution of the United States.

"That the public service commission law, in so far as it has been construed by the commission as preventing the reorganization in the manner proposed, and as preventing the capitalization of any franchises or the right to own, operate or enjoy any franchise whatsoever belonging to the company or its subsidiary companies, is unconstitutional and void.

"Second.—That the commission misapprehended its legal power and misconstrued the public service commission law by refusing to grant an order authorizing the issue of stock and bonds in view of proof of all the facts necessary to be proved, including the following: (1) that the agreement of reorganization had been entered into in conformity with the stock corporation law; (2) that the purchasers had acquired title to the property and franchises at foreclosure sale pursuant to the decree of a court of competent jurisdiction and to said plan of reorganization; (3) that the new corporation had been duly organized pursuant to such plan and the provisions of law; (4) that the new corporation had entered into the agreement between it and the purchasers at foreclosure sale and the bondholders' committee; (5) that the acquisition by the new corporation of the property and franchises was duly authorized by its certificate of incorporation; (6) that the terms of the agreement of May 20, 1910, were in the unanimous opinion of the board of directors advantageous to the best interests of the reorganized corporation; (7) that the terms provided in said plan of reorganization for the debts or liabilities of the former corporation had been approved by all the agents or trustees entrusted with the plan of reorganization; (8) that the use of the capital to be procured by the proposed issue of stock and bonds was reasonably required for the lawful purposes of said reorganized corporation; and (9) that the proposed issue was for a lawful statutory purpose.

"Third.—That the commission misapprehended its legal power by assuming that the Legislature intended to empower the commissioners to overrule the judgment of the board of directors and stockholders of the new corporation and the parties interested in the former corporation, and thereupon to substitute the judgment and discretion of the commission.

"Fourth.—That the commission misapprehended its legal power in that the rules of law and procedure necessary and essential for the impartial administration of justice according to established principles and the requirements of due process of law as guaranteed by the Constitution of the State of New York and by the Constitution of the United States were arbitrarily disregarded, and in that the commissioners constituted themselves parties and adversaries of the applicants, and so conducted the proceeding as to deny the applicants a fair, impartial and unbiased hearing.

"Fifth.—That the commission misapprehended the questions of law and fact to be determined and hence in its opinion inadvertently misrepresented the contentions of the applicants. The applicants' theory was that the following were fair elements to be considered:

"1. That all the existing stock represented bona fide investment in cash at par actually received by the existing corporation.

"2. That there had been no diversion of earnings to pay capital at any time and no depletion or impairment of capital by withdrawals for the use and benefit of stockholders or bondholders or any one else.

"3. That the consolidated 4 per cent bonds of the Third Avenue Railroad Company were just debts of the corporation which had actually received full value for them.

"4. That the capital expenditures and the cost of the property were equal to if not in excess of the proposed capitalization.

"5. That a new corporation undertaking to reproduce the system would reasonably have to provide for an issue of securities of a par of at least $58 000,000 in respect of the physical property alone, without regard to the cost or value of franchises and what would probably, if not necessarily, have to be expended in establishing the enterprise as a going concern.

"6. That the parties in interest were entitled to consider the amount invested in the property in determining the value of the property as a going concern and the commercial wisdom of the proposed transaction and the value to the new corporation of the property as a going concern, and that their action and judgment should not be set aside and that of the commission substituted in the absence of any proof of fraud or of any intention or purpose to deceive or impose upon the public.

"The commission may have been likewise misled by inadvertently assuming that the applicants urged that, on a readjustment of existing interests, stock and bonds should be allowed according to the present cost to reproduce all existing property in a new condition and not in its present condition, when as a matter of fact no such theory was intended to be presented or urged by the applicants. The evidence of the probable cost to reproduce the physical property, irrespective of allowance for franchises or money spent in establishing the commercial value as a going concern, established the fairness of the proposed readjustment.

"Sixth.—That the commission erred when it stated that competent evidence did not substantiate the assertion that the Third Avenue Railway Company had spent on the corporate property and assets an amount equal to or in excess of the proposed capitalization of the new company.

"Seventh.—That the commission erred in unwarrantably assuming the existence of prejudicial facts that the Third Avenue Railroad Company had been mismanaged by its officers and directors.

"Eighth.—That there is no competent proof to sustain the commission (1) in stating that the applicants did not attempt to show what the entire present existing physical property had actually cost the company originally; (2) in disregarding as a part of the estimated cost of reproduction the customary 5 per cent for contingencies, incomplete inventories and unforeseen requirements; (3) in stating that no evidence had been presented to show what became of the money obtained from bonds and stock; (4) in stating that it would be exceedingly difficult to separate each company and to value its property; and (5) in stating that unusual care had been exercised in making up inventories of the property, and that the lists prepared by the companies or their receivers had been checked by a consulting engineer in charge of the appraisal and his assistants.

"Ninth.—That the commission erred in its finding in regard to the estimated cost to reproduce new and the conclusions to be drawn therefrom as to the estimated depreciation and present value of the physical property.

"Tenth.—That the finding of the commission when it asserts that the witness Henry Floy admitted $10,000,000 or $12,000,000 of depreciation as a demonstrable fact is not supported by competent proof and the evidence shows that such estimate was

of a purely theoretical depreciation, and that the actual depreciation was only $2,699,046, and that the efficiency of the road could be restored by an expenditure of $2,000,000.

"*Eleventh.*—That the commission erred in stating that the company could have amortized a sufficient amount to have paid off the entire cost of the road for horse car lines and equipment and cable roads, and still have paid dividends of over 8 per cent and founded a reserve fund besides.

"*Twelfth.*—That the commission erred in intimating that the proof showed that the applicants in the estimate of cost of reproduction and necessary and reasonable capitalization contended as follows: (1) that items of expenditures in connection with the estimated cost of reproduction could be duplicated; (2) that estimated expenses in connection with the establishment of the bankrupt company were to be allowed; and (3) that the witness Floy included interest and taxes not merely up to the time when operation would probably begin, but also until the company could earn a sufficient surplus over and above operating expenses and interest to pay a reasonable dividend to the stockholders, the fact being that said witness allowed 8½ per cent to represent 'interest on capital and bond issues, rents and so-called wages of superintendence and administration in addition to further similar expenses chargeable to construction.'

"*Thirteenth.*—That the commission erred in stating that it had valued the property as a going concern, and that the appraisal was considerably larger than if this factor had been disregarded, and in stating that a further allowance had been made under this heading for the unification of the system, when the commission made no allowance whatever for such value as a going concern.

"*Fourteenth.*—That the commission misapprehended the bearing of the claim of $300,000 against the receivers of the New York City Railway and the Metropolitan Street Railway for use and occupation of the Third Avenue lines between Sept. 25, 1907, and Jan. 11, 1908.

"*Fifteenth.*—That the commission misapprehended the contentions of the applicants in intimating that the applicants contended that the physical property of the Third Avenue Railway was worth $58,125,000.

"*Sixteenth.*—That the commission erred in finding that the unit prices adopted by the engineers in this proceeding were in fact higher than the contract prices actually being paid by railroads.

"*Seventeenth.*—That the commission erred in accepting the appraisal of the witness E. G. Connette as competent evidence of estimated cost of reproduction, actual present value, or depreciation.

"*Eighteenth.*—That the commission misapprehended the evidence that possibly the witness Floy had made an error in considering as spent about $1,000,000 which the company had not spent but purposed to spend.

"*Nineteenth.*—That the commission misapprehended the evidence in finding that the classification of expenditures made by the witness Marvyn Scudder, employed by it, was based on vouchers, when the evidence established that his classification was arbitrary and not based upon an examination of the necessary books and vouchers.

"*Twentieth.*—That the commission may have been misled in assuming that the records were very incomplete and unsatisfactory.

"*Twenty-first.*—That the findings of the commission in Table V of its opinion [This table relates to depreciation and present value of the property as of Sept. 1, 1909.—Eds.] are not supported by competent proof, and that there was a preponderance of proof against the existence of the facts and figures therein found:

"(*a*) In that the findings under 'total cost to reproduce' are less than the cost to reproduce the property.

"(*b*) In that the findings under 'scrap value' are less than the scrap value.

"(*c*) In that the findings under 'wearing value' are less than the wearing value.

"(*d*) In that the statements under 'obsolescence, inadequacy and age' are greater than the obsolescence, inadequacy and age, and that such conclusions and figures are theoretical, speculative and contingent and are not based upon the existing facts, and in that there have been erroneously included allowances for speculative, anticipated progress in the arts and for supersession due to obsolescence and inadequacy which are purely theoretical and not based upon existing facts, and in that the age of the property upon which such findings and figures are based is theoretical and is not the actual life of such property.

"(*e*) In that the conclusions under 'deferred maintenance' are greater than the deferred maintenance of such property.

"(*f*) In that the findings under 'wear and tear' are greater than the wear and tear as established by evidence, and in that such wear and tear is an arbitrary estimate and is not based upon facts or upon the actual condition of the property.

"(*g*) In that the findings under 'remaining wear' are less than the remaining wear.

"(*h*) In that the findings under 'present value' are less than the present value.

"*Twenty-second.*—That the statements of the commission that no deduction had been made for anticipated progress in the arts, and that the depreciation computed by the witness Connette was founded merely upon what is now in sight and not upon the theory that some new invention or discovery will revolutionize the present street railway system and render useless a large part of the property before it is worn out, are erroneous.

"*Twenty-third.*—That the finding of the commission that the present value of the physical property upon Feb. 28, 1910, omitting development charges, was approximately $31,600,000 is erroneous.

"*Twenty-fourth.*—That the allowance by the commission of only $3,500,000 for development charges is erroneous. The allowance for development charges should have been approximately $11,500,000.

"*Twenty-fifth.*—That the conclusion of the commission that the total appraised value of the physical property upon Feb. 28, 1910, including $3,500,000 for development charges, was $35,100,000 is erroneous.

"*Twenty-sixth.*—That the estimated current assets of the Third Avenue system (Tarrytown company omitted) on Feb. 28, 1910, as stated and found by the commission, are erroneous, and there is a preponderance of proof that the said assets amounted to at least $2,057,937.72.

"*Twenty-seventh.*—That the valuation by the commission of the physical property and current assets at $36,850,000 is erroneous.

"*Twenty-eighth.*—That the conclusion of the commission that the estimated current liabilities of the Third Avenue system (Tarrytown company omitted) of Feb. 28, 1910, were $18,710,744.34 is erroneous.

"*Twenty-ninth.*—That the conclusion of the commission as to the financial results for the entire Third Avenue system, the Mamaroneck line excluded, for the fiscal year ending June 30, 1909, was erroneous.

"*Thirtieth.*—That the commission misapprehended the evidence as to the amount of income which would be available for the payment of interest on bonds and dividends on the capital stock of the reorganized company, and erred in disapproving the issue of the bonds and stock upon the ground that the earnings would not be sufficient to pay the interest and dividends thereon.

"*Thirty-first.*—That the estimates of gross earnings, operating expenses and net earnings of the system for the year ending June 30, 1910, contained in said opinion differ from the actual results.

"*Thirty-second.*—That the estimated gross earnings, operating expenses and net earnings for the year ending June 30, 1911, contained in said opinion are erroneous and prejudicial to the applicants, and that the actual net returns of any period covered by such estimate and speculation which has elapsed greatly exceed such estimates, and that such future net earnings may reasonably be expected to be greatly in excess of the commission's said estimates."

Statements of earnings of the Third Avenue Railroad Company and subsidiary companies were filed with the application. Total transportation revenues of the system for the year ended June 30, 1910, were $7,515,965 and total electric railroad operating revenues were $8,648,453. Non-operating income amounted to $27,017, making a total income of $8,675,470. Operating expenses aggregated $5,356,509 and rent deductions $240,167, making a total of $5,596,676. The resulting income was $3,078,794, against which taxes of $548,916 were charged, leaving gross income applicable to corporate properties of $2,529,878. Interest deductions, not including interest on receiver's certificates, were $618,798, leaving net corporate income of $1,911,080. The total operating and non-operating revenue in July, 1910, was $895,653, and in August, 1910, it was $818,929.

The commission has referred the application for a rehearing to its counsel.

CHEMICAL TREATMENT OF TIES USED IN THE CHICAGO TRACK REHABILITATION

The second annual report of the Board of Supervising Engineers of Chicago Traction presents an exhaustive report of the investigations made preliminary to the adoption of the chloride of zinc treatment of the ties used in the new track work. An abstract follows:

"We have learned that the treatments that have met with the greatest success and the ones that are in most general use are the following: creosoting, chloride of zinc (Burnettizing), zinc tannin (Wellhouse), creosote, zinc emulsion (Rutger) and carbolineum.

"The developments of the different combination treatments, zinc tannin, creosote, zinc emulsion, etc., are the results of information derived from the use of the plain creosote treatment and the plain chloride of zinc treatment of ties and timbers exposed to air and to variable conditions of moisture. The chloride of zinc treatment has been most commonly used in the preservation of ties in this country. It is the cheapest method and if retained in the wood in proper quantities is an effective preservative. The use of creosote has in most cases shown high results, but the cost of this treatment as compared to the straight chloride of zinc is very high. The cost of creosote treatment with about 10 lb. or more to the cubic foot is from 30 cents to 40 cents per tie, while the zinc chloride treatment ranges from 8 cents to 15 cents per tie.

"Chloride of zinc being soluble in water, it is believed that the salt is washed out of railroad ties and timbers by the action of rains and floods and the value of the preservative destroyed, thereby proportionately reducing the resistance of the timber to decay. In order to render the tie impervious to water and prevent the leaching out of the salt, the zinc tannin or Wellhouse process (chloride of zinc, glue and tannin) has been adopted, the glue and tannin combining to form an insoluble substance that plugs up the cells of the wood. The cost of the zinc tannin treatment is from 10 cents to 17 cents per tie.

"The complete impregnation of the timber to its center with preservative is essential to ensure the best results, and in the case of creosote this requires large quantities of oil, heavy pressure and long treatment, making the cost very high, 60 cents to 70 cents per tie, while chloride of zinc is easily and quickly carried to all parts of the timber with proper treatment. A combination of the two preservatives is now being used in the treatment of ties known as the 'Rutger' or 'emulsion' treatment, which results in an impregnation of chloride of zinc to the center of the tie and a partial impregnation with creosote, the result being that the interior of the stick is preserved by the chloride of zinc and the exterior has the benefit of the creosote as a preservative and to make it waterproof. The Chanute timber preserving plant at Paris, Ill., is at present engaged upon a chloride creosote or 'Rutger' treatment at a cost of 23 cents each.

"The carbolineum treatment of timber is being pushed by the Carbolineum Wood Preserving Company. The antiseptic material is a patented compound made in Germany and known as 'Avenarius Carbolineum.' The treatment advocated is 'dipping' and costs about 25 cents per tie, this cost information being given by the wood preserving company's Chicago representative, A. H. Sauerbier. He quotes a price of 60 cents per gallon for the compound and says that in the dipping treatment each tie takes up about one-third of a gallon, equaling 20 cents for material, and he adds 5 cents for labor, making a total of 25 cents per tie. The dipping treatment cannot possibly permit a complete penetration of the tie, and the small amount of compound taken up would indicate that this treatment is a surface treatment only and that the interior of the stick would not be protected against dry rot.

"It is conceded that the life of timber is greatly increased where there is no variation in the amount of moisture it contains and where it is protected from evaporation and alternating wet and dry conditions. In our substructure the ties will be protected when entirely encased in concrete, which will act as a great factor in extending the life of our tie timber beyond the life ordinarily experienced in open-track construction, where the ties are subjected to alternate varying conditions of wet and dry. We can expect, therefore, a much longer life to our ties. The information we have at hand as to the pine tie taken from the tracks of the Twin City Lines in St. Paul, Minn., after a service of 15 years, 3 years of which the tie was embedded in a sandy soil and 12 years on a sandy foundation with the sides and top encased in concrete (similar to our type 3 construction), and which tie seems to be in a perfectly sound condition, would seem to indicate that the original position taken by the board upon this subject, that a wooden tie encased in concrete would be preserved against decay, was, in the light of existing information, a tenable position. Timber absolutely free from fungus or fermentation at the time it was placed in the concrete would probably be preserved against decay. It is not so probable, however, that ties in which fungus has started or a state of fermentation exists at the time of placing them in the work will be preserved against decay, and, as it is a physical impossibility to inspect each tie to the extent of determining whether or not it is perfectly free from infection, it would seem that an antiseptic treatment of the ties would be a desirable precaution.

"Inasmuch as our ties are encased in concrete and thereby protected from the action of water there would be no tendency for the soluble salts to leach out and it would seem that the straight zinc chloride treatment would be all-sufficient for our requirements. Our present specifications call for long-leaf yellow pine 90 per cent heart. By using treated ties sap timber can be accepted, greatly increasing the scope of our market and reducing the cost of our timber. In considering suitable timber for treating, the permeability of the wood or its ease of accepting treatment must be considered. The financial part of the question may be summed up as follows:

The present price of our ties is on the basis of $27 per 1000 ft. b.m., or	75.6 cents each
New price of timber, $24 per 1000 ft. or	67.2 cents each
Add 1or zinc chloride treatment	15. " "
	82.2 " "

Cost per mile of tie, type 2 construction, present	$997.92
Cost per mile of tie, type 2 construction, treated	1,085.04
Additional cost per mile for treated ties	87.12
Total cost of track at present, $36,500 per mile, which makes added cost for treated ties ¼ of 1 per cent.	
Total cost of substructure, type 2 track	$11,500.00

"Inasmuch as we are not in possession of exact information as to length of life, we will assume 20 years' life for the substructure. Upon this basis annual depreciation would equal $575; depreciation per month, $48. Based on the theory that the renewal of the ties would mean the renewal of the entire substructure, an increased life of two months would pay for the extra cost due to treatment. Based upon the theory that the renewal of ties would mean a 50 per cent renewal of the entire substructure, then four months' added life would pay for the treatment. This depreciation and consequent saving does not include $25,000 represented by the cost of the superstructure, but the assumption is made that the substructure renewal would be made at a time when a renewal of rails would be necessary. In case rebuilding of the track was made necessary by the

condition of the substructure only, then an increased depreciation must be figured and a corresponding advantage given to the increased life.

"It would seem from the above that it would be advisable to adopt the zinc chloride treatment for our ties."

John Z. Murphy, chief engineer, Chicago Railways Company, and a member of the Board of Supervising Engineers, submitted the following table of costs for treating ties, which had been obtained by one of his assistants:

Method.	Cost per Tie, cts.	Est. Yrs. of Life for Tie.	Est. Inc. of Life for Tie.
Burnettizing, zinc chloride	11	10—12	6—8
Wellhouse, zinc chloride, tannin and glue	14	10—12	6—8
Rueping, creosote	15—18	12—15	8—11
Lowry, creosote	20—25	12—15	8—11
Rutger, zinc chloride and creosote	15—18	12—15	8—11
Allardyce, zinc chloride and creosote	15—18	12—15	8—11
Card, zinc chloride and creosote	15—18	12—15	8—11
Haskin	3—6	12—15	8—11

A discussion on the value of different chemical treatments for cross ties was submitted by Octave Chanute, past-president of the American Society of Civil Engineers. Mr. Chanute is quoted as follows:

"It was demonstrated that over 5,000,000 hemlock and tamarack ties treated by the writer for the Chicago, Rock Island & Pacific Railway averaged a life of 10⅔ years in the tracks east of the Missouri River and 11⅔ years west of that river, the latter in consequence of the lesser rainfall. These ties were mostly treated by the original two-injection zinc-tannin process, which was changed in 1895 to the three-injection process.

"Until the system of tie fastening is thoroughly reformed in this country and the barbaric spikes abandoned, it seems probable that the life of ties will be limited by mechanical wear, and that from this point of view the zinc-creosote process will be a good one to use. This has been introduced at the Paris (Ill.) plant, with which the writer is connected, and after a year's experimenting success has been achieved in thoroughly overcoming the only defect found in that process, i. e., the possible separation of the oil from the watery solution of chloride of zinc during the period of pressure required to inject the desired quantity."

It was Mr. Chanute's opinion that the best treatment is creosote, provided enough of it is used, but after being shown the board's plans for encasing the ties in concrete he recommended that the chloride of zinc treatment be used, inasmuch as the ties were not to be exposed to the weather. When zinc-chloride-treated ties are encased in concrete practically all possibility of decay from fungus will have been eliminated, if the tie is given an opportunity to dry for some weeks in the air so that the water of the solution is evaporated, leaving nothing but the antiseptic, which is chloride of zinc. In five or six weeks, under ordinary conditions, ties would lose seven-eighths of the water. The practice in France is to inject 60 lb. of creosote to the tie. The board states that in America the usual practice is to use about 20 lb., the cost of the treating substance being considered almost prohibitive to be used in large quantities.

In bringing out the importance of the exclusion of air in the preservation of timber, Trajan's bridge across the Danube River, where piles have been found in good condition after 1400 years, was cited, the good condition after many centuries being due largely to the exclusion of air.

NEW SOUTH WALES REPORT

The report of T. R. Johnson, chief commissioner for railways and tramways of New South Wales, covering the year ended June 30, 1910, shows total tramway earnings of £1,185,568 as compared with £1,097,565 in the previous year, or an increase of 8 per cent. Expenditures were £983,587, or 82.96 per cent of earnings, as compared with £875,560, or 79.77 per cent, in the preceding year. During the year 201,151,021 passengers were carried without loss of life to passengers from any tram accident. The number of miles of line operated at the close of the year was 165.75.

PROTECTION OF METAL EQUIPMENT*

BY WILLIAM MARSHALL

When this topic was assigned to the writer he realized it was altogether too great for any one man to handle properly. Hence he put himself in communication with men whose experience in painting, in both the building and repairing of metal cars, made them the best fitted to speak intelligently. Consequently, this is a composite paper, embodying the views of the men who have had to meet a condition that demanded their best thought. The writer formulated eight questions that if answered might impart most of the information required on the subject of "Protection of Metal Equipment." The questions and answers follow, together with some comments.

Question No. 1.—The difference and difficulties encountered as between wood and metal.

All answers call attention to the fact that wood is porous and metal only partially so. From the standpoint of difficulty some favor wood, because it comes to the paint shop from the hands of the wood worker ready to receive the priming coat, and no preparatory work has to be done. One advocates a treatment of the plates before assembling, so that there may be no opportunity for rust, which forms so quickly while the car is being built. Nearly all recognize the necessity for sand-blasting all parts before anything is applied; some advocate pickling to remove all scale and flash. One man calls attention to the importance of looking out for parts unseen, thus: All lap joints where metal is placed against metal or metal against wood should be thoroughly painted with a red-lead lute before being riveted together. The material used should be as heavy as possible and be applied with a brush. All hidden metal parts not to be surfaced and varnished should be given not less than two or three coats of the best protective paint obtainable, and suitable time allowed between coats for drying.

A second one remarks: Use different mixture for priming coat, on account of difference in absorption; less number of paint and varnish coats required on account of the improvement in the manufacture of steel sheets in being nearer to a perfect surface, fewer paint and varnish coats required consequently increasing average life of painting.

A third one states: The metal should be thoroughly sand-blasted to remove all scale and rust, and then primed with a material adapted for metal work. This treatment should be followed in the same manner as for wood cars. In rubbing the surfacer down to a smooth and level surface use emery cloth and oil, instead of pumice and water.

It is evident from all replies that the life and appearance of the car will depend upon the care taken in thoroughly sand-blasting to secure a uniformly smooth surface. No time must be lost between the sand-blasting and application of the initial or priming coat, as the natural moisture in the air rapidly condenses on the new bright surface and will soon form rust.

Question No. 2.—What do you consider the best treatment from foundation to last varnish coat?

(A) The primer coat should be applied, and when dry, all imperfections should be puttied up and time allowed for drying and hardening. Next operation, sandpaper and dust lightly, and to all flat surfaces apply one coat of glazing or knifing putty. This should fill the surface to such an extent that three coats of rough stuff should form body to rub to a smooth, level surface. When perfectly dry this surface should be carefully sandpapered with No. 00 emery cloth, well dusted off, and the surface given two or more coats of body color. When dry, ornament and allow 24 hours to dry. Then apply first coat of varnish, medium drying. When dry, apply second coat with more left on to give a perfect flow. This coat should have three days to harden, when it should be lightly rubbed with pumice pads, rinsed and dried off thoroughly. After which apply the third coat of a slower drying car body finishing varnish, and leave to harden.

* Abstract of paper presented before the New York Railroad Club, Oct. 21, 1910.

(B) First day.—One coat primer; should have little oil and should be well brushed out.

Second day.—One coat No. 2 surfacer.

Third day.—One coat No. 3 surfacer.

Fourth day.—One coat No. 3 surfacer.

Fifth day.—One coat No. 3 surfacer.

Sixth day.—Car to be rubbed smooth with a rubbing brick and water or emery paper block, one-half raw linseed oil and one-half benzine.

Seventh day.—After it is thoroughly dry, give two coats of flat color; one coat morning and one coat in afternoon.

Eighth day.—Car to be striped and lettered.

Ninth day.—Car to be first coated with a good finishing varnish.

Tenth day.—First varnish coat drying; 48 hours.

Eleventh day.—First varnish coat drying; 48 hours.

Twelfth day.—Second coat good finishing varnish.

Thirteenth day.—Second coat drying; 48 hours.

Fourteenth day.—Second coat drying; 48 hours.

Fifteenth day.—Third varnish coat applied.

Sixteenth day.—Third coat drying; 48 hours.

Seventeenth day.—Third coat drying; 48 hours.

Eighteenth day.—Car ready to turn out.

(C) After the usual surfacing materials have been applied use an elastic coat of color, one coat of enamel, and at least two coats of finishing varnish.

(D) . . . After above process (preparation of metal).

Allow priming coat to dry, 24 hours.....first day.

Then putty all depressions, and knife in surface one or two coats, as conditions may require (if two coats of latter) .....second and third days.

Then apply one or two coats of rough stuff (according to condition of surface).

When dry, rub with block pumice stone and water. Sandpaper with No. 0 sandpaper, and apply...fourth and fifth days.

One coat varnish.....sixth day.

One coat varnish.....seventh day.

One coat varnish.....eighth day.

Say three days for drying third coat.....

.....ninth, tenth and eleventh days.

(E) The difficulties encountered are in securing large metal plates free from buckles and other defects. When varnish is applied to plates containing the slightest buckles they are magnified to such an extent as to resemble mountains. These buckles do not interfere with the durability of the painting, only detracting from the beauty of finish.

(F) We favor any of the well-known paint surfacers with primer manipulated to suit the steel, with the minimum number of surfacer and enamel body color coats, and to include not more than two coats of body varnish for finishing.

Others agree in saying that there should be no material difference between treating a metal and treating wood, except that the priming coat should have less oil, on account of the smaller porosity of metal.

As to question No. 2, A's process would take about 17 days, B's 18 days, and D's 11 or 12 days. It will be noticed that D does not recommend puttying and glazing coat, but in place thereof uses three coats of No. 3 surfacer. The objective point in the use of all surfacers (called rough stuff) is to obtain an absolutely level and smooth surface before the color coats are applied, contributing not only to the appearance of the car, but aiding largely in holding up evenly the color and varnish coats. If such a surface was not secured it would be wavy, dimply and nibby, causing the paint and varnish to be broken off during the terminal mopping or regular cleaning. As to the relative merits of the "glazing or knifing putty coats" applied over the primer, in place of rough stuff, no reasons are given, but they are evidently used to reduce the number of rough-stuff coats.

Question No. 3.—In the few years metal cars have been in service what has been your observation in regard to their appearance and durability in comparison with wood?

(A) We have on our line over 200 steel passenger cars, which have been in service over four years. As far as the general surface is concerned, I see no material difference between them and our wooden passenger cars. One has the appearance of being equally durable with the other. Upon examination, however, we find that wherever there is the slightest opening of the joints moisture creeps in, causing corrosion. Time alone can determine how long a time would elapse before this corrosion would eat into the framework so as to cause weakening of the whole structure.

(B) Metal cars will undoubtedly be more durable than wooden cars. The metal freight car has proved its superiority over the old wooden cars, and, no doubt, the metal passenger car will do the same. We are not accustomed to the plain appearance of the inside of metal cars, but we shall get used to them and they will look all right. Besides being plainer, they are much more sanitary.

(C) This all depends upon what care has been taken in the preparation of and in painting the steel sheets. We have seen wooden cars fail in three years, more from careless work than from poor material; on the other hand, we have had steel passenger equipment under observation for five years and consider the cars in good condition. There is no question that painting on a wooden car will have a longer average life than on a steel car. The latter has the disintegration which starts from the time the car or steel sheets leave the sand-blast house and continues until it becomes necessary to remove and repaint that particular sheet, which usually is when it reaches the age of five and one-half years to six years. There is no primer of any of the surfacing systems on the market to-day that will prevent this deterioration.

The answers to question No. 3 are apparently in favor of metal. Several correspondents remarked on the appearance of a metal car because of rivets, laps, etc. The best the writer has seen are some of the more recent Pullman cars. The entire side, under the windows, is pressed up or molded to resemble the wooden battens. The under row of rivets is not seen, being placed under the car and fastened to a rigid strip of angle iron; the upper row of rivets is so close up under the windows as scarcely to be noticed; but the interior does not present the same elegance and taste that are given by the beautiful and artistic finish of the wooden cars.

Question No. 4.—Do metal cars clean at terminals as well as wood?

(A) Metal cars clean up a little harder than wood.

(B) . . . The inconvenience encountered with rivets is probably counterbalanced by the numerous beads of most wooden cars.

(C) I find no great difference in cleaning metal cars at terminals as compared with wood.

(D) Metal cars will in our judgment clean at terminals as well as wood.

The answers to question No. 4 vary a little. Terminal cleaning does not generally come under the supervision of the master painter, but the one in charge of that department should be one who has a practical knowledge of what is injurious to varnish and paint. Much harm can be done, great expense involved, and blame be put on the varnish and general work of the paint department by the use of strong solutions used to save elbow grease. Anything that is strong enough to remove dirt easily will be strong enough to remove a portion of the varnish film each time it is applied. Cleaning solutions of medium strength may be used when quickly applied and quickly rinsed off with clean cold water, but this requires both skill and expedition. A cleaner that is not soluble in water and cannot be rinsed off will embed itself in all interstices and gradually eat the varnish and paint away, and do it more thoroughly and quickly than surface exposure to rain and sunshine, heat and cold, or sulphuric acid gases encountered in tunnels.

Question No. 5.—On returning steel cars to the shop do you find problems in touching up, repairing and revarnishing different from those of the wooden car?

(A) The touching up, cutting in and revarnishing the ex-

terior is about the same with steel as with wood cars. With the interior parts there is a difference, as the natural wood must be scraped and refinished where it has been bruised, while the steel car can be forced up with putty and repainted.

(B) There are problems presented by the steel car that do not exist on the wooden car. For instance, take the button or rivet heads. In every case it was found that the varnish and paint had been worn off, exposing the metal. This also applies to the edges of metal plates. In my opinion this was due to repeated terminal cleaning; a really unavoidable result of a necessary practice. In a number of cases these exposed parts had begun to rust. These hundreds of rivets must be freed of this rust and carefully repainted before the car is cut in. The flat surface of a car may be in such condition as to require only a coat of varnish, but the touching up of these innumerable rivets with a color so difficult to match as ..... would produce an effect at once objectionable, and cutting in the entire car would be the only course to pursue. In other words, a steel car, on account of its construction, cannot receive the same treatment as a wooden car.

(C) In touching up and revarnishing metal cars we find many joints to be corroded, which must be scraped and cleaned down to the bright metal, then primed and resurfaced the same as new.

(D) We advocate cutting sheets in preferably to touching up. If a sheet is scarred it is better to clean the whole sheet with one of the paint solvents than to touch up, though the tendency on wood cars is to putty and touch up.

Question No. 6.—Does your present experience or does your opinion, based on present experience, lead you to believe that there will be any greater trouble in future years in making repairs to metal cars by reason of side-wipes, collisions and wrecks?

(A) It is conceded the metal car will withstand the greater impact in case of wrecks, rakes or severe side-wipes. What would merely rake the painted surface material down to the metal would most likely cut through the sheathing on the wooden car, causing renewal. Accidents which break in the end or side, or perhaps break the wooden car in two, would be likely to merely bend the metal so it could be repaired and got into service in shorter time. There are, however, instances where it would be out of the question to repair either class of cars, but where it would be much cheaper in the end to build entirely new than to attempt to cut apart, straighten out and reassemble the metal cars. Metal heated and worked over is not of the same nature or strength as in its original state. The metal is of some value as scrap, which is a gain over the wooden car.

(B) The corrosion in the joints, in my opinion, will eventually weaken the whole structure and cause extensive repairs to be made. If the car is side-wiped or wrecked the cost of repairs to metal cars would be much more expensive than with wooden ones.

(C) We have had several collisions and wrecks wherein metal and wood cars were concerned, and in almost every instance where the force of the collision was sufficient to make an indentation in the metal car the wood car was a wreck or damaged to such an extent as to make repairs harder and more expensive.

The consensus of opinion is that because a car is steel it will offer a greater resistance in accidents and so reduce to the minimum the number of times it will require repairing.

Question No. 7.—You know the average life of a wooden car; do you think the metal car will last as long?

(A) I think the metal car, if properly taken care of, will outwear the wooden car, but it is my opinion that if the cars are allowed to deteriorate on account of non-shopping at necessary intervals their appearance will show more markedly the neglect of proper care than the wooden car.

(B) It is rather early to tell the exact life, but one can safely say it will last one-third longer. A steel car well built and painted from the foundation up should last from 10 to 20 years. Practical experience teaches that paint is the life of a steel car.

(C) In my opinion the steel car equally well protected with the wooden car will outlast the latter.

(D) If the steel car structurally withstands the continuous vibrations, also probable rivet-shearing motion to which the fast traveling passenger car is subjected, I cannot see why it should not last longer than the wooden car.

(E) We have wooden cars on our line still in good condition which have been in service 30 years.

Question No. 8.—From an economical standpoint is it your opinion that although the cost of a steel car is greater in the beginning it will nevertheless compensate for the increased first cost by the longer service it will give?

(A) Yes, if the present substantial make of steel passenger car is put in proper general repair at timely periods, not abused because it is made of steel, kept in the best paint and varnish repairs, also allowed to live out its service life without being subject to the usual architectural changes made in passenger equipment.

(B) I do not think the increased cost of a steel passenger car will be compensated for by any longer service.

(C) If the design is good and construction stable, the steel car, if well protected, ought to be more economical in the long run.

(D) It is a question if the increased cost of steel equipment will compensate for the increased first cost by any longer service it will give, though when the additional element of safety it will give over the wooden car is considered, I should say the increased cost is warranted.

Naturally on so new and so great a subject there must be some difference of opinion, both in regard to practice and result, but the preponderance of views points to the practicability of properly protecting metal equipment and of maintaining it in the years to come. Too much emphasis cannot be put upon the importance of thoroughly coating the concealed parts, so that moisture and the destructive elements of the air may be excluded. Whatever may be discovered, it is a fixed principle that it is the action of the air and moisture that causes rust and decay. The demolition of some of the earlier built metal and concrete buildings has demonstrated that where the iron was perfectly embedded in concrete or cement no change has taken place.

STREET RAILWAY CAPITALIZATION

Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, in a letter addressed recently to officers of the Connecticut Editorial Association in relation to proposed public utilities legislation in Connecticut, refers incidentally to street railway capitalization. Upon this point Mr. Mellen says:

"The most important of the specific questions which you put to me is, in substance, whether the capitalization of a street railway company is of any importance to the public. My answer is, Yes, but not in the way many people seem to suppose. The mere amount of a company's capital bears no relation to the actual or possible gross or net earnings of the company, or to the rates charged or the service afforded.

"No street railway manager earns from his business more or less because of differences in the amount of his company's capital. If he is worth his salt, he always earns (whatever be the amount of his company's capital stock) all that he can; but the best way for him to do this is to give the public the best possible service at rates sufficiently low to create the largest possible volume of remunerative business.

"A careful comparison seems to show that under similar conditions public service corporations of Connecticut in general give at least as good service at rates as low as do like corporations of Massachusetts, whose capital has been stringently restricted. I may say, moreover, from an experience in a good many States, that the street railway service of Connecticut with all its faults is on the whole at least as good, with rates at least as low, as in any of such other States."

END OF THE COLUMBUS STRIKE

As stated in the Electric Railway Journal of Oct. 22, 1910, the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, has been declared off. The action by the men declaring the strike at an end was taken at a meeting held on Oct. 18, 1910, at 9:30 p. m., and the strike was terminated so far as the men were concerned 12 weeks and three days after it had been declared. All told, about 450 men quit their places with the company on July 24, 1910, when the strike was declared.

The company has announced no change in its decision regarding the re-employment of the men who went on strike. The company has been willing at all times to take back such men as were acceptable to it and place them on the extra list in the order in which they filed applications, The men that the company re-employs will not lose any time credit that they may have earned before going on strike and they will receive pay at the same rate paid prior to the strike. All of the regular runs, however, have been filled by new men, and only extra runs are left for the men who went on strike. In many cases the old men have accepted these conditions.

The resolution adopted by the union declaring the strike off follows:

"Whereas, Division No. 538 of the Amalgamated Association of Street & Electric Railway Employees of America has been unable to arrive at a satisfactory settlement or come to any agreement that was fair to the men with the Columbus Railway & Light Company in the controversy which brought on the present street car strike; and

"Whereas, The striking street car men are of the opinion still, and remain unchanged in their belief, that their cause was and is a most just one and that they ought and ultimately would win, except that winter with its attendant hardships is fast coming on; and

"Whereas, In view of the approach of the inclement season, a further prolongation of the strike of this union against the Columbus Railway & Light Company will entail suffering, embarrassment and loss upon loyal friends,

"Therefore be it resolved: First, that the strike of Division No. 538 of the Amalgamated Association of Street & Electric Railway Employees of America against the Columbus Railway & Light Company be and the same hereby is declared terminated and ended.

"Second, that the thanks of this union are due and are hereby extended to our many loyal supporters, friends and sympathizers among the general public, and most especially are we grateful to organized labor of the city, State and nation for its moral and financial support in the recent struggle."

The funds which the employees of the company had accumulated by dues and other means in the treasury of their organization have all been dissipated in the effort of the men to enforce their demands on the company, as have also $20,000 contributed by the parent organization and donations by sympathizers in other lines of work. Sympathizers with the strikers had already subscribed for stock in an automobile omnibus line to compete with the cars of the company, and action will now have to be taken in regard to the future of this company. It is expected that the subscriptions will be returned after the expenses so far involved by the bus company have been prorated among those who subscribed to the company.

According to the *Columbus Citizen* the cost of the strike to the city and the State was $215,300. The *Citizen* has tabulated the cost as follows: "Total cost to the State of Ohio of the disorder incident to the strike, $178,000. This includes: Pay for troops, $12,000; feeding the troops, $20,000; transporting the troops, $28,000; incidentals, $10,000; disorder in Columbus approximately $37,300, as follows: Police autos, $17,000; special police, $18,000; feeding special and regular police, $2,300."

At the expense of a member of the City Council of Columbus and several business men an accountant is investigating the books of the city to ascertain whether it is true that employees of the city purchased second-hand automobiles and rented them to the city during the strike for more than the machines cost. An attempt will also be made to ascertain whether patrolmen used machines rented by the city for pleasure rides and whether machines were rented and paid for when not needed. Mayor Marshall and Director of Public Safety McCune state that they will aid in the investigation. Mr. McCune has been asked to furnish to the City Council an itemized statement of the expenses of the strike to the city at an early date.

On account of the necessity for taking up other cases, the men indicted for participation in the riots were not called to trial during the week commencing Oct. 16, 1910. Lawrence Riehl, however, was found guilty of violating the manifesto issued by the Mayor against open saloons for a certain period during what was then believed to be the worst of the rioting. A new trial has been asked, as the prosecution of 64 other owners of saloons on the same charge will depend upon the final outcome of this case.

FURTHER DISCUSSION ON PROPOSED TRI-BOROUGH SUBWAY

George Gibbs, chief engineer of electric traction, Pennsylvania Tunnel & Terminal Company, contributed a communication after adjournment of the meeting at the United Engineering Societies Building on Oct. 17, reported in the last issue of this paper. Mr. Gibbs lays stress on the importance of supplying adequate local transit facilities to the new Pennsylvania station to accommodate the 100,000 to 200,000 people who, he says, will daily arrive at or depart from this terminal. He considers the suggestions of Mr. Sprague deserving of very careful consideration, but believes the most important thing at present is that the city should not make a false step by committing itself to construct with its own money, or even by authorizing others to construct with their own money, an independent road which cannot be merged with the present one, which parallels the present one for an important part of its distance, and which, by diversion of traffic, would indefinitely postpone the completion of the present subway system in its logical extensions.

Mr. Sprague has replied to the contention of Mr. Willcox that the criticism of the engineers on the tri-borough subway should have been made earlier or later. Mr. Sprague says that the route of the proposed tri-borough has been condemned by all traffic experts not in the employ of the commission, but that it was impossible to criticise the engineering plans because they were not made public until Sept. 1. He further states that the meeting was not planned to give expression to one-sided criticism. Invitations to attend the meeting had been sent to the Mayor, the chairman of the commission, the Chamber of Commerce and other bodies in ample time to be represented, but no representatives of any city department, or of the commission, or of any urban railroad company participated in the discussion. Mr. Sprague repeated his prophecy that the private construction and operation of the proposed tri-borough system meant financial disaster and a receivership or the assumption by the city of an operative deficit beside which that of the municipal ferries would be a bagatelle.

A hearing was given by the Massachusetts Railroad Commission on Oct. 18 upon the petition of the Selectmen of Abington for a 5-cent fare from all parts of the town to Brockton, on the lines of the Old Colony Street Railway. Bentley W. Warren, counsel for the company, stated that the issue was simple, and that if the fare was reduced as desired it would result in earnings of less than 1 cent per passenger mile on the branch of the system in question. A 5-cent fare is already in force for the 5 miles of track between Abington Center and Brockton, and a similar fare is in force between Whitman and Brockton. Mr. Warren said that if the fare should be cut as desired the residents of parts of Whitman would be discriminated against. He said that the present 7-cent workingman's ticket from points in Abington to Brockton, with transfer privilege at no additional cost in Brockton, answered all the needs of the situation.

DECISION IN THE PEORIA WATER CASE

An important decision in the long-drawn-out case of the Peoria Water Works Company vs. the Peoria Railway Company (now a part of the Illinois Traction system) was decided Sept. 20 by Judge A. L. Sanborn, of the United States Circuit Court for the Northern District of Illinois. It was practically a victory for the railway company. This case has frequently been referred to in the pages of this journal during the last 10 years. The testimony on the subject was taken by Frank L. Wean, special master in chancery, who made two reports on the subject. An extended report of the evidence in the hearing during the first reference to Mr. Wean was published on page 390 of the Street Railway Journal for June, 1899. Mr. Wean's report in full to the judges of the court was published on page 722 of the Street Railway Journal for June 22, 1901, and stated that as the defendant could prevent the injury to the pipes of the water company through the installation of a double overhead trolley system an injunction should be issued against the operation of the system as it was then being operated.

The highly technical features of the case and the importance of the interests involved led to a re-reference after considerable delay, and on Oct. 25, 1907, the case was recommitted to the same master, who was directed to hear further evidence and also to report particularly upon the remedies which could be applied substantially to minimize or prevent the injury, if any, complained of; the relative merits of the single and double overhead trolley system; the means then employed to prevent injury to the water pipes; the extent, if any, to which the mains had been injured since the close of the proofs of the original case; and the improvements, if any, which had been made by the defendant since the close of the defendant's evidence.

Evidence in connection with this second reference was taken in March and April, 1908, and the report of the master, which was submitted in June, 1909, was published on page 43 of the Electric Railway Journal for July 3, 1909. Briefly, it stated that the evidence offered on the re-reference failed to disclose any sufficient ground for changing the previous conclusions complained of.

JUDGE SANBORN'S DECISION

In his decision Judge Sanborn quotes the conclusions of Mr. Wean in the two references and then defines some of the terms used by the expert witnesses, such as the "C. G. S. system," "potential," "volt" and "electrolysis."

He then summarizes the claims of the complainant, which were, briefly, that its water mains and service pipes were being used as part of the negative return system of the railway company, inducing electrolysis or chemical decomposition to the mains and pipes. This took place largely at the joints of the pipes, where the current passed through the wet earth around the joints, and also at other places on the pipes where the current left them to pass to other underground structures or back to the railroad track, and also on the lead service pipes of the complainant. It was further claimed that the smallest fraction of a volt difference in pressure or potential on the pipes would cause their gradual decomposition and destruction. Finally, it was claimed that the complainant could do nothing to lessen the injury, while the defendant, by putting in an insulated metallic circuit by means of a double trolley or otherwise, could entirely prevent the damage.

The defendant claimed briefly that, by ordinance, it was required to operate by the single trolley system and that it had done everything possible for the safe return of the current in the present state of the art. Its acts were authorized by legislative authority and if any incidental injury had been done to the water system, it was *damnum absque injuria*. If there had been any serious injury, the remedy called for the exercise of the police power to be authorized only by the Legislature or the city council, and not by the court. It was also contended that the operation of street railways by electricity was practically in its infancy. Injury by electrolysis was not clearly understood in the present stage of scientific knowledge and experts were changing their views in respect to the danger of injury. Some 1600 single trolley systems were in operation in the United States and only one or two double trolley systems. The injury in Peoria was not done generally to the whole pipe system but was localized to the region near the power station and was continually growing less and less by better methods of negative return. There was not such great or irreparable injury as to justify the installation of a double trolley or other insulated system. Moreover, the double trolley system was unreasonably expensive, its use was dangerous and it would not entirely prevent the escape of electric current into the ground and upon the water pipes so as to cause injury.

LEGAL REMEDIES AVAILABLE

Judge Sanborn then made clear that the court had no power to prescribe by an injunction the use of any particular system of circuit or negative return. The utmost possible relief was to restrain the defendant from continuing the injury, assuming, as a premise, that sufficient damage had been shown, and to punish it and its officers for contempt in case of disobedience, leaving the means of curing the injury entirely to its discretion. The whole duty of the defendant was to make the damage as little as possible by using the best means reasonable within its power.

The judge then described what constituted an electrical circuit and summed up the testimony and declared his conclusions as follows:

TECHNICAL PRINCIPLES INVOLVED

"It is indeed stated by some of the expert witnesses that wherever the current leaves a pipe electrolysis occurs, stripping off small particles of the pipe metal and gradually destroying it in direct proportion to the amperage or volume of current flowing on the pipe. But under all the testimony and from common observation it is clear that the mere passage of electricity from one substance to another is not electrolysis, the metals being conductors, without decomposition, and is not necessarily attended with injury at the point of escape. Mr. Waterman, an experienced electrical and railway engineer, testified that the water around a pipe will carry electricity either conductively, without damage or decomposition, or electrolytically, with injury to the pipe and decomposition of the solution; also that there may be electrolysis of the solution without injury to the pipe. Prof. D. C. Jackson, who has made a thorough study of the practical side of electrolysis to water mains for many years, and is a most accomplished electrical engineer, says that if the anode is crude copper, containing also iron and silver, only the copper may be carried to the cathode, while the iron and silver may go to the bottom of the tank. This illustrates the position sustained by the evidence as a whole, that electrolysis is a question of surrounding conditions and that current leaving a pipe may or may not be attended with injury to the pipe. Prof. Jackson's experiments tend to show that cast-iron and lead plates embedded in moist earth will suffer electrolysis when a current is applied. But he did not cover the plates with silica asphalt or other insulator, nor does he state current volume or voltage. He did not make any test with pieces of pipe covered with iron rust, which is an insulating protector. It is inferable from the evidence as a whole that wet earth surrounding a water pipe may, by containing some solution not described, possibly iron, iron rust, common salt, sulphate of zinc, nitrate of soda or carbonate of lime, become an electrolyte, decomposable by having an electric current pass through it; and also, under some conditions not described and apparently unknown, particles of the iron pipe, or anode, may be stripped off and pass into the electrolyte solution, or possibly be carried over to some unknown cathode, as in the process of silver plating. Analysis of samples of soil taken from two places above a water main showed from 2½ per cent to 3⅛ per cent of iron, and ½ per cent to 1 per cent of soluble salts composed of sodium chloride, potassium nitrate, lime and a small amount of sulphates. The testimony shows that 1 amp constantly leaving a pipe for 18 hours a day under electrolytic conditions will take away 15 lb. of iron per annum. Yet in 8½ years not a single break in a water main occurred, although

the rails were at that time very poorly bonded. Prof. Jackson during this period found a volume of 75 amp on some of the water mains.

DAMAGE DECREASING

"Injury to the ends of water pipes, near the joint, may also result from the current flowing from one pipe to another. The pieces of pipe are 12 ft. long and are covered with a non-conducting coating. It is not convenient so to join the pipe sections as to obtain a complete metallic contact between them, on account of the coating, and the oakum and lead used in the joints. Oakum is not a good conductor, and the lead, while a good conductor, is not put into electrical contact with the cast iron of the pipe, though preventing leakage of water. As a result there is a break in the conductivity of the pipe every 12 ft. However, the joint resistance is very much less than the soil resistance around the main, as well as of the water in it, pure water being nearly a non-conductor, although absolutely pure water has probably never been produced. It follows, therefore, that the current will take the path of least resistance through the joints, rather than the path of much higher resistance around them, unless an electrolyte is found near the joint, or in the water in the pipes, of such a character as to divert the current from its natural path. Complainant's witness Maury, speaking of a volume of 50 amp to 100 amp, says: 'If it left the pipe to flow along the conductor connection to the pipe it would not necessarily injure the pipe at the point of leaving. If it left to flow through the electrolyte it would cause very serious injury.' Another witness testifies: 'It is generally accepted that the current has to leave the pipe by a non-conductor path to produce injury.' Another, speaking of electrolysis, says: 'There must be an electrolyte. If the pipe was in dry, sandy soil conditions would be entirely different.' When this shunting will occur, or how often, no one knows. Many of the witnesses say that the joint resistance becomes so great that the current will shunt around the joint through the outside earth, or the water in the pipe, and that when it leaves the pipe it causes injury. It appears that most of the joints must make a high resistance. If the current were shunted around these joints, and invariably resulted in injury to the pipe, it would not take long to destroy the whole water system. In many years there was not a single break in a water main from electrolysis. During the same period only 88 out of 5000 service pipes were destroyed by it. Out of 9000 service pipes there were 12 breaks in 1905, 8 in 1906, 5 in 1907, and 2 in the first four months of 1908. During the same four months there were 2 joint leaks, 4 in 1907, 12 in 1906, 7 in 1905, 9 in 1904 and 14 in 1903. As a result of three tests at different places of a large number of pipes made in 1903, 1904 and 1906, the percentage of pipe damage in 1903 was found to be 20, 15 in 1904 and 10 in 1906. The same tests showed the average current on the pipes in 1903 to be 5½ amp, 4 amp in 1904, 6 amp in 1906, and a test in 1908 showed an average of 24 amp. These tests were by no means universal in the system and should not be given any undue weight. But they tend to show a progressively lessening average damage. In particular places, especially near the power station, steadily increasing damage by electrolysis appears, but on the average the evidence shows it is lessening. One reason for improvement is better bonding of rails and more attention to negative return feeders. Another seems to be that as electrolysis proceeds and the pipes become rusted the oxide formed increases the electrical resistance of the pipe coating and thus prevents further electrolysis except under unusual conditions.

"Mr. Herrick, who testified at great length on both references, and whose testimony will be again referred to in connection with different systems of return, testified that while in case of lead pipes electrolysis carries sulphate or carbonate of lead into adjacent soil and thus lessens the electrical resistance, yet in the case of iron pipes the resistance is increased by the iron decomposition in the soil. The oxide surface formed on water pipes by current flow diminishes subsequent chemical action by current leaving such surface. This is corroborated by some other witnesses. Tests made by Mr. Herrick in Peoria showed a constant rise in resistance as current continues to flow from the pipes, with some variation depending on moisture. A thin surface is formed protecting the pipe from further action, because the current is prevented from passing through the adjacent electrolyte. It seems, also, that the decomposition of the water in the electrolyte sets up a great resistance to further electrolysis and tends to stop it. The proof as a whole conclusively shows that no dependence whatever is to be placed upon the numerous general statements of the expert witnesses to the effect that wherever current leaves a pipe injury occurs. With an increasing current there is found diminishing damage. These experts have entirely failed to harmonize the undisputed facts shown by actual inspection of pipes and actual tests of current flow with their theories of decomposition of metallic substances in the earth by electrolysis attended by decomposition of the pipes themselves.

AMOUNT OF POTENTIAL REQUIRED TO CAUSE DAMAGE

"Especially unsatisfactory is the theory of complainant's witnesses adopted by the master that the smallest amount of current may cause injury; that 'a difference in potential of a fraction of a volt may cause electrolysis.' As a laboratory theory this sometimes is true, and sometimes not, but as applied to a general system of water pipes it is utterly untrustworthy. The inference is made by some of the witnesses because a small pressure is sometimes found on a pipe showing small damage, made at some other time, and by some other pressure, both absolutely unknown. One witness made a laboratory test by passing 1/100 amp under pressure of ⅛ volt through an electrolyte of sulphate of zinc, similar to solutions in the earth, and with zinc electrodes, and got electrolysis of the zinc anode. Whether cast-iron electrodes covered with insulating material like that used on water pipes or pieces of oxidized iron would have given a like result he does not state. Again, it is not explained how or why the weak current on the pipe does not pass through the joint rather than seek a path through a weak electrolyte near by. While this theory finds some little support in the evidence it is so inconsistent with established facts as to leave the finding without any sufficient foundation. Mr. Waterman says that an iron anode is not always corroded by the escaping current even when the electrolyte is itself split up, and that the silicon found on the water pipes will prevent corrosion; and he concludes that it is impossible to tell what amount of current it is safe to draw per square foot from the surface of a pipe. Defendant's experts generally agree that a small amount of current is not injurious. Complainant's witnesses are convinced to the contrary, and the master has followed them; but the finding is quite unsatisfactory, and so inconsistent with the nature of electrolytic action, and with the facts clearly established by undisputed evidence as to actual damage, that it cannot be sustained. It is also inconsistent with the theory of increased resistance due to water decomposition in electrolysis.

DAMAGE TO LEAD SERVICE PIPES ALSO DECREASING

"Lead service pipes have also to some extent been injured by electrolysis, especially near the power station. Altogether there are about 9000 of them. During the 19 years from 1890 to 1909 there have been 217 breaks in service pipes attributed to electrolysis, and many more from other causes. From electrolysis there were 12 breaks of service pipes in 1905, 8 in 1906, 5 in 1907 and 2 in the first five months of 1908. These service pipes are many of them under the street railroad tracks, and the theory of damage is that when the iron pipes are positive to the rails the current flows from the mains through the lead pipes, and then through some electrolyte in the earth to the rails, decomposing the service pipe as it goes. This injury, like that to the mains, is shown to be lessening, and the percentage of damage is not enough to show danger of the ultimate destruction of these lead pipes, even of those in the region of the power station, where almost all the breaks have occurred. Repairs to service pipes are paid for by the water consumer. It may be that the use of galvanized-iron service pipes instead of lead, near the power station, might be an improvement, but this will be left to the judgment of complainant.

METHODS OF RELIEF

"Complainant's water works system is being damaged by electrolysis caused by electricity generated by defendant, but not so seriously as reported by the master. This injury should be stopped. Complainant cannot, in the present state of development, find any reasonably practical way to cure it. Both parties insist that the injury is curable, but they differ as to means. The subject has been most seriously studied by many engineers, and there is a difference of opinion among them whether anything short of a metallic circuit will be a complete remedy. Many other plans have been tried. The effort has been so to perfect the rail return as to prevent escape of current into the earth. No claim is made that this can be fully done, but some 11 witnesses testified on the second reference that the rails can be so bonded and cross-bonded as practically to stop electrolysis of the water pipes with the assistance of other means of negative return. Nearly as many other witnesses are of opinion that no such thing is possible, and the master agrees with them and has recommended the compulsory installation of a metallic, non-rail return circuit.

"Four plans of improving the rail return are explained by defendants' witnesses, which they think practically efficient. They have been used more or less since 1899. All of them contemplate the use of the brazed rail bond, of which defendant had installed about 6 miles at the time the testimony was closed on the second reference. This bond consists of a number of leaves of thin copper folded back and forth on themselves, with a piece of brass wound around the end and applied to the side of the ball of the rail near the end. The rail is first ground with an emery wheel to make it clean and bright. Then the end of the bond is clamped between a carbon plug and the rail and subjected to a current of 2000 amp passed through bond and joint until the brass melts and flows upon the clean rail surface, thus making a perfect and permanent electrical contact. Each bond is equivalent in conductivity to 3 ft. of rail—that is, to one-fourth as great a conductivity as that of a continuous rail—and each has a greater conductivity than the trolley wire.

"The first plan consists in the use of some efficient form of rail return, as the brazed bond, welded joint, etc., with cross wires between rails and assisting the return by feeder wires from rail to negative side of dynamo at regular distances from the power house. This is the system now in use in Peoria.

"The second plan is called the quadrilateral or constant potential system, and is simply a modification of the first, with additional bonding at crossings and switches. This system is recommended for Peoria by defendant's witnesses, with a possible addition suggested by Mr. Winters. It was called quadrilateral because of its supposed application to the case of a railway surrounding the center of a city and forming a four-sided network of rails requiring a four-sided system of negative return copper wires from the track and bringing them together to the negative side of the dynamo. The purpose is to reduce to a constant potential all the negative feeder points and by expanding the feeders in the shape of a fan to equalize the pressure all over the rail system, thus preventing as much as possible the escape of current from the rails and its return to the power house. The system was installed in Richmond, Va., by Mr. Waterman, and he claimed to have reduced the amperage on the water pipes from a varying current of considerable size to a maximum of less than 1 amp. It is also being put in at Toronto. The underlying idea is that the tendency to leakage of current from the rails varies as the square of the distance between feeders, so that the putting in of an additional feeder divides the distance by two and the leakage by four. In Richmond four copper wires ¾ in. in diameter were attached at one end to the negative busbar at the station, and at the other each to an extended network of smaller wires attached to the rails. Each system of wires extended in a different direction.

"The third plan is called the drainage system, often used to protect the sheaths of telephone cables. In this the rails and pipes are regarded as a parallel conductor system of return feeders, pipes and rails being connected by copper wire. This can only be put in when the owners of both systems are working in harmony. It is in use in Rochester, N. Y., where it is claimed to have avoided trouble from complaint of electrolysis. The testimony as to its efficiency is conflicting.

"The last plan is not fully described in the proofs. By this it is sought constantly to keep the whole piping system negative to the rails, so that no current can flow from pipe to rail. This may be done by copper wire, or by a 'negative booster,' an additional dynamo so connected with the pipes as to produce upon them a lower potential than upon the rails.

"The quadrilateral or constant-potential system is recommended for Peoria by defendant's witnesses, and Mr. Winters also suggests a limited use of the drainage system in addition to the other, but thinks it would not be necessary for the protection of the pipes.

"Denfendant's expert witnesses agree in testifying that no system will prevent all leakage of current, but think that the quadrilateral plan will be a substantial success. Complainant's witnesses believe it to be necessary to keep all the current from the rails by the double trolley or other insulated system, and that if any current whatever gets upon the pipes they will be destroyed. This conclusion is not established by the evidence. The fourteenth, sixteenth, seventeenth and paragraphs five and six of the twentieth findings of the master on the first reference are not sustained by the proofs. The findings on the second reference need modification according to this opinion.

CONCLUSIONS

"Defendant should be enjoined from continuing the injury to the complainant's water mains and service pipes, and should be given a reasonable time to take such measures or put in such improvements to its negative return as will substantially prevent injury. This should be upon condition that complainant cooperate with defendant so far as reasonable and proper in aiding it to prevent or lessen the escape of current from its rails, or in preventing the escape of current from the water pipes in such manner as to cause injury thereto. The matter of the terms of the decree in these respects, as well as the modification of the findings, will be further considered on application for decree.

"As to costs, I am inclined to think that neither party should have costs as against the other, and that clerks', marshals' and master's fees should be equally divided between the parties. Fees and expenses of witnesses, experts and engineers, and for examinations and tests, should be borne by the party calling the witness or requesting the services."

HEARING ON AMENDED TRANSFER SYSTEM IN BROOKLYN

A hearing in reference to a complaint regarding the new transfer system adopted by constituent companies of the Brooklyn Rapid Transit System was held by the New York Public Service Commission, First District, on Oct. 19.

John J. A. Rogers, the complainant, said that the tariffs and schedules which had been filed seemed to him not to be sufficiently definite to be binding upon the company and to be understood by the public and he, therefore, thought the best procedure was to find out exactly what the new regulations of the company were.

George D. Yeomans, counsel for the company, said that the subpœna had been received only on the night of Oct. 17, but that the company, so far as was physically possible, was prepared to present largely what was requested. What was not presented at this hearing would be presented later.

Mr. Yeomans presented samples of transfers, notices to conductors and other notices bearing on the change and certified copies of the resolutions passed by the directors of the various companies affected. He said that the new system had been in operation for about four days and that with a total of about 4,000,000 people carried about 250 complaints had come to the attention of the company.

At the hearing on Oct. 24 a request was made for a list of points at which transfers have been discontinued. Adjournment was taken until Oct. 27.

PUBLIC UTILITIES A CAMPAIGN ISSUE IN NEW JERSEY

Woodrow Wilson, the Democratic candidate for Governor of New Jersey, has made public a letter written by him in response to a request for an expression of opinion on various public issues. Part of the questions answered by Mr. Wilson relate to public utilities and are as follows:

(1) "That the Public Utilities Commission should have full power to fix just and reasonable rates to be charged by all public service corporations. Do you favor this?" Yes.

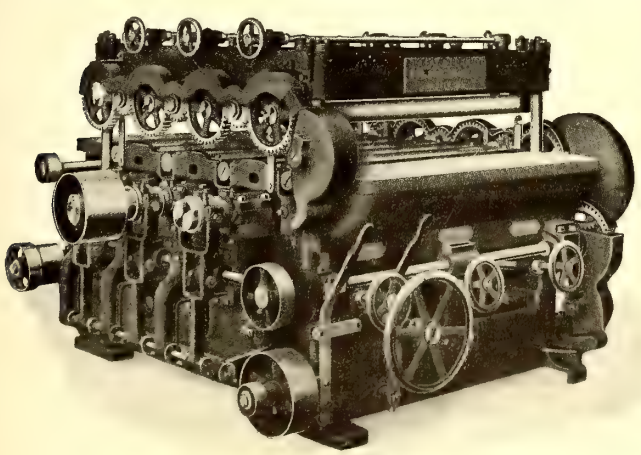
(2) "That the physical property of each public utility corporation which is devoted to a public use should be valued by the State. Do you favor this?" Yes.

(3) "That such physical valuation should be taken as the assessment upon which such corporations shall pay local taxes. Do you favor this?" Yes.

(4) "That such valuation should be used as a basis for fixing rates to be charged by these corporations and that such rates should be so limited as to allow them to earn not exceeding 6 per cent upon this valuation. Do you favor this?" No. I think that such valuation should form a very important part of the basis upon which rates should be fixed, but not the whole basis. All the financial, physical and economic circumstances of the business should be taken into consideration. The percentage of profit should be determined by the commission after full inquiry and not by statute.

A NEW SANDER

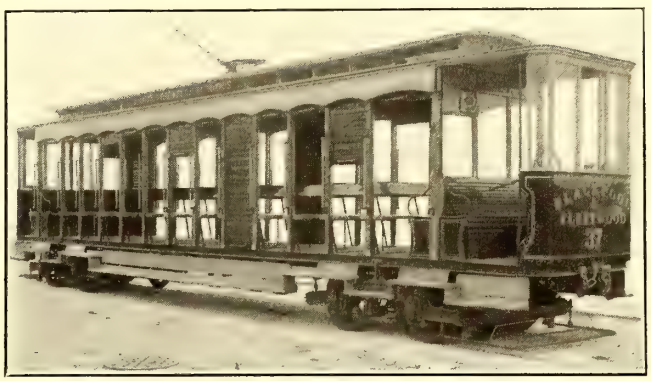
The accompanying engraving illustrates a new type of triple drum sander built by J. A. Fay & Egan Company, Cincinnati, Ohio. The machine is designed to meet the most exacting requirements where a perfectly smooth surface is wanted for varnishing or painting. An automatic take-up device holds the sandpaper tight on the drums under all working and atmospheric conditions. It is claimed that all three of the drums can be covered with sandpaper by any ordinary mechanic in 7 minutes. The drums are covered with specially prepared non-stretchable combination rubber and felt, which forms an effective cushion for the paper. On this machine the oscillators are pivoted on a rigid shaft so that all weight is taken off of the drum shafts. This prevents wear of the drum-shaft bearings and the oscillator bearings cannot wear as the shaft does not touch the walls of the bearings. The bed frame is made to lift by power clear of the drums so as to give easy access to the drums. When the bed frame is hoisted the drums may be removed from the machine without disturbing the table plates. The column of the machine is made extra heavy to prevent vibration. The feeding mechanism consists of four top rolls and four bottom rolls, all positively geared. The top rolls are adjustable vertically to receive material up to 8 in. thick. These triple drum sanders are being built in nine sizes from 30 in. to 80 in. wide.



Triple Drum Sander

COMPENSATING BOLSTER TRUCK

The Blackpool & Fleetwood Electric Tramways, England, have recently installed several trucks furnished with a new type of bolster, designed and patented by J. E. Anger, works manager of the United Electric Car Company, Ltd., Preston, Lancashire, Eng. The object of the bolster is to limit the oscillation experienced when operating double-truck cars. This arrangement is considered to be a much-needed improvement in swing bolster trucks for carrying a car level and counteracting the effect of centrifugal force on curves.



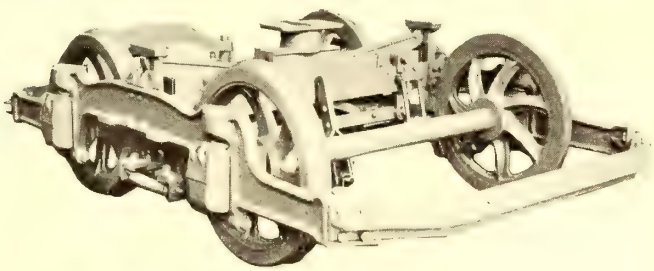
Car Equipped with Compensating Bolster Trucks

The center bearings and side bearings of this truck bolster are carried on cantilevers which are supported on fulcrum pins. The truck bearings are free to move vertically and adjust themselves to the variation of the load. The fulcrum pins are fitted to bolster plates of the ordinary pattern which are supported at each end by springs. These springs are in turn suspended from the truck transoms in the ordinary way, that is, by suspension links hung from the truck transoms.

The distribution of the load is accomplished by the center bearing and cantilevers. The center bearing is of the ordinary center pivotal type, but the bottom half is carried on the short arms of the two cantilevers; the load at this point is supported on a three-point suspension and the action of the cantilevers tends to counteract the effect of the load on the truck frame and wheel flanges toward the outer rail when the car is entering or leaving a curve.

The method of operation is as follows:

In entering, leaving or rounding a curve the compensating levers counteract the roll or hammering due to centrifugal force on the outer rail, thus distributing the weight equally over all wheels and portions of the truck frame and lessening the friction and wear between flanges of wheels and rails. When operating on straight track the action of the compensating levers, with their three bearing surfaces in constant contact with the center bearings and side bearings on the car-body bolster, is such as to prevent the oscillation and rocking of the trucks.

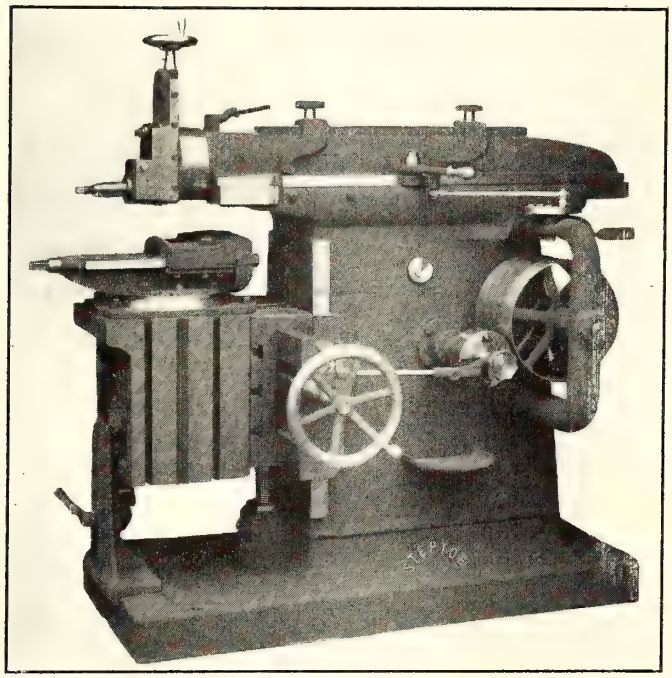


Compensating Bolster Truck

The improvement described, apart from giving easier riding, decreases the wear and tear of both track and rolling stock and should result in lower operation and maintenance cost. Compensating levers of this design have been fitted to double trucks of the equal-wheeled type, and to maximum traction trucks of the swing bolster type. They are also applicable to any type of double truck for either light or heavy service.

NEW TRIPLE-GEARED SHAPER

The John Steptoe Shaper Company, Cincinnati, Ohio, has recently placed on the market a new 25-in. triple-geared shaper, shown in the accompanying engraving. All of the shaft bearings in the column of this machine are bushed with cast-iron bushings and provided with ring oilers. The shafts are turned with spiral oil grooves to ensure the proper distribution of the



Triple-Geared Shaper

oil over the entire bearing. The ram is driven by means of two rack gears of large diameter, and the rack is cut from the solid steel bar. The teeth in the rack are staggered to give an even pushing strain on both gears. The use of two gears permits the passing of bars through an opening in the top of the column for key-seating, which cannot be done where only one large gear is used. The plate for shifting the belts has eccentrical slots so arranged that one belt is shifted before the other. The head can be very quickly loosened and swiveled to any angle by pushing the lever at the back of the head and can be fastened by pulling the lever toward the operator. The shifter dogs are placed on top of the ram in a very convenient position, permitting a ram of larger and stronger dimensions to be used.

All wearing surfaces are provided with flat gibs, and the screws for adjusting the gib in the ram and harp slides are fitted with lock nuts. The lead screw and harp-slide screw are provided with hand wheels. The table support has a roller which slides on a plane surface under the table, and can be very quickly adjusted by the lever shown in the illustration. The machine is geared 42:1 and is made to take very heavy cuts with high-speed steel. The column, ram and base are ribbed and braced, and all bearings are made very heavy.

The vise has a graduated swivel base which can be easily read by the operator. The upper jaw of the vise grips the lower jaw, thereby preventing the upper jaw from rising when the work is being tightened in the vise.

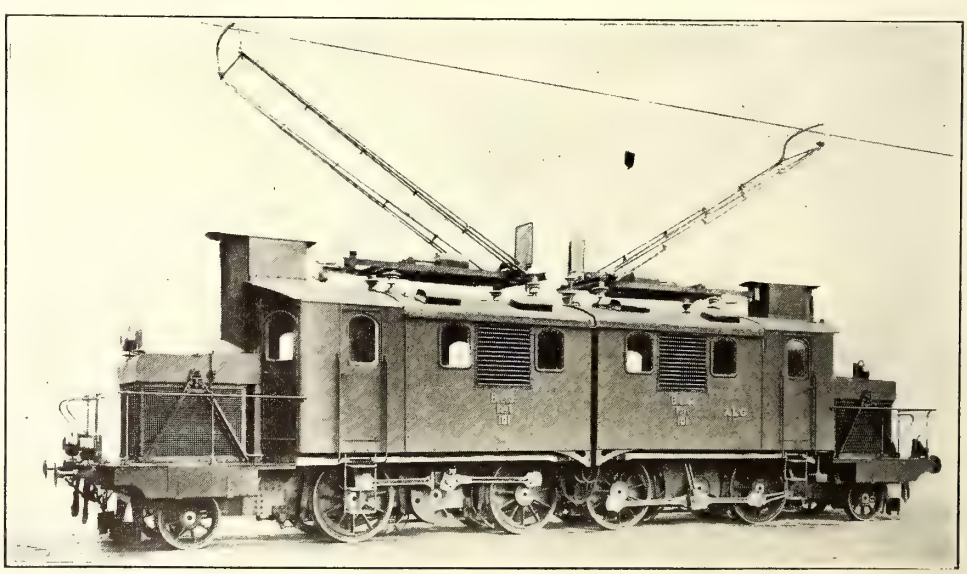
SINGLE-PHASE LOCOMOTIVES FOR THE BERNE-LOTSCHBERG SIMPLON RAILWAY

The Bernese Alps Railway, Switzerland, has recently received from the Allgemeine Elektricitäts-Gesellschaft two 4-ft. 8½-in. gage single-phase locomotives which are designed for operation at a maximum speed of 75 km (46.5 miles) an hour, at 15 cycles, 15,000 volts. The maximum tractive effort at the periphery of the driving wheels on starting is 13,500 kg (29,700 lb.) and the drawbar pull for one hour at 40 km (24.8 miles) an hour is 8000 kg (17,600 lb.).

On a 2.7 per cent grade a train weighing 250 metric tons must be drawn at a speed of 24.8 m.p.h. and on a 1.55 per cent grade a 400-ton train must be drawn at the same speed for one hour. The locomotive is built for parallel crank drive. The two 800-hp motors are mounted in the upper part of the locomotive frame and transmit their energy by driving and connecting rods through an intermediate jack shaft to the two driving axles. The locomotive is built in two halves, which are similar in every respect. The principal dimensions, the weight and other details are given herewith:

Diameter of driving wheels	1,270 mm.	50 in.
Diameter of leading wheels	850 mm.	33 in.
Diameter of crank circle	540 mm.	21 in.
Length over buffers	15,750 mm.	51 ft. 8 in.
Total wheel base of the double locomotive	15,750 mm.	51 ft. 8 in.
Wheel base of one half	5,300 mm.	17 ft. 5 in.
Distance between centers of pony trucks	4,250 mm.	13 ft. 11 in.
Pressure on driving axles	17 tons	
Pressure on leading wheel axles	12.5 tons	
Weight of the mechanical portion	44 tons	
Weight of the electrical equipment	49 tons	
Total weight	93 tons	
Weight available for traction on four axles	68 tons	

These locomotives will be operated on open track with a minimum curve radius of 250 m (820 ft.) and the railway stations with a minimum curve radius of 180 m (590 ft.). To attain smooth running and flexibility on curves leading running axles were adopted. As a sliding axle when used for the leading wheels exhibits a tendency to set up rocking it was decided to employ a form of pony truck. The running axle, therefore, is combined with the adjoining coupling axle in pony truck of a Kraus-Helmholtz type. The new construction ensures an even wear of the flanges of both running wheels. The running axle can turn independently, within narrow limits, on a straight track and can also swing slightly in a horizontal direction. Means are provided to keep the running axle at right angles to the longitudinal axis of the locomotive when traveling on tangents.



Single-Phase Locomotive for Berne-Lotschberg Simplon Railway

The machine compartment and motorman's cab of each half of the locomotive are separate. The former is constructed throughout of sheet iron and has a sheet-iron roof on which the current collector is carried. Each machine compartment contains an air compressor in addition to the traction motor.

One of the halves also has a converter set and a storage battery. The sides of the locomotive are partially perforated for motor ventilation, the exhaust passing through the roof. The control apparatus compartment is in the rear and the transformer set is in the front of each motorman's cab. The braking equipment consists of a combination Westinghouse automatic and hand-operated brake; also a separate hand-wheel brake. In addition, the locomotive is equipped with speed indicators, pneumatic sanders, electric and petroleum signal lamps, fog horns and the usual tools.

The current collectors are of the sliding bow type constructed for clearances varying from 4.8 m (15 ft. 9 in.) to 7.5 m (24 ft. 7 in.). This wide range of height adjustment necessitated a long and narrow construction of the current collector frame, the sides of which consist of three pyramid-shaped tubes. The contact piece adjusts itself automatically to the direction of travel. Wind shields are provided to counteract the effect of wind pressure on the current collector frame. The current collector is operated by compressed air.

EXPANSION CAR WHEEL BORING TOOL

One of the most interesting exhibits at the recent Atlantic City convention was that of the Davis expansion car wheel boring tool. This tool is being used by a number of electric railway companies, among them: Detroit United Railway, East St. Louis & Suburban Railway, Cleveland Electric Railway, Louisville Railway, United Railways of St. Louis.

At the last Master Car Builders' convention a report was accepted which recommended that all car wheels should be bored to fit the axles in two independent cuts and that these operations were preferably to be accomplished by some form of car wheel boring tool having a micrometer adjustment and that the fits were to be determined by the use of micrometer calipers.

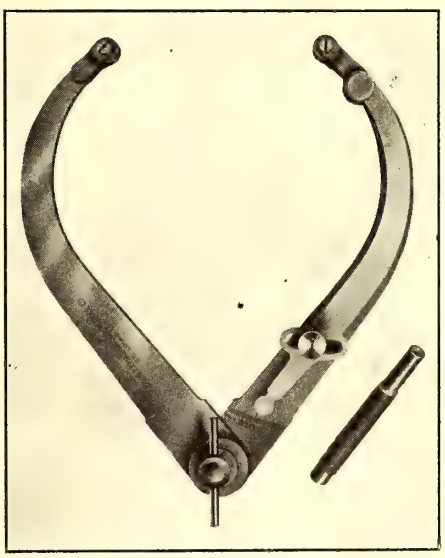


Fig. 1—Micrometer Caliper to Adjust Tool for Boring Wheels

The Davis expansion car wheel boring tool was designed to accomplish this result and has also effected a decided reduction in the cost of wheel and axle work in many of the steam railroad shops of the country. It can be applied to any make of wheel-boring machine. Previous to the introduction of these tools it was customary in railroad shops to turn all axles to fit the wheel. The average output of the wheel-boring machine at that time was 40 to 50 wheels per day. The average of the wheel-boring machine equipped with the Davis expansion boring tool is said to be 80 to 120 wheels per day.

An instance of the saving effected can be taken from the records of the Canadian Pacific Railroad at Montreal. In its new shops with absolutely new and up-to-date wheel-boring mills 35 wheels were being bored per day on each mill, using the old-style boring tool. Since the equipment of these shops with Davis expansion boring tools an average output from the Montreal shops has been obtained of 119 wheels per day of 10 hours.

These tools are especially adapted for boring the wheels to fit the axles. It requires but 10 to 20 seconds to adjust the tool to bore the wheels for the axles and to make a perfect hydraulic fit. This is accomplished by means of the micrometer caliper shown in Fig. 1, which has recently been brought out by the manufacturers and can be operated by any ordinary machine hand.

The expansion car wheel boring tool for steel wheels is shown in Fig. 2. One for cast iron is shown in Fig. 3. It will be noted that each tool is equipped with two sets of cutters and one chamfering cutter at the top. The lower set is especially made for rough boring. It cuts freely and easily and involves the same principle as the turning tool. The cutter itself carries away the chips and causes them to curl in a parallel direction with the tool, thus preventing them from eating into its body.

The upper single cutter is easily adjusted by means of a special screw to correspond with the bore of the hole. It chamfers the hole immediately after the roughing cutter has passed through the wheel. It prevents the wheel from cutting the axle when being pressed through. It is removed from the tool while the finishing cutters are passing through the wheel. The upper or second cutters are especially made for finished boring. They have a wide cutting surface and will bore a smooth hole with an unusually coarse feed, it being an easy matter to keep them in perfect condition. The cutters are made unusually heavy to withstand the most severe strains and perform each individual operation with mechanical correctness, yet can be quickly and easily adjusted.

The tools described are manufactured by the Davis Expansion Boring Tool Company, St. Louis. The personnel of this concern has recently changed somewhat, and the officers are now:

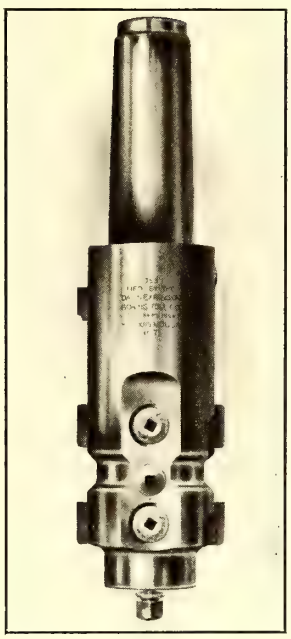


Fig. 2—Cutter for Use with Steel Wheels

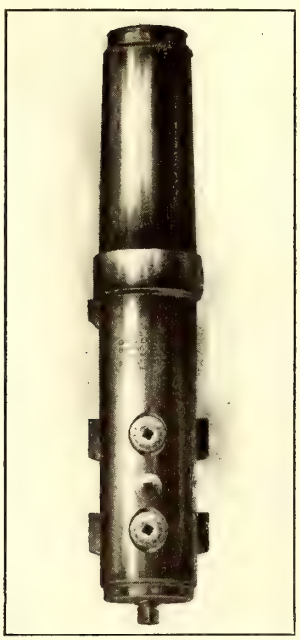


Fig. 3—Cast-Iron Wheel Cutter

W. N. Matthews, president; Emory E. Davis, vice-president, and Claude L. Matthews, secretary. W. N. Matthews and Claude L. Matthews are members of the well-known firm of W. N. Matthews & Brother.

Owing to the salt-laden atmosphere of Charleston, S. C., the ordinary form of grid resistance of asbestos and iron ribbon cannot be used because they corrode rapidly and pop open. The Charleston Consolidated Railway & Lighting Company is therefore using three-suspension spiral resistances which are mounted on micanite bars fitted with intermediary micanite washers. The spirals were furnished by W. R. Kerschner, New York. Another unusual maintenance feature on the lines of the Charleston Consolidated Railway & Lighting Company is the repairing of worn Stanwood car steps by covering them with lead tread.

News of Electric Railways

Report of Cleveland Railway for September

The report of the Cleveland (Ohio) Railway for September, 1910, shows a deficit of $8,466.70 under the terms of the Tayler franchise. For the first time since March, 1910, a surplus was shown in the maintenance and repair fund. It amounted to $14,579.51. Through the summer months the company renewed several sections of track and made other improvements, depending upon the surplus during the winter to offset the deficit thus incurred. The operating expenses for September were $262,790.97, while the amount allowed under the franchise was $256,853.88. The amount spent for maintenance and repair was $119,431.21, whereas the franchise allowance was $134,010.72. Thus the expenditures for operation and maintenance were equalized to some extent by the surplus in the maintenance account. The total number of passengers carried was 20,210,570, or about 4,000,000 more than for September, 1909. The number of transfers issued was 5,069,952. The report follows:

Gross receipts	$520,616.56
Operating expenses	390,864.60
Net earnings	$129,751.96
Other income	2,870.35
Gross income	$132,622.31
Taxes	27,907.95
Net income	$104,714.36
Interest	113,181.06
Deficit	$8,466.70

During the week of the Centennial celebration of Cuyahoga County, beginning with Oct. 10, 1910, and including the Sunday which followed, 5,332,966 passengers were carried and the receipts were $136,997.79. On Oct. 15, 1910, 888,451 passengers were carried and the receipts were $23,649.86. This has been exceeded by only one day in the history of the system, Dec. 24, 1909, when the receipts under the receiver were $23,804.78.

No Bids for Constructing New York Subway with Private Capital

The time for receiving bids for the construction and operation of the tri-borough subway system, as planned by the Public Service Commission of the First District of New York, on the contract calling for construction and operation by private capital expired at noon on Oct. 20, 1910, without any bids having been received. On Oct. 27, 1910, the commission will open bids for the construction of the same system with municipal capital. Some time ago the Bradley-Gaffney-Steers Company, New York, N. Y., submitted a proposal to the commission for the construction of the system, but it did not bid on account of the differences between the plan submitted by it and the requirements which the commission sought to impose. The letter from the Bradley-Gaffney-Steers Company to William R. Willcox, the chairman of the commission, explaining its attitude, follows:

"We regret that we are unable to submit to you to-day a bid in accordance with your invitation for the building of the Broadway-Lexington Avenue subway by private capital. The proposed contract submitted to bidders is so different from the proposition which we submitted to you that we do not see how private capital can accept the terms you offer. Our proposition as submitted called for a first lien upon all income for the purpose of making payments of interest and amortization upon private capital invested before anything should be set aside for interest or amortization of city moneys employed. The proposed plan gives no such preference to private capital, and as we outlined to you at the time of the public hearing upon the proposed contract, we believe that this change, so fundamental, is the difference between the success and failure of the plan. We wish to thank you for the many courtesies we have received in the progress of our negotiations."

After reading the letter, Mr. Willcox made this statement in reply to the contentions made by the company:

"The draft contract for the construction, equipment and operation of the tri-borough line was submitted to criticism at a public hearing held on May 9, 1910, at which a representative of the Bradley-Gaffney-Steers Company objected to the proposed form on three grounds, namely:

"First—That the contractor and not the city was obligated to provide real estate.

"Second—That a term of only five years was allowed for what was designated as the municipally maintained railroad, comprising the lines and the approaches thereto over the bridges.

"Third—That the contractor was obligated to pay interest and sinking fund payments on city bonds in advance of similar payments on company bonds.

"In the light of the information gained at the public hearing, and after conference with the transit committee of the Board of Estimate and Apportionment, consisting of the Mayor, the Controller and the President of the Board of Aldermen, the commission modified the form of contract in order to provide that real estate should be acquired by the city. It also modified the contract, cutting out the five-year term and making the term for the operation of the so-called municipally maintained railroad the same as that for the whole line. It modified the provision in regard to order of payments so as to put city bonds and company bonds on a parity; that is, the payments on either class of bonds were not to be given preference over the other.

"This is as far as the commission thought it proper to go with due regard to the safeguarding of the public interest. Over $25,000,000 worth of bonds have been authorized for the construction of the loop lines and the Fourth Avenue subway, and the commission did not consider it proper to make these bonds practically second mortgage bonds."

Boston Chamber of Commerce Urges Thorough Study of Transit Needs

The directors of the Chamber of Commerce of Boston will present to that body on Oct. 27, 1910, a report in favor of a thorough study of the transit needs of Boston, with particular reference to the systematic development of rapid transit connections between the heart of the city and the suburbs. The report will urge that no action be taken at present by the Chamber of Commerce in favor of the proposed West End loop and the proposed Boylston Street subway or any other subway until the report on the needs of the city as a whole has been completed. The report says in part:

"We have been asked from time to time to recommend that the chamber favor various additions to or changes in existing transportation facilities of the city. Usually the addition or change has been urged by persons who wished to advance the interests of a particular district in which they held investments. To consideration of such requests your committee on public utilities has devoted much time, but with a steadily growing conviction that, while the interests of a particular district are entitled to serious consideration, the transportation problem ought to be considered in a broader way and with a view to devising and providing the system of transportation which will best serve the requirements and convenience of the whole Metropolitan District. The problem has not been dealt with in any such broad way. This is apparent from the history of the shifting transportation legislation during recent years.

"The Boston Transit Commission and the Massachusetts Railway Commission have now jointly been directed by the Legislature to report to it as to the wisdom or lack of wisdom of undertaking a considerable number of specific projects; but they have not been specifically directed to make investigation of the transportation situation in Boston and the probable requirements of the future and to lay out a plan which will meet those requirements.

"We think that there is real and imminent danger of a

patchwork transportation system, not based on any comprehensive and carefully studied plans, but resulting from a yielding on the part of the Legislature to the demands of particular districts. Moreover, any plan which merely provides for present transportation needs is not sufficient. The volume of our street car traffic increases so rapidly that it is folly to provide for or consider only the present or the immediate future.

"In 1871 the street railways within 10 miles of the State House carried 34,000,000 passengers. In 1881 they were carrying 68,000,000, and in 1891 they carried 136,000,000. In 1901 the Boston Elevated Railway and its leased lines carried 213,703,983 passengers and last year the elevated lines carried 281,008,471 passengers, nearly one-third as many people as all the steam railroads in the United States combined carried in the same length of time.

"We feel very strongly that the imperative need at present is to abandon the method of trying to decide whether this or that patch or addition on the existing system is for the advantage of some district and to adopt the method which has not been used by Boston since the rapid transit commission of 1892 of having some permanent board charged with the duty of making a progressive study of the present and future requirements of the Metropolitan District and of formulating plans to meet those requirements.

"We recommend that the chamber take action that will result in a thorough report by the joint commission or some other public board as to present and prospective transportation needs and as to how far those needs will be met by the changes already contemplated by statute and as to whether they would be better met by different or further changes; also that the joint commission or some other permanent board be charged with the duty of making progressive studies and recommendations as to the transportation needs of the Metropolitan District from time to time and the best means of meeting those needs."

Student Course for Stone & Webster Employees

Acting upon a suggestion by S. C. Lindsay, assistant electrical engineer, officials of the Seattle (Wash.) Electric Company have approved of a plan for giving electrical students a practical education in the departments of the Seattle Electric Company. The plan submitted to the officers of the company in the form of a brief prospectus follows:

"This course shall be known as the 'The Seattle Electric Company's Students' Course.'

"The object of this course is to develop men to meet the needs of the Seattle Electric Company in responsible operating positions. The course will be of 2½ years' duration and will consist of training in the following lines of work:

"Electrical construction, both station and line work; central station operating, both steam and electrical apparatus; a small amount of meter testing and such office engineering work as conditions permit will also be given.

"Applicants who have not had a college training will be required to pass an examination in order to prove their qualifications for entering the course. Examination will be more of a practical than of a technical nature.

"All students must be over 21 and under 30 years of age. Persons already in the employ of the company will be given preference when selecting students.

"Students will be required to study standard works relating to the kind of work on which they are employed and to attend lectures once a week relating to the same subjects. Time on each class of work to be approximately as follows: Line department, 3 months; meter department, 6 months; engineering office work, 6 months; steam and electrical operating, 15 months.

"Students not already in the employ of the company and who may be selected from the list of applicants shall receive $50 per month upon entering the course. A record of the students will be kept and their showing in each department reported by the head of the department, so as to determine their fitness for any particular line of work.

"Some one person will have charge of the students and arrange for their transfer to the various departments and for lectures and special duties. Heads of departments will be required to keep the person in charge of the students advised of such vacancies, as students would be expected to fill so the proper assignments can be made.

"It is desired to start a class of 10 students this fall, and the number will probably be increased next year by adding students as vacancies occur. Students who complete the course will be given a diploma, and if we have more graduates than this company can use, we will endeavor to place them with other Stone & Webster companies, if possible; if not, we will try and place them with some other company desiring capable men.

"Men already in the employ of the company wishing to enter this course will be examined and given proper credit for work already performed and assigned a position in the course in accordance with their qualifications. Employees wishing to enter this class must apply on the regular form for the course.

"Application blanks will be furnished by heads of departments to employees wishing to apply for enrolment. Additional information can be had by applying to S. C. Lindsay, electrical engineering department."

Dispute Between Winnipeg Electric Railway and Its Employees

On Oct. 12, 1910, the Winnipeg (Man.) Electric Railway dismissed four men because they violated the rules by drinking at a bar while in uniform. Three of these men had been with the company for more than five years. The men deny that they were drinking and state that one of them has been a teetotaler for 24 years. On Oct. 13, 1910, a committee from the men waited on the company, but the company refused to reinstate the men pending an investigation.

Wilson Phillips, acting manager of the company, wrote the following letter to the committee of employees selected to deal with the case of the men who were discharged:

"The discharge took place because of complaints received by us that these men were in hotels in the city drinking intoxicating liquors while in the uniform of the company.

"When you presented your ultimatum to reinstate the men or there would be a strike, I pointed out to you that, under the agreement entered into between the company and the men as a result of the last arbitration, provision was made for investigation of any reasonable complaints made by the men, and as I told you I was prepared to have a full and thorough investigation take place at the very earliest possible moment.

"The statement that this is a case of discrimination is entirely incorrect. The dismissal of these motormen and conductors was brought about in the ordinary discharge of my duties as acting manager. The complaint was made to me of the conduct of these men with reference to drinking, and I have no alternative but to enforce the rules laid down by the company.

"I told you and the men in question explicitly why they were discharged, but as you refused to say whether you would ask for an investigation or not, I declined to produce my evidence pending a decision by your committee as to whether you wanted an investigation or not.

"I need hardly point out to you that the Parliament of Canada has passed an act in the interests of and for the protection of the public in just such disputes as this, which makes it illegal for employers of labor to declare a lockout, or for employees to strike without first applying for a board of conciliation and submitting the questions in dispute to it."

Subsequently the men realized that they were in error in regard to calling a strike, and the question of the right of the company to deal as it did with the men who were discharged will be submitted to arbitration under the Dominion Industrial Disputes Acts, to which reference was made by Mr. Phillips in his letter to the men.

Explanation of Reduction in Working Force in Pittsburgh

In carrying out improvements to its lines recently the Pittsburgh (Pa.) Railways found it necessary to increase the number of men employed in its shops and various departments. The improvements having for the most part been completed, the company early in October laid off about half the men engaged for its extra force. In explanation of the action of the company James D. Callery, its president, has addressed to the motormen and conductors a circular in which he says:

"An extraordinary amount of work has been done in the shops during the last six months, the force of men having been increased by more than 200 over the same period in 1909. The extra work having been completed, the company must of necessity reduce its force. In consequence slightly over one-half of the extra force was laid off. The company cannot understand why the motormen and conductors in its employ should call a meeting to break their contract with the company and we believe that when they fully consider the proposition they will not do so. We were informed when the contract was entered into with the committee that the graduating scale of wages and the working conditions were satisfactory and would put the question of disputes out of the way for two years. It has always been the policy of the company to find employment wherever possible for faithful employees, and the company is now willing to receive applications from the car barn and shop men who have been laid off for positions as motormen and conductors."

Transit Affairs in New York

The Public Service Commission has reported on the progress of the work on the Fourth Avenue subway in Brooklyn. Section 1, known as the Flatbush Avenue extension, running from Nassau to Willoughby Street, is 47 per cent completed, some 94,600 cu. yd. of material having been excavated to date. The section between Bridge Street and Myrtle Avenue is practically completed. An average of 50 per cent of the work has also been done on the sections which William Bradley is building down Fulton Street from Willoughby Street to Ashland Place, to Flatbush and Fourth avenues, to Sackett Street. This is the most difficult division of the entire route, running through the heart of the business section of the borough. It has been necessary to demolish several buildings, and undoubtedly several more will have to come down before the work can be completed. A large part of the work on the lower sections of the subway from Sackett Street to Tenth Street and from Twenty-seventh Street to Forty-third Street has also been completed. The work has been easier here, the excavation being made in outlying districts which are not densely populated.

Franchise Cases Transferred.—Attorney-General O'Malley, of New York, has obtained orders from the Supreme Court transferring to New York County writs of certiorari brought by the Metropolitan Street Railway, New York, N. Y., to review the taxes on its special franchises. The total amount of valuations placed on the franchises aggregates $58,000,000.

Monorail Company Desires Extension of Time.—The Board of Estimate and Apportionment of New York has referred to its transit committee the application of the Pelham Park & City Island Railroad for an extension of time until next spring in which to complete and place in operation its monorail railway between Pelham Park and City Island, a distance of 3 miles.

Meeting of Massachusetts Street Railway Association.—The first fall meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, Mass., on the evening of Oct. 19, 1910. President R. S. Goff occupied the chair and after the usual dinner the salient features of the recent convention of the American Electric Railway Association were reviewed.

Mayor Busse of Chicago Approved Consolidated Traction Ordinance.—Mayor Busse of Chicago has approved the ordinance passed by the City Council of Chicago to permit the rehabilitation of the principal lines of the Chicago Consolidated Traction Company and to allow the purchase of the property of the company as contemplated in the reorganization plan by the Chicago Railways, to which reference was made in the Electric Railway Journal, of Oct. 22, 1910, page 887.

Report on Transit Conditions in Pittsburgh.—Edward M. Bigelow, former director of Public Works of Pittsburgh, Pa., has presented to the Mayor of Pittsburgh plans for relieving street railway congestion in the heart of the city based on a study of the situation which he made recently. Mr. Bigelow's plan provides briefly for four loops in the down-town section, the utilization of a number of streets not now occupied by street car lines and the rerouting of several lines of cars. The changes suggested by Mr. Bigelow are given in detail by him in his report.

Complaint on Account of Delay in Installing Signal Plant.—The Lehigh Valley Railroad has complained to the Public Service Commission of the Second District of New York that the completion of its signal plant in Cheektowaga, Erie County, has been prevented for more than a year because of objection on the part of the International Railway to the installation of certain derails. This the Lehigh Valley Railroad believes is a specious objection and made for the purpose of delay and the complainant desires that proper protection be afforded at this crossing as soon as possible.

Date Set for Opening Hudson & Manhattan Railroad Extension.—William G. McAdoo, president of the Hudson & Manhattan Railroad, which operates under the Hudson River between New York and New Jersey, has announced that the operation of trains will be extended from the present temporary terminus of the company at Sixth Avenue and Twenty-third Street, New York, to Herald Square at Thirty-fourth Street and Broadway on Nov. 10, 1910. The company expects to begin work on the line from Herald Square to the Grand Central Station, at Fourth Avenue and Forty-second Street, in about three months' time.

Meeting of the New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on Oct. 27, 1910. Dinner will be served at 6:45 p. m. At 8 o'clock the regular business meeting will be held, after which A. D. Claflin, president of the Boston Suburban Electric Companies and general manager of the recent Harvard-Boston aviation meet, will present some interesting data "Relative to Aviation Meets," and A. A. Merrill, expert on aeronautics, and secretary of the contest committee of the Harvard-Boston aviation meet, will address the club on "Development and Progress of Aeronautics," illustrating his remarks with stereopticon views taken at the recent meet.

Conference Regarding Sale of Toronto Railway to City.—At a conference on Oct. 10, 1910, between the Board of Control of Toronto and representatives of the Toronto Railway, William MacKenzie, president of the company, stated that if the ratepayers of the city voted in favor of the city taking over the property of the company he would recommend the stockholders of the company to dispose of their holdings to the city at a price to be mutually agreed upon, or to be determined by arbitration. The Board of Control will report the result of the conference with the company to the City Council and a by-law will probably be submitted to the ratepayers to determine whether they favor the purchase of the street railway by the city. Mr. MacKenzie, however, stated that he would not advocate the sale of the radial railway now operated by the Toronto & York Railway, which is controlled by the Toronto Railway through ownership of its capital stock.

Franchise Matters in Toledo.—In a letter to the committee on finance of the City Council of Toledo, Ohio, Mayor Whitlock has suggested that the company which secures a franchise in Toledo should be required to pay the bill of $6,500 incurred in securing the report on the earnings of the Toledo Railways & Light Company submitted by Nau, Tanner & Rusk and any other expenses to which the city may be put in the franchise negotiations. Itemized, the original bill of Nau, Tanner & Rusk follows: One principal, 64 days, at $25 a day, $1,600; senior accountant, 93 days at $15 a day, $1,395; junior accountants, 296 days, at $10 a day, $2,960; traveling expenses and hotel bills, $842.73; total, $6,797.73. Later the bill was revised and made $6,500. This report is to be supplemented by an inventory of the property of the company now being prepared by Ford, Bacon & Davis, of New York. Plans are being made to discuss the franchise question publicly later in the year. The Mayor has stated that he expects to make addresses in every ward in the city so as thoroughly to acquaint the people with the conditions that govern the granting of the new franchise.

Financial and Corporate

New York Stock and Money Market

Oct. 25, 1910.

In spite of the fact that for the past two days stocks have been lower and there has been some selling pressure, the general condition of the Wall Street market is improved and the sentiment of the Street is distinctly cheerful. The present reaction is attributable to the tightening up of the money market and the desire of many holders to take profits. No great boom in prices is expected or desired, but it is believed that within a few weeks trading will increase and that the outside public will be in the market.

The bond market is neither so strong nor so active as it was a few weeks ago. This is due to the higher price of money and reawakened interest in stocks. Money to-day was quoted: Call, 3@4 per cent; 90 days, 4@5 per cent.

Other Markets

There were sharp breaks in traction stocks on the Philadelphia market, following the letter of E. T. Stotesbury read at the meeting of the Union Traction directors yesterday. The transactions in both Union Traction and Rapid Transit have been heavy, in the two days, and prices have declined to 38 for Union and 15½ for Rapid Transit.

In the Chicago market Series 2, Railways Certificates, and Metropolitan El. preferred have each been traded in moderately at slightly higher prices.

There has been little traction business in Boston during the week. A few shares of Massachusetts Electric and Boston Elevated have sold at former prices.

In Baltimore there has been no trading in traction stocks and the transactions in the bonds of the United Railways have been fewer. Prices have remained about the same.

Quotations of various traction securities as compared with last week follow:

	Oct. 18.	Oct. 25.
American Railways Company	a43¼	a43½
Aurora, Elgin & Chicafio Railroad (common)	a48	a50
Aurora, Elgin & Chicago Railroad (common)	a48	a50
Boston Elevated Railway	128½	a128
Boston & Suburban Electric Companies	14¼	*14¼
Boston & Suburban Electric Companies (preferred)	72	*72
Boston & Worcester Electric Companies (common)	*10½	*10½
Boston & Worcester Electric Companies (preferred)	36½	*36½
Brooklyn Rapid Transit Company	79	77¼
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	84½	83⅞
Capital Traction Company, Washington	*129	a130
Chicago City Railway	102½	a160
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a75
Chicago Railways, ptcptg., ctf. 2	a19¾	a19
Chicago Railways, ptcptg., 3	a10	a10
Chicago Railways, ptcptg., ctf. 4	a6	a6
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	155½	155
Georgia Railway & Electric Company (common)	a120½	a122
Georgia Railway & Electric Company (preferred)	87	87
Interborough-Metropolitan Company (common)	22⅝	22⅞
Interborough-Metropolitan Company (preferred)	58⅝	59½
Interborough-Metropolitan Company (4½s)	81¼	81½
Kansas City Railway & Light Company (common)	a23½	a23½
Kansas City Railway & Light Company (preferred)	a80	*80
Manhattan Railway	143	a143
Massachusetts Electric Company (common)	a20½	a20
Massachusetts Electric Companies (preferred)	a85	a85
Metropolitan West Side, Chicago (common)	a23	a21
Metropolitan West Side, Chicago (preferred)	a70	a64
Metropolitan Street Railway	*15	22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	67½	*67½
Northwestern Elevated Railroad (common)	*20	a22
Northwestern Elevated Railroad (preferred)	a43¼	a63
Philadelphia Company, Pittsburg (common)	a46½	a45¾
Philadelphia Company, Pittsburg (preferred)	a43	42½
Philadelphia Rapid Transit Company	a19¼	a15⅞
Philadelphia Traction Company	82	a83
Public Service Corporation 5 per cent col. notes	a94½	a94½
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	58	a65
Third Avenue Railroad, New York	10⅛	12¾
Toledo Railways & Light Company	8¼	*8¼
Twin City Rapid Transit, Minneapolis (common)	112½	*112½
Union Traction Company, Philadelphia	43¼	38½
United Rys. & Electric Company, Baltimore	*15⅝	a15
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	60	*60
Washington Ry. & Electric Company (common)	33	a38
Washington Ry. & Electric Company (preferred)	89	a89
West End Street Railway, Boston (common)	84½	a86
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	72	72¾
Westinghouse Elec. & Mfg. Company (1st pref.)	*129	*129

aAsked. *Last sale.

Conditions Under which E. T. Stotesbury Will Become Director of Philadelphia Rapid Transit Company

E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., has made the following reply to the petition of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company that he enter the board of directors of the Philadelphia Rapid Transit Company and to the petition of the directors of the Philadelphia Rapid Transit Company that he become a director of that company:

"I duly received the communication signed by yourself and others interested in the Union Traction Company and the Philadelphia Rapid Transit Company requesting that I enter the board of directors of the Philadelphia Rapid Transit Company, with such associates as I might select, and thereafter 'control the policy and business of the company.'

"An earnest desire to advance the welfare of the general public, as well as the business interests of this city, prompts me to comply with your request, but in view of the Philadelphia Rapid Transit Company's financial requirements I feel that I could only accept this responsibility upon a certain definite understanding having been reached with the Union Traction Company stockholders, by which the Union Traction Company will guarantee the Philadelphia Rapid Transit Company's obligations to provide such new capital as may be required until such time as the net earnings of the system are sufficiently increased to make possible the sale of Philadelphia Rapid Transit Company's securities on their own merits.

"From the published annual reports of the Philadelphia Rapid Transit Company it appears that the net earnings during the past four years have not been sufficient to pay the annual guaranteed dividend of 6 per cent upon the Union Traction Company stock. Moreover, the net earnings of the Philadelphia Rapid Transit Company for the current fiscal year will not be sufficient, according to President Kruger's estimate, to pay this dividend.

"I have given much thought to the problem and have sought the advice of experts in the conduct and operation of similar properties, particularly Thomas E. Mitten, who has had wide experience in such matters and is now president of the Chicago City Railway. From all that I can learn, I am satisfied that a considerable sum of money will be required in the near future for necessary renewals, and also a substantial amount should be provided properly to enlarge and thus increase the efficiency and earning power of the system. It is therefore essential that a comprehensive plan be formulated whereby a fund can be provided for capital expenditures covering a period of some years, and also that a larger amount should be appropriated from the earnings of the company for renewals of the present property.

"Should the Union Traction Company stockholders agree to the lending of their company's credit for the purpose of securing the new capital necessary they will by so doing serve to increase the value of their own property, which, operated under the conditions of the Philadelphia Rapid Transit Company's contract with the city (which, however, is not transferable), will secure to the Union Traction Company's stock all of the advantages in the way of net earnings resulting therefrom up to the limit of the Philadelphia Rapid Transit Company's guarantee. In no other way can the Union Traction Company stockholders, in my opinion, secure such favorable return from the operation of their property.

"From the best information that I am able to obtain there seems to be no reason, barring unforeseen contingencies, to question the ability of the property ultimately to show substantial earnings on the present capitalization, provided a financial plan along the lines indicated can be consummated, making possible the full development of the company's earning capacity.

"In conclusion, I desire to express my appreciation of the confidence reposed in me and would be willing to accept your invitation to go on the board, conditionally, however, upon:

"First—That the Union Traction Company stockholders agree to guarantee the obligations for capital requirements.

"Second—That a sufficient amount be appropriated from

the earnings properly to maintain the physical integrity of the property."

The letter from Mr. Stotesbury was placed before the directors of the Union Traction Company on Oct. 24, 1910, and a committee consisting of Robert A. Balfour and George W. Elkins was appointed to consider the matter.

Atchison Railway, Light & Power Company, Atchison, Kan.—The stockholders of the Atchison Railway, Light & Power Company have voted to make a mortgage for $1,500,000, of which $750,000 will be issued to retire the $400,000 of preferred stock of the company and $150,000 of first mortgage 6 per cent bonds due July 1, 1915, and for improvements.

Chicago (Ill.) Consolidated Traction Company.—Attorneys for Mrs. Adelaide Yerkes, widow of Charles T. Yerkes, have filed a suit in the Circuit Court at Chicago asking that Louis O. Owsley, executor of the estate, be enjoined from exchanging $4,594,000 of bonds of the Chicago Consolidated Traction Company for new securities to be issued by the Chicago Railways. A receiver is asked for the bonds and a decree is sought directing the Chicago Railways to pay more than $6,000,000 now due on the bonds for principal and interest.

Dartmouth & Westport Street Railway, New Bedford, Mass.—The Railroad Commission of Massachusetts has approved the consolidation of the Dartmouth & Westport Street Railway and the Union Street Railway, New Bedford, the former to be absorbed by the latter. To perfect the merger the Union Street Railway will exchange $500,000 of its capital stock share for share for the stock of the Dartmouth & Westport Street Railway.

Eastern Pennsylvania Railways, Pottsville, Pa.—The pamphlet report of the Eastern Pennsylvania Railways for the year ended June 30, 1910, has been made public. Aside from the consolidated statement of earnings and expenses of the company and its subsidiaries in which the gross earnings, operating expenses and taxes, net earnings, interest on bonds, loans and rentals and the surplus are given, there is a consolidated balance sheet, which shows total assets and liabilities of $9,178,965, and a brief review of construction work carried out during the year. P. G. Gossler, president of the company, in presenting the report to the stockholders, refers as follows to the earnings of the company: "Your directors present their report for the fiscal year ended June 30, 1910, together with statement of earnings and expenses for the period, also consolidated balance sheet as of that date. The gross earnings amounted to $629,053.38, operating expenses (including taxes) were $366,017.45, leaving net earnings of $263,035.93. The gross earnings increased $49,104.01, or 8.5 per cent, and the net earnings show an increase of $26,782.36, being an increase of 11.3 per cent. Interest and rental charges were $208,674.38, an increase over the previous year of $10,408.68, leaving net profits for the year of $54,361.55, an increase over 1909 of $16,373.68, or 43.1 per cent, which is considered very satisfactory. Of the company's bonds $126,000 face value were issued during the year to cover part of the expenditures for construction."

Hudson & Manhattan Railroad, New York, N. Y.—Lewis L. Clarke, president of the American Exchange Bank, has been elected a director of the Hudson & Manhattan Railroad.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Judge Carter, of the Supreme Court at Indianapolis has fixed Nov. 10, 1910, as the date of the sale of the property of the Indianapolis & Cincinnati Traction Company under foreclosure. As stated in the Electric Railway Journal of Oct. 8, 1910, page 672, the minimum price fixed for the property in the decree is $1,045,000.

Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.—George A. Bushkirk and Louis F. Smith, trustees of the mortgage of the Indianapolis, New Castle & Toledo Electric Railway, have filed a suit to foreclose the mortgage.

Interstate Railways, Philadelphia, Pa.—The American Railways, which holds $1,500,000 of the bonds of the Interstate Railways, has made known its disapproval of the plan to issue preferred stock of the Interstate Railways to fund all coupons due on the 4 per cent bonds of the company in 1910 and 1911.

Lehigh Valley Transit Company, Allentown, Pa.—The holders of the $300,000 of outstanding bonds of the Quakertown Traction Company have been offered $750 in cash or $750 in first mortgage 5 per cent bonds of the Lehigh Transit Company or $900 in refunding and improvement 5 per cent bonds of the Lehigh Transit Company, accrued interest to be adjusted in cash, for each $1,000 bond of the Quakertown Traction Company.

New York, Westchester & Boston Railway, New York, N. Y.—The Public Service Commission of the Second District of New York has approved the application of the New York, Westchester & Boston Railway for authority to issue $5,000,000 of 50 year first mortgage 5 per cent gold bonds to pay $953,446 advanced by the City & County Contract Company in connection with the construction of the branch line from Mount Vernon to White Plains and to meet the cost, estimated at $4,294,549, of completing, electrifying and equipping this branch.

Philadelphia (Pa.) Rapid Transit Company.—The meeting of the directors of the Philadelphia Rapid Transit Company which was called for Oct. 19, 1910, was not held on account of inability to obtain the necessary quorum. City Councils have adopted a resolution which provides for a joint meeting on Nov. 3, 1910, to elect a representative of the city to the directorate of the company to succeed George H. Earle, Jr., who resigned last spring. Augustus Loeb has resigned as a director of the company because his other interests prevent him from giving the company the amount of his time which its affairs demand.

Scranton (Pa.) Railway.—Bioren & Company, Philadelphia, Pa., are privately offering for subscription at 97½ and interest a block of the new issue of general mortgage 5 per cent gold bonds of the Scranton Railway, dated Nov. 1, 1910, and due Nov. 1, 1920, but subject to call at any interest period at 102 and accrued interest.

Second Avenue Railroad, New York, N. Y.—Justice Amend has granted the application of George W. Linch, receiver of the Second Avenue Railroad, to issue $2,500,000 of receivers' certificates, bearing 6 per cent interest, for one year. The proceeds will be used to pay interest due on Nov. 1, 1910, on $5,682,000 of 5 per cent consolidated mortgage bonds held by the Guaranty Trust Company and about $545,000 of franchise taxes, the amount agreed upon between the receiver and the State. The balance will be used to improve the road and equipment.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company, which, as noted in the Electric Railway Journal of July 2, 1910, page 55, was organized in the interest of Child, Hulswit & Company, Grand Rapids, Mich., to take over a number of public utilities, has organized as follows: Frank T. Hulswit, president; Richard Schaddelee, first vice-president; Ralph S. Child, second vice-president; Benjamin C. Robinson, secretary and treasurer; T. J. Weber, consulting engineer.

Washington, Berwyn & Laurel Electric Railway, Washington, D. C.—The Public Service Commission of Maryland has approved the purchase of the Washington, Berwyn & Laurel Electric Railway by the City & Suburban Railway, Washington, D. C., which is controlled by the Washington Railway & Electric Company.

Dividends Declared

Cape Breton Electric Company, Sydney, N. S., 1½ per cent, common; 3 per cent, preferred.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Helena Light & Railway Company, Helena, Mont., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1¼ per cent, preferred.

Tampa (Fla.) Electric Company, 4 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

Traffic and Transportation

Fender Regulations of Massachusetts Railroad Commission.

The Massachusetts Railroad Commission has issued the following order to all the electric railways of the State in connection with the question of fenders, authorization being given by Chap. 463, Acts of 1906, Sec. 90, Part 3, which provides that a street railway shall equip its cars when in use with such fenders, wheel guards, brakes and emergency tools as may be required by the commission:

"Ordered, That the following regulations and requirements be prescribed relative to the equipment of street railway cars with fenders and wheel guards:

"1. All cars operated on surface lines by street railways (excepting cars run only as trailing cars) shall be equipped with fenders; and all cars operated on surface lines shall be equipped with wheel guards.

"2. In the opinion of the board the rigid part of all fenders should be, as near as practicable, 12 in. above the rail; and the height of wheel guards should be, as near as practicable, 4 in. above the rail.

"3. Each street railway shall submit to the board on or before Dec. 1, 1910, a blue print, sketch or photograph showing the types of such fenders and wheel guards attached to a car as it desires to use, together with the height of same above the rails, and accompanied by a petition requesting the approval of the same by the board."

Circular on the Value of Courtesy and Loyalty

J. F. Strickland, president of the Texas Traction Company, Dallas, Tex., has addressed the following communication on the value of courtesy and loyalty to all the employees of the company:

"The value of loyalty is beyond the conception of the average man.

"The possession in a marked degree of any worthy faculty should always be an incentive to develop that faculty.

"This company already appreciates the fact that its management has been fortunate in selecting its employees from among men whose natural inclination and training have had a tendency to develop within them loyalty and a courteous disposition much above the average.

"To those who cultivate and exercise this faculty the company extends its congratulations and its thanks; but to those who may not have fully appreciated its importance, and for the purpose of encouraging still further development along this line, thoughtful consideration of the following is suggested:

"First—The principle that underlies courteous treatment of others is simply that of 'doing unto others as you would have them do unto you.'

"Second—In a highly complex and technical business such as that of the interurban there are many things that you, with your training and daily experience, understand with perfect familiarity, but which the public do not understand. Therefore, do not assume that the public should comprehend them without asking questions, but when they make inquiry of you give them the courtesy of a reply just as full and clear as you can make it—to stay within your knowledge of the facts.

"Special attention should be given to the young and inexperienced in travel, to the aged and to ladies when traveling alone.

"Third—Words are only one means of expression, and manner is quite as important. Therefore remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man, but is to your words what oil is to machinery in making them move effectively to their purpose.

"Fourth—True courtesy is no respecter of persons; it remembers that 'a man's a man for a' that,' and gives a civil word and helping hand quite as readily to the ill-clad stranger as to an official of the company.

"Fifth—Courtesy is something the public not only has a right to expect of you, but it pays:

"It pays in the friends it makes you personally and as a representative of the company;

"It pays in minimizing the friction of your life, as well as that between the company and its patrons;

"It pays in raising your standing with the company; and

"It pays in the personal satisfaction resulting from having done the right and kindly thing by your fellow-man.

"Be careful in selecting your words. A man's demeanor, expression and phraseology are the index of his character; profanity and vulgarity are the opposite to refinement, culture and good breeding.

"The value of loyalty is beyond the conception of the average individual. A corporation, in some respects, is like a family, and nothing is appreciated more in a man than loyalty to his family, hence every man connected with a corporation, directly or indirectly, regardless of his position, should in justice to himself be loyal to that company's interest. Then it should be all together, all the time, for all that is right and good for the company.

"It is the desire of this company that all its representatives and employees whose work brings them in contact with the public may fully appreciate the value of courtesy, both to themselves and to the company, and that rivalry may exist in a friendly effort to see who can make the best record along this line."

Lima Interurban Station Opened.—The interurban station of the Ohio Electric Railway at Lima, Ohio, which was illustrated and described in the Electric Railway Journal of Oct. 22, 1910, page 874, has been opened to the public.

Gasoline Car Service Out of Indianapolis.—The Pennsylvania Railroad has placed a gasoline motor car in regular service on one of its lines out of Indianapolis with a view to adopting this type of car to meet the competition of the interurban electric railways.

Car License Ordinance Proposed in Paterson.—The Aldermen of Paterson, N. J., have adopted a resolution instructing the city counsel to prepare an ordinance to require the Public Service Railway to pay a license of $25 a year for every car which it operates in Paterson.

Ordinance to Limit Car Capacity in Newport, Ky.—An ordinance to limit the number of passengers allowed on a car and to require the electric railway operating in Newport, Ky., to clean and fumigate cars at least once a week, has been introduced in the Council of Newport and referred to the committee of the whole.

Maryland Commission Dismisses Petition for Reduction of Fare.—The Public Service Commission of Maryland has dismissed the application of residents of Ellicott City to compel the United Railways & Electric Company, Baltimore, Md., to reduce its fare from 15 cents to 10 cents one way from Baltimore to Ellicott Bay.

Petition to Carry Express in Boston Dismissed.—The City Council of Boston, Mass., has dismissed without prejudice the petition of the Boston Elevated Railway to carry freight, express and baggage over its lines in Boston on the ground that the company had not given sufficient details on which to base intelligent action.

New Haven Aldermen Reject Committee Report Which Favors Traction Expert.—The recommendation made by the committee on railroads and bridges of the City Council of New Haven, Conn., to appropriate $2,000 to defray the expenses of an expert to study street railway traffic conditions in New Haven has been laid on the table by the Council.

Complaint Against Buffalo & Lake Erie Traction Company.—The Public Service Commission of the Second District of New York has served upon the Buffalo & Lake Erie Traction Company a complaint against the manner in which cars pass each other and against the siding facilities on the Hamburg branch, which, it is alleged, are inadequate.

Cutting Brush Which Obstructs View.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., is clearing its right-of-way of brush wherever the view of the line is obstructed. Residents along the line who formerly refused to permit the company to cut the brush in order to make the operation of cars safer no longer object to the company clearing the right-of-way.

Use of Commutation Tickets on New York Line Extended.—The Poughkeepsie City & Wappingers Falls Elec-

tric Railway, Poughkeepsie, N. Y., has extended the use of 52-trip monthly commutation tickets on the Wappingers division between Poughkeepsie and Wappingers Falls to include passage on cars which are scheduled to leave either terminus before 8 a. m. and between 12 m. and 9:30 p. m.

New Limited Service Between Tacoma and Seattle.—About Dec. 1, 1910, the Puget Sound Electric Railway will establish an especially fast limited service between Tacoma and Seattle between 8 a. m. and 8 p. m., trains to leave the cities every hour on the even hour. The new limiteds will be scheduled to make the run between the cities in less than 70 minutes. The local service will probably be continued as now operated.

Electric Railways Boost Trade of Louisville.—Electric railways have played a prominent part in the recent campaign of the Louisville Commercial Club to boost Louisville as a trade center. Fifty representative merchants and manufacturers of Seymour, Ind., were entertained by the Commercial Club of Louisville at a luncheon at the Seelbach, Louisville, a short time ago, the visitors being transported by the Louisville & Southern Indiana Traction Company in a special car.

Traffic Figures in New York.—In a report made by the Public Service Commission of the First District of New York showing the total number of tickets sold on the elevated and subway lines in New York City in the year ended June 30 last, the statement is made that 268,962,115 tickets were purchased for the subway and 293,826,280 for rides on the four elevated lines. The report shows that 30,531,969 more tickets were sold in the subway and 17,576,084 more on the elevated system than in the previous year. At the Brooklyn subway stations 32,476,087 tickets were sold, an increase of 5,392,645 for the year.

Action Urged in Regard to Restoration of Transfers.—Samuel J. Bloomingdale, of Bloomingdale Brothers, New York, N. Y., has sent a letter to the Public Service Commission of the First District of New York in which he urges that no further extension of time be granted in respect of the order of the commission which provides for the restoration of transfers between the Fifty-ninth Street line of the Central Park, North & East River Railroad and the lines of the Metropolitan Street Railway, which it intersects. The order has been extended by the commission to Nov. 1, 1910.

Accident in New York Subway.—A car of one of the south-bound express trains in the New York subway was derailed near the Fulton Street station on Oct. 20, 1910, about 5 p. m., and service below the Brooklyn Bridge and to Brooklyn was as a consequence suspended for about five hours. Traffic was for the time being diverted to the Brooklyn Bridge, and it was with great difficulty that the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad were able to handle the crowds which were so suddenly forced to change from the avenues of travel that they customarily use to the routes over the bridge.

Fender Ordinance in Trenton.—Walter Madden, Mayor of Trenton, N. J., has signed the amendment passed by the City Council of Trenton recently to the ordinance compelling the use of fenders on street cars in Trenton, which ordinance was originally passed by the Council in 1903. Section 1 of the original ordinance is the part changed by the passage of the amendment. The amendment follows: "Section 1. That Section 1 of the ordinance entitled 'An ordinance to compel street railway companies owning and operating electric street railway cars within the city of Trenton to equip the same with fenders of the most approved pattern, approved May 6, 1903,' be and the same is hereby amended so as to read as follows: 'Section 1. That all street railway companies owning and operating electric street railway cars within the city of Trenton shall equip with and maintain upon each street railway car by them operated and run within the city of Trenton fenders of the most approved pattern, subject to the approval of the Mayor of the city, and so attach the same to the said cars as best to protect from injury persons and vehicles using the streets of the said city and riding on the said cars.' Section 2. All ordinances and parts of ordinances inconsistent herewith be and the same are hereby repealed."

Personal Mention

Mr. William Spalding, formerly construction engineer with the Portland Railway, Light & Power Company, Portland, Ore., has been appointed general manager of the Tillanrook Electric Light & Fuel Company, Tillanrook, Ore.

Mr. J. G. Swain has resigned as superintendent of light and power of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., to become superintendent of motive power of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.

Mr. George Westinghouse is the subject of an appreciative article in the New York daily *Tribune* for Oct. 23, 1910, in which an account is given of his latest invention, that of a pneumatic cushion for automobiles, to eliminate the necessity of pneumatic tires.

Mr. J. H. M. Andrews, whose appointment as assistant to the chief engineer of the Philadelphia Rapid Transit Company was mentioned in the Electric Railway Journal of Aug. 27, 1910, has been appointed superintendent of lines and cables of the Philadelphia Rapid Transit Company. Mr. Andrews takes the place made vacant by the death of the late James Heywood.

Col. E. C. Spring has been appointed assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., in charge of traffic. Col. Spring was formerly general superintendent of the Dayton, Covington & Piqua Traction Company, Dayton, Ohio. Before becoming connected with the Dayton, Covington & Piqua Traction Company in 1902, Col. Spring was superintendent of the Newton & Boston Street Railway and the Wellesley & Boston Street Railway. Col. Spring was also president of the New England Street Railway Club and the Central Electric Railway Association.

Mr. Leslie R. Coffin, who has been acting manager of the Whatcom County Railway & Light Company, Bellingham, Wash., since the appointment of Mr. L. H. Bean as manager of the Tacoma Railway & Power Company, Tacoma, Wash., has been appointed manager of the Whatcom County Railway & Light Company. Previous to his appointment as acting manager of the Whatcom County Railway & Light Company to succeed Mr. Bean, Mr. Coffin held the position of electrical engineer of the company for about three years. He went to Bellingham direct from the home office of Stone & Webster, Boston, Mass., where he had been in the service of that company for a year, having entered its office after his graduation as electrical engineer from Harvard, 1906.

Mr. E. H. Mather has become associated with the bond department of Hayden, Stone & Company, bankers and brokers, New York and Boston, as the expert in street railway, water power, gas and electric light securities. Until recently Mr. Mather was general manager of the Nassau Light & Power Company, Mineola, N. Y. He served his engineering apprenticeship with the Thomson-Houston Company and entered the service of the General Electric Company after the consolidation. In 1895 he left that company to become superintendent of the Fair Haven & Westville Railroad, New Haven, Conn. After similar connections with the Central Railway & Light Company, New Britain, Conn., and the Portland (Maine) Electric Lighting Company he became in 1907 general manager of the Nassau Light & Power Company.

Mr. George F. Reed, division superintendent of the Springfield (Mass.) Street Railway, has been appointed superintendent of transportation of all the lines included in the Springfield system, a new department just created by the company. Mr. Reed will continue in the capacity of division superintendent as heretofore, with offices at North Main Street and Carew Street, Springfield. In his new position Mr. Reed will have jurisdiction over all interests pertaining to transportation on the lines embracing Springfield, Westfield and Palmer. Mr. Reed entered the service of the Springfield Street Railway in 1882 as a clerk. He was appointed electrical superintendent of the company in 1890 and foreman of transportation in 1895. In 1905 he was appointed superintendent of transportation of the Springfield division of the company, and continued in this capacity until his recent appointment as superintendent of transportation of all lines of the company.

Construction News

RECENT INCORPORATIONS

***Carnesville (Ga.) Railway.**—Chartered in Georgia to build a 20-mile electric railway to connect Toccoa, Carnesville, Mize and Red Hill. Capital stock, $200,000. Incorporators: W. S. Erwin, J. H. Hicks, E. S. Hunnicull, G. W. Edwards, G. W. Davis, J. C. Andrews, H. H. Parker, W. R. Whiting, W. P. King and J. R. Hall.

Alton & Mississippi Belt Railway & Transportation Company, Chicago, Ill.—Application for a charter has been made in Illinois by this company to build an electric railway from a point in St. Clair County on the eastern inner harbor line of the Mississippi River, opposite St. Louis, through St. Clair and Madison Counties to Alton. Capital stock, $25,000. Headquarters, Chicago. Incorporators: John W. Bissell, Julius H. Quasser, Henry L. Stern and Herbert J. Feinberg, all of Chicago.

***Bogalusa Public Service Company, Bogalusa, La.**—Incorporated in Louisiana to build and operate electric railways in and around Bogalusa. Capital stock, $500,000. Incorporators: C. W. Goodyear, Jr.; J. K. Breeden and C. J. Wade.

***Omaha & Western Iowa Traction Company, Pierre, S. D.**—Incorporated in South Dakota to build a 90-mile electric railway to connect Omaha, Neb.; Council Bluffs, Ia., and Pierre, S. D. Capital stock, $250,000. Headquarters, Pierre, S. D. Incorporators: C. E. Brown, M. E. Gallitan, G. Desmond McDonough, Daniel J. Avery, Chicago, Ill., and James S. Sebree, Pierre, S. D.

Dallas (Tex.) Traction Company.—Incorporated in Texas to build street and interurban railways. Capital stock, $10,000. Incorporators: E. L. Lancaster, J. B. Martin, R. A. Graves and W. G. Siler. [E. R. J., Feb. 19, '10.]

FRANCHISES

Lodi, Cal.—The Central California Traction Company, San Francisco, has been granted a franchise by the Council to build its tracks on certain streets in Lodi.

Marysville, Cal.—The Northern Electric Railway, Chico, has been granted a franchise by the City Council to extend its tracks in Marysville.

South Pasadena, Cal.—The Pacific Electric Railway, Los Angeles, has been granted a 37-year franchise to double-track some of its lines in South Pasadena.

New Haven, Conn.—L. M. Daggett, representing the Shore Line Electric Railway, has asked the Board of Aldermen for the right to build its tracks in New Haven in accordance with its franchise rights.

***Albany, Ga.**—C. W. Rawson and associates have asked the City Council for a franchise to build an electric railway over certain streets in Albany.

Council Bluffs, Ia.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has asked the Council for a franchise to extend some of its lines in Council Bluffs.

Shreveport, La.—It is stated that the Shreveport Traction Company will ask the City Council for a franchise to build an extension of its Southern-Fairfield Avenue line in Shreveport.

Baltimore, Md.—The United Railways & Electric Company, Baltimore, has been granted a franchise by the City Council to extend its tracks in Baltimore. The company will ask the Public Service Commission for approval of this franchise.

Kansas City, Mo.—The Metropolitan Street Railway has been granted permits by the Board of Public Works to double-track its line from Broadway to Wyandotte Street in Kansas City.

Morristown, N. J.—The Morris County Traction Company has been granted a franchise by the Board of Aldermen to extend its tracks in Morristown around the park, down Morris Street to Spring Street, from there a double track to Washington's headquarters, and then by private right-of-way beyond the town limits.

Baldwinsville, N. Y.—The Syracuse, Lake Shore & Northern Railroad, Syracuse, has been granted a franchise by the Village Board to double-track its line through Syracuse Street, in Baldwinsville.

Hamilton, Ohio.—The Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, has asked the County Commissioners for a franchise to build its railway over certain streets in Hamilton. This proposed railway will connect Cleveland and Zanesville, via Elyria, Barberton, Oreville, Millersburg and Coshocton. J. J. Breittinger, president. [E. R. J., Oct. 22, '10.]

Salem, Ore.—The Oregon Electric Railway, Portland, has been granted a franchise by the City Council to build its tracks over certain streets in Salem.

Spokane, Wash.—The Spokane Traction Company has been granted a franchise by the Council to build four extensions of its tracks in Spokane.

***Delavan, Wis.**—Hamilton Brown, Delavan, has been granted a franchise by the Board of Supervisors to build an electric railway in Delavan.

Madison, Wis.—The Chicago & Wisconsin Valley Railway has been granted a franchise by the Common Council to build an electric railway in Madison. This proposed line will connect Madison and Wausau via Portage, Janesville and Merrill. Allen T. Russell, Chicago, Ill., general manager.

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—It is reported that this company has begun work on the extension of its tracks from Lincoln Place to Orangewood.

Hot Springs (Ark.) Street Railway.—This company reports that it will soon build a mile extension to its South Hot Springs line.

Eureka Springs Electric Company, Little Rock, Ark.—This company has recently been taken over by the Eureka Springs Company, and it in its turn took over the road formerly known as the Citizens' Electric Company, which is in the hands of receivers. Adolph M. Barron, Eureka Springs, secretary. [E. R. J., March 5, '10.]

***Westminster, B. C.**—It is reported that the Board of Trade is considering plans for building an electric railway to connect Westminster and Ladner.

Northern Electric Railway, Chico, Cal.—This company has awarded the contract to the Mississippi Valley Bridge Building Company, Leavenworth, Kan., for the construction of the foundations of the M Street bridge in Sacramento across the Sacramento River. The Vallejo & Northern Railway is also interested and included in the contract. According to the contract, the M Street bridge will have a single railway track, two driveways and two sidewalks. It will have two fixed spans of 125 ft. in length and a draw of 400 ft.

Oakland & Antioch Railway, Oakland, Cal.—It is reported that this company has resumed the work of grading on its line between Bay Point and Lafayette, the contract for which has been awarded to the Bay Point Construction Company. An 80-ft. bridge will be built across the Grizzly Creek, near Lafayette.

Porterville (Cal.) Northeastern Railway.—This company has completed survey and secured the necessary capital for constructing its proposed 18-mile electric railway along the north bank of the Tule River in Porterville. Contracts for building are to be let at once. C. S. Freeland, Porterville, chief engineer. [E. R. J., Oct. 8, '10.]

California Midland Railroad, San Francisco, Cal.—This company is said to have been successful in selling its bonds and that construction work will be soon resumed on its railway to connect Hammonton, Grass Valley and Marysville. The roadbed between Marysville and Hammonton was partially constructed two years ago. The line as planned will connect Marysville, Grass Valley, Nevada City and Auburn, a distance of 70 miles. John Martin, 708 Alaska Commercial Building, San Francisco, president.

Shore Line Electric Railway, New Haven, Conn.—This company has filed plans for the extension of its line from Guilford and North Branford through the Totoket and Foxen regions across the meadows, crossing the Quinnipiac River and tapping the Connecticut company's line at State Street and Ferry Street in New Haven.

Southern Traction Company of Illinois, East St. Louis, Ill.—This company has resumed construction of its 30 miles

of railway between St. Louis, East St. Louis and Belleville. It will connect with the St. Louis Municipal Free Bridge in St. Louis. About half of the grading is finished and some track laid in East St. Louis and Belleville. The East St. Louis Engineering Company, Cahokia Building, East St. Louis, is engineer for the East St. Louis and St. Louis end and Harper Brothers, East St. Louis, are engineers for the Belleville section of the line.

*Brazil, Ind.—It is reported that plans are being made to build a proposed electric railway to connect Jasonville and Brazil via Clay City.

*Indiana Electric Transmission Company, Evansville, Ind.—It is said that this company is planning to build an electric railway from Terre Haute to Clay City, and that it has completed surveys.

Evansville, Mount Carmel & Olney Electric Railway, Evansville, Ind.—This company is said to have begun work on its 65-mile interurban railway to connect Mount Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. E. Q. Lockyear, secretary. [E. R. J., July 2, '10.]

Tri-City Railway, Davenport, Ia.—This company has awarded to the McCarthy Improvement Company, Davenport, the contract for grading for the extension of its Twenty-seventh Street line in Davenport.

*Winnipeg, Salina & Gulf Railway, Salina, Kan.—This company, it is reported, proposes to construct an electric railway from Omaha, Neb., via Oak to Chester, thence to Belleville, Kan., and then to Salina, Sterling and Pratt, Kan., thence to Alva, Okla.; Fairview, Okeene and Oklahoma City. Other branch lines will be run from Salina to Kansas City, Mo., and from Alva, Okla., to Des Moines, N. M. The W. K. Palmer Company, Engineers, 717-720 Dwight Building, Kansas City, Mo., will make all surveys and have charge of all the engineering work.

Berkshire Street Railway, Pittsfield, Mass.—This company is said to be considering plans to extend its Briggsville line through to Wilmington, Vt., via Stamford, Hartwellville and Readsboro.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company reports that it is now building about 2 miles of new track in Gulfport.

*St. Louis, Mo.—Charles F. Dollas, representing the Gratiot & Lindenwood Improvement Association, and associates are considering plans for building an independent street railway in St. Louis to extend from South Broadway to the suburbs of Greenwood and Maplewood.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has completed and placed in operation its Twenty-fourth Street extension, thereby connecting South Omaha and Florence.

Elmira, Corning & Waverly Railroad, Elmira, N. Y.—This company has awarded the contract to the Powers & Mansfield Company for the grading and masonry for 10 miles of track from Elmira to Waverly. It has also awarded a contract to Smith-McCormick Company, Easton, Pa., for the construction of a new iron bridge across the Chemung River, 3 miles from Corning.

Hornell (N. Y.) Traction Company.—This company reports that during the next few weeks it will rebuild its tracks on some of the streets in Hornell.

*Manchester, N. Y.—The Manchester Improvement Company, Manchester, is said to be considering plans for building an electric railway to connect Manchester, Geneva, Clifton Springs, Port Gibson, Palmyra and Manchester. Surveys have already been completed. This new line would connect with the Rochester, Syracuse & Eastern Railway at Geneva and with the Syracuse & Eastern Railway at Palmyra.

New York, Westchester & Boston Railway, New York, N. Y.—This company has been authorized by the Public Service Commission, Second District, to exercise franchise granted for the construction of its railroad within Mount Vernon, New Rochelle, North Pelham, Eastchester, Scarsdale and White Plains.

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—This company is straightening its line between Syracuse and Auburn. The new route will save one mile and reduce the running time between the cities many minutes, being practically a straight line between Skaneateles and Auburn.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—The stockholders of this company at a meeting in Cleveland on Oct. 22 voted to increase the capital stock from $100,000 to $2,000,000 and also to issue $1,900,000 40-year 6 per cent gold bearing bonds. The bonds, it is said, will be taken by London and Montreal bankers. The financial arrangements thus made will enable the company to build that portion of the line between Cleveland and Orrville and put it into operation. A. De Mayo & Co., Montreal, have been awarded the contract for building this railway and will begin work about Nov. 1. More than 190 miles of private right-of-way have been secured and the surveys have covered 275 miles. A franchise for the use of about 8 miles of the county road in South Brooklyn and south of that point is being sought from the Cuyahoga County Commissioners. J. J. Breitinger, president [E. R. J., Oct. 22, '10.]

*Ponca City, Okla.—Messrs. B. Steward and Frank Hatten, Ponca City, are said to have made preliminary arrangements and secured the necessary capital for building a street railway in Ponca City. They will soon apply for a charter.

Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.—This company announces that it will begin work at once building its proposed 60-mile railway from Ottawa to Brockville. Andrew Haydon, president. [E. R. J., Oct. 1, '10.]

Cumberland Railway, Carlisle, Pa.—It is said that this company will soon build a 22-mile extension of its railway from Newville to Shippensburg.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company reports that it is ready to award contracts for grading 30 miles of roadbed. This proposed railway will connect Clarion, Reidsburg, Sligo, Rimersburg and East Brady. G. C. Arnald, Clarion, president. [E. R. J., Oct. 22, '10.]

Scranton & Binghamton Traction Company, Scranton, Pa.—This company has filed for record at Wilkes-Barre a mortgage in favor of the Anthracite Savings Bank, Wilkes-Barre, as trustee to secure an issue of $10,000,000 of 6 per cent bonds, dated June 1, 1910. This proposed 62-mile electric railway will connect Franklin Forks, Lausville, Corbettsville, Conklin, Brooklyn, Lindaville, Montrose and Binghamton. A viaduct will be built over the Delaware, Lackawanna & Western Railroad tracks at Montrose. The final surveys for the railway are now in progress. W. L. Connel, Scranton, president. [E. R. J., March 5, '10.]

Wilkes-Barre (Pa.) Railway.—This company is said to have begun work on the extension of its railway from Hughestown to Avoca. It is planned to complete this line and to place it in operation before January, 1911.

*Williamsport, Pa.—Messrs. James Fisher and Oliver Berger are said to be surveying for a route for an electric railway from Antes Fort through the Nippenose Valley.

Amarillo, Tex.—It is reported that preliminary arrangements have been made and construction has begun on a proposed 2-mile electric railway to be built from Amarillo to San Jacinto Heights. N. A. Brown is interested. [E. R. J., Aug. 25, '10.]

Galveston-Houston Electric Railway, Houston, Tex.—This company is said to have laid 10 miles of track between Texas City Junction and League City. This proposed 50-mile railway will connect Galveston and Houston. [E. R. J., July 2, '10.]

Nooksack Valley Traction Company, Bellingham, Wash.—This company, it is said, has made preliminary arrangements for building its proposed electric railway to connect Bellingham and Sumas. Samuel Alsop is interested. [E. R. J., Jan. 29, '10.]

Spokane & Inland Empire Railroad, Spokane, Wash.—It is reported that this company will build a 2-mile extension of its railway from its present terminus at Cleveland Avenue and Elm Street to the Boulevard Park addition in Spokane.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—It is reported that this company is considering plans for building a passenger depot on the corner of Myers Street and Robinson Street and a freight depot on Huntoon Street and Robinson Street in Oroville.

Evansville Suburban & Newburgh Railway, Evansville, Ind.—This company advises that it is now building a new fireproof freight depot in Evansville.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company, it is said, will remodel its machine shop into a passenger, freight and car house. The structure will be one story, 60 ft. x 120 ft., of brick construction. The cost is estimated to be about $5,000.

Central Kentucky Traction Company, Frankfort, Ky.—This company is said to be considering plans for building a station at Versailles, Ky.

Michigan United Railways, Lansing, Mich.—This company is erecting a terminal building and train shed at Jackson. The new terminal will have an arcade entrance on one of the main business streets and the train shed in the rear of the terminal building will be a block long, enclosing two tracks. It is expected that the terminal will be completed by Nov. 15.

Butler (Pa.) Passenger Railway.—It is reported that this company is considering plans for building an extension to its car house in Butler. The addition will be 60 ft. x 100 ft. It will have a capacity for sheltering nine of the larger cars and will be used largely for storage, painting and repair work.

Hull Electric Company, Deschenes, Que.—This company reports that it will build a new car house and repair shops in Deschenes next Spring.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has completed its new substation at Valley Center and the machinery for the plant is being installed.

Pittsfield (Mass.) Electric Street Railway.—This company is now installing a new system for furnishing power for its lines out of Pittsfield, and when completed there will be sufficient power to meet all requirements. It has awarded the contract to Ley & Company for building a new substation at Cheshire, from which power will be transmitted over the Cheshire line out of Pittsfield as far as Lanesboro, and also over the Dalton and Hinsdale line from Coltsville to Hinsdale. New feed wires are being strung from the power station on Seymour Street, Pittsfield, to supply additional power on the West Pittsfield line.

Meridian (Miss.) Light & Railway Company.—This company has let the contract for the construction of an addition to its boiler house in Meridian. It will install a 500-hp. Babcock & Wilcox boiler.

Boston & Maine R. R., Concord & Manchester Electric Branch, Concord, N. H.—This company advises that it has now in progress under contract with the Stone & Webster Engineering Corporation the development of its new water-power plant at Franklin, N. H.

Oakland Street Railway, Dayton, Ohio.—This company is said to be considering plans for relocating and enlarging its power plant.

Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa.—This company advises that it now has in course of erection a bulkhead and wharf, 50 ft. x 100 ft., at its power plant on the Neshaminy Creek, Bridgewater, for the purpose of unloading coal, which it expects to have shipped by water instead of by rail. Barges of 250 tons capacity will be unloaded by a derrick and clamshell apparatus. The estimated cost of construction, including the engine and derrick, will be about $1,800. William H. Murphy, superintendent.

Holmesburg, Tacony & Frankford Electric Railway, Tacony, Pa.—This company reports that during the next two weeks it will let contracts for building an addition to its boiler house in Tacony. Henry Glazier, general superintendent.

Manufactures & Supplies

ROLLING STOCK

International Transit Company, Sault Ste. Marie, Ont., is considering the purchase of three closed trailers.

Great Falls & Dominion Railroad, Washington, D. C., is reported to be considering the purchase of several cars.

Illinois Traction System, Peoria, Ill., has ordered 50 coal cars and 25 box cars from Haskell & Barker and 35 trailer express cars from the McGuire-Cummings Manufacturing Company.

Richmond & Henrico Railway, Richmond, Va., reported in the Electric Railway Journal of Aug. 27, 1910, as planning to purchase 16 cars, has ordered 12 closed cars from the Southern Car Company.

Second Avenue Railroad, New York, N. Y., mentioned in the Electric Railway Journal as being in the market for 200 new railway motor equipments, has ordered 200 equipments of No. 216 interpole motors from the General Electric Company.

Beaumont Traction Company, Beaumont, Tex., has ordered three semi-convertible double-truck pay-within cars from the American Car Company. The car bodies are 25 ft. 4 in. long and the length over all is 37 ft. 4 in. They are equipped with Brill 27 G1 trucks, G. E.-67 motors and type A4 National air brakes.

Portland Railway, Light & Power Company, Portland, Ore., reported in the Electric Railway Journal of Sept. 17, 1910, as contemplating the purchase of 40 additional cars, has ordered 25 28-ft. 8-in. pay-as-you-enter cars and 15 31-ft. 6-in. pay-as-you-enter cars from the American Car Company. The cars will be mounted on Brill No. 22E trucks.

Central Park, North & East River Railroad, New York, N. Y., which has been operating horse cars on a number of its lines, has practically concluded negotiations with the Federal Storage Battery Car Company for 10 Beach storage-battery cars similar to the car now in service on the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad, New York.

Michigan United Railways, Jackson, Mich., has several equipment orders under way. The J. G. Brill Company will soon ship to this company 30 double-truck city cars, 41 ft. long over all. A portion of these bodies will be equipped with McGuire-Cummings Company No. 10-A trucks. The platforms will be adapted for the use of the pay-on-platform fare-collecting system. All of the new city cars will be equipped with Hale & Kilburn seats and Allis-Chalmers air brakes. Within the next month the company expects to receive from the McGuire-Cummings Manufacturing Company a new office car for its interurban system. This car will have a complete office equipment, an observation end, sleeping apartments, kitchen and dining room. Other rolling stock equipment recently ordered includes a McGuire-Cummings gravity street sprinkler with a capacity of 3000 gal. for the Jackson city lines and two snow sweepers of the same manufacture with steel underframes to be used in Jackson and Lansing. The General Electric Company is furnishing the Michigan United Railways with four G. E. 216 2-motor car equipments and 10 G. E.-210 2-motor equipments.

TRADE NOTES

Edward V. Kane & Company, Philadelphia, Pa., bankers, have dissolved and a new firm of the same name has been formed, with offices at 610 Morris Building.

H. H. Curran, of the firm of Curran & Mead, New York, N. Y., is a candidate for Congress on the Republican and Independence League tickets in the Eleventh Congressional District in New York.

Bird-Archer Company, New York, N. Y., has appointed G. Fred Collins as special representative with office in New York. Mr. Collins was formerly connected with the Crucible Steel Company of America.

American Car & Foundry Company, New York, N. Y., will erect a one-story addition, 72 ft. x 100 ft., to its plant at Wilmington, Del. The new structure will be of steel and concrete and will cost, it is estimated, $8,550.

Peter Smith Heater Company, Detroit, Mich., has delivered the first installment of 10 Peter Smith hot-air heaters to the Public Service Railway, and 4 hot-air heaters to the North Jersey Rapid Transit Company.

United States Metal & Manufacturing Company, 165 Broadway, New York, N. Y., has taken the exclusive agency for the electric railway field in the United States for the axles (including the Cunningham axle) manufactured by the Carbon Steel Company.

Malcolm Brake Shoe Company, Charleston, W. Va., has been incorporated with a capital stock of $25,000 to manufacture brake shoes. The incorporators are: C. A. Malcolm, Mindon, W. Va.; T. Mairs, S. B. Avis, Walter Hardy and A. E. Scherr, Charleston.

Gisholt Machine Company, Madison, Wis., and **Joseph T. Ryerson & Son, Chicago, Ill.,** announce an association of interests in the manufacture and sale of machinery and machine tools. Extensive additions will be made at once to the Gisholt plant to increase the output of that company.

Wesco Supply Company, St. Louis, Mo., is erecting a new building at Eighth Street and Clark Avenue, St. Louis, which will be a duplicate of its present building at Seventh Street and Clark Avenue. The company will occupy both structures, thus giving it double the amount of floor space that it has at present.

Baldwin Locomotive Works and Standard Steel Works Company, Philadelphia, Pa., have appointed C. H. Peterson Southwestern representative, with offices at 914 Security Building, St. Louis, Mo. Mr. Peterson was formerly connected with the Chicago office of these companies. Edward B. Halsey, who has been in charge of the St. Louis office, has been transferred to the sales department of the Philadelphia office.

Railway Equipment Company, Portland, Ore., which is a jobber and manufacturer's agent for all kinds of steam and electric railway equipment and supplies, is preparing to issue a general railway supply catalog. Manufacturers of railway supplies are invited to furnish illustrations, descriptive matter and stock lists of their goods for insertion in this general catalog or to send copies of their own catalogs from which the information required may be abstracted.

American Brake Company, St. Louis, Mo., has awarded a contract to Westinghouse, Church, Kerr & Company, New York, N. Y., for building and equipping an additional machine and blacksmith shop and for making other improvements at the company's plant at St. Louis. The machine shop will be constructed of steel, concrete and hollow brick, will be three stories high and will cover an area of 13,000 sq. ft. The blacksmith shop will have the same dimensions, but will be only one story high.

Robert W. Hunt & Company, Chicago, Ill., have taken over the entire equipment of an electrical testing laboratory with a view to improving and enlarging their facilities. The following is a partial list of the investigations which this company is prepared to make: Insulation tests of wires and cables; resistance and conductivity tests; insulation of completed systems; calibration of instruments; life and photometric tests of lamps; location of faults in power and telephone cables; efficiency tests of motors, generators and transformers; location and prevention of electrolysis.

Northern Engineering Works, Detroit, Mich., are completing an addition to their crane-erecting shop, approximately 160 ft. x 60 ft., of fireproof structural steel and brick construction and having steel sash. Three cranes and two overhead trolley runs will serve the floor. Electric and pneumatic hoists will be used. The machinery has been installed and the building will soon be occupied. A new storage yard for structural steel has been laid out alongside the addition and is covered by a 60-ft. span, three-motor electric Northern gantry crane of special construction.

Federal Storage Battery Company, New York, N. Y., reports that it is completing a practically all-steel 28-ft. double-truck car for the South Shore Traction Company to be operated over the Queensboro Bridge from Long Island to New York City. It also reports the receipt of a letter from the Atlantic City & Shore Railroad, on whose line its single-truck car was run during the convention. The car ran on South Carolina Avenue, between the Boardwalk and Atlantic Avenue. On Oct. 15 between 1 p. m. and 5 p. m. it made 36 trips and 93 stops, carried 266 passengers and showed a consumption of exactly 5 kw-hours. This corresponds to an average consumption per car mile of 0.347 kw-hour, and per ton mile of 54.2 watt-hours. The car speed, including all stops, was 9 m.p.h. The letter concludes with a statement from John N. Akarman, general superintendent of the Atlantic City & Shore Railroad, saying that "the car referred to was operated at all times while on our lines without the least difficulty; its acceleration and performance generally were perfect, and I wish to congratulate you on the production of such a splendid and adaptable car."

ADVERTISING LITERATURE

Holland Trolley Supply Company, Cleveland, Ohio, is mailing a circular describing and illustrating the Holland sleet cutter.

Wickes Brothers, Saginaw, Mich., have issued their October monthly stock list of boilers, engines, pumps, machine tools, electrical machinery, etc., which they have on hand for immediate shipment.

Goldschmidt Thermit Company, New York, N. Y., has issued a 16-page catalog in which the various applications of thermit to rail welding are described. Attention is also called to the repairing of motor cases and truck frames by the thermit process.

Wesco Supply Company, St. Louis, Mo., is distributing its general supply catalog No. 150. It covers every department of the electrical industry, including general supplies, a complete line of street railway material, electrical novelties and ignition apparatus and supplies. The publication contains about 1400 pages.

C-A-Wood-Preserver Company, Austin, Tex., is mailing a circular calling attention to the fact that the recent forest fires in the West destroyed more than $25,000,000 worth of uninsured timber and that in the year 1908 more than $50,000,000 was spent for replacing ties which were uninsured against rot destruction. The company also discusses the value of the C-A-wood preserver.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has issued a 22-page pamphlet entitled "Titanium in Iron." This alloy may be used through the cupola or through the air furnace to be melted down with the charge, making it more simple and practicable for ordinary use than the ladle method, where the alloy may also be used. The publication contains directions for using titanium in machinery castings, gray iron castings, malleable iron, chilled rolls and chilled iron car wheels.

The J. G. Brill Company, Philadelphia, Pa., in the October issue of the *Brill Magazine* prints the following articles: "Conditions Which Govern the Type of Car for City Service —Richmond, Va.," "Motor Car for the Southern Railway," "Private Car for C. D. Beebe," "Single-Truck Cars for Dayton, Ohio," "Equipment for Citizens' Railway, Waco, Tex.," and "Exhibition Car at A. S. I. R. A. Convention." The subject of the biographical sketch in the October issue is James F. Shaw, past-president of the American Street & Interurban Railway Association. As a supplement to the present issue the magazine contains an illustrated description of the Brill exhibition at the 1910 Atlantic City convention.

General Electric Company, Schenectady, N. Y., has recently issued Bulletins 4766, 4769, 4771, 4773, 4775 and 4776. Bulletin 4766 describes and illustrates tantalum incandescent lamps for general illumination. Bulletin No. 4769 is entitled "Train Lighting with G. E. Mazda and Tantalum Lamps." Bulletin No. 4771 is entitled "Hand-Operated Starting Compensators for Alternating Current Motors" and supersedes previous bulletins on this subject. Bulletin No. 4773 describes and illustrates Thomson high torque induction test meter, type 1B-4. Bulletin No. 4775 describes and illustrates type K3 single-phase induction motors. This motor is made in capacities of from 1 to 15 hp and wound for 110 or 220 volts, 60 cycles. Bulletin No. 4776 illustrates and describes engine type continuous current generators, forms RB and RBC for lighting and power. These generators are for two and three-wire systems, from 25 to 250 kw and for standard voltages.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, NOVEMBER 5, 1910 No. 19

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 5, 1910.

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Surface Contact Systems Abroad

For the past three or four months the English electrical papers have been chronicling different stages in the efforts of one of the few tramway companies in England using the surface contact system to get rid of it and to adopt the overhead trolley in its place. Our readers will not be surprised to hear that inefficiency in operation and danger to passers-by were the charges brought against the prisoner at the bar, who is an old offender. The reports of the trial, with the complaints on the one side of dead studs which should be alive and of live studs which should be dead, and on the other side of the objectionable appearance of the overhead system, take one back to the middle ages of electric railroading. The plea of the city that the surface contact system should receive another chance and that "the company alter its studs in accordance with the advice of our experts" was met by the reply that the company had already spent thousands of pounds in attempting to make the system a success and that it now considered itself entitled to relief. It is gratifying to find that the arbitrator appointed by the Board of Trade to hear the testimony gave an award promptly in favor of the company.

Extra Fares in the Pennsylvania Tunnel

The principle of making passengers pay for expensive improvements which they enjoy is strikingly exemplified in the new rates announced by the Pennsylvania Railroad for suburban tickets to be used via the new tube to the station at Seventh Avenue and Thirty-third Street, New York. For tickets from Newark to New York by this route a charge of 12 cents will be imposed in addition to the regular fare, and for the stations beyond Newark but within the suburban district the supercharge will be about 10 cents per trip. Six dollars additional will be charged for 60-trip monthly commutation tickets from suburban stations and $5 additional for 50-trip family tickets. Undoubtedly these fares are based on the calculated pro rata cost per passenger using the new station. While the increase is large on the mileage basis, the time saved by the new route, as compared with the ferry or Hudson tube route, is considerable, and many persons will undoubtedly be glad to pay higher fare. The principle of making each part of the traffic bear its proportion of the cost of operation and of increasing fares where the service given warrants an additional charge could well be copied by many electric railways. Only very unusual circumstances should warrant any road in continuing to carry passengers below cost, or at cost. The difficulties in increasing fares on city railways are undoubtedly much greater than on steam or interurban railways, but with a public sentiment educated to the idea of higher railroad rates through steam railroad example, there should be less difficulty than there has ever been before.

Selection of Transportation Employees

There are almost as many theories as to the class of men who make good platform employees as there are in regard to the cause of rail corrugation. Some of these opinions were expressed during the discussion of the report on the training of transportation employees at the Atlantic City convention, but interviews on the subject with representative managers would disclose a very much larger number of theories. Some railway companies will not hire men who have previously been engaged in steam railroad work, while others decline to accept any other class of employees. Some companies draw the line at a man who has had an accident on another road, whereas their neighbors often believe that a man who has had an accident is more careful and makes a better employee than before. Still other companies prefer men from the country, while on other lines the question of city or country residence has nothing to do with the question of engagement. After all, the principal point is whether the man who enters the service will conform to the rules and discipline of the company cheerfully and faithfully. If his past experience will help him to do this, he is so much the better off, but whether it does or not, if he is always ready to do not only his duty, but more than his duty if the interests of his employers demand it, he should have no difficulty in remaining in their service and winning their respect. There is no doubt that greater attention is being given to the selection and training of employees at present than ever before and that there is a constant tendency toward their more rigorous training. Railway companies are being held to a closer accountability by the courts than in the past for the proper and safe operation of the cars, and the position of the trainman is increasing in responsibility. This fact requires a higher standard of men and of itself should tend to cause them to join the service.

Minor Economies in the Car House

Systematic work in the car house brings as large a reward in proportion to the size of the plant as in the repair shop itself. Labor cost is the striking item of expense in car house operation, and it pays to eliminate every possible waste of time in handling cars at such points, since the mileage is entirely unproductive. Such a simple thing as maintaining spare fuses on transfer tables is a time-saving plan all out of proportion to its cost, especially when a table is shut down during the rush hours. Improved lighting of track switches in important yards is another essential, and the maintenance of first-class overhead work on the short curves and frequent intersections or crossings of tracks is worth a great deal where work is handled under pressure. It is a mistake to assume that cast-off main line overhead material can be advantageously worked to its limit on car house property. The concentration of car movements in modern houses and yards calls for the best standards of design and construction throughout the entire physical plant. There are many small economies possible also in the dealings of scattered car houses with the main repair shop. It is surprising how much material improperly labeled or not tagged in any way whatever will find its way from car houses into the shops. On a large system the practice of relying upon the telephone instead of the tag when repairs are in order leads to the postponement of work often sorely needed, delays in returning finished repairs, and frequently to the going astray of parts and the uneven stocking or over-stocking of sub-storage rooms. Another source of trouble is the return of scrap in a form which makes its subdivision and sale unprofitable. A worn-out brake shoe hanger and malleable iron head sent in bolted together means that some one with tools must be at the scrap pile to effect a separation, or else that the material must be junked at the lowest price. The separation of bins for steel turnings, sheet-steel scraps, iron-pipe scraps, cast-steel scraps, brake shoes, light iron and steel, malleable and cast-iron scraps enables higher prices to be obtained than are given for miscellaneous junk, and on a large system means a gain of considerable money yearly. The cost of erecting bins for storing this junk, suitably marked and located alongside tracks for economical gravity delivery, is little in proportion to the benefits of such a plan.

"THE PUBLIC SIDE OF STREET RAILROADING"

It has been many a day since anything has come from the lips of a railway man which is so important, so encouraging or so significant as the address delivered at the recent Atlantic City convention by Mr. Calhoun, of San Francisco. We urge his contemporaries in the transportation business to read it, to ponder it and to read it again. We hope that the politicians in the cities and that the users of street railways all over the country will read it and have a new conception of the aims and purposes of railway managers.

It would be folly to ignore the fact that public utility corporations have suffered like other large corporations and interests from the venal politician, and in some cases have succumbed to him. But it does not follow that all corporations have done so. Nor does it follow, even in the cases where corruption is known to have existed, that the individual officials charged with the responsibility are alone guilty. More than that; it does not follow that their personal guilt is at all what the public has been led to believe. The controlling motive of railway managers is that of wanting to do right. To quote Mr. Calhoun:

"There is not an intelligent street railway manager in the country who does not desire to keep his corporation per se out of politics. No class of men is more opposed to corrupt alliances between corporations and politicians; no men more earnestly favor the overthrow of the boss system in party management; no men more sincerely desire non-partisan discussion and non-partisan action in regard to the serious business problems involved in city transportation; no men are better equipped to help the people arrive at correct conclusions on this subject; no men have greater selfish interests or broader patriotic motives in seeking the proper solutions of the problems; no men will unite more cordially with their fellow-citizens in an effort to better conditions, materially and morally. They believe earnestly that the railroad companies and the problems involved in their operation should not be made the targets of political attacks, but should be left unmolested, subject to public, non-partisan control, to carry on their business."

Furthermore, many of the corporation managers who have been held up to public scorn, and who by the man in the street are looked upon as ferocious horned beasts, are known by their intimates to be upright citizens. In numerous instances they pursued devious paths under a mistaken sense of loyalty to the

interests confided to their care; under the tremendous pressure of dire consequences that threatened if they held to the straight and narrow path of business and political rectitude. As individuals these men, as a rule, gained nothing by the conduct for which they are now condemned. They did not act merely as individuals. They were acting for the corporations by which they were employed and they were actuated by a code of ethics now happily passing away never to return.

To the extent that the people as a whole elect and retain in public office men who have received or solicited bribes and contributions from corporations, to just that extent the nation as a whole is guilty under the indictment which is now so widely brought. It is well for men to remember that while guilt is individual and personal the responsibility for that guilt may be widespread in the final analysis.

We would not be understood as condoning crookedness or immorality in any form on the part of either individuals or corporations. We are merely stating certain facts which undoubtedly exist and which it may be well for those who are disposed to "throw the first stone" to take into account.

There are several reasons why it is not good policy for corporations to indulge in irregular political practices. One reason is that corruption, like murder, "will out," and when it is out it emits a nasty odor. The man or the party that accepts money for a specific job will not "stay bought." A political bribe taker is of necessity a political striker. He is sure to come back for more, and some day when he fails to get what he wants he will "tell" or "squeal," which is usually embarrassing to somebody. Another reason is that it is unnecessary in the long run for corporations to pay money to get what they are justly entitled to and they should not try to get that to which they are not entitled. The real and final reason is that bribery and the purchase of political favors in any form are morally, legally and eternally wrong.

The opportunity of the corporations at the present juncture is great and their duty is clear. We are in the midst of a great moral awakening in this country. Out of it should come a purer political atmosphere and a higher regard for law. Out of a higher regard for law must come more equitable laws. As the corporation is a creature of the law, it is more dependent upon the just and impartial enforcement of the statutes than any class of citizens. It should, therefore, be the first strictly to observe the law. What can be clearer than that one of the chief attributes of a great business executive should be a high regard for public morality and the courage to stand for what is honest and right at all times? Financially and institutionally the future welfare of the large corporation, and especially of the public service corporation, will depend in no small measure upon the popular belief that the corporation is law-abiding and politically clean.

Again we quote Mr. Calhoun: "I advocate absolutely clean political methods—bold, fearless, courageous methods—and the establishment in every community by the men who manage corporations of a reputation for fearless political courage, until they secure a leadership in civic affairs recognized to be disinterested and for the public good. . . . A bold, frank, open, courageous course will give any man a standing, whether he is a corporate manager or whether he is not, in any American community. The people will listen to what he has to say if they believe truth and honesty are in his words."

THE BROOKLYN RAPID TRANSIT LINE DEPARTMENT

As this issue contains the last of the six articles on the Brooklyn Rapid Transit System's line department, it may be profitable to consider wherein the experiences of this organization could be applied to advantage elsewhere. It is true that many electric railways have special conditions which can be met only by unique solutions, but for all that there is too strong a feeling that most of the line problems of the large and small company are essentially different. In reality, such problems are likely to differ more in extent than in kind. Thus in a large city like Brooklyn several of the congested traffic sections may be over a mile long, whereas in scores of small cities the congested sections are confined to the tracks in the heart of the town. In both cases, however, there is the same problem of maintaining the reliability of the service under abnormal wheel wear. Why, then, should not the smaller companies take advantage of the remedies discovered and applied by the specialists of a large company? Thus, to answer the requirements of abnormal traffic, the Brooklyn Rapid Transit System has developed a complete system of bar-iron overhead conductors, including every accessory such as circuit-breakers, frogs, diagonals, ears and feed-in taps. So far as individual improvements are concerned, the use can be mentioned of copper-clad span wires in districts where steel rapidly corrodes from the presence of acid fumes; the installation of side-feeds which are not made to serve also as span wires; and the use of a long-life ear just as heavy but 5 in. shorter than the customary 15 in. design. These examples will serve to indicate that good mechanical and electrical practice may be just as applicable to 5 miles as to 500 miles of track.

The dependence of the line maintenance on the work of the way and rolling-stock departments is vividly brought out in Brooklyn by records like those relating to wire breakage and abnormal wire wear. If similar records were kept on other railways there would be fewer disputes as to whether an overhead breakdown was due to excessive trolley base tension, the absence of retrievers, a bad piece of track, or simply to failure of proper line inspection. It is hardly necessary to add that when the cause for trouble is known every dollar allowed for maintenance can be placed where it will do the most good.

On its own account the small company cannot undertake to prepare specifications for material, but it can learn much of value from those issued by a large company which operates under a great range of conditions. One important point about the Brooklyn specifications is the omission of such phrases as "——':" or "equal to." Instead there are specified exactly what qualities the material should have so that all bidders are placed on the same footing. The result has been that no one manufacturer's goods have been adopted throughout, although the patterns themselves may be exactly alike. It is worth noticing that an inspection organization is maintained to see that the requirements of the specifications are met. A small company, of course, could not afford to employ permanent inspectors, but it could take advantage of the service of independent testing laboratories from time to time.

There are several other features of this company's practice which commend themselves for imitation, but they need not be dwelt upon here, as they are described at length in the articles themselves.

IS IT A GAMBLE IN SUBWAYS?

Bids for the construction with municipal funds of certain sections of the proposed tri-borough subway, which is the distinctive feature of the rapid transit program of the New York Public Service Commission for the First District, have been opened with public formality. The project is one that will involve an expenditure of "more than $100,000,000" of the funds of the City of New York. How much more no one can state now. The rather indefinite mention by the commission of the large sum which will be required is evidence complete and final of the dimensions of the undertaking. If it will cost an unestimated amount over $100,000,000 for construction only, then the final expense plus the cost of equipment for operation will make the total necessary capital expenditure greatly in excess of the figures that are bandied about so freely. It is with no desire to exaggerate that we state that estimates for such a subway, equipped for operation, have run to $150,000,000 and even $200,000,000.

The only undertaking in New York to which it is possible to turn for comparison is the present subway system of the Interborough Rapid Transit Company—that is to say, the subway lines proper and the elevated extensions in the northern part of the city. This cost the City of New York for construction only in excess of $52,000,000. The additional cost for initial operation is understood to be represented by the $35,000,000 capital stock of the company. Later capital costs have raised the amount about $7,000,000 further. The total length of the present road is about 25 miles. The tri-borough system as projected covers 44 miles of road and is therefore, if carried out, to be 76 per cent greater in length than the existing road which is controlled by the Interborough company.

It may be well to refer incidentally to the history of the tri-borough project as given by the commission. An official statement says that six months after the commission began work it laid down the route for the Broadway-Lexington Avenue subway and "ordered its engineers to push work on the plans. Later this became the trunk line of the so-called tri-borough system. Two years have been spent in getting consents, complying with other legal formalities and perfecting the plans and forms of contract for this colossal work." The commission, therefore, claims the full responsibility for the conception. Its expenditures on this account have been considerable and explain what Chairman W. R. Willcox had in mind when he stated in reference to the criticism of Mr. Sprague and other engineers (published in the issue of the Electric Railway Journal for Oct. 22, 1910, page 878) that the commission was "committed" to the plan. Is it committed because (1) it has the well-founded opinion of competent and experienced men and is reasonably assured that its project will furnish marketable transportation facilities which will return fair interest on the investment, or because (2) it believes that the tri-borough system will be a great public benefit which the City of New York ought to father without respect to the consideration of whether or not the improvement will be self-supporting? If the new subway, when finally completed, is found to be operable from a strict business standpoint, of course, the means for its operation will be found in some way. But if it has to be operated, if at all, partly as a public benefit the city will have to contribute, of course, some part of the annual interest on the great cost of construction and equipment and the expenses.

Mayor Gaynor has shown that he is keenly alive to the fact that in its subway policy the City of New York has come to the parting of the ways. The question, in brief, is whether the city shall expend the funds available for rapid transit work in allowing the Interborough company to supplement its present system or shall construct a new system. If a new system is to be constructed, the question in the main is (1) whether it shall be so built as to be closely competitive with the present system and, from an engineering standpoint, inoperative in connection therewith, or (2) whether it shall meet the needs of certain important districts that are now without transit facilities, and, if necessary, be capable in the future of operation as part of the Interborough system. The city has indicated that it can appropriate for rapid transit purposes this year $60,000,000, and this sum would presumably be available for any approved plan.

In any consideration of the rapid transit situation the Interborough company occupies a position of peculiar advantage. Although the congestion in the subway at the height of the rush-hour periods makes travel therein almost intolerable, the operation of the property, when allowance is made for the fierce public demand upon its restricted facilities, is undeniably superb. When the commission entered office it found that as the Interborough Rapid Transit Company had first choice of routes, it had pre-empted the most valuable route for service of this character in the city. The investment in the present system was made at a time when, as compared with present conditions, prices of labor and materials were low. Rates of interest were also lower, and the company was allowed to use during construction the open-cut method, which greatly restricted the investment. If it were possible to say how much greater the cost of the present system would be if it had to be constructed in 1910 and ensuing years instead of in 1902-06 it would be feasible to estimate the extent of the handicap to the tri-borough system.

Notwithstanding the dominant position of the Interborough company, the commission could have proceeded, without dealing with that company, to develop much more conservative plans than those embraced in the monstrous tri-borough system. If it believed the wisest public policy forbade the construction of lines that would inevitably develop the present system further, it could have mapped out a subway to serve the lower West Side and the upper East Side of Manhattan and capable of operation either as an independent system or as a part of the existing system.

Time is an essential element in a gigantic work of construction, and its prodigal dissipation is a deplorable incident of the recent history of rapid transit progress in New York. Two years or more have been spent in preparations that are of such a nature that the commission regards itself as "committed" to the tri-borough plan. Three years and four months have passed since the commission came into existence. How many more years must elapse before additional important lines of subway will be opened for service? Of time, the commission has all that there is. Of money, a plentiful supply can presumably be provided upon the credit of the City of New York. But plenitude need not and should not lead to waste. Advance estimates of cost on large construction enterprises are frequently, if not usually, far below the final necessary expenditure. The com-

mission should show the same frankness in its estimates of cost that it demands from corporations subject to its jurisdiction.

The conservation of capital is as valuable a public service as the conservation of other resources. The net debt of New York City on April 1, 1910, was $781,000,000, and every thinking person will appreciate the alarming tendency of such debts to increase and the resultant heavy interest charge which must be offset by tax. It is almost an axiom that monopoly in local public utility service, with reasonable regulation, is better for the public than unrestricted competition, and the Commission of the First District has so held in a decision disapproving a proposed investment for a competitive electric lighting and power plant. Will the plan of the commission, daring in conception as it may be, block the economical and logical extension of the present subway system and fail dismally to produce with economy a wise public betterment in transit facilities that will be of real value to the developing city?

THE PEORIA ELECTROLYSIS DECISION

Electric railways have passed through two extended periods of litigation in their fight for the use of the streets. The first of these was with the telephone interests between 1888 and 1892. The second was with the water companies and has lasted some 15 years. The difficulty with the telephone companies arose through the cross induction caused by the railway circuits in the single-wire grounded circuits which were used in the early telephone installations. To overcome this trouble it was essential for one system to install a complete metallic circuit, and the telephone companies, being in possession of the field, thought that the obligation to do so lay upon the railway companies. But the courts held that the purpose for which the streets were primarily dedicated was that of transportation and not that of long-distance conversation and that the user who was there on sufferance could not impose conditions on one whose right to the streets was far greater.

The cost of adequately protecting the telephone wires against induction from the railway circuits was not serious, because the telephone companies soon found that a trunk return circuit would answer their purposes as well as a grounded circuit, but with the water companies a different condition arose. Here the electric railway company was charged with corrosion by electrolysis of underground water pipes and no such simple or cheap solution of the problem was apparent. It can fairly be admitted that many of the early railway return circuits were very inadequate. Large losses in transmission were looked upon with equanimity by railway managements, and undoubtedly in many cases the railway return current made wide excursions and took all sorts of paths to get back to the power station. As in the telephone litigation, the opponents of the electric railway saw no relief, or claimed to see no relief, except through the introduction of a double-trolley system. It was largely through fear of electrolysis that a double trolley was installed in Washington and Havana. The double trolley in Cincinnati, which is often mentioned in this connection, was installed originally with the purpose in view of avoiding telephone disturbance.

Litigation between the water companies and the single-trolley systems soon followed, but the fight raged most fiercely around Peoria, where in 1893 the railway company was charged with injuring the pipes of the water company. Finally in March, 1898, a suit was brought for an injunction against the electric road in Peoria to cease causing the alleged damage. From that date to Sept. 22, 1910, the case has been in the courts continually. In the meantime electric railways in other cities were charged with similar destruction, but by almost general consent Peoria was selected, like Waterloo, to be the decisive battle-ground for supremacy between two systems. The Peoria case went through two references, both by the same master, and in each case, after long and exhaustive hearings, the master recommended a double-trolley system for the railway company as the only solution of the difficulty.

The situation was complicated because laboratory experiments showed that under favorable conditions a fraction of a volt was sufficient to cause electrolysis. Hence the hasty assumption was reached that this slight difference in potential between the rails and the water pipes would cause electrolysis and that the extent of the electrolytic corrosion at any point was always proportional to the difference in potential. The fundamental error in this theory is that current, not potential, causes electrolysis, and this point is clearly brought out in Judge Sanborn's decision, which, we hope, will conclude the litigation between the owners of underground metallic structures and railway companies so far as electrolysis is concerned. In Judge Sanborn's decision, which we printed last week, the court shows that while the operations of the railway company have been constantly increasing during the past five years, there has been a progressively lessening average damage to the water pipes in Peoria, and that the modern methods of electric railway construction warrant the belief that with co-operation between the two interests there should be no difficulty in preventing practically all damage in the future. It also makes clear the important point that the court has no power to prescribe by injunction the use of any particular system. It might require a person or company to refrain from injuring another, but the means by which this should be done is a legislative question which the court has no power to decide. In other words, the court practically declared that all of the technical testimony presented by the experts during the trial was immaterial to its final conclusions.

During this contest the electric railway return circuit has been made the scapegoat for a great variety of corrosion in water systems. It was even gravely alleged in the early part of the Peoria case that electric railway return current had seriously injured the shell of a standpipe at a point several feet above the surface of the ground and some distance from the track. Other charges almost, if not quite, as absurd against the electric railway circuit were made in other cities, and we are glad to see under the sanction of a court ruling the expression of a more sane view in regard to this matter. The adoption of the cumbersome and insufficient double-trolley system was unthinkable and, besides, would not have given assurance that the damage would cease.

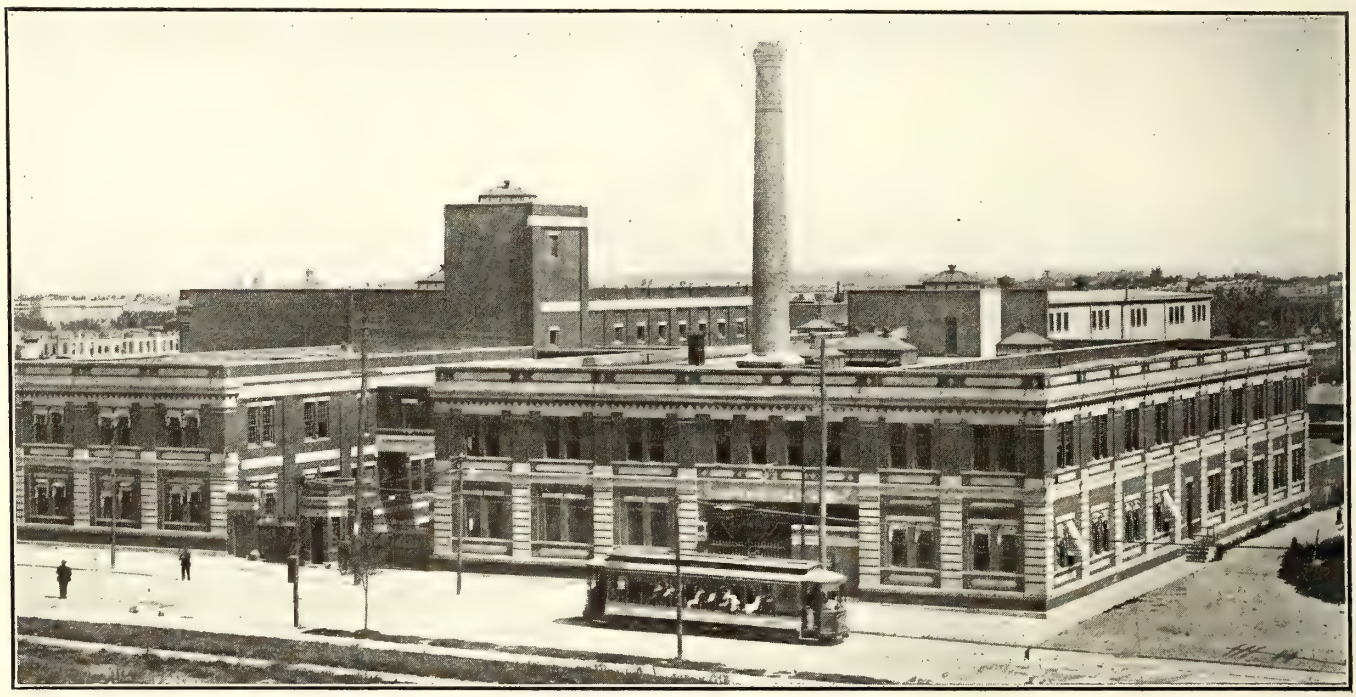
The immense advance in the development of rail bonds has done more than anything else to improve the situation. With good and adequate rail bonds and supplementary return very little else is needed on most systems, but if additional precautions are required, and their need can very easily be determined, there are ample remedies for the trouble which can be applied.

BROOKLYN LINE DEPARTMENT—MANUFACTURING FACILITIES, PURCHASING STANDARDS AND EXPERIMENTAL WORK

The preceding five articles* on the line department of the Brooklyn Rapid Transit system have described the wide variety of construction and maintenance carried on by this organization. The present article, which is the last in this series, will be devoted chiefly to matters dealing with line material manufacture, storage, purchasing and experimental work.

LOCATION OF SHOPS AND STOREROOMS

All of the manufacturing and storage facilities of the line department are located at the Nostrand Avenue headquarters, shown in the accompanying illustration. As this group of buildings was described at length in the Electric Railway Journal for Dec. 5, 19 and 26, 1908, it need only be mentioned here that the shops are located on the second floors of the central and right-hand buildings. Each division is in well-lighted rooms which are isolated from one another by brick walls having gravity fire-door openings, except that there is a wagon passage to the paint shop between the metalworking and woodworking shops. The storerooms for small line material are located on the second floor of the central building convenient to loading platforms and tracks on both sides. The accompanying illustration of the wider of the two track entrances shows several of the supply and service vehicles of the line department, as well as the wagon shelter under the stable of the first building. Heavy line material is stored in a steel-frame and corrugated-metal structure located in the rear of the central building. As shown in the illustration of the interior on page 500, this shed is provided with two galleries on each side. Reels of wire or other heavy articles intended for storage are delivered by cars which run around a loop at the rear and are distributed in numbered sections of the galleries by a 7½-ton Maris crane.



Brooklyn Line Department—Nostrand Avenue Headquarters of the Department, Including a Transfer Printing Plant on the Second Floor of the Front Part of the Building on the Left and Track Department Quarters on the First Floor of the Building on the Right

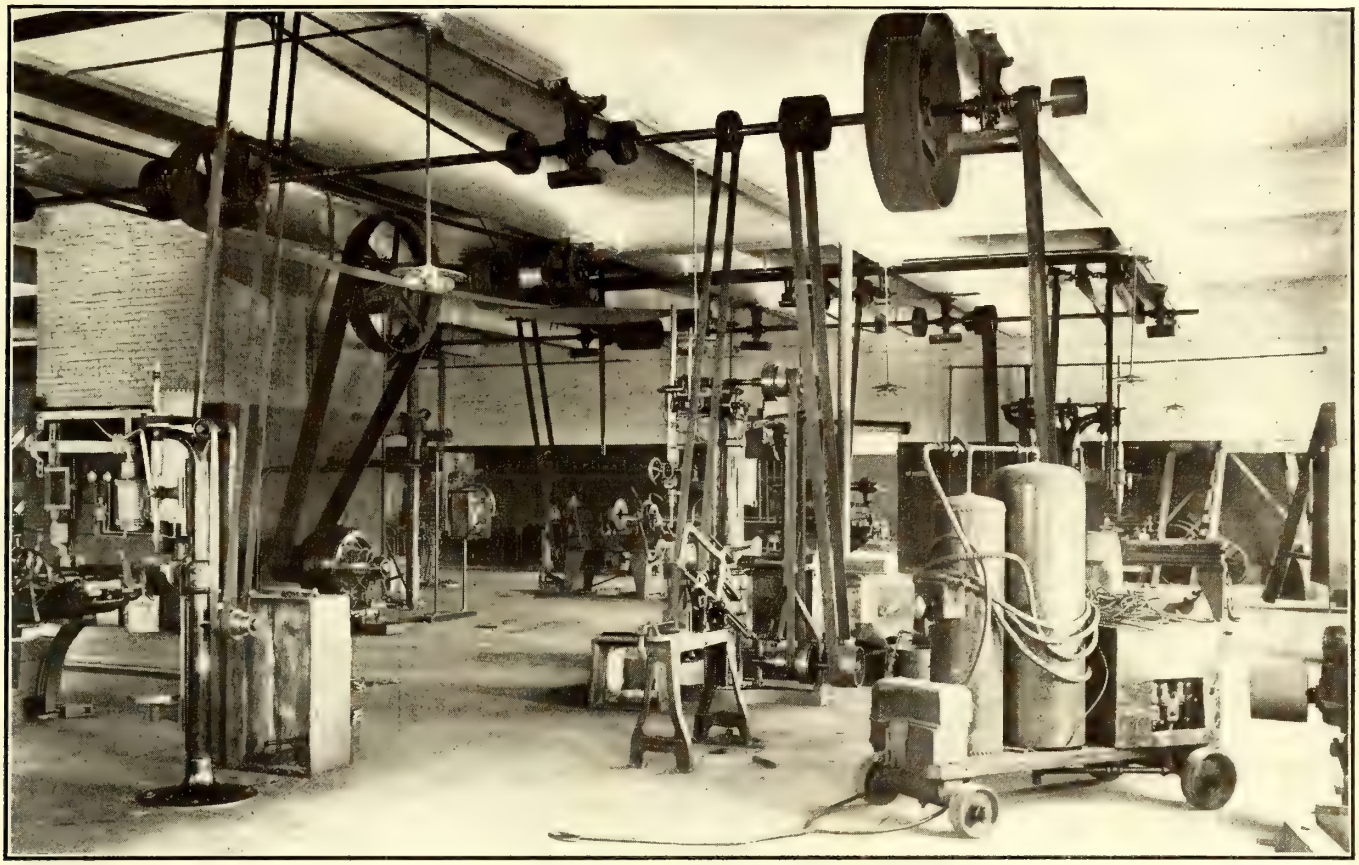
SCOPE OF THE SHOPS

The manufacturing and repair facilities comprise a metalworking shop with a horse-shoeing section, a mill-room, a painting shop and lamp repair quarters. These shops are under the general direction of the line department, but much work is done also for the track department, such as re-edging of picks, bars and chisels, the repairing of portable blacksmiths' wagons, track jacks, wheelbarrows, special compromise plates, switch tongues, etc. A limited amount of track work manufacture is also done here. Shop work requisitions sent in by the track department are accompanied by a tag and instructions which include the proper account number to which the job should be charged. These tags are delivered to the superintendent of the line department, who thereupon issues a shop order for the work. After the job is completed, a statement of the labor and material is forwarded to the track department for the latter's records.

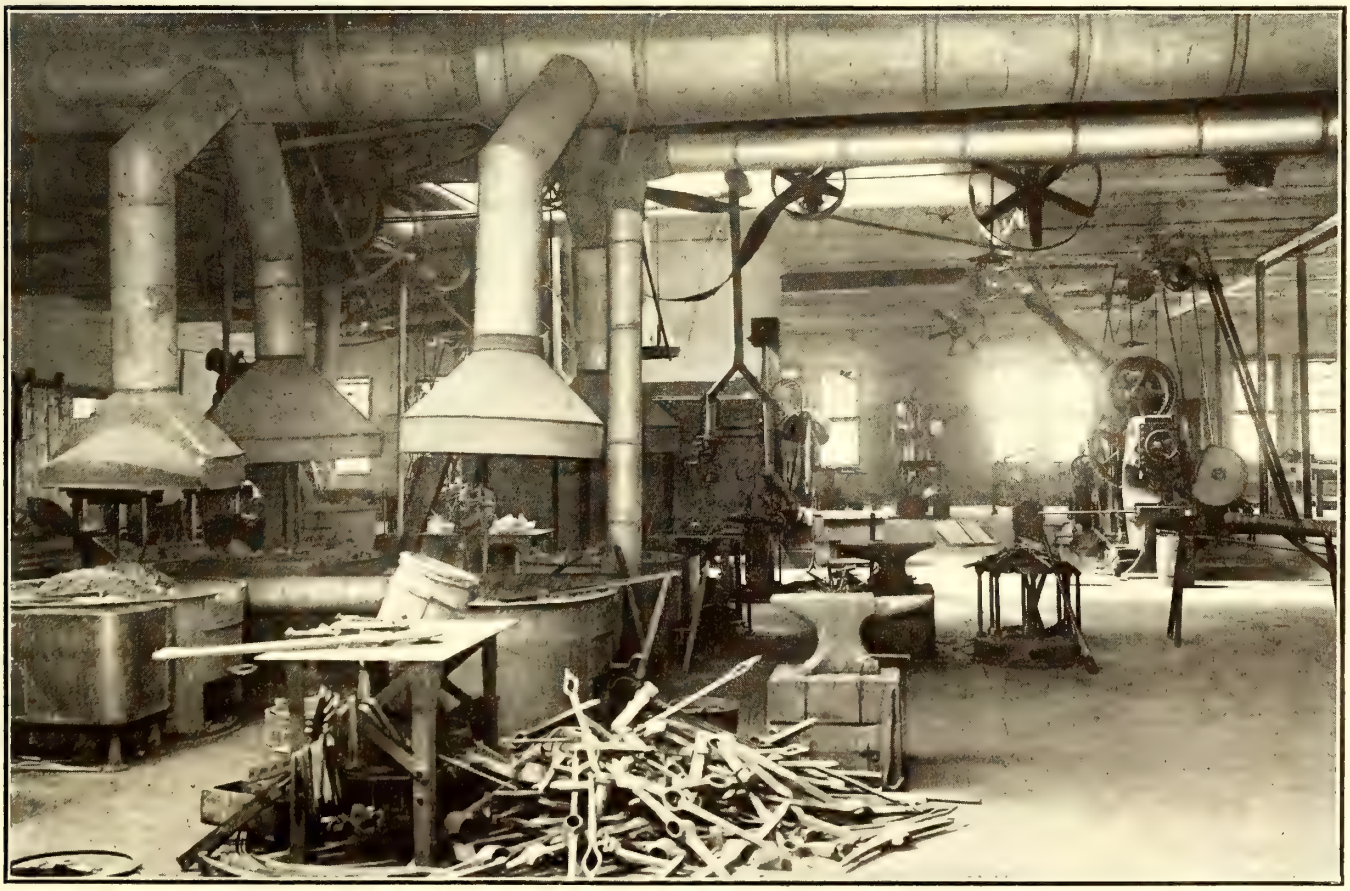
Much of the work done by the line department for its own purposes consists of repairs to the trucking equipment including automobile tower wagons. One blacksmith and helper are employed continuously on wagon repairs; a second blacksmith makes all the hangers used in supporting trough work, special pole supports, bar-iron frogs and other parts required in the bar-iron trolley construction. A third blacksmith who is on the payroll of the trucking department devotes all of his time to shoeing horses.

Views are presented on page 939 of equipments in the metalworking shop. One of the most important tools is a Williams-White double-end punch and shear, which is fitted with a set of dies for the mechanical slotting of the bar-iron conductors. Another large tool is the National "Hercules" hydraulic tire setter, which is illustrated on page 942. This machine permits tires to be set cold in 10 minutes. The company has found it to be very advantageous because the factor of time is so important in the maintenance of its many wagons. Third-rail anchors, compromise plates and other special forms are made by a Williams-White bulldozer, which is used in connection with a Rockwell oil furnace. The metalworking shop also contains eight Buffalo 4-ft. and 3-ft. forges, the blast for which is furnished by a 7-in. Buffalo blower, hung from the ceiling. A 70-in. fan draws the exhaust from each forge to a common header which discharges through a steel plate chimney. The view of the forge section on page 939 shows how effectively this exhaust system keeps the room free from smoke. The balance of the equipment in the metalworking shop comprises the following: One 125-hp Beaudry power hammer; one Le Blond plain miller for slotting and shaping; one Sebastian lathe; one drill press with 26-in. drill; one drill press with 6-in. drill; one sensitive drill; one pipe threader and pipe cutter; one bolt cutter; one Springfield double-wheel emery

*See Electric Railway Journal of June 11, June 18, July 23, Aug. 20 and Sept. 10, 1910.



Brooklyn Line Department—A Portion of the Metalworking Shop, with the Portable Compressor in the Foreground

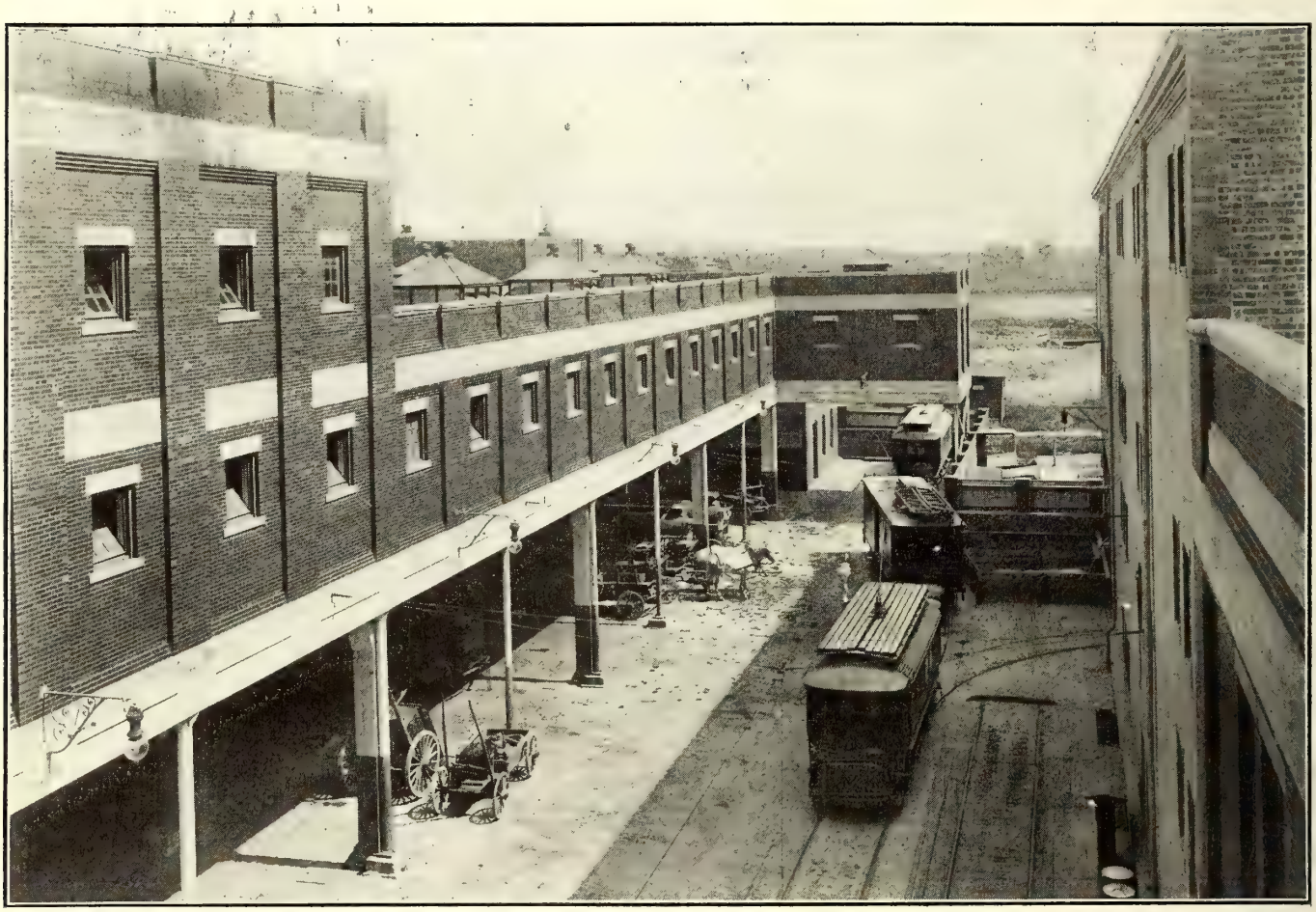


Brooklyn Line Department—The Forge Section of the Metalworking Shop, Showing the Exhaust Piping

grinder and one grindstone. All of the foregoing machinery is driven through line shafting from one 45-hp, 550-volt, constant-speed, compound-wound Northern motor, which is operated at 750 r.p.m.

The mill room employs three carpenters, two for wagon work and one for the construction of switch boxes, special forms of section insulators and miscellaneous work for the electrical engineer. The woodworking tools include one pattern lathe; one borer; one 20-in. planer; one 24-in. circular saw; one 30-in. band saw. All of these tools include one pattern line shafting by a 20-hp, shunt-wound Northern motor.

The paint and lamp shops are on the second floor of the right-hand building in the Nostrand Avenue group. They are separated from each other by a solid brick wall and from the other shops by gravity fire doors. The paint shop opens directly on a passage used to bring in wagons for general repairs and painting. The wagons are brought up to this level by an elevator in the first building and thence over a bridge to the second building. The paint shop is in charge of a foreman painter and helper, who do all the painting required on wagons, automobile bodies, switch boxes, illuminated letters on signs, etc. The lamp room is the headquarters of the lighting repair gang.



Brooklyn Line Department—A View of the Open Passageway Between the First and Second Buildings, Showing the Wagon Shelter Under the Stable on the Left and the Delivery Tracks and Scale on the Right

PURCHASING STANDARDS

The purchasing standards of the line department of the Brooklyn Rapid Transit System are set forth in a series of wire, cable and other specifications, which have been revised from time to time in accordance with extended service trials. These specifications are issued through the electrical engineer, who is designated in all of them as the sole party having the right to accept the manufactured material. Another general feature common to the specifications is that relating to inspections and tests. To see that the standards set by the company are complied with, inspectors are sent to the mills to observe and check the processes of manufacture. In addition to this precaution, the electrical engineer's department maintains a laboratory and certain testing facilities are also supplied directly by the shops of the line department. The following sections will present the current specifications individually with such explanations as may be needed in regard to unusual requirements. It should be stated that all Brooklyn low-tension feeder cables and wires are intended for a normal operating potential of 600 volts, but all sizes above 250,000 circ. mil must be capable of being safely operated at any tension not exceeding 1000 volts.

SINGLE-BRAID AND DOUBLE-BRAID RUBBER-COVERED WIRES

The Brooklyn Rapid Transit System frequently uses single-braid, rubber-covered wires where the conductors do not have to go into conduit, where inside connections are made to switch boxes, for temporary work, etc. Double-braid, rubber-covered wire is installed in conduit work in accordance with the standards of the fire underwriters. The following is an abstract of the two specifications for rubber-covered wires and cables ranging in diameter from No. 14 B. & S. to 2,000,000 circ. mil. These specifications are exactly alike with the exception of the paragraphs on tape and braid, as will be indicated hereinafter.

Conductors.—The cables shall be composed of the number of strands called for in the table I on page 943; each conductor shall be of soft-drawn annealed wire, having a conductivity of not less than 98 per cent of that of pure copper—"Mathiessen's Standard." It shall be continuous throughout its length and shall be provided with a heavy uniform coating of tin without burrs or fins.

Insulation.—The cables and wires shall be insulated with a vulcanized rubber compound containing not less than 30 per cent and not more than 33 per cent by weight of fine dry Para rubber, free from reclaimed rubber or other substitutes making

a tough, elastic and homogeneous covering of a thickness not less than that given in the following table. The Para gum itself shall not contain more than 3½ per cent of resinous matter, and the completed vulcanized rubber compound shall contain not more than 5 per cent of extractive matter by weight and not more than 1 per cent of free sulphur. The completed vulcanized compound must show a tensile strength of not less than 800 lb. per square inch.

Tape (Single Braid).—All wires above No. 8 are to receive a single tape over the rubber. This tape is to be at least 1/64 in. in thickness, and is to be applied spirally, lapping at least one-half of its width and making a smooth surface.

Tape (Double Braid).—All cables above and including 1,000,000 circ. mils are to receive a single tape over the rubber. This is to be at least 1/64 in. thick and is to be applied spirally, lapping at least one-half of its width and making a smooth surface.

Braid (Single Braid).—All wires are to be covered with a single braid of closely woven cotton, not less than 1/64 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.

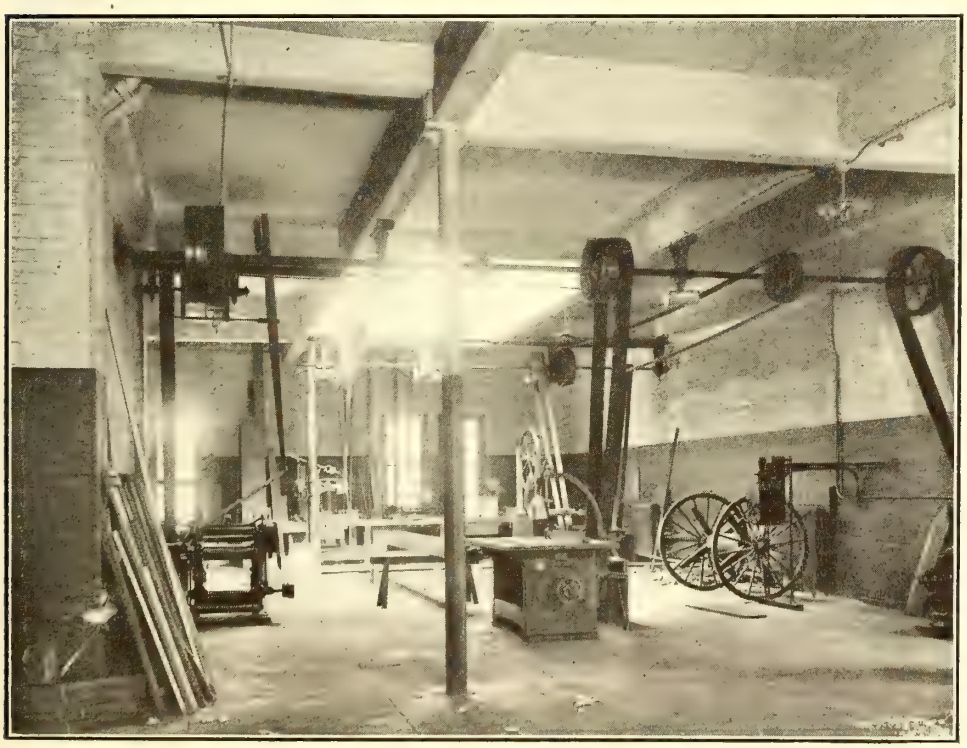
Braid (Double Braid).—All cables and wires are to be covered with two braids of closely woven cotton, each not less than 1/64 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.



Brooklyn Line Department—A Portion of the Paint Shop, Showing the Lighting with Vapor-Proof Five-Lamp Clusters

Inspection and Test.—The high-potential and insulation-resistance tests (at the manufacturer's plant) shall be made upon the wire after 48 hours' immersion in water, before taping or braiding, and while still immersed. The test voltage alternating current, as per the following table, shall be applied for a period of five minutes. After the high-potential test, the insulation resistance shall be measured with a battery of not less than 100 volts or more than 500 volts, and all results corrected for a standard temperature of 15.6 deg. C. (60 deg. Fahr.). The test readings shall be taken at the end of one minute electrification, and shall show a resistance at least equal to that given in table I on page 943.

A sample of the completed vulcanized rubber insulation, not less than 4 in. long, shall have marks placed upon it 2 in. apart. The sample shall then be stretched until the marks are 6 in. apart, and at once released. Five seconds after release the marks shall not be over 2⅜ in. apart. The sample shall then again be stretched until the marks are 9 in. apart without breaking.



Brooklyn Line Department—A Part of the Mill Room

WEATHERPROOF WIRE AND CABLE.

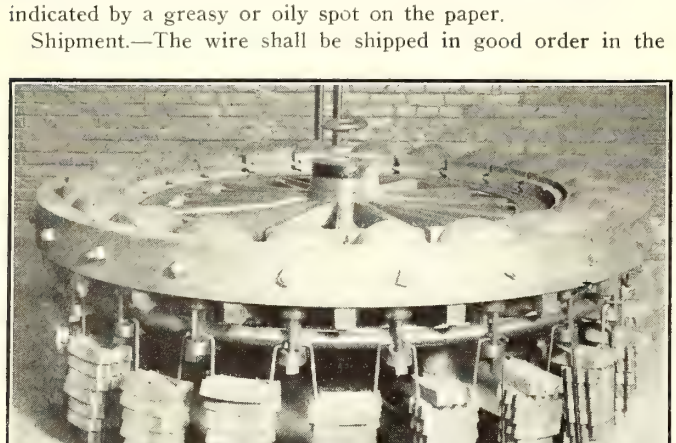
The following is an abstract of the standard specifications for weatherproof wire and cable in sizes from No. 10 B. & S. to 5,000,000 circ. mils:

Conductors.—The conductor shall consist of not less than the number of strands called for in the table given below, stranded concentrically, with the exception of 5,000,000-circ. mil rope-stranded, which consists of 61 strands of seven wires each and having a conductivity of 98 per cent of that of pure copper—"Mathiessen's Standard." The conductor shall have an area of not less than that called for in table II on page 943, to be measured by taking the combined area of the individual strands of the conductor.

Insulation.—The conductor shall be covered with three braids of closely woven cotton, each layer thoroughly saturated with a weatherproof compound that will not injure the cotton covering.

Test for Weatherproof Compound.—The melting test on the weatherproof compound shall be made as follows: Short pieces of the wire are placed on a piece of clean white paper in a chamber which has been heated to 125 deg. Fahr. and the chamber is maintained at this temperature for half an hour. The wire shall be rejected if the compound becomes sufficiently fluid to be transferred to the paper on which the wire was placed in sufficient amount to form a ridge perceptible to the fingers or in case the compound is absorbed by the paper as indicated by a greasy or oily spot on the paper.

Shipment.—The wire shall be shipped in good order in the



Brooklyn Line Department—Hydraulic Tire-Setting Machine

lengths and on reels or in coils as specified in the table given below. Each reel shall have its number, weight and length of wire plainly and indelibly marked on the outside of the reel.

SUBMARINE CABLES

A small amount of submarine cable is required in Brooklyn for installation in crossing various canals under water. One of the features developed by the company in connection with this cable is the use of jute between the rubber and the lead. This jute acts as a cushion to prevent the crushing of the rubber. Another feature of the specification for 500,000-circ. mil cable is the provision of a ⅛-in. lead sheath over the jute. A lesser thickness would not be considered safe, as even a ⅛-in. sheath is subject to porosity. An abstract of the specification follows:

Conductor.—The conductor shall consist of at least 61 soft copper wires stranded into a cable so as to produce a thoroughly flexible conductor. Each cable is to be of the size called for and to have a minimum conductivity of 98 per cent of that of pure copper—"Mathiessen's Standard."

Size of Conductor.—The conductor shall have a combined area of not less than 500,000 circ. mils, to be measured by taking the sum of the area of the individual strands when all the wires are laid out straight.

Insulation.—The insulation shall be 3/16 in. in thickness and shall consist of at least 30 per cent of pure Para rubber. This insulation shall be covered with a layer of jute 1/16 in. in thickness.

Sheath.—A lead sheath ⅛ in. in thickness shall be applied over the jute.

Armor.—The lead sheath is to be covered with a 3/16-in. wall of jute, and the whole then covered with No. 6 B. W. G. double-galvanized iron wires. The armor wire shall show no trace of copper color after four immersions in a saturated solution of sulphate of copper. The wire is to remain in the solution one minute each time and is to be wiped dry after each immersion.

Tests.—The cables shall have a minimum insulation resistance after one minute electrification of 1000 megohms per mile at 60 deg. Fahr. and shall be tested with an alternating current of 15,000 volts for 10 minutes between the conductor and lead sheath. These tests and the tests for conductivity shall be made at the manufacturer's plant under the supervision of an inspector from the railway company, the necessary apparatus for making such tests being furnished by the contractor. The railroad company is to have the privilege of furnishing any part of such apparatus however, if the engineer sees fit to do so.

Guarantee.—The contractor shall guarantee the cables against failure from all causes excepting mechanical injury for a period of five years after their installation.

VARNISHED CAMBRIC OR CLOTH-COVERED CABLES

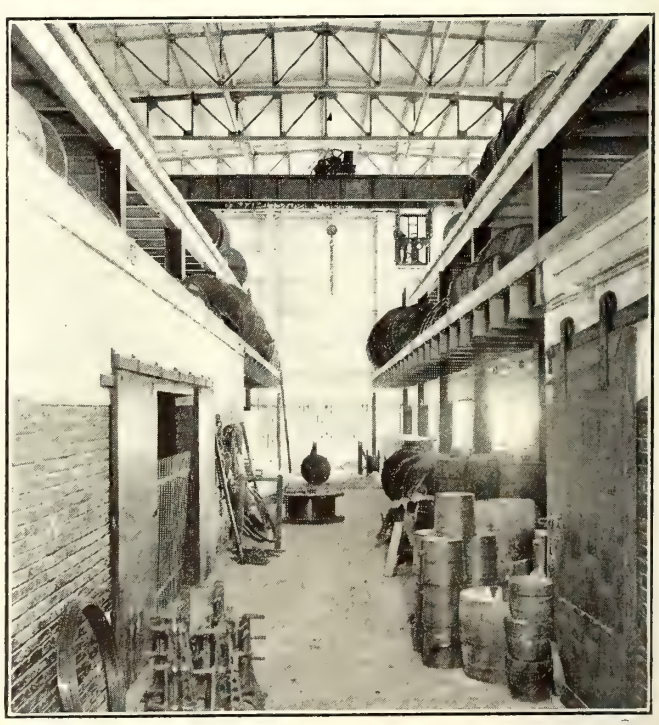
Varnished cambric or cloth-covered 600-volt cables from No. 14 B. & S. to 2,000,000 circ. mils are used principally for short underground runs in dry locations from substations to aerial feeders. An abstract of the specification follows:

Conductors.—The cables shall be composed of the number of strands called for in the table given below. Each conductor shall be of soft-drawn annealed wire, having a conductivity of not less than 98 per cent of that of pure copper—"Mathiessen's Standard." It shall be continuous throughout its length.

Insulation.—The wire shall be insulated with taping or specially prepared varnished cambric or cloth, with multiple films of insulating varnish on both sides which will prevent the absorption of moisture. The insulation to be applied spirally in strips in such a manner as to make a tough, flexible and homogeneous insulating wall of at least the thickness, at all points, given in the following table.

Braid.—All wires are to be covered with a double braid of closely woven cotton, each not less than 1/32 in. in thickness, thoroughly saturated with a black waterproof compound that will not injure the cotton covering or the insulation.

Tests (the conditions with regard to instruments and apparatus are the same as in the like paragraph on submarine cables.)—The high-potential and insulation-resistance tests



Brooklyn Line Department—Storage Galleries for Wire Reels and Other Heavy Material

shall be made upon the wire after 48 hours' immersion in water and before braiding. The test voltage, as per table, shall be applied for a period of five minutes using alternating current. After the high-potential test, the insulation resistance shall be measured and all results corrected for a standard temperature of 15.6 deg. C. (60 deg. Fahr.). In this test readings shall be taken at the end of one minute electrification and shall show a resistance at least equal to that given in the table below.

SPAN WIRE EXPERIMENTS AND SPECIFICATIONS

During the past year the line department has installed copper-

clad span wires in some places where ordinary galvanized wires are entirely corroded in three or four years from the fumes of nearby chemical works, oil refineries and the like. If the new wire proves corrosion-proof, it will be installed more widely despite the fact that it costs at least three times as much as the common span wires. It would save an average cost of $1 per span wire replacement, to say nothing of reducing accidents from defective spans. The customary span wires of the Brooklyn Rapid Transit System are made up of seven strands of double-galvanized iron wire. An abstract of the specification follows:

Galvanizing.—The galvanizing shall consist of a uniform coating of zinc, so applied that it will adhere firmly to the surface of the wire. A sample shall be taken from each reel and be submitted to the following tests:

Tests for Galvanizing.—The sample shall be immersed in a standard solution of copper sulphate for one minute and then removed and quickly wiped dry. This process shall be repeated three times. If, after the fourth immersion, there should be any copper deposited on the sample, all of the wire on that reel shall be rejected.

Solution.—The standard solution of copper sulphate shall be made in the presence of the inspector, and shall consist of a saturated solution of commercial copper—sulphate crystals in water—and shall have a specific gravity of 1.185 at 70 deg Fahr. Solution must have a temperature of from 62 deg. to 70 deg. Fahr. while the samples are being dipped.

Size of Wires.—Wires shall be made up of seven strands, each strand being made up as follows:

Size wire.	Diameter in inches Required.	Max.	Min.	Lay in inches.
¼-in.	.083	.085	.081	3
5/16-in.	.109	.111	.107	4
⅜-in.	.120	.122	.118	4¼
7/16-in.	.134	.136	.132	4½
½-in.	.165	.167	.163	5

Mechanical Tests.—From each reel two samples shall be taken for mechanical tests—one being tested as a whole and the wires of the other being tested separately. All wires must be soft enough to bend easily without breaking and must pass the following test. None of the single strands, as well as none of the made-up samples, will be permitted to fall under the figures given below:

	Seven Strands		Single Strands	
	Per cent elongation in 10 in.	Breaking weight, lbs.	Per cent elongation in 10 in.	Breaking weight lbs.
¼	14	1,800	12	250
5/16	14	3,500	12	450
⅜	14	4,800	12	650
7/16	14	6,000	12	800
½	14	8,500	12	1,100

TROLLEY WIRE EXPERIMENTS AND SPECIFICATIONS

During the past two years the line department has installed about 6 miles of No. 0000 grooved steel trolley wire having a tensile strength of about 75,000 lb. per square inch. This wire has proved fairly satisfactory in operation except for some trouble from breakage at brazed joints. One strong advantage of the steel trolley wire is the low first cost of 7½ cents per pound as compared with copper at 14 cents; another advantage is the longer life which may confidently be expected. On the other hand, the steel trolley wire possesses several disadvantages, among which the following may be cited: Practically no scrap value; more side feeds than with copper wire owing to the greater voltage drop; greater installation cost on account of its stiffness; danger of having the wire fuse if one end should fall and come into contact with the rail; weakening of insulators from wire rust thrown upon them through the action of the trolley wheel. The line department also put up during July of this year about a mile of bronze wire, which was bought at a figure slightly higher than copper. Up to the present writing this installation has not been in service long enough to form a definite conclusion about its value.

With regard to the following specifications on copper trolley wire it may be remarked that while the company demands a higher breaking weight and more twists per unit of length than are usually specified, the manufacturers have had no difficulty in meeting its requirements with either lake or electrolytic copper. Breaks at brazed joints are remarkably rare. The rods are scarfed first, then the joints are soldered with silver in an oil furnace, and afterward the wires are drawn to size.

A phenomenon noted in the testing of trolley wire is that after the reel is drawn finished and while still very hot the samples then cut off and laid aside for testing will nearly always fail to come up to the acceptance requirements. However, if the samples are not cut off until the reel has cooled, the pieces will pass the tests satisfactorily.

The following is an abstract of the specification for No. 0 and No. 00 copper trolley wire.

Material.—All wire is to be drawn from strictly electrolytic or Calumet & Hecla copper.

Finish.—The wire shall be drawn in lengths not less than 5000 ft. nor more than 1 mile, and shall have only such joints

TABLE I—SINGLE AND DOUBLE BRAID, RUBBER-COVERED

Size.	Strands.	Insulation wall.	Voltage test.	Insulation resistance.
14 B. & S.	solid	3/64-in.	2,000	1,000 megohms per mile
12 B. & S.	solid	3/64-in.	2,000	1,000 megohms per mile
10 B. & S.	solid	3/64-in.	2,000	1,000 megohms per mile
8 B. & S.	7	3/64-in.	2,000	1,000 megohms per mile
6 B. & S.	12	4/64 in.	3,000	1,000 megohms per mile
4 B. & S.	12	4/64 in.	3,000	1,000 megohms per mile
2 B. & S.	19	4/64-in.	3,000	1,000 megohms per mile
1 B. & S.	19	5/64-in.	3,000	1,000 megohms per mile
0 B. & S.	19	5/64-in.	3,000	1,000 megohms per mile
00 B. & S.	19	5/64-in.	3,000	1,000 megohms per mile
0000 B. & S.	37	5/64-in.	3,000	1,000 megohms per mile
250,000 circ. mil.	37	6/64-in.	4,000	750 megohms per mile
500,000 circ. mil.	61	8/64-in.	5,000	750 megohms per mile
750,000 circ. mil.	61	8/64-in.	5,000	500 megohms per mile
1,000,000 circ. mil.	91	8/64-in.	5,000	500 megohms per mile
1,250,000 circ. mil.	127	10/64-in.	6,000	500 megohms per mile
1,500,000 circ. mil.	127	10/64 in.	6,000	500 megohms per mile
1,750,000 circ. mil.	127	10/64-in.	6,000	500 megohms per mile
2,000,000 circ. mil.	127	10/64-in.	6,000	500 megohms per mile

TABLE II—WEATHERPROOF WIRE AND CABLE

Size.	Strands.	Maximum weight per 1,000 ft.	Length of conductor on each reel or coil.
10 B. & S.	solid	55	1,000 coil
8 B. & S.	7	78	1,000 coil
6 B. & S.	12	116	1,000 reel
4 B. & S.	12	170	1,000 reel
2 B. & S.	19	271	1,000 reel
1 B. & S.	19	328	1,000 reel
0 B. & S.	19	423	1,000 reel
00 B. & S.	19	525	1,000 reel
0000 B. & S.	37	759	2,640 reel
500,000 circ. mils.	48	1 850	1,760 reel
1,000,000 circ. mils.	61	3,575	1,200 reel
1,500,000 circ. mils.	91	5,395	1,000 reel
2,000,000 circ. mils.	127	7,025	600 reel
2,500,000 circ. mils.	127	8,000	...
5,000,000 circ. mils.	61 (7 wires each)	Rope strand	...

TABLE III—STRANDING, INSULATION AND RESISTANCES OF VARNISHED CAMBRIC OR CLOTH-COVERED CABLES

No.	Strands.	Wall.	Voltage test.	Insulation resistance.
14	solid	4/64-in.	1,500	100 megohms
12	solid	4/64-in.	2,000	100 megohms
10	solid	4/64-in.	2,000	100 megohms
8	7	4/64-in.	2,000	100 megohms
6	12	4/64-in.	2,000	100 megohms
4	12	4/64-in.	2,000	100 megohms
2	19	4/64-in.	2,000	100 megohms
1	19	5/64-in.	3,000	100 megohms
0	19	5/64-in.	3,000	100 megohms
00	19	5/64-in.	3,000	100 megohms
0000	37	6/64-in.	3,000	55 megohms
250,000	37	6/64-in.	3,000	65 megohms
500,000	61	6/64-in.	3,000	60 megohms
750,000	61	9/64-in.	5,000	60 megohms
1,000,000	91	8/64-in.	5,000	50 megohms
1,500,000	127	8/64-in.	5,000	40 megohms
2,000,000	127	8/64-in.	5,000	35 megohms

or splices as are required to join the wire bars necessary to make up the above lengths, these joints or splices to be made after the bars have been rolled before drawing the same through the first die. All wire shall be truly cylindrical and fully up to the gage specified for each size, and must not contain any scale, inequalities, flaws, cold shutes seams or other imperfections.

Size of Wire.—The wire shall be truly and fully up to the gage standard as per B. & S. wire gage. It shall be truly cylindrical in every respect. A variation of not more than 1½ mils on either side of the specified wire gage will be allowed, and the wire must be truly round within 1 mil upon opposite diameters at the same point of measurement.

Weight.—Each reel shall have its gross, net and tare weights plainly and indelibly marked on the outside of the reel. The weight per mile for the No. 0 wire shall be 1684 lb. and for the No. 00 wire 2123 lb. A variation of 1 per cent on either side of the above figures will be allowed.

Packing for Shipment.—The wire shall be put on reels of sufficient size to prevent sharp bends, and shall be properly protected so that it shall not be injured in transportation. The reels shall measure over all not more than 48 in. in diameter and not more than 25-in. in width, and they shall have a heavy iron bushing with a hole 2⅜ in. in diameter suitable for carrying the reel on a 2-in. arbor.

Tests.—Tests shall be made by the manufacturer's plant under the supervision of the engineer, the necessary apparatus for making such tests being furnished by the contractor. The railroad company, however, reserves the right of furnishing any part of such an apparatus if the engineer sees fit to do so. The apparatus furnished by the contractor shall be examined by and shall be satisfactory to the electrical engineer. Should the samples selected as provided above fail to come up to the specifications, the electrical engineer may take a second sample at his discretion. If the average results from both samples shall be within the specifications, the reel shall be accepted. If not within the specifications, the reel shall be rejected. The following tests shall be made:

Strength of Wire.—The strength of the wire shall be determined by taking a sample from one end of each reel 30 in. in length. Of this piece 18 in. shall be tested for tension and elongation by breaking the same in a tension machine. The samples shall show a tensile strength as follows:

No. 0, wire-breaking weight...4,700 lb.
No. 00, wire-breaking weight...5,800 lb.

A variation of 1½ per cent on either side of these limits will be accepted by the inspector.

Elongation.—The elongation of these samples shall be at least 3 per cent for No. 0 wire and 2½ per cent for No. 00 wire.

Torsion.—The remaining 12 in. of the above test piece shall be tested for torsion. These pieces shall be twisted in the torsion testing machine to destruction, 10 in. in length being placed between the jaws of the machine. Under these circumstances the wire shall not show less than 18 twists for No. 0 wire and 15 twists for No. 00 wire. The twists are to be made at the rate of not less than 10 per minute.

Conductivity.—The wire shall show a minimum conductivity of 95 per cent of that of pure copper—"Mathiessen's Standard."

WOOD STRAIN SPAN INSULATORS

The specifications for wood strain span insulators offer no features for comment except the requirement that "the eyes in the caps shall be placed at right angles to each other." This arrangement is demanded so that these insulators can be used with double pull-offs and to permit the span wire to slide freely through the eye. If both eyes were in the same place the wire would not slide freely between them to equalize the stress on both wires. An abstract of the specifications follows:

General.—Insulators are to be made from second growth, first quality split hickory and are to have malleable-iron caps compressed on the ends. The minimum dimensions of the finished insulator are shown in the accompanying drawing.

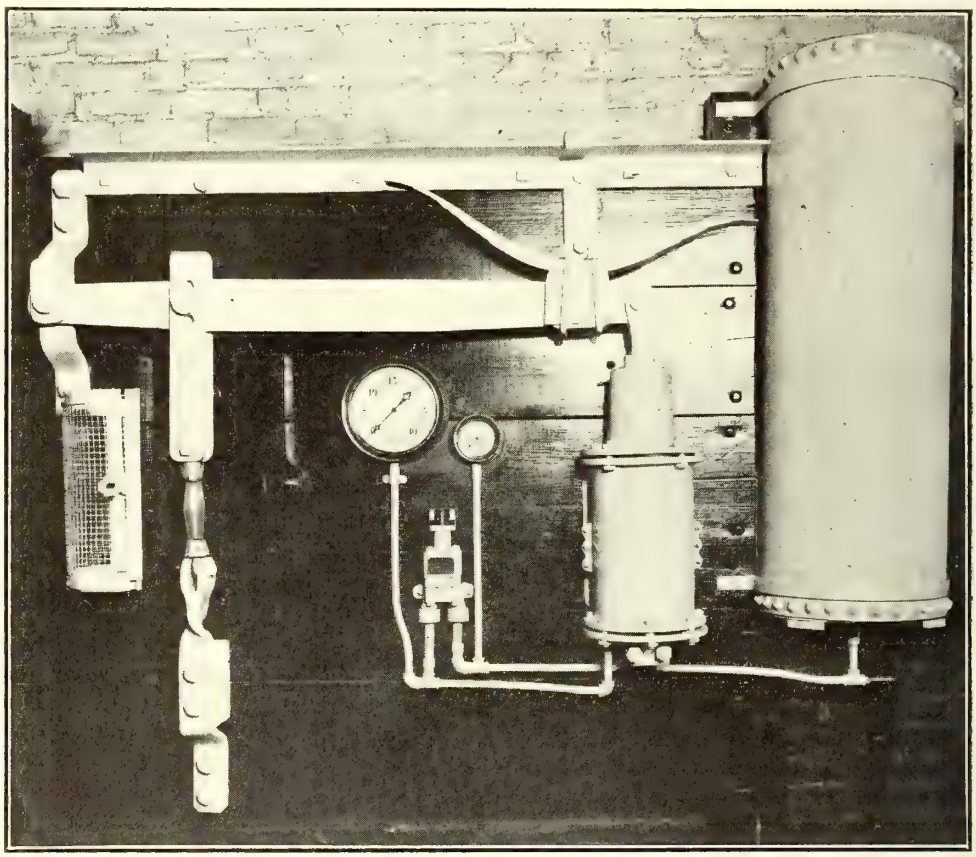
Wood.—The wood is to be thoroughly seasoned and straight-grained, and to be so treated as thoroughly to fill all of the pores with oil. As a finish, it is to be given two coats of clear varnish.

Caps.—The caps shall be compressed so tightly on the ends of the wood as to prevent any moisture working in between the cap and the wood, but not so tightly as to injure the fiber of the wood. The iron shall be protected against rust either by a heavy galvanized coating or by being sherardized. The eyes in the caps shall be placed at right angles to each other.

Tests.—All insulators will be inspected upon delivery. The inspector will first carefully examine each insulator and will reject all in which any defects can be found. Each insulator shall then be tested by having a tensile stress of 4000 lb. applied to it, which shall not damage it in any way. If desired, a representative of the manufacturer may be present during these tests.

Marking.—Upon at least one cap of each insulator there shall be a distinctive mark stamped or cast into the metal.

It will be observed from the specifications that each insulator is tried out for a tensile stress of 4000 lb. These tests are made at the Nostrand Avenue headquarters with a machine designed by H. H. Hilborn, superintendent of the line department. As shown in the accompanying illustration, the device consists of a lever and Westinghouse brake cylinder mechanism, engineer's valve, two gages and a reservoir, all mounted on one board. The air is compressed by the portable compressor shown in one of the illustrations of the metal-working shop. The insulator under test is placed in the jaws of the machine and then air is admitted from the main reservoir of the brake cylinder at the pressure needed to produce the desired stress. A wire-screen door is closed around the insulator under test to prevent injury to nearby persons from flying wood or metal. This device has proven very convenient for the accurate, rapid testing of wood strain insulators. Over 300 specimens have been tested in one hour. It is very successful in picking out insulators with defective wood or defective castings because they will usually break far below the specified stress. The cost of this outfit, exclusive of the compressor, was only $125.

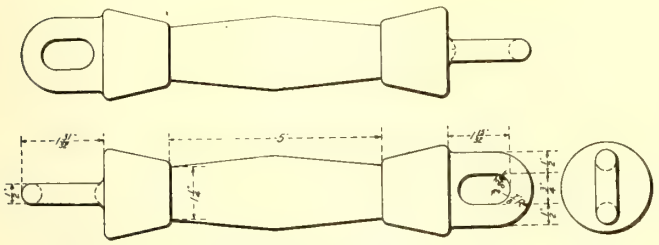


Brooklyn Line Department—Air-Operated Machine Used for Testing Insulators

TROUGH HANGERS

The following specifications relate to the trolley wire and iron-bar hangers, the first of which was illustrated in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, on page 138, and the second in the ELECTRIC RAILWAY JOURNAL of June 11, 1910, on page 1017.

Shells.—The shells are to be made of malleable iron to the dimensions shown in the drawings and are to be plated with zinc.



Brooklyn Line Department—Minimum Dimensions of Standard Wood Strain Insulators

Studs.—For trolley-wire hangers the studs are to be drop-forgings, either shaped as shown in the drawings or to be bolts of the usual shape supplied with washers embedded in the insulation and against which the hub of the ear can be screwed. The stud for use with iron-bar conductors is to be made of malleable iron. The studs can be either electro-galvanized or sherardized. Each iron-bar hanger is to be furnished with one ⅜-in. x 1⅜-in. bolt and nut, both of which must be sherardized or electro-galvanized.

Insulation.—The insulation must be of a composition that will not only withstand the laboratory tests, but also the influence of exposure to the weather. The use of petticoats between the stud and the shell will be left to the judgment of the manufacturer.



Brooklyn Line Department—Organization Diagram

Tests.—Ten per cent of all hangers received will be tested: First, by a direct pull on the stud of 2000 lb. after the insulator has been soaked in water at a temperature of 150 deg. Fahr. for one hour; then, after being wiped and allowed to dry for 30 minutes, with a potential of 5000 volts applied between the stud and shell for one minute.

Marking.—Each hanger shall have some distinguishing mark, either in the shell or the insulation, showing the name of the company by which it is made.

CONCLUSION

While the various articles on the line department have given a fair idea of its scope, the following résumé and accompanying organization diagram may be of interest. The line department is one of the departments under C. E. Roehl, electrical engineer, Brooklyn Rapid Transit System. It employs about 200 men divided as follows herewith: Overhead feeders and third-rail; trolley wire construction, poles; lighting repairs; telegraph, telephone, fire-alarm and crossing signals; shops; office force, including inspectors and draftsmen. On account of the area covered it is found necessary to have more subdivisions of labor than would be needed on smaller systems. Proper supervision could not be given to the different classes of work mentioned unless each was in charge of responsible specialists ready to go to any part of the territory at any time.

Practically all important instructions are issued directly from the office of the electrical engineer except emergency lighting, fire-alarm and trolley trouble calls, which are answered immediately. It may be noted here that the electrical engineer has charge of practically all electrical work on the system except car circuits and some low-tension signal circuits on the elevated structure. Even the electrical repairs and renewals of the lamp clusters in the car shop structures are carried out by the line department, which conforms in this work to the insurance requirements.

TRACTION GROWTH IN ATLANTA

The remarkable growth of Atlanta, Ga., is well shown by the record of the railway department of the Georgia Railway & Electric Company: During the year 1909, 9,020,897 passenger miles were operated over a total of 177 miles of route measured as single track. This represented an increase of 6.83 per cent over the preceding year. During 1909 the company also constructed 11 miles of single track. The number of passengers carried in 1909 was 50,570,953, which was equivalent to an increase of 11 per cent over the preceding year. The total operating cost per car mile for 1909 was 11.59 cents, made up of the following items: Maintenance, 2.07 cents; power plant operation, 1.50 cents; car operation, 5.63 cents; general expenses, 2.39 cents. The gross earnings of the railway department alone increased very rapidly, as shown by the following table of typical years:

1892.....	$351,394	1905.....	$1,419,650
1897.....	372,482	1908.....	1,902,398
1901.....	636,679	1909.....	2,109,565
1902.....	940,006		

The operating expenses of the railway department in 1909 were 49.95 per cent of the total earnings.

MANCHURIAN ELECTRIC RAILWAY

The South Manchuria Railway Company, which supplies current to the general public in Dairen (Dalny), Mukden and Changchun from its own electric power station, also operates the Dairen electric railway system, being also under the same management. The electric line in Dairen has been running since September, 1909, over a standard gage route consisting of 3 miles of single and 5 miles of double track. The available number of cars is 30 with 10 spare cars, all being double compartment vestibule cars with a capacity of 30 passengers each. The fares are uniform all over the town, being 6 cents and 4 cents for first and second class. Thirty trip tickets are issued at 75 cents and 50 cents for the two classes respectively, and time tickets at 8 cents and 5 cents available for one hour can be used for any number of rides and for any direction. No transfers are issued. The present receipts scarcely pay the expenses, but the line certainly provides the city with an excellent means of communication. An electric park near the center of the town, intended to develop the traffic, is equipped with conservatories and menageries, theater, bowling and shooting alleys, roller-skating rink, ponies, camels, etc. The cost of admission is about 2 cents.

ADVERTISING METHODS AND TRAFFIC OF THE CLEVELAND, PAINESVILLE & EASTERN RAILROAD

BY E. L. SCHMOCK, ASSISTANT SECRETARY AND TREASURER.

Advertising for promotion of traffic for interurban railways and summer resorts is in a division by itself. We do not advertise a commodity, but a service.

We use practically all different methods of advertising—



Cleveland, Painesville & Eastern—Package Car

newspapers, illustrated folders, timetables and maps, street cars, billboards, post cards, photographs and any other means that appeal to us and that are likely to bring results.

In our newspaper advertising we use display advertisements in the Cleveland papers, accompanied by illustrations whenever possible; in the other towns through which our line passes we run smaller display advertisements and have several small items in the local news columns. These advertisements refer to special events along the line, large picnics at the park and special excursions.

With every change of schedule a new time folder is issued. At present we are issuing a folder containing the time of trains on all interurban railways in Northern Ohio, and giving connections for through trips between Buffalo, N. Y., and Detroit, Mich. Our part of this through trip is from Cleveland to Ashtabula. We also issue a vest-pocket folder giving time on our lines in a concise form.

We keep a supply of blotters on hand for enclosing in letters and other mail matter which is sent out. We also distribute the blotters in hotels and banks. These blotters are 3¼ in. x 6 in. in size and are made from the best blotting paper on the market, for I believe in sending out blotters that will blot, and will, therefore, be used and serve their purpose as an advertising agent. The reading matter on these blotters is changed from time to time, say, every three months. During the last year we have put on blotters our limited train schedule, express and baggage schedule, photographs showing different types of cars and also showing different scenes at our park. At the beginning of the summer season I had the express and baggage schedule printed on shipping tags, as illustrated herewith. These tags were tied to packages handled by our different agents, and to empty milk cans by the messengers on the cars. In this way the timetables of express trains were delivered to the people that used them.

The Cleveland, Painesville & Eastern road extends from Cleveland to Ashtabula, a distance of 60 miles. Two lines extend from Cleveland and connect at Willoughby, 20 miles east. The main line leaves Cleveland by way of Euclid Avenue; the shore line leaves via St. Clair Avenue and follows the shore of Lake Erie. Willoughbeach Park, located 17 miles east of Cleveland on the shore of Lake Erie, is reached by our shore line. An illustrated booklet is issued each year telling about the beauties of the park and why it is the best place for picnics, outings, etc. New photographs are taken each summer to be used in the booklet of the following year. These booklets are mailed to fraternal orders, ministers, Sunday school superintendents, members of clubs and other people who would be interested in getting up picnics or private dancing parties. A short letter stating a few facts about the park is mailed to all people who receive booklets. These letters are made to look as nearly like personal letters as possible, and 2-cent stamped envelopes are used in mailing them. We feel that we are repaid for this extra expense by getting the people to read the letters. If a 1-cent stamp were used a great number of the letters would not be opened.

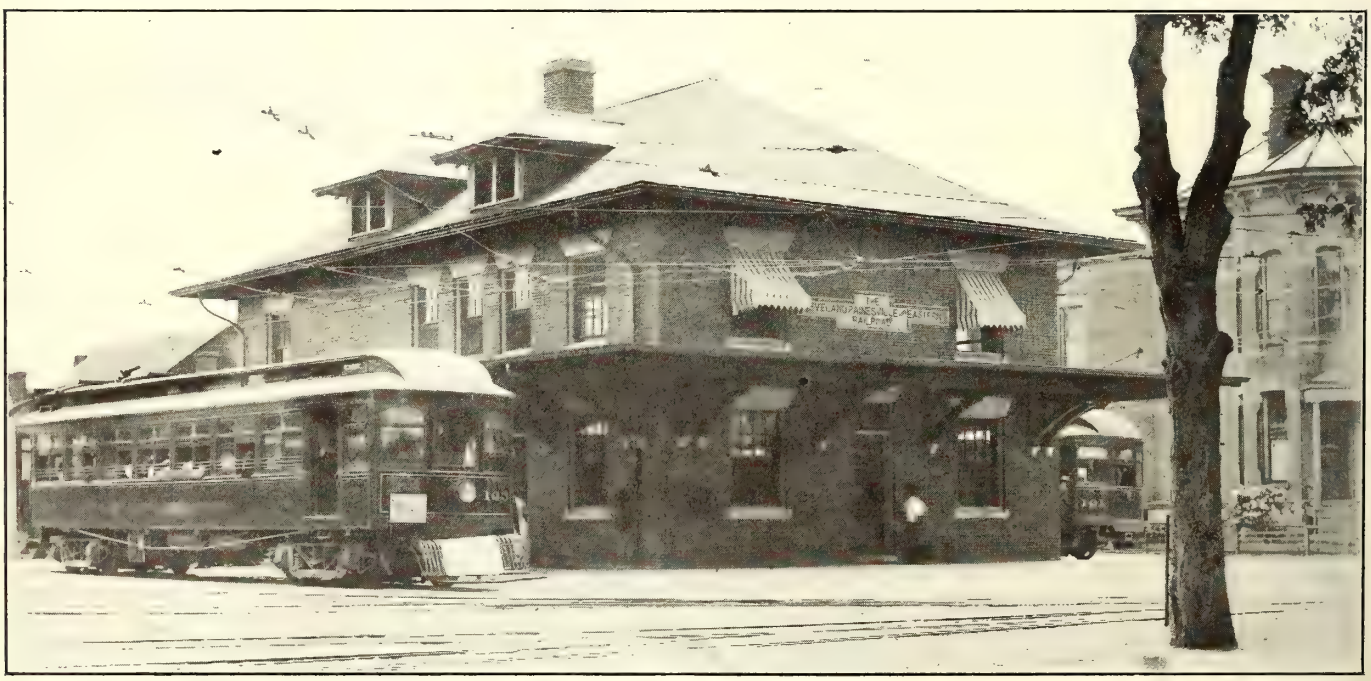
The text of one of these letters follows:

LETTER ADVERTISING PARKS SENT TO CLUBS

"Many of the churches, lodges and societies of the city hold their picnics annually in Willoughbeach Park, and we thought you would be interested to know our proposition this year.

"Special round-trip tickets from Cleveland to Willoughbeach Park good on regular cars are as follows: 20 or more, 30 cents each; 500 or more, 25 cents each. From Collingwood the rates are 10 cents less.

"Special cars may be obtained for $16 round trip, allowing 55 passengers on each car.



Cleveland, Painesville & Eastern—New Station and Office Building at Willoughby, Ohio

"The special cars may be arranged to leave from place most convenient for the picnickers and at time and schedule to suit them. Cars leaving west of the river will be $2.50 extra.

"The dance hall and music can be reserved on Monday, Wednesday and Friday evenings for private parties for $18.

"Our solicitor is at your service to help you make arrangements for any outing or picnic you may be interested in."

Special leaflets and small folders are issued from time to time for special events. During 1908 we distributed in various ways 50,000 leaflets telling about a newspaper reporter's trip by trolley from Cleveland to New York. Part of this trip was made over our line. During a convention in Cleveland we distributed several different folders about points of interest along the line. Although the attendance at this convention was not as large as was expected, we could see that our folders accomplished results.

Any number of postal cards giving views of our park have been furnished to fraternal orders and other societies and were used by them in notifying their members of their picnic.

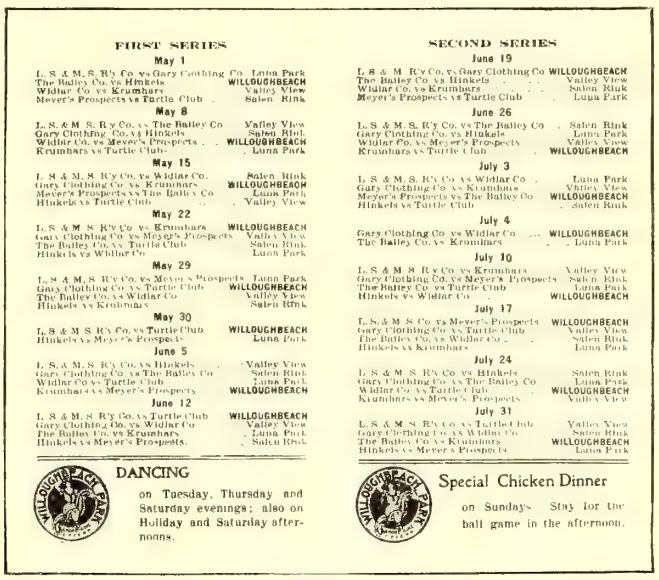
We find that the work of a solicitor is valuable in the advertising department, in following up inquiries for picnic dates or chartered-car rates, and in assisting people in making arrangements for picnics.

Some time ago this company offered a prize of $25 for the best trade-mark design which could be used for practical purposes. This contest was advertised in the newspapers and the railway journals. We also sent leaflets, stating conditions of contest, in all letters mailed from the office. We received 186 designs from people in our neighborhood and in various other sections of the country extending as far west as Madison, Wis., east to Maine and south to New Orleans. A committee of five newspaper men awarded the prize. This trade mark is being put on all of our stationery and on our cars.

I am a firm believer in the policy of keeping the company's name before the public all the time, and we take advantage of every opportunity to advertise it. On the front of stamped envelopes we have our trade mark, and on the back some little advertisement pertaining to the road which can be read at a glance. There are very few letters which take up all the weight allowed for the 2-cent stamp; we, therefore, have blotters or leaflets to enclose in all outgoing mail.

Special attractions are booked for the park on holidays, and on Sundays we have the city league ball teams play there. The ball games are advertised by cards placed in our cars. These are changed weekly. For special attractions and large picnics we put a cloth banner 36 in. square on the fenders of the cars and a sheet poster, 10 in. x 15 in., on the front windows in the cars. We also have cards in the regular advertising racks in the cars.

A company in Cleveland publishes in one booklet the timetables of all of the interurban roads which enter that city. This company distributes the timetables and furnishes us 10,000 copies a month, enough for our cars and various agents. Before this contract was made we published our own timetables, which cost, with two publications a year, for 20,000 large timetables and 10,000 of small size, each time, $230 annually. There is no expense for timetables now as the company which publishes them secures its remuneration from advertising in the booklets. Whenever new schedules are issued they are advertised in the cars. Extra service for holidays or other special occasions is advertised by posters in the cars and stations.



FIRST SERIES

May 1

L. S. & M. S. R'y Co. vs Gary Clothing Co . . Luna Park
The Bailey Co. vs Hinkels . . . WILLOUGHBEACH
Widlar Co. vs Krumhars . . . Valley View
Meyer's Prospects vs Turtle Club . . Salem Rink

May 8

L. S. & M. S. R'y Co. vs The Bailey Co . . Valley View
Gary Clothing Co. vs Hinkels . . . Salem Rink
Widlar Co. vs Meyer's Prospects . . . WILLOUGHBEACH
Krumhars vs Turtle Club . . . Luna Park

May 15

L. S. & M. S. R'y Co. vs Widlar Co. . . Salem Rink
Gary Clothing Co. vs Krumhars . . . WILLOUGHBEACH
Meyer's Prospects vs The Bailey Co . . Luna Park
Hinkels vs Turtle Club . . . Valley View

May 22

L. S. & M. S. R'y Co. vs Krumhars . . . WILLOUGHBEACH
Gary Clothing Co. vs Meyer's Prospects . . Valley View
The Bailey Co. vs Turtle Club . . . Salem Rink
Hinkels vs Widlar Co . . . Luna Park

May 29

L. S. & M. S. R'y Co. vs Meyer's Prospects . Luna Park
Gary Clothing Co. vs Turtle Club . . . WILLOUGHBEACH
The Bailey Co. vs Widlar Co . . . Valley View
Hinkels vs Krumhars . . . Salem Rink

May 30

L. S. & M. S. R'y Co. vs Turtle Club . . . WILLOUGHBEACH
Hinkels vs Meyer's Prospects . . . Luna Park

June 5

L. S. & M. S. R'y Co. vs Hinkels . . . Valley View
Gary Clothing Co. vs The Bailey Co . . Salem Rink
Widlar Co. vs Turtle Club . . . Luna Park
Krumhars vs Meyer's Prospects . . . WILLOUGHBEACH

June 12

L. S. & M. S. R'y Co. vs Turtle Club . . . WILLOUGHBEACH
Gary Clothing Co. vs Widlar Co . . . Valley View
The Bailey Co. vs Krumhars . . . Luna Park
Hinkels vs Meyer's Prospects . . . Salem Rink

SECOND SERIES

June 19

L. S. & M. S. R'y Co. vs Gary Clothing Co . WILLOUGHBEACH
The Bailey Co. vs Hinkels . . . Valley View
Widlar Co. vs Krumhars . . . Salem Rink
Meyer's Prospects vs Turtle Club . . Luna Park

June 26

L. S. & M. S. R'y Co. vs The Bailey Co . . Salem Rink
Gary Clothing Co. vs Hinkels . . . Luna Park
Widlar Co. vs Meyer's Prospects . . . Valley View
Krumhars vs Turtle Club . . . WILLOUGHBEACH

July 3

L. S. & M. S. R'y Co. vs Widlar Co . . Luna Park
Gary Clothing Co. vs Krumhars . . . Valley View
Meyer's Prospects vs The Bailey Co . . WILLOUGHBEACH
Hinkels vs Turtle Club . . . Salem Rink

July 4

Gary Clothing Co. vs Widlar Co . . . WILLOUGHBEACH
The Bailey Co. vs Krumhars . . . Luna Park

July 10

L. S. & M. S. R'y Co. vs Krumhars . . . Valley View
Gary Clothing Co. vs Meyer's Prospects . Salem Rink
The Bailey Co. vs Turtle Club . . . Luna Park
Hinkels vs Widlar Co . . . WILLOUGHBEACH

July 17

L. S. & M. S. Co. vs Meyer's Prospects . . WILLOUGHBEACH
Gary Clothing Co. vs Turtle Club . . . Valley View
The Bailey Co. vs Widlar Co . . . Salem Rink
Hinkels vs Krumhars . . . Luna Park

July 24

L. S. & M. S. R'y Co. vs Hinkels . . . Salem Rink
Gary Clothing Co. vs The Bailey Co . . Luna Park
Widlar Co. vs Turtle Club . . . WILLOUGHBEACH
Krumhars vs Meyer's Prospects . . . Valley View

July 31

L. S. & M. S. R'y Co. vs Turtle Club . . Valley View
Gary Clothing Co. vs Widlar Co . . . Salem Rink
The Bailey Co. vs Krumhars . . . WILLOUGHBEACH
Hinkels vs Meyer's Prospects . . . Luna Park

DANCING

on Tuesday, Thursday and Saturday evenings; also on Holiday and Saturday afternoons.

Special Chicken Dinner

on Sundays. Stay for the ball game in the afternoon.

Cleveland, Painesville & Eastern—Schedule of Baseball Games at Willoughby Park

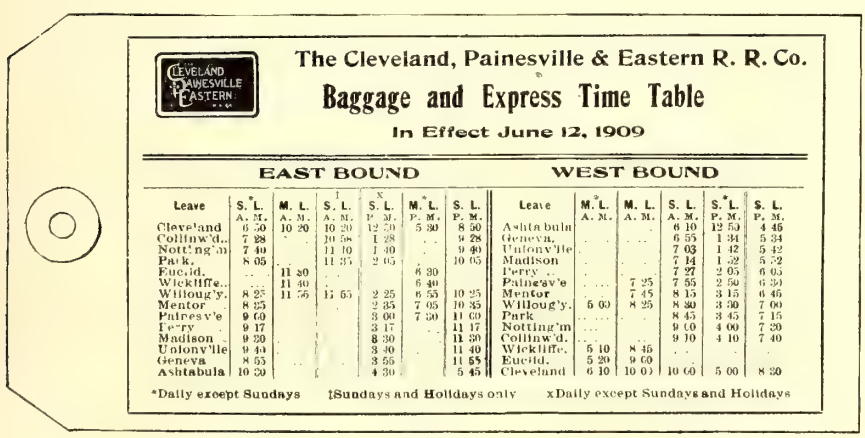
In soliciting passenger traffic I write to officials of different lodges and societies, which furnish a good deal of business in the winter. During the winter months theater parties are frequently organized in the different towns and we furnish cars for trips to Cleveland at a charge of $1 a track mile and an allowance of 55 people to the car. For all passengers over this number carried on excursions of this kind we charge the regular fare.

In inviting some excursion business for country picnics or similar events we advertise in the newspapers and also distribute bills at the houses in the interested communities. When an industrial exposition was held in Cleveland we gave reduced rates on three days of the week. Special tickets, including transportation and admission to the grounds, are sold for baseball games in Cleveland at prices that make admission to the grounds cost the purchaser 15 cents net instead of the regular price of 50 cents. We had one special car arrangement that was a failure. We advertised that a special car would be operated from Ashtabula to Cleveland on Thursdays in June. The car was very poorly patronized, but we continued to operate it for the period we had advertised, preferring to stand the loss rather than disappoint any patrons.

The colors of tickets are in accordance with the recommendation of the Central Electric Railway Association, green for single trip, gray for round trip and orange for excursion. A special form of ticket is used for excursion tickets.

On business to Willoughbeach Park 20 or more round-trip tickets are sold at a reduction of 25 per cent from double the regular single-fare rate. A reduction of 37½ per cent is made if the number of tickets purchased is 350 or more.

Interline business is transacted with all of the interurban companies that enter Cleveland and with all of the Ohio mem



The Cleveland, Painesville & Eastern R. R. Co.

Baggage and Express Time Table

In Effect June 12, 1909

EAST BOUND							WEST BOUND						
Leave	S. L. A. M.	M. L. A. M.	S. L. A. M.	S. L. P. M.	M. L. P. M.	S. L. P. M.	Leave	M. L. A. M.	M. L. A. M.	S. L. A. M.	S. L. P. M.	S. L. P. M.
Cleveland	6 50	10 20	10 20	12 50	5 30	8 50	Ashtabula			6 10	12 50	4 45
Collinw'd..	7 28		10 58	1 28		9 28	Geneva			6 55	1 34	5 34
Notting'm	7 40		11 10	1 40		9 40	Unionv'lle			7 03	1 42	5 42
Park	8 05		11 25	2 05		10 05	Madison			7 14	1 52	5 52
Euclid		11 30			6 30		Perry			7 27	2 05	6 05
Wickliffe		11 40			6 40		Painesv'e		7 25	7 55	2 50	6 50
Willoug'y	8 25	11 56	11 55	2 25	6 55	10 25	Mentor		7 45	8 15	3 15	6 45
Mentor	8 25			2 25	7 05	10 35	Willoug'y	5 00	8 25	8 30	3 30	7 00
Painesv'e	9 00			3 00	7 30	11 00	Park			8 45	3 45	7 15
Perry	9 17			3 17		11 17	Notting'm			9 00	4 00	7 30
Madison	9 30			3 30		11 30	Collinw'd.			9 10	4 10	7 40
Unionv'lle	9 44			3 40		11 40	Wickliffe	5 10	8 46			
Geneva	9 55			3 55		11 55	Euclid	5 20	9 00			
Ashtabula	10 20			4 30		5 45	Cleveland	6 10	10 00	10 00	5 00	8 30

*Daily except Sundays ‡Sundays and Holidays only xDaily except Sundays and Holidays

Cleveland, Painesville & Eastern—Shipping Tag with Baggage and Express Timetable

ber-companies of the Central Electric Railway Association. We do not have more than five through tickets a year, however, to lines beyond the roads with which we make direct connection at Cleveland. With the other lines that enter Cleveland we do a large business. Baggage is checked through. We receive about as much of this business as we give.

A record is kept of the car-mile earnings of limited cars, as shown in a statement published herewith.

THE CLEVELAND, PAINESVILLE & EASTERN RAILROAD COMPANY—EARNINGS OF LIMITED TRAINS BY TRIPS FOR SATURDAY, AUG. 6, 1910

Train No.		C. P. & E.	C. P. & A.	Total.
	Eastbound			
80	Leave Cleveland 7:50 a. m., arrive Ashtabula 10:26 a. m.	$12.55	$7.65	$20.20
82	Leave Cleveland 12:50 p. m., arrive Ashtabula 3:26 p. m.	{ 14.75 / 18.35	6.95 / 15.60	21.70 / 33.95
84	Leave Cleveland 3:50 p. m., arrive Ashtabula 6:26 p. m.	19.05	10.65	29.70
86	Leave Cleveland 4:55 p. m., arrive Painesville 5:27 p. m.	7.75	....	7.75
88	Leave Cleveland 6:55 p. m., arrive Ashtabula 9:25 p. m.	10.30	4.05	14.35
	Westbound			
81	Leave Painesville 6:35 a. m., arrive Cleveland 7:55 a. m.	9.15	....	9.15
83	Leave Ashtabula 6:30 a. m., arrive Cleveland 8:55 a. m.	14.35	12.50	26.85
85	Leave Ashtabula 8:05 a. m., arrive Cleveland 10:25 a. m.	13.45	12.15	25.60
87	Leave Ashtabula 1:05 p. m., arrive Cleveland 3:25 p. m.	30.40	26.30	56.70
89	Leave Ashtabula 4:05 p. m., arrive Cleveland 6:26 p. m.	19.30	14.80	34.10
91	Leave Painesville 7:05 a. m., arrive Cleveland 8:25 a. m.	9.90	....	9.90
	Total	$179.30	$110.65	$289.95
	Car-miles	270	229	499
	Earnings per car-mile	$0.67	$0.48	$0.58

At the end of each month a statement is made showing the amount of ticket sales in each agency as compared with the record of the corresponding month of the previous year. A comparative statement is also made of the through passengers between Cleveland and Ashtabula. Samples of these statements are published herewith.

CLEVELAND, PAINESVILLE & EASTERN RAILROAD
COMPARATIVE STATEMENT OF AGENTS' TICKET SALES FOR THE MONTH OF AUGUST

	1908	1909	Increase	Decrease
Cleveland	$3,720.70	$5,007.55	$1,286.85	
Willoughby	1,299.99	1,330.80	30.90	
West Mentor	137.49	217.30	79.81	
East Mentor	409.06	438.88	29.82	
Painesville	2,505.75	3,351.51	845.76	
Perry	1,080.76	984.77		95.99
Madison	389.15	455.09	65.94	
Unionville	323.75	237.80		85.95
Geneva	1,205.73	1,425.60	246.93	
Ashtabula	1,534.50	2,105.08	570.58	
Totals	$12,606.79	$15,581.44	$3,156.59	$181.94

CLEVELAND, PAINESVILLE & EASTERN RAILROAD
THROUGH TICKETS, CLEVELAND TO ASHTABULA AND ASHTABULA TO CLEVELAND AUGUST

	1908				1909			
	Cleveland to Ashtabula		Ashtabula to Cleveland		Cleveland to Ashtabula		Ashtabula to Cleveland	
	S.T.	R.T.	S.T.	R.T.	S.T.	R.T.	S.T.	R.T.
1	12	10	23	1	13	14	10	2
2	1	3	18	5	15	5	24	8
3	16	4	20	7	14	5	29	3
4	11	2	11	1	12	10	17	5
5	11	14	24	7	14	6	28	2
6	4	7	22	4	12	6	24	11
7	6	3	15	2	25	22	32	5
8	7	6	26	7	5	9	21	..
9	5	7	11	6	30	9	58	6
10	17	3	22	9	15	5	27	10
11	9	7	13	6	5	7	23	8
12	26	4	30	7	17	11	35	5
13	10	3	15	3	4	9	18	10
14	4	7	25	8	20	10	31	10
15	17	19	17	3	17	5	15	5
16	5	4	12	2	38	11	20	9
17	12	9	20	10	26	11	30	7
18	17	8	17	3	14	10	36	6
19	14	28	26	1	27	13	22	6
20	15	6	19	1	17	12	34	10
21	17	9	35	6	11	7	36	9
22	11	8	15	5	17	10	23	6
23	5	10	14	1	..	8	38	4
24	5	11	30	10	5	5	30	13
25	12	4	10	5	11	3	24	5
26	21	10	29	15	12	10	26	4
27	10	9	12	3	14	6	23	10
28	7	6	17	7	17	4	30	3
29	4	9	20	15	19	10	32	2
30	3	2	14	1	27	5	23	6
31	8	1	41	9	11	3	17	5
	322	233	623	170	484	261	836	195

Cleveland to Ashtabula, S. T. increase, 162.
Cleveland to Ashtabula, R. T. increase, 28.
Ashtabula to Cleveland, S. T. increase, 213.
Ashtabula to Cleveland, R. T. increase, 25.

A sheet is also kept to show each day the number of passengers on every trip.

A schedule of the cars of the Electric Package Agency, which carry baggage, is shown on the timetable. As an accommodation to shippers express is carried occasionally on regular cars, so that if an agent has made a mistake it can sometimes be rectified with little delay. The package business includes large quantities of groceries, meats and merchandise shipped from Cleveland to merchants in the different towns. On the return trips of the cars to Cleveland fruits, vegetables and nursery stock are a conspicuous part of the business. There are a number of nurseries on the line and one, located near Painesville, has 1700 acres of land under cultivation. At Perry a special siding was constructed this year so that cars could be loaded with fruit easily, and next year similar facilities will be provided for nursery stock. We have started an early morning car from Cleveland for the accommodation of shippers of meat.

The new station building of the company at Willoughby, which is illustrated herewith, is an attractive feature of the system. The first floor contains a waiting room, ticket office, package office and employees' room. The second floor is occupied by the offices of the officials of the company and the third floor is used by the engineering department. The building is 30 ft. x 80 ft. in size and is heated by hot water. The basement extends under the entire building, and, with the exception of one room, is used for storage purposes. This room, measuring 10 ft. x 12 ft., contains a machine which is used to destroy tickets. The building contains a 3-story vault. The basement vault is used for storing valuable papers, letters, etc., which may be needed only occasionally. The vault on the first floor is used for tickets, stationery and cash and the vault on the second floor is used for the records of the accounting and engineering departments.

In order to get more people into the country and along the lake shore we are going to compile a list of people who have cottages for rent, those who keep boarders or have camping grounds for rent, giving the names, addresses and the stop number at which the place is located on the line. This material will be put in leaflet form for distribution.

It is best to give the advertising man all the freedom possible, to tell the truth in advertisements and have the best work in printing.

SIGNAL PROTECTION FOR ILLINOIS TRACTION SYSTEM

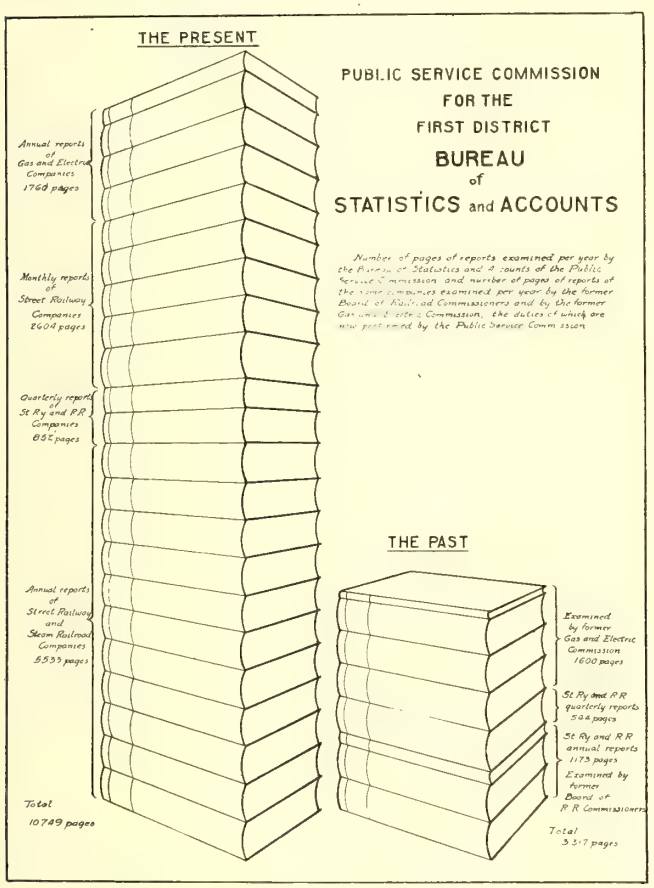
The Illinois Traction System is now completing plans for the largest block signal and dispatching signal installation ever made by an electric railway. It is proposed to protect 100 continuous miles of track on one portion of the system with automatic block signals and to install similar signals on all curves and other dangerous places on other lines operated by this organization. The automatic block signals will be in addition to the Blake dispatching signals which the company has been installing at each siding during the past summer. The selection of the type of automatic block signals is the hands of H. E. Chubbuck, general manager of the Illinois Traction System. It is likely that the contracts will be announced within a few days. It is the ambition of the Illinois Traction System to be known in the future as the "Signal Road" because of the comprehensive system of protection which will be installed.

EXHIBIT OF PUBLIC SERVICE COMMISSION

A unique exhibit has been given in New York under the auspices of the Board of Estimate and Apportionment of the city. It was entitled a "Budget Exhibit" and was given for the purpose of showing the citizens how their money is spent. Various departments of the city were represented. The exhibit was opened on Oct. 3 and was closed on Oct. 28. It was held in a building at 330 Broadway, Manhattan.

One of the principal features of the exhibit was the section devoted to the Public Service Commission for the First District. The commission showed by chart, circular and demonstration various features of its work since organization on July 1, 1907. The regulation division of the exhibit included a demonstration of testing gas meters, photographs of fender and wheel guard tests, a profile chart of ticket sales at subway and elevated stations and charts showing the cost of regulation and giving illustrations of economical management by the commission. In the rapid-transit division of the exhibit a full set of plans and specifications of the proposed tri-borough subway, a model of the existing subway and photographs showing views during construction of the present subway were given. Representatives of the commission were present to furnish information to visitors.

A profile chart was displayed showing ticket sales at subway and elevated stations and the Brooklyn and Williamsburg bridges and East River ferries, as illustrated in the issue of the Electric Railway Journal for May 29, 1909, page 979.



Public Service Commission Exhibits—Development of Statistical Work

This chart was originally exhibited at the Conference on City Planning and Municipal Art, held in New York in May, 1909. It has also been exhibited at the New York State Fair at Syracuse.

Diagrams were presented showing the distribution of the daily traffic by half hours on the surface lines of Greater New York. These were entitled "Homeward" and "Workward" charts. An explanatory poster stated in part:

"The difference in distribution between the morning and evening rush is well shown by these charts. The workward chart shows for three consecutive hours about 6 per cent of the total one-way movement. The homeward chart shows for two successive half hours about 7½ per cent of the total one-way movement. If the traffic were uniformly distributed each period would have about 2 per cent of the total, but during the morning rush the maximum is three times and during the evening rush three and three-quarter times this average."

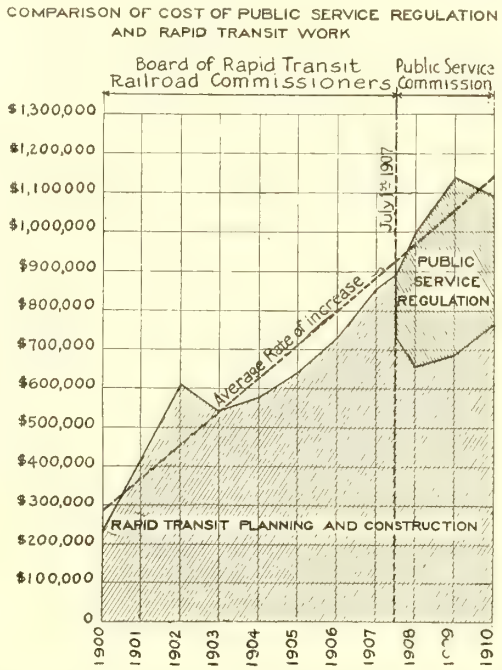


Chart Shown at Exhibit of Public Service Commission

A leaflet distributed among the visitors said in part:

"At the office of the Public Service Commission:

I. You can see—

"The certificates of incorporation, franchises, mortgages, deeds, agreements, leases, maps and other corporate and franchise papers of the railroad, street railway, gas and electric companies operating in Greater New York, all carefully indexed by companies and by subjects so that you can get them on a moment's notice—more than 5000 of them.

"Historical charts, showing the interrelations of all the companies—75 companies in the Brooklyn Rapid Transit system alone.

"Franchise charts and maps, showing when, where and from what authority each company acquired its franchises—over 60 franchise maps for Queens, 30 for the Bronx, 50 for Manhattan, 200 for Brooklyn.

"Territorial maps, showing the history and boundaries of the old towns, villages and cities whose franchise grants are now effective in any part of Greater New York—about 40 of them.

"Trackage and operating maps, showing the extent and location of each company's tracks, pipes or wires owned or operated.

"Indexes of legislative and local franchise grants, trackage agreements and street railway operation by streets, of car routes and of companies—700 railroad and street railway companies incorporated to do business in Greater New York.

"Historical route book, showing the route of every street car line operated in Greater New York since the Public Service Commission was established, with name of company and dates of changes in route or in operating company.

"II. You can find out—

"What companies have franchises in your section or on your street, and what their rights and obligations are.

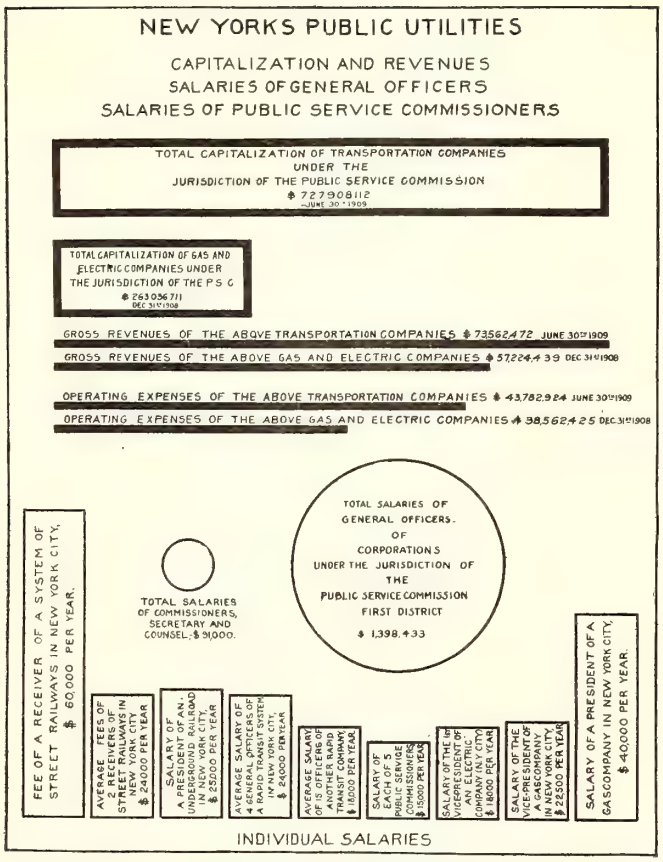
"What company or companies operated cars on a given street on a given day, where their offices are located, and who their officers are.

"What rapid-transit routes have been laid out in various sections of the city, and their present status.

"At what points street railway companies are required to give transfers, and at what points they do it voluntarily.

"III. You can get—

"An abstract of the monthly report of each street railway company operating in the City of New York, showing its earnings and expenses and the extent of passenger travel during the month.



Public Service Commission Exhibit—Comparison of Public and Corporation Salaries

"An abstract of the quarterly report of each railway company operating in the city, showing not only revenue, expenses and gross and net profits, but also assets and liabilities.

"The annual report of the Bureau of Statistics and Accounts, showing in complete detail the operating, financial and property statistics of every railroad, street railway, stage coach, gas and electric corporation (operating or lessor) in the City of New York, together with analyses and summaries of the statistics for each borough prepared by expert statisticians and accountants.

"Investors find this information indispensable.

"This is a public service commission.

"It has taken the Bureau of Franchises three years, with an average of nine persons at work, to get together the franchise information that is now available for public use.

"In the Bureau of Statistics and Accounts on the average 15 persons are constantly employed checking up and tabulating the financial reports of the companies for the information of the public.

"The personal attention of competent employees is given to every inquiry, and no one seeking legitimate information can get away without it, if the commission has it."

A poster called attention to the collection of books, pamphlets and articles from technical periodicals relating to public utilities and rapid transit contained in the commission library. The library comprises 2600 volumes and 6000 pamphlets. The commission employees refer to 300 of these volumes and pamphlets per week, or about 15,000 per year.

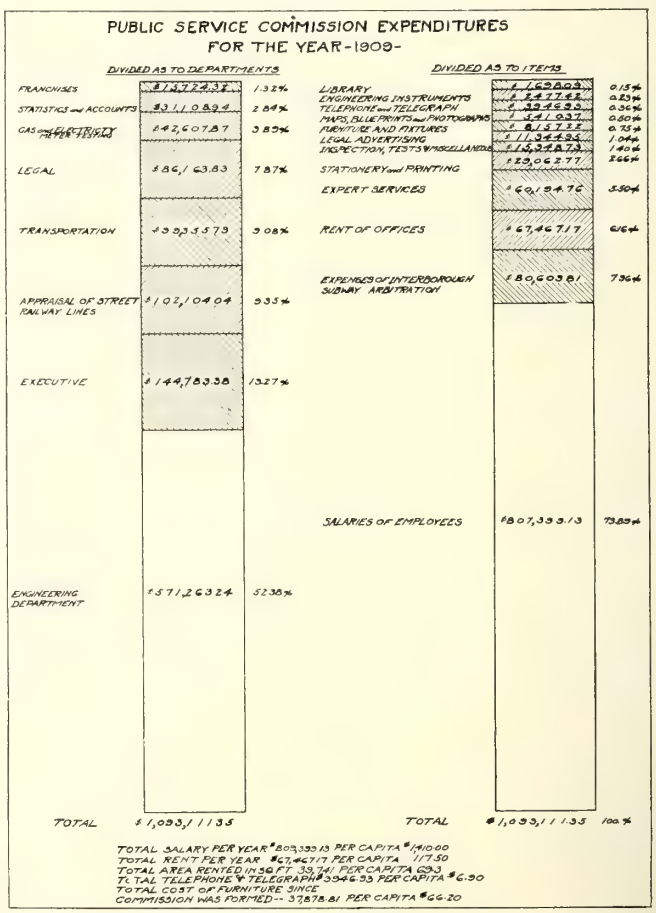
On a chart entitled "Commission Stationery, Quantity and Cost," samples of the different classes of stationery and of pencils, etc., were displayed together with figures showing the average cost of each.

A statement was presented showing the increase in service on the surface lines in New York since the organization of the commission.

One display which attracted attention related to economy in drinking water. On a water cooler in the section of the building devoted to the exhibit of the commission a placard was displayed reading as follows: "Cost of bottled spring water for 600 employees, 1909, $407.50, discontinued in 1910. Cost of Croton water, filtered, including coolers, bottles, filters, etc., good for five years, per year, $35.90. Saving per year, $371.60."

The statistical department presented the forms of reports required now and those used by the preceding State bodies. A poster stated: "Formerly only a few general statements were required of the companies. Now the facts which are essential to public control are required to be recorded in detail. The constant supervision of corporation bookkeeping exercised by the Public Service Commission requires a staff of extra accountants and statisticians to make critical examinations of the companies' reports and books of account, but saves the heavy expense attending special investigations which had to be made at intervals when no permanent supervision was provided."

In connection with photographs of the fender tests made at Schenectady, N. Y., and in East Pittsburgh, Pa., in 1908, the commission exhibited a poster stating that the steady decrease in the number of lives lost each year showed the beneficial results of the orders of the commission for the installation of efficient life-saving devices, the overhauling and repair of cars,



Public Service Commission Exhibit—Expenditures by Items and Departments

the maintenance of equipment in effective condition, and the better protection of grade crossings. The figures for the number of lives lost are shown in the following table:

Fiscal year.	Steam, Subway and Elev.	Street Surface.	Total.
1907-1908	203	303	506
1908-1909	184	199	383
1909-1910	189	152	341

Other charts shown by the Public Service Commission at the exhibit are reproduced herewith.

RECENT CAR HOUSE CONSTRUCTION IN CHICAGO

The second annual report of the Board of Supervising Engineers, Chicago Traction, presents interesting descriptions of several new car houses built during the last three years by the Chicago Railways and the Chicago City Railway companies. A number of these structures have been illustrated and described in this paper, but the observations of the board regarding principles of design and some remarks on the types of construction are abstracted from the report.

CAR HOUSE CONSTRUCTION FOR YEAR 1908

During the year 1908 the Chicago City Railway Company completed the work on two fireproof car houses located at Seventy-seventh Street and Vincennes Road and at Thirty-eighth Street and Cottage Grove Avenue. These buildings are described in detail in the first annual report. In addition this company built modern, fireproof car houses at Sixty-ninth Street and Ashland Avenue and at Thirty-eighth Street and Archer Avenue, giving this company a total of four new, modern, fireproof car houses capable of housing 1095 cars. The capacity required by the ordinance is 1051 cars; therefore, the Chicago City Railway Company, with the completion of these four new car houses, will have complied with its ordinance requirements relating to car houses.

The Chicago Railways Company during the year 1908 built two new car houses. The West Twenty-fifth and Leavitt Streets car house has a capacity of 142 cars, while the Lincoln Avenue car house as originally planned has a capacity of 94 cars. During the year 1908 only three bays of the Lincoln Avenue car house were built. Each bay has a capacity of 18 cars, making a total for the three bays of 54 cars. This car house may be further extended if desired.

Work has also started on a new car house at Kedzie Avenue and Van Buren Street, which will have a capacity of 291 cars. Plans have also been made for a new car house at Ogden and Fortieth Avenues, known as the Lawndale car house, which when completed will have a capacity of 187 cars. Plans have been made for the construction of a new car house at North Clark Street and Dewey Place, known as the Limits car house, which will have a capacity of 86 double-truck and seven single-truck cars. These five modern, fireproof car houses will have a capacity of 807 double-truck cars.

Several of the old car houses have been temporarily reconstructed by the moving of posts, rearrangement of tracks, etc., so as to permit the entrance of the large new cars. It is the intention to house some of the new equipment as it is received at these reconstructed car houses until such time as new, modern, fireproof car houses shall be built.

The Burnside car house of the Calumet and South Chicago Railway Company was partially rehabilitated during the year 1908 by the building of two new pits and changing of entrance columns and tracks. The determination of car house requirements for this company is to be made during the year 1909.

GENERAL BUILDING FEATURES

In the construction of all the new buildings of the companies the general building ordinances of the city of Chicago have been complied with and all buildings have been built substantially fireproof, thus guarding against great loss of cars and obtaining the minimum rate of insurance. All the new car houses of the Chicago City and the Chicago Railways companies have been designed with the double-end feature, so that cars may be turned into the car house at the rear end. The car then moves progressively through the hands of inspectors and cleaners, and is thoroughly inspected, washed, cleaned and disinfected, and placed at the forward end of the car house ready to go out on the line as the service may demand. This design of house permits of the rapid handling of cars without any unnecessary shifting from track to track and enables the work to be done on the cars at a minimum expense.

It has been the special effort of the Board of Supervising Engineers to improve the architectural features of both substation and car house buildings. Such buildings, if architecturally well designed, are an asset beyond their intrinsic value; they have a definite effect for good, not only among the employees, but also upon the general public. Particular attention has been paid to meeting the recommendations of the Chicago Board of Fire Underwriters, so as to reduce to a minimum the rates of insurance. By reducing the number of cars stored in each bay it has been possible to minimize the amount of equipment which could be damaged in case of fire, so as not to cripple the service to any serious extent.

GENERAL DESIGN OF CAR HOUSES

In the first annual report of the chief engineer of the work the following points regarding car house design were discussed in full: Closed storage versus open storage of cars; single and double-end car houses; pit area and washing facilities; architectural features; fireproof construction; area between fire walls.

Further points regarding the latest approved design of car houses will now be taken up:

DESIGN

In considering the question of the design of the new car houses of the railway companies the following conclusions were reached:

(1) All car houses that are to be permanent should be divided into bays or sections, so as to reduce the loss in case of fire to a minimum.

(2) All new car houses to be built should be divided into bays or sections of fireproof construction.

(3) When an old car house is to be remodeled so as to become a permanent structure, involving the expenditure of considerable money, such building shall be fireproof.

(4) When it is necessary to remodel an old car house which will probably be abandoned in the near future such modifications should be made with as little expense as possible and yet make it reasonably safe for the property within it. Such temporary structure should be replaced by a new car house at the proper time, at the same or a more desirable location.

(5) Wherever conditions will permit car houses should be of the double-end type.

FLOORS, PITS AND ROOFS

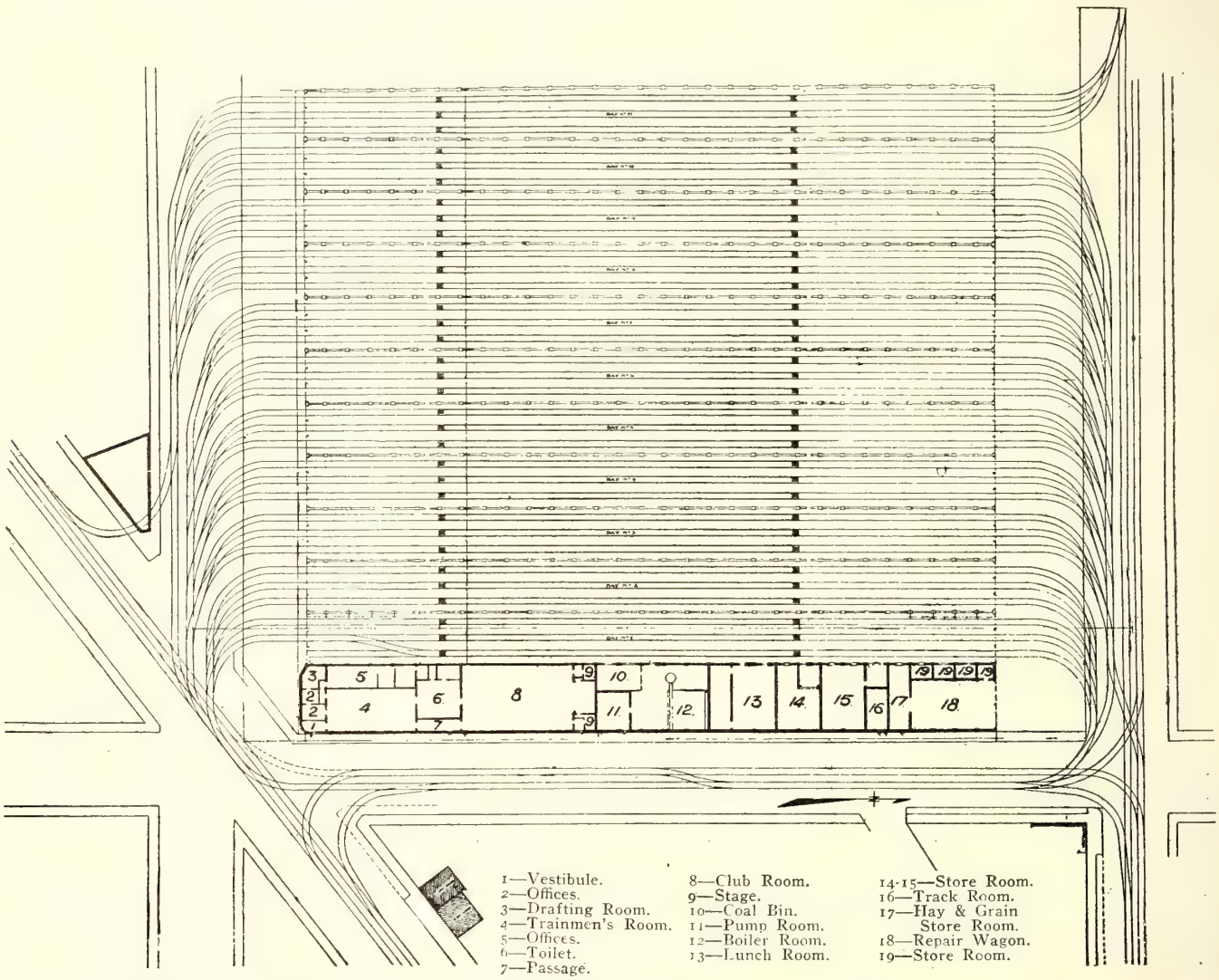
In all new car houses concrete floors are being laid throughout the entire house. Open pits have been used in all car house bays, with a reinforced concrete floor between rails of the adjoining tracks and with concrete sub-floors for all pits. All floors have been graded so that water will flow readily to the drains. This is a great improvement over the old car houses, where cinder or dirt floors were the rule. Very little drainage was provided in the old car houses, and the men in washing the cars, especially in the winter time, were compelled to wear rubber boots. The water stood in all the pits, and the interior of the house was in an undesirable and unsanitary condition. This condition was often made worse by the storing of material in the pits. The new car houses with the well-drained concrete floors are very easily kept clean, dry and in a healthful condition.

The open-pit construction which has been adopted in the new car houses has a great many advantages over the old construction. Inspectors and repair men can readily pass from one pit to the other as they go over the cars without going up and down the stairs. Men working in adjoining pits can pass tools, etc., to each other with ease.

Reinforced concrete slab roofs have been decided upon as the best fireproof roofs for car houses. Reinforced concrete forms ample protection against the flames from burning cars, and by the use of skylight monitor openings with plain glass sides, which automatically open in case of fire, the flames have a vent. For car houses a flat type of roof is greatly to be desired on account of the large area to be covered. The roof is placed as close to the trolley wire as possible, so that the cost of the building is decreased. A uniform height of 18 ft. to the reinforced concrete girders supporting the roof slabs has been used, with all door openings of the same clear height. By this construction it is possible to bring the trolley wire in from the street on the same level and the chances of the trolley pole

leaving the wire in passing from the street to the overhead special work entering the car house are minimized.

The earlier car houses which were built with concrete roofs, for example the Cottage Grove Avenue and Thirty-eighth Street and Seventy-seventh Street and Vincennes Road car houses of the Chicago City Railway Company and the Lincoln Avenue and the West Twenty-fifth and Leavitt Streets car houses of the Chicago Railways Company, were 47 ft. 6 in. between fire walls. On account of this long span the cost of the entire roof was rather high, especially in the girder construction. Later car houses have been built on property such that a longer house could be obtained and bays built three tracks wide, giving 37 ft. 6 in. span for the concrete roof girders; thus it is possible to get the same storage capacity in each bay, approximately $200,000 money value in rolling stock, and allow of a greater saving in the concrete roof construction.



Final Plan of Chicago City Railway's Car House at Archer Avenue and Rockwell Street, Chicago

SKYLIGHTS

In the most lately designed car houses skylights have been placed in the center of the bays, extending the full length of the house, except for the last pilaster bent of 16 ft. at each end. Skylights have been built over approximately 20 per cent of the area of the storage bays. In the case of the Lincoln Avenue and the West Twenty-fifth and Leavitt Streets car houses a different type of skylight construction was tried out. This construction, briefly stated, was the placing of small 2 ft. by 3 ft. skylights over each aisle between cars and over the aisles between the cars and the fire walls, these skylights being uniformly placed in each 16-ft. pilaster bent. The advantage to be gained by the use of this construction was a more uniform distribution of light and the placing of the light where it was most needed. It was found, however, after these two car houses had been built that this type of car house construction was more expensive than the central skylight construction, and that the lighting obtained from its use was not a sufficient improvement to warrant the increase in cost. It has, therefore, been decided to use central skylights in all standard fireproof car houses. The increased cost of the distributed skylights is due to the concrete curbing which is required at each end of the great number of small skylights. It is also due to the increased cost in sheet-metal work on the greater number of skylights and to the increased amount of flashing required in the roofing. The roofing felt has to be cut, fitted and placed around the greater number of small skylights, while with a central skylight the felt is applied in one continuous stretch on each side of the skylight.

HEATING

Both the blast system of heating car houses and the pipe-coil direct-radiation vacuum system have been used. A blast-heating system has several advantages over a direct-radiation system. In car houses the doors are open for a considerable time when cars are leaving or entering. At each time, however, the doors are open at only one end of the house, as the case may be. When the doors are again closed and warmth is desired the blast-heating system raises the temperature more quickly; with a direct-radiation system a large quantity of piping becomes necessary, which requires considerable attention in order to keep the joints tight. A vacuum pump is also required in order to return the condensation to the boilers, while with a blast system the heater can be placed at such an elevation that the condensation will return to the boilers by gravity.

Direct radiation, however, has one great advantage over the blast system, in that the pipes can readily be laid in the pits under the concrete floor decks, out of the way, and a more even heating obtained with less inconvenience to the men working in the pits. Further, with a direct-radiation system pipe coils can be placed around the walls and directly over the doors to temper the incoming cold air.

REPAIR BAY

Every car house has been provided with one bay equipped for the general repairing of cars. This repair bay is generally placed next to the office and storeroom bay. Overhead traveling cranes spanning the entire repair bay have been installed so that car bodies may be shifted from one set of trucks to another with little delay. These cranes are also useful for the moving of trucks, etc.

General repair tools are provided for the overhauling and repairing of cars, such as motor-driven lathes, drill presses, emery stones, etc. If a car is in need of extensive repairs it is not handled at the car house, but is taken to the main repair shops.

CLUB ROOMS AND ACCOMMODATIONS FOR TRAINMEN

The question of providing ample accommodations for the division superintendents, car house foremen, repair men, clerks and trainmen has been carefully considered. Separate offices have been apportioned to the division superintendents and car house foremen, as well as to the receivers and callers or dispatchers. These rooms face on large well-lighted assembly rooms for the trainmen, and are provided with suitable counters where trainmen can make out their reports. In addition, club room facilities are being provided at all of the large and most important car house sites. The club rooms consist of a large hall, with a stage at one end, and anterooms which can be used for committee, chess or card rooms.

ARCHER AVENUE AND ROCKWELL STREET CAR HOUSE

This car house now has seven fireproof bays, six of which are storage bays of three tracks each and the seventh is a repair bay. The trainmen's quarters, club rooms, toilet rooms and the division superintendent's office are provided on the first floor in the office section, which parallels the repair bay. The storage capacity inside this house is 210 cars, with an additional temporary capacity of 28 cars outside of the building on the special work at each end. The repair bay is practically a duplicate of the storage bays, except that a sand storeroom is built at one end of the wheel storage track. This bay has two 3-motor traveling cranes. There are 5040 ft. of inspection pits provided in these seven bays, which have a total straight trackage of 10,220 lin. ft., making 49.3 per cent of all straight track inside of the car house pit tracks. The construction of this building was started in August, 1908. The accompanying cut shows the final plan of this car house.

The entire house is built of fireproof construction. The roof is of reinforced concrete slab construction and is carried on reinforced concrete girders of the same design as those used in the Sixty-ninth Street and Ashland Avenue car house. Skylights have been provided in this car house to the extent of 20 per cent of the total square foot area of the building. These skylights are similar to those used on the Sixty-ninth Street and Ashland Avenue car house. It has been the idea of the Chicago Board of Fire Underwriters that the use of thin glass would be advantageous in car houses, for the reason that such glass would act as an automatic door, providing a hole in the roof for the escape of smoke and gases in case of fire.

The building is heated by a direct steam vacuum system. Three 100-hp horizontal tubular boilers have been installed and they are connected by means of a steel breeching to the concrete stack. The office section has been built adjoining the repair bay, and facing on Thirty-ninth Street is the trainmen's assembly room, with offices of the division superintendent and clerks extending around the side of this room. To the rear of the assembly room is the toilet room, in which room has been provided for one barber's chair. The floors of both the assembly room and the toilet room are of concrete with a red wearing surface. To the rear of the toilet room is a club room with a stage at one end. By means of the passageway from the assembly room to the club room, which has a door from this passageway to the street, access is gained to the club room without passing through the assembly room.

Automatic steel fire doors have been provided in all of the car houses in all fire walls so that direct passageway can be obtained throughout the entire building. This plan has been provided in all of the four new car houses of this company.

LINCOLN AND WRIGHTWOOD AVENUES CAR HOUSE

This building has been erected partly on the site of the old Lincoln Avenue cable power house and partly on the site of the old Lincoln and Wrightwood Avenues car house. To make room for the new car house the old power house building and stack were torn down. The dismantling of this brick stack was required to be done without any damage to adjoining property. In order to remove the stack a ladder was built inside by which workmen could reach the top. The bricks were loosened at the top and thrown down inside of the chimney, a deflecting board being placed at the bottom so that the bricks would pile up outside, whence workmen could haul them. It was found that by this method the stack could be torn down very rapidly and economically without danger to persons or property.

This car house has been built with five standard storage bays, with four tracks in each, and one repair bay, with one single repair track and an industrial track. The total length of straight track inside of the building is 5251 lin. ft., of which 3350 ft. is over pits, making 63.8 per cent of the total trackage inside of this car house over pits. Skylights were placed throughout the building to the extent of 11.31 per cent of the entire ground area of the building. These skylights (2 ft. by 3 ft.) were arranged so as directly to light up the aisles between cars, a large number of them having been required under this scheme of lighting. It had been found that a smaller percentage of the entire area could be used and give a better lighting effect than is ordinarily obtained with a center skylight. The cost of these skylights was increased, as more framing was required. It was also found that the roofing was more expensive, as more flashing was required, there being no large straight area to be roofed. It has, therefore, been decided that while this diffused lighting scheme gives a fine lighting effect, yet from the standpoint of cost and general utility the central skylight is much to be preferred.

A reinforced concrete slab roof carried on reinforced concrete girders was placed over the entire car house. On account of the large number of small skylights, longitudinal reinforced concrete beams were required to carry the roof loads to the large reinforced concrete girders spanning the bays. A five-ply, coal-tar pitch, felt and gravel roof was laid over the entire building, the same as at the West Twenty-fifth and Leavitt Streets car house.

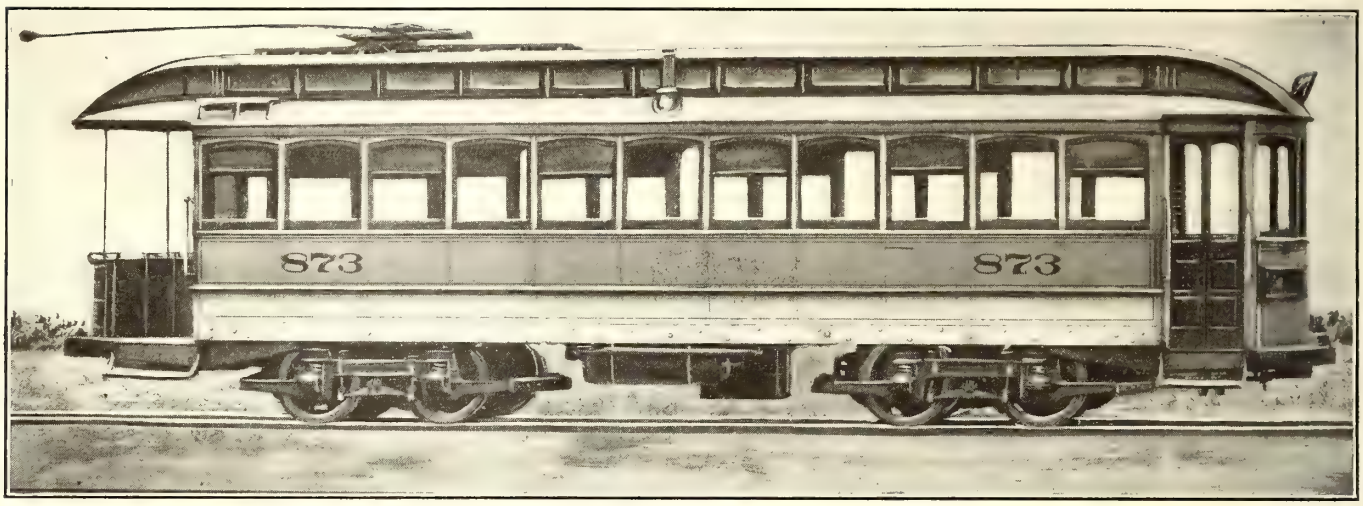
The heating plant consists of blast apparatus, which occupies two rooms in the office section. Hot air is distributed throughout the car house from the blowers, which discharge into large underground concrete ducts. Automatic steel fire doors were placed in the concrete heating ducts, where they pass through the fire walls, the same as at the West Twenty-fifth and Leavitt Streets car house. Two 100-hp horizontal tubular boilers complete the heating apparatus. These are connected to a concrete stack by means of a steel breeching.

In the repair bay a traveling crane was installed, spanning both the repair track and the industrial track. On account of the shallowness of the property it was found necessary to have the tracks near the car house on a curve, two doorway openings only being used for each bay, the tracks in each bay branching off just inside of the building. This building was started in the year 1908 and three car storage bays were completed.

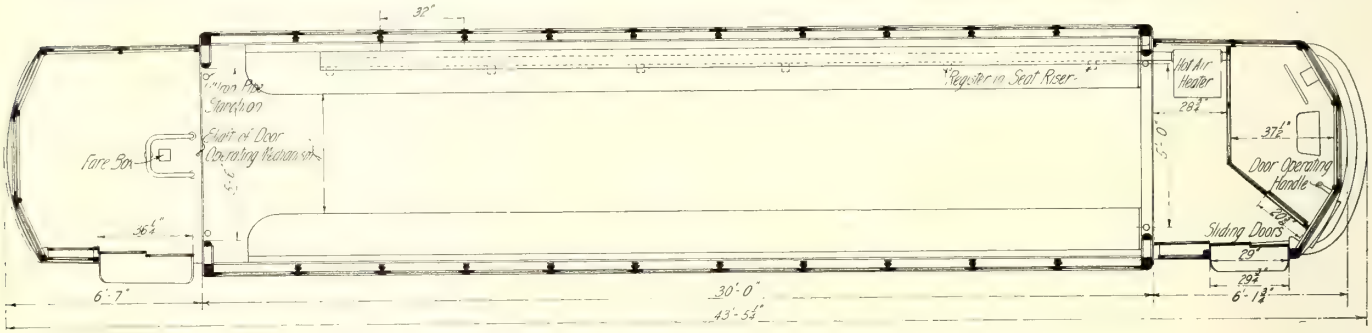
The advertising literature which is being sent out from a popular seaside resort on the southeast coast of England conspicuously states among other advantages that there are no electric tramways in the town. Why should electric street cars be a negative attraction?

PAY-WITHIN CARS IN CLEVELAND

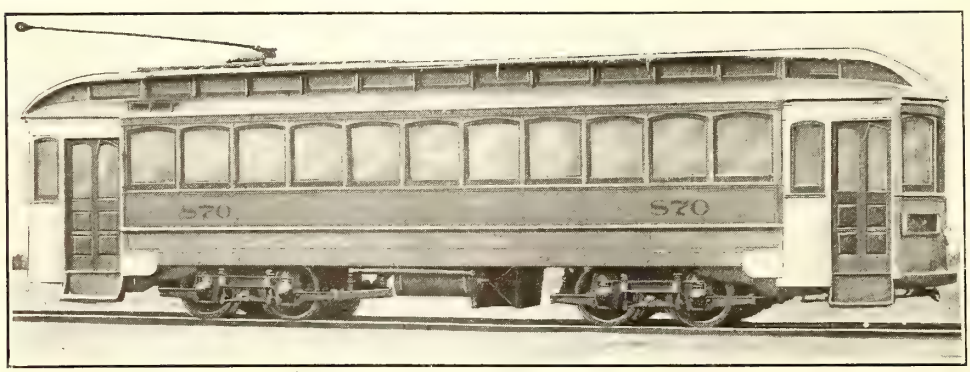
The Cleveland Railway is rebuilding 300 of its double-truck, single-end closed cars with 28-ft. and 30-ft. bodies for pay-within operation under license from the Pay-Within Car Company. Fifty of the cars are to be fitted with collapsible sliding doors over the steps operated manually by a mechanism designed and patented by Terrance Scullin, master mechanic of the railway company. The remaining 250 cars will be fitted with double folding doors and manual operating mechanism furnished by the Pay-Within Car Company. Ten cars with sliding doors and 50 cars with folding doors were rebuilt by the G. C. Kuhlman Car Company, Cleveland; the other cars are being rebuilt in the railway company's shops at the rate of eight or ten a week. As fast as the cars are turned out of the shops they are being put in service.



Cleveland Pay-Within Cars—Type of Car Rebuilt



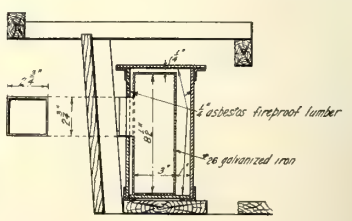
Cleveland Pay-Within Cars—Floor Plan of Car with Sliding Doors



Cleveland Pay-Within Cars—Rebuilt with Sliding Doors

The bodies of these old cars were only 7 ft. 5 in. wide over side sills and they were furnished with longitudinal seats. Only minor alterations in the car bodies were required to adapt them for pay-within operation. The front and rear end bulkheads and sliding doors were removed and the body corner posts and end plates were furred out to form arched openings 5 ft. 6 in. wide. At the rear end the longitudinal seats were cut away for a distance of 13¼ in. and the corners were rounded off to facilitate entrance from the platform. Iron pipe stanchions were put in just inside the corner posts to serve as grab-handles when stepping up or down from or to the platform floor.

Most of the old cars had short enclosed front platforms and open rear platforms. Both platforms have been lengthened and entirely enclosed and this necessitated reinforcement of the platform underframing. The old center knees were left in place and two new knees, 2¾ in. x 7 in., were attached just outside of the old ones. The new side knees, which were also 2¾ in. x 7 in., were reinforced with 3-in. x 4-in. angles on the bottom. The rear platforms were lengthened to 6 ft. 7 in. and the front platforms to 6 ft. 10¼ in. over the bumpers. The motorman's vestibule on the front is formed by a glass and wood partition. Between the partition and the end of the car body on the left-hand side is placed a Peter Smith hot-air heater. On the rear platform is mounted a fare box surrounded on three sides by a pipe railing. The conductor stands inside the car facing the fare box.



Hot Air Duct Under Seats

On the cars equipped with sliding doors the entrance opening is 36¼ in. wide and the exit opening on the front platform is 29 in. wide. The cars with folding doors have an entrance

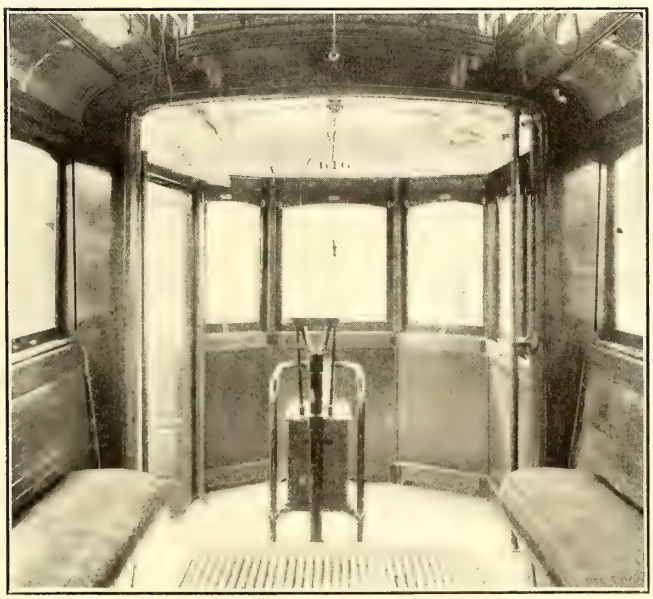
opening 48 in. wide, and the doors fold outwardly in pairs. The entrance and exit steps are stationary for both types of doors. The Cleveland Railway did not believe that the complication of apparatus and the extra weight and expense of folding steps was warranted, as no trouble had been experienced in the past from attempts to board moving cars with doors closed.

The operating mechanism is very similar for both types of



Cleveland Pay-Within Cars—Rear Platform with Folding Doors

doors. A crank on the upper end of a vertical rod which projects down through the floor is turned by the motorman or conductor, as the case may be. This motion is imparted to the doors through a series of rods, levers and bell cranks under the platform floor and across the top of the door openings. The conductor's operating stand is immediately in front of the fare box and the motorman's handle is mounted on the



Cleveland Pay-Within Cars—Rear Platform Showing Fare Box and Control Stand

front of the vestibule just to the right of the air-brake valve.

The heater, which is mounted on the front platform, is connected to a hot-air duct, 3 in. x 8½ in., built under the left-hand longitudinal seat. Six registers in the seat riser admit the warm air into the body of the car.

The London County Council has decided to apply for Parliamentary powers for the construction of 22½ miles of new tramway lines. It now operates 113½ miles of electric lines and 19 miles of horse-car lines.

NOTES ON THE MAINTENANCE OF ELECTRO-PNEUMATIC CONTROL

BY A CONTROL INSPECTOR

Within the past four years multiple-unit control apparatus of the electro-pneumatic type has been brought to a high state of efficiency. While this control has been fully described from time to time in the ELECTRIC RAILWAY JOURNAL, little or nothing has been published regarding its maintenance. Nevertheless, this subject should be a live one at present because this apparatus is so extensively used in heavy electric traction. It may, therefore, be of interest to present some particulars based on experience with the maintenance of electro-pneumatic control from the time when it was in the experimental stage up to and including the development of the present standard apparatus.

MASTER CONTROLLER

The starting point in a discussion of the electro-pneumatic control is the master controller. This is a very efficient piece of apparatus owing to the low operating potential of 14 volts. Consequently it requires no blow-out coils, arc shields or renewal drum segments. The only trouble for which master controllers are ever reported is the breakage of the return spring, which is easily repaired. The only maintenance needed by the master controller is a semi-annual cleaning, when the tension in the fingers should be adjusted, the bearings oiled, and the drum wiped clean with a rag moistened with machine oil and then wiped dry with cheese cloth. However, master controllers which have run 18 months without receiving such attention have been found in good operating condition at the end of that time.

JUNCTION BOXES

The junction boxes are usually located under each master controller and at the unit switch group. They should always be kept dustproof and should be blown out with compressed air at each regular overhauling. On the latter occasions the connection nuts should be tightened with a small special T-socket wrench. This wrench is a very useful tool, for it also fits all interlock connections and its use saves the terminals from destruction by gas pliers or pincers.

STORAGE BATTERIES.

The next detail in order is the storage batteries which supply the 14-volt current used to operate the control magnets. Some railway men consider this use of storage batteries an undesirable feature of the electro-pneumatic control and prefer a control system in which the train line receives its energy from the trolley circuit and operates at a voltage much higher than the battery potential; but the writer's experience with both seven-wire, 14-volt and seven-wire and 10-wire, 600-volt train lines convinces him that a low train line voltage is one of the most valuable features of a control system. Aside from the daily throwing of the battery switches, which is done so that the two sets will alternate daily in charging and discharging, the maintenance of these batteries requires very little time or trouble. The battery switch throwing is just as much the duty of the motorman as it is for him to cut in more than one air compressor.

Although the maintenance of the storage batteries does require very little time or trouble, whatever work is necessary should be carefully followed up, for slack methods will not suffice. At each inspection a voltage reading of each set of batteries should be taken from the battery switches. Then once a month the batteries should have a half-hour inspection, to include taking the voltage and specific gravity of each cell, adding distilled water or chemically pure acid to restore the specific gravity and proper acid level of each cell, cleaning the wire terminals at the end of each tray and tightening all connections. Once a year each cell should be overhauled, at which time the individual plates should be brushed clean, the mud cellars emptied and the electrolyte replenished; further, each battery terminal should be carefully cleaned, tightened and coated with petroleum jelly, the battery trays and

boxes should be cleaned and coated with a heavy asphaltum paint, and the battery set should not be put in use until fully charged.

Several points require special mention in connection with battery maintenance: First, to avoid broken electrode straps each set of plates should fit snugly in the battery cells and each cell should fit snugly in the battery trays; second, it is very easy to reverse the polarity of a tray of batteries when assembling them, and as this not only injures the batteries but interferes with train operation, the possibility of such an error should be minimized by painting a large plus sign on the positive end of each tray and a corresponding plus sign on that end of the battery box having the positive leads; third, the batteries should be placed in an accessible position, as much time can be lost in handling inconveniently located batteries; fourth, the battery boxes become acid-soaked in time and consequently ground through the iron hangers. This grounding not only allows a leakage of battery current but aggravates serious control trouble; it should be prevented by insulating the hangers from the body frame by insulated bolts such as are used for resistances.

Batteries may be charged from the ground side of the car lights, the ground side of the air-compressor motor or from a tap taken off a trolley contact on the unit switch group through a high resistance. In any case the charging line should be fused. The second and third methods are preferable, as they give a charge more nearly proportionate to the amount of discharge. However, charging from the switch group eliminates the delay required with the air-compressor method. The charging relay and fuses should be examined at each regular inspection.

SWITCH GROUP

The most important feature of the electro-pneumatic control is the switch group. The maxim of the successful maintainer of this control is: "Keep the magnet valves clean," but this is not as generally recognized as it should be. The neglect of the magnet valves means switch contacts welded, increased burning of contacts, slow operation of the switch group and failure of switches. These various troubles arise from the condition that the shoulder of the magnet needle valve is designed to limit the flow of air to the switch cylinder. Hence any gum on this shoulder decreases the amount of air which can enter the cylinder and operate the switch. Troubles from this source may be entirely prevented by removing the magnet valve needles every two months and cleaning them thoroughly with cheesecloth. In addition, the valve seat casting should be removed at each regular overhauling and boiled in a solution of potash to remove the accumulated gum.

The next detail in the order of its importance is the piston packing leathers. These should be taken out and soaked in oil about once a year or whenever they develop leaks. The pistons should not be allowed much lost motion in the cylinder bushings, and it is a good plan to renew these bushings at each regular overhauling. The magnet comes next. The armature cups should be kept free from dirt and the magnet armatures and stems should be kept clean. If the stems become cut at the valve seats they should be replaced, for grinding the seats tends to allow the magnet armatures to come down on the pole pieces, thereby causing a sluggish release of the magnet armatures due to residual magnetism. This should be further prevented by renewing worn copper plating on the magnet armature.

When control equipments are furnished the manufacturer specifies the correct magnet armature travel. This travel should be checked at regular overhaulings, the necessary adjustment being made by lengthening or shortening the needle valve stem since the length of this stem determines the amount of travel. Again, after the magnet armature travel has been properly adjusted it may be found that the magnet armature is slow in pulling down. This effect most likely is due to a long magnet armature stem, but in shortening this stem great care must be taken to keep the armature clear of the pole piece when attracted.

The interlocks of the switch group require very little attention. Of course, the contacts should be kept clean and the fingers should be watched when the switches operate to note if they have sufficient tension to follow the contacts quickly. A large amount of interlocking used in the low-voltage electro-pneumatic control has been criticised by some railway men, but the writer's experience proves that when these interlocks are maintained properly and are not meddled with they give practically no trouble whatever.

The whole switch group should be overhauled about every two years. While two years may seem a long time between overhaulings, it is even practicable to increase this period if all the details noted have been carefully followed. At these overhaulings all magnets, cylinders, switches, arc chutes and interlocks should be taken apart and all worn parts renewed. This should include the rebushing of worn fingers and switch arms, the renewal of all pins, cotter pins, lock washers and wiper springs and the retinning of shunt terminals. The motor-circuit terminals and connections should be carefully inspected, cleaned and tightened. The blow-out coils and control magnets should be given an ohmmeter test for short-circuits. The magnets should be treated as hereinbefore noted and the terminals and terminal insulators inspected and cleaned. All worn gaskets should be renewed and the pipe insulators should be inspected very closely. The interlock contacts should be cleaned and smoothed with crocus cloth. Interlock fingers should be taken down and renewed in all cases where the contact surface has worn enough to increase the length of contact. This is important, as increased contact surface on the interlock fingers interferes with the original adjustment of the interlocks. In all cases the tension should be restored to each interlock finger before replacing it. In reassembling the switch group all moving parts subjected to wear should be sparingly oiled, and finally it is advisable to give each overhauled switch group a breakdown test of from 2000 volts to 3000 volts.

All those points of the switch group which require particular attention have now been noted; otherwise the switches practically take care of themselves, although carelessness in tightening screws, etc., will give trouble as in any other apparatus. However, the important point of ventilation remains to be mentioned. Some control apparatus has been turned out in utter disregard of the fact that an electric arc generates gases which on cooling deposit soot on adjacent surfaces, and that this soot, particularly in damp weather, will conduct an electric current. It is essential, therefore, that some means be provided to allow the rapid escape of these gases. Such provision will materially reduce the amount of cleaning which the switch group requires.

REVERSER AND LINE SWITCH

The magnets, valves and cylinders of both the reverser and line switch require no attention in addition to that previously suggested for the switch group, but the reverse interlock, owing to its location, is apt to be neglected, so care should be taken to inspect the fingers and contacts on each inspection. The moving contacts and the fingers of the electro-pneumatic reverser require little attention. The two contacts on each side, which are easily reached, occasionally should receive a thin coating of petroleum jelly and about once a year all the fingers should be taken down for cleaning and the restoration of the spring tension.

The electro-pneumatic line switch, type No. 222 or similar, is a very efficient piece of apparatus. The superior ventilation of the arc chutes, the powerful magnetic blow-out and the heavy piston spring combine to give a current breaker which remains unaffected after breaking the heavy currents caused by grounded armatures. It is advisable to take out the switch head about every two months and examine wiper springs, shunts, contacts, cotter pins and finger pins, replacing all parts, except contacts, which show the least signs of wear or overheating. This is also a good time to remove the brass side pieces and blow out the interior with compressed air.

Some control equipments are designed so that the line switch

operates merely as a circuit-breaker and the motor circuit is normally broken by the switch group. Other equipments have the line switch and switch group drop out together and the rupture of the motor circuit is supposed to be divided between the switch group and the line switch, while in still other equipments the line switch is arranged to drop out ahead of the switch group and the motor circuit is thereby normally broken by the line switch. The writer's experience has included the care of equipment arranged according to each of these methods and he strongly believes that the last method is the most desirable, because the line switch is perfectly capable of handling this arc and thus carbonization and tip burning in the switch group is avoided.

RESPONSIBILITY FOR MAINTENANCE

Different roads pursue different methods in caring for electro-pneumatic control. The writer knows of one large company which employs an experienced inspector to do nothing but inspect the control, while other less experienced men do the cleaning, adjusting and repair work noted by the inspector. In this case the inspector is the only man responsible for the condition of the equipment. This company further places all pneumatic parts of the equipment under the care of the pipe fitters and the wiremen are not allowed to touch these parts. Another large company has all inspection and light maintenance repairs made by inspectors who are held accountable for their work until the next inspection, and all important repairs and adjustments are made by experienced controller men. This company places the entire control, both electric and pneumatic, under the care of wiremen, but the writer believes that the best results are obtained by placing a certain definite number of cars under the care of one experienced controller man who is thoroughly familiar with both the principles and details of the entire control. This man can then be held responsible for all the control equipment on each car under his charge. If the number of cars warrant it, he is provided with a helper, as numerous jobs require the assistance of a second man. Wherever this method of maintenance has superseded some other method there has resulted a marked improvement in control efficiency.

PROPOSED SYSTEM OF UNIFORM STREET RAILWAY ACCOUNTS IN NEW JERSEY

A short account of the proceedings before the Board of Public Utility Commissioners of New Jersey in relation to a uniform system of accounts for street railways was published in the ELECTRIC RAILWAY JOURNAL of Aug. 27, 1910. During the proceedings depreciation was discussed briefly by representatives of the commission and the companies. This subject was brought up by Philander Betts, chief inspector of the utilities division of the commission.

C. L. S. Tingley, second vice-president of the American Railways Company, which controls the Bridgeton & Millville Traction Company, said that the question of the most vital importance to the companies was that of depreciation. It must be recognized that depreciation existed and it should be accounted for in some way. On the other hand, the very practical question had to be met that a very large majority of the roads were what are known as small roads.

Mr. Tingley's recollection was that something like 90 per cent of the roads in New Jersey had gross receipts of less than $100,000 each and some had not more than $5,000 or $10,000. These properties earned nothing for their stockholders. The only justification for their existence was that they served the community. It was a question whether it would be wise to try to develop the properties or whether they should be forced into the hands of receivers, which would be the unquestionable result of a hard and fast rule regarding depreciation. Mr. Tingley thought that the commission should lean very largely on the judgment of the officers in actual control of the properties. After the commission had seen that the property was conserved and adequate service given, it should not enforce a hard and fast rule respecting depreciation. The Bridgeton & Millville road earned a very small return, possibly 5 per cent on the investment. The company did not maintain a depreciation account but did try to keep the property up. Wastage of the property was made good from time to time out of the earnings. Following this practice, the outlay for upkeep was taken out of a good year. In a lean year as little as possible was done. Since 1907 the company had paid no dividends but had met the interest on its obligations. The company must serve the community as best it could, and if the property was maintained in good operating condition the company was entitled to a fair return on the money invested.

L. R. Isenthal, Central Passenger Railway of Atlantic City, endorsed the remarks of Mr. Tingley. He said that he would like to have the fiscal year coincide with the calendar year.

Mr. Tingley said that he would be glad to accept the calendar year as a fiscal year, although it would conflict with the practice of railway companies in other States. The company operated roads in Pennsylvania, Ohio, Illinois and Virginia and its fiscal year ended on June 30, the fiscal year of the Interstate Commerce Commission. To complete the year either on June 30 or Dec. 31 might make very much less trouble than to have it end with some other month.

Walter H. Bacon, Millville Traction Company, said that his company had never paid dividends on the stock or interest on the bonds. It was operated as a matter of local pride to the owner, a man of large interests in Millville. It was kept in good condition and money was expended on the property. The company was interested, of course, in the subject of depreciation, but if a material depreciation charge should be added to its other troubles, he thought that the road would not be operated except under direction of the courts. As the public was well served it would seem to be unnecessary to prescribe a depreciation account. An arbitrary rule of accounting should not be enforced without some excellent reason when the result would be to put a large number of small roads out of business.

George B. Cade, Atlantic Coast Electric Railroad, said that that company had no depreciation account. The property was maintained but no charge for depreciation was made. The company paid its bond interest and for seven years had paid dividends. The position of the directors was that, as the property was maintained properly, it was not necessary to keep a depreciation account.

M. R. Boylan, Public Service Railway, said that the fiscal year of the company ended on Dec. 31. At the present time two sets of classifications of accounts were used. One was the old classification of the American Street & Interurban Railway Accountants' Association and the other was the new classification of the association. It was intended to use the new classification altogether, beginning on Jan. 1, 1911.

Mr. Cade said that the Atlantic Coast Line Electric Railroad used the classification adopted in 1907.

Commissioner Hillery, who presided at the hearing, asked the names of companies whose fiscal year ended on Dec. 31. Representatives of the Riverside Traction Company and the Camden & Trenton Traction Company said that date ended their fiscal year. It was announced on behalf of the Millville Traction Company that the company could change its fiscal year to end on Dec. 31.

J. A. McCarthy, New Jersey & Hudson River Railway & Ferry Company, said that the new classification of the Interstate Commerce Commission had been adopted and the fiscal year of the company ended Dec. 31.

In response to an inquiry from Commissioner Hillery, it developed that no companies represented at the meeting kept depreciation accounts. Mr. Betts asked Mr. Tingley whether his company did not charge to various accounts among maintenance and replacement items which would be charged to depreciation account if such an account existed. Mr. Tingley said that the company had determined by the condition of the business on all of its properties about what average expenditure for maintenance of track and roadbed per annum would provide for replacement of ties and rails and the renewal of

special work. This amount was divided by 12 and the resulting sum charged each month to the maintenance of track and roadway and credited to accrued maintenance. As renewals were actually made, they were charged to "accrued maintenance of track and roadway."

Mr. Betts said that the commission did not have power now to make rates arbitrarily. It had power, however, to decide questions in regard to discrimination in rates. A case might be brought up where the board would have to investigate the costs of operation. The company would make a report showing certain net results from operation that appeared to be large. A certain rate might appear to be excessive. If the board should announce that upon investigation it had been found that the company was receiving an excessive net return there would immediately be a public outcry that would compel the company to reduce the rates. If a different method of accounting had been employed, it would show that the apparent excessive net return was apparent only after proper arrangements were made to take care of maintenance charges which might have to be met in future years. It appeared to Mr. Betts to be a question of an account that would protect the company against trouble of that nature. If one company, for instance, was not earning a proper return, the board would probably authorize, if it had rate-making power, an increase of fares. The proper method of accounting would show a reserve fund, which would provide for continuous operation.

Commissioner Hillery asked the companies what system of accounts they used.

The Bridgeton & Millville Traction Company used form C of the new association classification. The Jersey Central Traction Company uses a classification of its own. The Millville Traction Company uses the Interstate Commerce Commission classification. The Ocean Street Passenger Railway uses the Interstate Commerce Commission classification. The Phillipsburg Horse Car Railroad uses classification B of the Interstate Commerce Commision. The Camden & Trenton Traction Company uses classification C of the Accountants' Association. The Central Passenger Railway has postponed putting a new classification into effect until the board takes action on this subject. The Riverside Traction Company uses classification C of the Accountants' Association.

L. R. Isenthal, Central Passenger Railway, said that the matter of depreciation should be left entirely to the judgment of the companies. That was practically the condition recognized by the Interstate Commerce Commission classification.

Mr. Betts believed that a proper depreciation account, called by that name, was really a protection to the companies. He referred to the depreciation requirements of the accounting system prescribed by the New York Public Service Commissions. In this system companies were free to adopt their own rule for computing depreciation. The commissions had no rule by which depreciation should be declared or estimated but simply definitely prescribed that an account should be kept.

Mr. Tingley said that the case was really one of the machinery by which depreciation should be accounted for. Unless some good end would be served, it appeared to him to be an unnecessary hardship to increase the accounting requirements of a small company with a slender organization. If the commission had the power to order improvements and they should be charged to maintenance, it appeared to Mr. Tingley that the principal point which was sought would be attained. He thought that there was one vital defect in the suggestion to change the rate, if the income of the company was inadequate. The companies operate under municipal franchises granted for a definite length of time with definite rates of fare. He did not believe that the contracts with the municipalities could be ignored. Increases in fare were made in States where indeterminate franchises were granted directly by the commissions.

The total registration of delegates from street railway companies at the Atlantic City convention, just compiled by the secretary of the association, shows between 400 and 500 in excess of those registered at the Atlantic City convention of 1908.

AUTOMATIC STOPS AND CAB SIGNALS

At the annual meeting of the Railway Signal Association held in Richmond, Va., Oct. 11-13, a committee presented a report outlining certain requisites and desirable characteristics for automatic stop and cab signal systems, for steam and electric railways. The report stated that the committee believed the difference between the requisites of installation for systems of automatic stops on steam and electric lines to be so slight that recommendations could be made covering both steam and electric roads. The committee also expressed its opinion that in the present state of the art automatic stop and cab control signal systems should be used only in connection with a complete installation of fixed block signals.

The following are the requisites and desirable characteristics which the committee believes form an adequate basis on which to design and construct the system of automatic stops and cab signals which will meet the requirements of railways:

REQUISITES

1. Apparatus so constructed that it may be used on either steam or electric roads, and under any physical conditions to be encountered.

2. Apparatus and circuits so constructed that the removal or failure of any essential part will cause the display of a stop indication and the application of the brakes.

Note—This requisite is intended to apply only within the limits of the strength of material and good designing practice.

3. Apparatus so constructed that it may be used with either absolute or permissive operation.

With either system the restoration of the stopping device and the release of the brakes must be within the control of the engineman or trainmen, but only after the speed of the train has been reduced to —— miles per hour.

4. Apparatus so constructed that it will be operative under all weather conditions that permit of the operation of trains.

5. Apparatus so constructed that it will conform to the standard clearance on the road on which it is to be used. The roadway parts should not extend within the lines of maximum equipment of rolling stock, and the engine or train parts should not extend outside the lines of minimum clearance for structures, but at the same time the proper operative relations should be obtainable under all conditions of speed, weather, wear of rolling stock, train oscillation or shock.

6. Apparatus so constructed that two or more engines may be used with one train or a train may be allowed to assist another train without causing the brakes to be set on the second or following engine when passing a signal which indicated "proceed" when the head of the train passed it.

7. Apparatus so constructed as to be capable of control by the means used for indicating the condition of the block about to be entered, such as an electric track circuit.

8. The automatic stopping device should be operative only in the normal direction of traffic, except in connection with signals governing reverse movements.

9. The cab signal should be a visible signal of prescribed form, the indication being given continuously by not more than three positions or colors.

10. The cab signal should indicate the condition of the block about to be entered.

11. An audible signal should be provided in addition to the visual signal, and where "stop" and "proceed with caution" indications are given, separate and distinct audible signals should also be provided.

DESIRABLE CHARACTERISTICS

1. Apparatus so constructed that "speed control" may be used if desired; that is, if the speed of the train has been reduced to a pre-determined rate, it should, without being stopped, be allowed to pass a stop which would apply the brakes if the train were moving at more than the said pre-determined rate of speed.

2. Apparatus so constructed that the release of the brakes by the engine or train crews can be accomplished only after the train has been brought to a stop; or if the speed control is

used, when the speed of the train has been reduced to the predetermined speed in effect, or when the cause of stopping has been removed.

3. Apparatus so constructed that an audible alarm shall be given in the cab each time the stopping device has supplied the brakes.

4. Apparatus so constructed that the cab signal shall give an indication of the condition of the next block in advance of the block about to be entered.

5. Apparatus so constructed that the cab signal shall be correctly displayed when the engine is moving either forward or backward.

6. Proper apparatus should be provided on the engine to record the number of times the automatic stopping devices have applied the brakes.

REDUCTION OF FARES DENIED BY MARYLAND COMMISSION

A decision has been rendered by the Public Service Commission of Maryland denying an application for a reduction of fares on a line of the United Railways & Electric Company of Baltimore. The commission holds that any material reduction of the fare would jeopardize the interest on the bonds of the company, and under the provisions of the law under which the commission was created "it would require a clear case to warrant any action on the part of this commission that would tend to 'disturb the value of any bonds of any of said corporations issued prior to the passage of this act.'" The opinion was written by James M. Ambler, chairman.

The line on which the reduction of fare was asked extends from Baltimore to Ellicott City, 11 miles. It is divided into three 5-cent fare zones; on the west-bound trip the first zone extends about 4 miles from Baltimore to Roguel Heights, a little beyond the city limits of Baltimore; the second is about 4½ miles in length, and the third about 2½ miles. On the return trip the end of the first zone from the Ellicott City terminus is a little different. The complaint centered on the rates of 10 cents for a single trip or 20 cents for a round trip between Ellicott City and Roguel Heights, which were said to be greater for the length of haul and schedule time than the rate of fare charged on other suburban lines of the company. It was also complained that no commutation tickets were sold on this line as on other suburban roads of the company.

Witnesses testified that on other lines longer rides were given for a single fare than on the Ellicott City line. On one line divided into two fare zones residents of Catonsville, the outlying terminus, can secure books of tickets at a rate of 5 cents a ticket, good for a round trip on the outlying fare zone and therefore making, with the additional fare of 5 cents for the other zone, a net rate of 7½ cents for the trip to or from Baltimore. None but residents of Catonsville, the outlying terminus, however, can secure the books of tickets. It was also testified that on most of the other suburban lines a similar concession is made to residents, although on the Ellicott City line, which also passes through Catonsville, even residents of Catonsville must pay the full fare of 10 cents to reach Baltimore. The decision of the commission continues:

"So far as unjust discrimination is concerned, it is to be observed that the public service commission law does not absolutely prohibit all discrimination. To be unlawful discrimination must be unjust or unreasonable. The law does not undertake to put all persons and all localities on exactly the same footing at all times and under all circumstances. It prohibits only 'undue or unreasonable preference or advantage' and requires the charge to be the same to all only when there is 'like and contemporaneous service in the transportation of a like kind of traffic under the same or substantially similar circumstances and conditions.' If there is any substantial difference in time or in kind of service or traffic or in the circumstances or conditions under which the service is rendered, discrimination may be both fair and reasonable. The owners of a railroad are not entirely deprived of all share in the management of the enterprise in which their money is invested. Much is necessarily still left to their discretion, subject only to the limitation that the exercise of this discretion must be honest.

"It could serve no useful purpose to compare the zones on the various suburban lines running out of Baltimore. All are now combined in one system and are under the same management, but originally they were separate and independent, and each differs in some particular from almost every other line. Some compete with steam railroads. Some run through thickly settled districts. Some lead to industrial centers or pleasure resorts or have some special attractions to increase the amount of traffic. According to the complainants' own testimony, the Ellicott City line for a considerable part of its length runs through a sparsely settled country with physical irregularities that make the cost of operation at least above the average.

"No motive has been suggested for any unjust discrimination against Ellicott City, and it is not easy to perceive how residents of Ellicott City or other persons using the Ellicott City line are prejudiced by the fact that on this line no special favor is shown to residents of Catonsville, but all are required to pay the same price for the same service. It was admitted by all of the complainants' witnesses that since this line came into operation the property along its route has 'developed' rapidly and steadily in the western part of the city and almost as far out as Catonsville. That the 'development' has not extended to the country west of Catonsville cannot be attributed wholly to 'excessive' or 'discriminatory' fares; for the railroad is unquestionably of some benefit to Ellicott City. All of the witnesses stated that they are residents of Ellicott City or its neighborhood and have occasion to come to Baltimore quite frequently, and yet not one of them ever comes by the Baltimore & Ohio Railroad, which competes with the defendant for Ellicott City patronage. Each has some special reason which makes it necessary or more convenient for him to use the electric road. It would seem that proximity to the city rather than any action of the defendant has created a discrimination in favor of the country east of Catonsville, and it is beyond the power of this commission to overcome that by ordering a reduction of fare to the remoter points. We can find no unjust discrimination and, desirable as it may be to have all of the country thickly settled, we have no right to impose the burden of its 'development' upon the railway company.

"Nor do we think that the charge of 10 cents for a ride of 7 miles on a suburban road can justly be called excessive. This is at the rate of less than 1½ cents a mile and at the most favorable season of the year yields to the defendant 24 cents a car mile for this line, while the average receipts from its entire system amounted to 26 cents a car mile during the year 1909, when, for the first time in its history, the annual report showed a small balance of income after providing for expenses and the interest on its outstanding bonds. Any material reduction of the fare would therefore jeopardize the interest on the bonds and, under the provisions of Section 30 of the public service commission law, it would require a clear case to warrant any action on the part of this commission that would tend to 'disturb the value of any bonds of any of said corporations issued prior to the passage of this act.'

"We are somewhat fortified in the view that the present rate is not excessive by the fact that the complainants themselves appear to consider the charge reasonable and proper for all persons who are so unfortunate as not to be 'residents of the section traversed by said line.' It is altogether beyond our power to order one rate of fare for 'residents' when for precisely the same service, at the same time and under the same conditions, a higher rate is applied to the general public. That would be a gross form of the unjust discrimination which the law creating this commission expressly forbids.

"If it be true that it is the custom of the defendant to issue such 'residents' tickets' on other suburban lines, it may not be proper for us to order a discontinuance of the custom without giving the parties interested an opportunity to be heard in its defence, but it is clearly our duty to bring the question to a prompt determination, and we will request our counsel to take whatever steps may be necessary to that end. In the meantime we must deny the prayer of the complainants in this case."

REORGANIZATION OF THE ST. LOUIS CAR COMPANY

The St. Louis papers announce that the plans for the reorganization of the St. Louis Car Company, which have been mentioned in previous issues of this paper, have been consummated, through the co-operation of John I. Beggs, president and general manager, Milwaukee Electric Railway & Light Company, David May and M. Shoenberg, of St. Louis. These gentlemen will take a large financial interest in the company. The only remaining step is for the unsecured creditors to give their assent to the refinancing plan. A number of them have already agreed to do so and the consent of all is expected.

It is understood that the Beggs, May and Shoenberg syndicate has agreed to take $850,000 of the preferred stock of the company, of which Mr. Beggs will purchase personally $350,000. It is also reported that George J. Kobusch, the president of the company, will continue to hold a very large stock interest in the company and will be chairman of the board of directors and that Mr. Beggs will be president and general manager. Mr. Beggs has not announced whether he will go to St. Louis or remain in Milwaukee if the deal is consummated. The letter sent to the creditors Oct. 31 and signed by Messrs. Beggs, May and Shoenberg and Mr. Kobusch for the St. Louis Car Company follows:

"An arrangement has been made, dependent upon receiving the consent of the creditors, for re-establishing the St. Louis Car Company and enabling it at once to resume active business operations.

"Under this arrangement $850,000 of new money is to be put in by Messrs. John I. Beggs, D. May and M. Shoenberg and associates. For this they are to receive 7 per cent cumulative preferred stock at par.

"The co-operation of the creditors is essential to carrying out this plan, it being necessary that they take 7 per cent cumulative preferred stock for their claims at the face or principal sum of their claims. The preferred stock issued to the creditors will stand on the same footing as the preferred stock issued for the new money at par.

"The result of the arrangement will be to discharge all the indebtedness of the company, except $1,000,000 of bonds and a mortgage on the automobile plant of $40,000, and leave a cash balance of $400,000 for working capital.

"Messrs. Beggs, May and Shoenberg will be in control of the company, and Mr. Beggs will be president and general manager.

"Messrs. Beggs, May and Shoenberg show their faith in the future of the company by their willingness to put in their money for preferred stock on the same footing with like stock for the claims of the creditors.

"The time from which dividends on the preferred stock shall begin to accrue is Jan. 1, 1911.

"Please send in at once a statement of your claim and your assent to take preferred stock therefor, to Messrs. Beggs, May and Shoenberg, 310 Security Building, St. Louis, Mo. As the consummation of this plan depends on creditors consenting immediately, please sign the enclosed and return not later than Nov. 10."

Accompanying the letter is the following endorsement, signed by the heaviest creditors:

"The undersigned creditors of the St. Louis Car Company have considered the proposed arrangement for reorganizing the St. Louis Car Company, and are firmly persuaded that it is very much the best that can be made. We believe the preferred stock to be issued is worth par.

"The gentlemen proposing to furnish the needed capital are men of ripe experience, recognized ability and character in business, and their direction of the company is the strongest possible assurance of success.

"We urgently recommend acceptance of the proposition by all creditors. The alternative is an adjudication of bankruptcy and a forced sale of the property."

It is reported that the St. Louis Car Company did a business of more than $10,000,000 in 1907 and that its earnings that year exceeded $1,000,000. The reorganizers are confident that the production will increase to such an extent as to necessitate an enlargement of the plant in a few years.

HEARING ON BROOKLYN TRANSFER SYSTEM

The hearing in the case affecting the revised transfer system of the Brooklyn Rapid Transit Company lines before the New York Public Service Commission for the First District, on Oct. 24, was devoted principally to the testimony of C. D. Meneely, secretary and treasurer of the company.

John J. A. Rogers, the complainant, said that a subpœna had been served upon the secretary and treasurer of the companies calling for "all and singular any and all reports, recommendations or plans originally submitted to the defendant companies for their consideration by any officer or employee thereof, and also all and singular the minutes or other records of each of the defendant corporations, showing what action was taken thereon by the board of directors or executive committee of each of the defendant corporations; and also any report, document or other instrument in the possession of the defendant companies relative to the proposed tariffs or transfer rules and regulations, filed Sept. 15, 1910, and also copies of letters that have been written between the defendant companies relative to the said tariffs or transfer rules and regulations, and also a transcript of the minutes of said corporation, wherein some memorandum is made of the oral agreement which exists between the defendant companies as to the reciprocal privileges named in said transfer rules and regulations, and such other books, documents, memoranda and writings in your custody and under your control as may be required in the investigation of said subject."

Mr. Rogers said he had been supplied with information on various matters connected with the transfer system, but that he wanted the original plan that was submitted to any or all of the companies.

George D. Yeomans, counsel for the company, said that the question of change in the transfer system had been a subject of conference between the officials of the various companies for a year and a half or two years. After the plan was matured it was submitted, not on paper, but in its general terms, to the directors or executive committees, who authorized the change.

Mr. Rogers said he had been unable to form an exact opinion as to the purpose of the companies. The schedules said that the reciprocal privileges were not established under the obligation of law and the notices in the cars said they were established in accordance with existing law.

Mr. Meneely was then called as a witness. Mr. Rogers stated that his chief object in examining Mr. Meneely was to show that the schedules were too indefinite and uncertain to be understood by the public and to be binding upon the companies. He asked certain questions based upon the schedules.

Mr. Meneely called attention to a paragraph reading: "The issue of transfers on the lines of this company is based upon affording passengers a continuous trip in the same general direction, with a maximum of two transfers and three rides and with an additional privilege to and from feeder lines." He said that if in any case the company had not given passengers if they desired the benefit of a continuous trip in the same general direction anywhere in the city it stood ready to do so.

An adjournment was taken until Oct. 27, but on that date another adjournment was taken until Nov. 3.

The Mexico City Tramways Company has obtained a concession to extend its suburban lines from Santa Fe, a suburb of Mexico City, to Toluca, a distance of 32.25 miles. For a period of five years the company will be allowed to import construction materials for the new line free of duty. The concession provides that the passenger fares shall be based on the following: First-class, 3 cents per kilometer; second-class, 2¼ cents, and third-class, 1½ cents, with a minimum fare of 5 cents.

NEW TYPE OF CAR FOR METROPOLITAN STREET RAILWAY, NEW YORK

The Metropolitan Street Railway, New York, has in trial service on its Madison Avenue line a new car, No. 556, which differs in several important respects from the company's standard pre-payment-type closed cars. The new car is an improved form of the Brill semi-convertible car, and is fitted with cross seats instead of longitudinal seats. There are nine cross seats on each side and longitudinal seats for four passengers in each corner, giving 52 seats within the car body. In addition there is a folding wooden-slat seat on one side of the front platform which will hold five passengers and a single folding seat in one corner of the front platform, making 58 seats in all.

The car is designed for double-end operation and both platforms are alike. The arrangement of platform doors, steps and railings is very nearly the same as on the present standard pre-payment cars. On the right-hand side is a stationary step 5 ft. 6 in. wide and the opening above this is closed with a two-piece door which folds inward against the controller. A pipe stanchion on the edge of the platform divides the step opening into entrance and exit passageways of approximately equal width. Two iron-pipe stanchions about in the center line of the platform support the curved horizontal pipe railing on which the fare box is attached. When not in use this horizontal railing is lifted and latched under the platform hood. On the left-hand side of the platform are a single sliding exit door and a folding step. In the new car the sliding body end doors are made in two halves which open and close independently of each other. No dividing post is used in the center of the door opening.

The body framing of the car is designed to be as light as possible. The window posts are bolted at the bottom to a ¾-in. steel sill plate and at the top they are attached to the side plate with pressed steel corner angles. The curved sash runways at the top are made of separate pieces of wood and the curtain roller boxes are omitted entirely. A thin inside lining is applied directly on the outside panels between the posts, thus reducing the thickness of the car side to a minimum. The center aisle, in consequence, is unusually wide for a car only 8 ft. 3 in. wide over all. The head lining is of painted composition board and all the interior trim is white ash finished in the natural color. A row of six lights is placed in the center line of the upper deck and five lights are mounted under the deck sill on each side. Four automatic ventilators are provided in the deck sash openings on each side of the monitor deck and in addition there are five pivoted deck sash on each side. The exterior of the car is painted green and resembles very closely in appearance the present standard pre-payment cars of the Metropolitan Street Railway.

The car is mounted on Brill 39-E single-motor trucks and is equipped with Westinghouse air brakes. Some of the other special equipment includes Pantasote curtains, Curtain Supply Company's curtain fixtures, International registers and Hunter destination signs.

THIRD AVENUE REORGANIZATION CASE

A rehearing on the reorganization plan for the Third Avenue Railroad System has been granted by the New York Public Service Commission, First District A preliminary hearing took place on Oct. 31. The proceedings are presumably to be of a routine nature and to serve as a basis for an appeal to the courts, as the commission is expected to reaffirm its disapproval of the plan.

At the hearing on Oct. 31 testimony was offered for the committee of holders of the consolidated 4 per cent bonds of the Third Avenue Railroad Company. Upon behalf of the commission, its counsel asked the committee to rearrange the statement of earnings for the system for the year ended June 30, 1910, so as to eliminate the inter-company accounts and thus arrive at the actual net revenue. The commission also desires a statement in reference to the franchise taxes of the system.

BLOCK SIGNALING FOR ELECTRIC RAILWAYS

At the annual meeting of the Railway Signal Association, held in Richmond, Va., Oct. 11-13, a committee of the association made an exhaustive report on automatic block signals for electric railways. The report described the first attempts at controlling block signals through track circuits, where the track rails were utilized for the return circuit of the compulsion current. The first installation in which direct-currect track circuits were used in connection with direct-current compulsion was on the Boston Elevated Railway. This system, which included 175 electro-pneumatic signals and 61 switches, was installed in 1901. Among the other installations of later date which were described in the report are the signals in the London Underground Railways, Metropolitan Underground Railroad of Paris, North Shore Railroad in California, West Jersey & Seashore Railroad, New York Subway, Long Island Railroad, Philadelphia Subway, New York Central & Hudson River Railroad, New York, New Haven & Hartford Railroad and the Hudson & Manhattan Railroad. The report is accompanied by numerous diagrams of track circuits and illustrations of special types of relays employed.

BOSTON AND ALBANY ELECTRIFICATION AT BOSTON

Studies of the electrification of the main line and suburban circuit track of the Boston & Albany Railroad from Boston to South Framingham were filed on Nov. 1 with the special commission authorized at the last session of the Massachusetts Legislature to deal with the electrification of all the steam roads within the Metropolitan district. The motive-power equipment will be substantially of the type now in use by the New York Central Railroad, the lessee of the Boston & Albany, at the Grand Central Station in New York, but with one important difference, namely, that a direct current of 1200 volts will be used instead of the 600 volts for which the Central road's distribution system was planned. For the local service on what is known as the Newton circuit there will be provided multiple unit cars, while for local trains running direct between Boston and South Framingham and for through trains to the latter point there will be electric locomotives of the New York Central type.

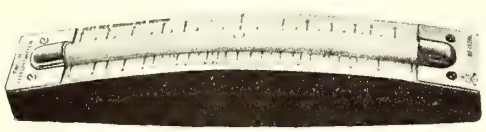
Although the limits of the Metropolitan district, within which the electric hauling of passenger trains is considered, do not include Framingham, it was necessary to plan for electrification to that junction point. Framingham is the western terminus of the four-track section of the Boston & Albany main line. At this point, therefore, all through trains bound for Boston will drop their steam locomotives and complete their trip to Boston behind an electric locomotive; and the opposite change will be made for outgoing through trains. On the basis of present traffic the proposed electrified section would include about 65 per cent of all the trains entering or leaving Boston over the Boston & Albany.

Much construction work and some relocating of tracks will be involved in the carrying out of this plan. The local circuit traffic, which now has the two southern tracks on the main line, will have to be carried on the outside tracks of the group of four, leaving the two middle tracks for through traffic. This change will involve building considerable additional station accommodation and a large number of overhead crossings. Just outside of the South Station at Boston there will be need of rather extensive relocating of tracks and a combining of two of the present stations in order to avoid the existing "bottle neck" and to give four tracks all the way into the South Station.

Financially the change offers no early promise of being advantageous to the railway company. Operating and fixed charges under the proposed scheme will apparently much exceed the earnings possible in the near future from the electrified traffic. There are, however, large possibilities of increased earnings in a reduction of fares and quick trains at short intervals.

A SPIRIT-LEVEL ACCELEROMETER

A simple form of pocket accelerometer has lately been designed by A. P. Trotter, and placed on the market by Everett, Edgecumbe & Company, London, England. The instrument is particularly well adapted for railway tests. It is made on the spirit-level principle, with a curved glass tube containing a bubble, which is deflected over a scale from its zero position. The position of the bubble is affected, of course, both by the grade and by the acceleration to which the instrument is subjected, so that the scale can be calibrated to read direct either acceleration on the level or grade at rest or constant speed. The acceleration and grade scales are on opposite sides of the tube, and the zero is in the center, so that acceleration or deceleration and grades up or down can be measured with equal ease. In use, the instrument has only to be placed on a window-ledge or on the floor, so that the bubble is at zero when the car is at rest, and the tube points in the direction of motion. Starting acceleration or braking retardation can then be read direct in feet per second per second, and calculations of the distance



Spirit-Level Accelerometer

in which a car can be stopped at any speed can be made without the necessity for speed or distance measurements. Tractive resistances may be measured for cars coasting by noting the retardation. The draw-bar pull and brake horse-power during acceleration and running can then be deduced. It is important to notice that the instrument will always indicate the retardation due to frictional resistance, etc., of a coasting vehicle only, whether on the level or on a grade, as the effect of the part of the acceleration or retardation due to gravity is canceled by the effect of the grade on the instrument. In like manner in the case of a train starting up a grade the acceleration due to the propelling power only is indicated, and not the actual acceleration relatively to the track. The instrument should be useful in connection with tests of electric railway equipment and brakes and for studying traffic conditions, as well as to test cars on the road. In addition to the pocket instrument illustrated, another form, fitted to a bracket for attachment to the car, is made.

INTERURBAN CARS WITH HAND-OPERATED, UNIT-SWITCH CONTROL

The development of the Westinghouse hand-operated unit switch control, by affording a simple means of obtaining multiple unit operation, has placed in the hands of railway companies an important means of effecting economies by the use of small cars. The size of the cars can be based on the average rather than the maximum load, since two-car trains can readily be operated whenever the traffic conditions warrant. On this account quadruple equipments of 50-hp motors can often be used where four 75-hp motors or even four 100-hp motors would otherwise be necessary.

A typical case where this principle has been applied to advantage is that of the Fairmont & Clarksburg Traction Company, of Fairmont, W. Va. The line of this company extends from Fairmont to Clarksburg, a distance of 32 miles. Formerly large cars equipped with four 75-hp motors were operated singly. About a year ago, however, six additional cars were purchased and on account of the adoption of hand-operated unit switch control smaller quadruple equipments of Westinghouse No. 306 motors were considered sufficient. When the traffic requirements exceed the capacity of single cars, two-car trains are operated.

These cars are of the combination type, 46 ft. 6 in. long over all, and seat 48 passengers. While answering every requirement of the larger cars, they represent an important saving both in original cost and operating expense. The motor and hand-operated unit switch control is a particularly light one for its output and is well adapted for moderate speed interurban work.

Where the use of larger equipments is necessary on account of the speed or traffic requirements, a quadruple equipment of No. 317 or No. 304 motors, with hand-operated unit switch control, offers similar advantages of light weight per unit output.

EXTENSION OF THE HUDSON RIVER TUNNELS TO THIRTY-THIRD STREET

At 3 a. m. Thursday, Nov. 10, trains of the Hudson & Manhattan Railroad will begin operating from the new station at Broadway, Sixth Avenue and Thirty-third Street. The new station at Twenty-eighth Street and Sixth Avenue will also be opened and the temporary terminal at Twenty-third Street and Sixth Avenue will be converted into a way station. All trains to Hoboken, Henderson Street and Cortlandt Street terminals will use the easterly track northbound to Thirty-third Street and the westerly track southbound from Thirty-third Street, so that all southbound trains will stop at the platforms on the west side of the Twenty-eighth Street and Twenty-third Street stations.

The new station at Thirty-third Street was originally designed as the northern terminal of the Sixth Avenue line. When plans were made to extend the Sixth Avenue line north to Forty-second Street and east to Lexington Avenue the design of the Thirty-third Street station was changed somewhat so that instead of being a terminal station it will eventually be used as a way station. Just south of the Thirty-third Street station the northbound and southbound tracks are connected by a double cross-over, and they branch out into three station tracks which are served by two island platforms and two side platforms. The island platforms will be used for loading, and the side platforms for unloading. The platforms will be about 400 ft. long, but at the present time only about 200 ft. of their length has been completed. Stairways lead from the platforms up to the concourse floor, which is about 18 ft. below the street level. This concourse floor will have an area of 33,000 sq. ft. Five stairways lead from the street down to the concourse, and in addition there are two entrances from the basement floors of each of two large department stores on the west side of Sixth Avenue. Space around the wall in the concourse will be rented to merchants and proprietors of small booths. Almost the entire wall area on the west side of the concourse is occupied by show windows of the department stores which adjoin the station.

The roof of the concourse is formed by groined arches, and is supported by reinforced-concrete columns which have been given a finish closely resembling terra cotta. All of the balusters around the stair openings are made of similar material. The ticket booths and barrier gates are made of ornamental iron painted a delicate shade of green.

Arrangements have been made in this station for handling at some future time the baggage of passengers to or from the steam railroad stations reached by the Hudson & Manhattan trains on the New Jersey side of the river. A baggage room has been built in one side of the station on the level of the track floor, and a baggage checking booth is provided on the concourse floor. Baggage will be raised to the street level by an escalator and will be delivered from the street to the baggage room through a chute. Retiring rooms for men and women have also been provided in the station, and the Erie Railroad, Lehigh Valley Railroad and the New York, Susquehanna & Western Railroad will establish ticket offices on the concourse floor for the convenience of outgoing passengers.

The station at Twenty-eighth Street has platforms on each side which are reached by stairways entered through kiosks on the sidewalk of Twenty-eighth Street. This station does not differ in its decorative treatment or general design from the other way stations on Sixth Avenue.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Alabama.—Eminent Domain—Compensation—Consequential Damages—Allowing Benefits.

In assessing consequential damages to abutting property from the grading of a street and constructing a street railway thereon, special benefits accruing to the property must be considered and set off against the damages. (Bragan v. Birmingham Ry., Light & Power Co., 51 S. Rep., 30.)

Indiana.—Street Railroads—Crossing Steam Railroad.

A street and interurban railroad carrying freight and passengers, and having the lawful right to construct its lines in a city street, had the right to cross at a grade the tracks of a steam railroad, which owned in fee the land sought to be crossed. (Pittsburgh, C., C. & St. L. Ry. Co. v. Muncie & Portland Traction Co. et al. (No. 20,929), 91 N. E. Rep., 600.)

Massachusetts.—Municipal Corporations—Rights in Street—License—Termination—United States—Occupation of Premises for Governmental Purposes—Eviction by Owner—Site for Post Office—Rights of Government.

Where the owner of a building let to the government for a post office was granted permission by the city to excavate and occupy part of a basement room lying under the sidewalk, the owner's license to continue so to use the street was terminated by a subsequent notice from the mayor to remove everything belonging to him under the sidewalk within the street line which interfered with a street railway company's construction of a subway under authority granted by Acts Massachusetts 1906, chapter 520, authorizing it to locate and construct the subway wherever it might deem best within the limits of the street, subject only to the approval of the railroad commissioners.

The owner of premises, by virtue of his title, may evict and dispossess officers of the government, though occupying and using the premises by governmental authority and in the performance of governmental functions.

Laws Massachusetts 1906, Chapter 520, conferring on a street railway company the right to locate and construct its subway anywhere within the limits of a street, took effect by acceptance of the company Aug. 23, 1906. The plans of the company showing the location at the point in question were filed Jan. 28, 1907. These plans were finally approved April 30, 1909, with some alterations, not, however, affecting the point in question. In June and October, 1908, the owner of abutting property obtained a license from the city to use the space under the sidewalk, which would necessarily be encroached on by the subway when built. On Oct. 7, 1908, the owner rented the premises, including the space under the sidewalk, to the government for a post office. Held, that the United States was chargeable with notice of the railroad's rights in the premises so that it could not maintain a bill to enjoin the railroad from interfering with the space beneath the sidewalk. (United States v. Boston Elevated Ry. Co. et al., 176 Fed. Rep., 963.)

Missouri.—Street Railroads—Alienation of Franchises—Constructions—Corporations—Alienation of Property—Mortgages—Statutes—Constitutional Law Construction—Street Railroads—Requisites—Municipal Consent—Powers—Issues Raised—Forfeiture of Franchises—Remedy—Abandonment—Equitable Remedy.

A corporation cannot without statutory authority alienate its franchise to construct, maintain and operate a street railroad.

An ordinance granting to a street railway a franchise to construct, maintain and operate a street railroad must be strictly construed.

A corporation mortgaging its property alienates it, since the mortgage may culminate in the absolute alienation of the property.

Under Rev. St. 1879, Sec. 706, providing that every corporation may hold, purchase, mortgage or otherwise convey such real and personal estate as the purposes of the corporation shall require, etc., a street railroad company may mortgage its property, including its franchise.

Statutes must be construed in the light of the Constitution.

Rev. St. 1879, Sec. 706, authorizing every corporation to hold, purchase, mortgage or otherwise convey its real and personal property, when construed in connection with Const. 1875, Art. 12, Sec. 20 (Ann. St. 1906, p. 309), prohibiting the Legislature from granting the right to operate a street railroad in a city without acquiring the consent of the local authorities, and providing that the franchise so granted shall not be transferred without similar assent first obtained, prohibits a street railway company from mortgaging its franchise obtained from a city without first obtaining the assent of the city.

Where plaintiff, in a suit against a city, pleaded an ordinance granting a street railway franchise, and the mortgaging of the franchise by the street railway company, and the city only pleaded and proved an abandonment of the franchise, the question of the invalidity of the mortgage for want of the assent of the city thereto did not arise.

A street railway franchise is granted by the State through the agency of the city granting it.

The forfeiture of a street railway franchise granted by a city can only be taken advantage of in quo warranto, and neither the city nor its officers can declare a forfeiture.

Equity in a suit to restrain a city from removing from a street the poles, wires, etc., of a street railway company having a franchise to operate a street railroad has no jurisdiction to declare a forfeiture of the franchise on a cross-bill alleging an abandonment. (Kavanaugh v. City of St. Louis, 119 S. W. Rep., 552.)

New Jersey.—Highways—Right of Public—Street Railroads—Use of Highway by Traction Company.

When a highway is laid out of a certain width, the entire width becomes subject to the public easement of passage; if a less width is graded and worked for travel, or if a bridge or culvert does not extend to the entire width, the public rights of passage are not thereby limited in favor of one who places an unauthorized or improper structure within the highway limits.

Consent granted to a traction company under P. L. 1893, p. 302 (Gen. St. p. 3235), for the construction, maintenance and operation of a street railway along certain streets and highways, does not warrant the construction and maintenance, within the limits of the highway, of a bridge for the accommodation of the tracks that in design and construction is dangerous to ordinary travel and calculated to entrap and kill horses and other animals that may attempt to pass over it. (Opdycke v. Public Service Ry. Co., 76 Atl. Rep., 1032.)

New York.—Carriers—Penalties for Overcharging Passengers—Right of Action Therefor—Construction and Operation of Railroad—Presumption of Lawful Consent—Action Therefor—Burden of Proof.

Railroad Law (Laws 1890, C. 565), Sec. 39, provides that any railroad corporation which shall ask or receive more than the lawful rate of fare, unless such overcharge was made through inadvertence or mistake not amounting to gross negligence, shall forfeit $50, etc. Held, that action would not lie thereunder for a penalty if the overcharge was the result of an honest mistake in the construction of its statutory rights.

When a railroad has been constructed and operated for a long period of years, it is presumed such construction and operation were in accordance with some lawful consent.

Where there are two acts or ordinances under which a railroad may operate within city limits, one of which imposes no restriction as to rate of fare and the other does, if action is brought under Railroad Law (Laws 1890, C. 565), Sec. 39, to recover the penalty for excessive fare charged, the burden of proof is on plaintiff, who asserts the charge to be illegal, to establish by a fair preponderance under which defendant is operating. (Enton v. Coney Island & B. R. Co., 121 N. Y. Sup., 793.)

New York.—Street Railroads—License Fees—Franchise and Ordinances.

Laws 1860, C. 511, having granted a street railway company a franchise to construct and operate a railroad on certain streets in the city of New York, subject to such reasonable rules and regulations as the Common Council may from time to time prescribe, with a provision as to payment to the city of an annual license fee, on which the parties put the practical construction of meaning a fee of $50 per car, based on the greatest number of cars in daily use at the busiest season of the year, and not on every car used during the year, and with a provision authorizing and requiring the City Council to grant the company permission

to construct and operate the road, and there having been in force at the time Laws 1860, C. 10, declaring it to be unlawful to construct and operate a railroad on a street of such city, except under the authority and subject to the regulations and restrictions which the Legislature may grant and provide, so that the Legislature, as the sole source of the rights of franchise for such a construction and operation, could alone prescribe the regulations and restrictions therefor, the city had no right to collect, or to impose a penalty for failure to pay a greater license fee, because of the permission of the Common Council to lay the tracks providing that the company should be subject to certain ordinances, providing that every passenger car running in the city should annually pay it $50 for a license, and declaring a penalty for failure to exhibit in the car the certificate of payment. (City of New York v. New York City Ry. Co., 127 N. Y. Sup., 457.)

New York.—Street Railroads—Receivers—Right to Use Income for Operating Expenses.

Receivers for the lessee of a street railroad system comprising lines owned by different companies are entitled to use the income from the entire system for the purpose of operating and maintaining the same as a unitary system, notwithstanding the provisions of mortgages on the property or parts thereof. (Barber Asphalt Paving Co. v. Forty-second St., M. & St. N. Ave. Ry. Co. et al., 180 Federal Rep., 648.)

CONTRIBUTORY NEGLIGENCE

Alabama.—Crossing Track—Injuries to Traveler—Instruction.

In an action for injuries to a traveler while crossing a street railway track, the complaint counted on simple negligence and on a wanton, wilful or intentional injury. The court charged that if a pedestrian is negligent in crossing or attempting to cross a street railway track on a public highway, and such negligence proximately contributes even in the slightest degree to an injury received by him by being struck by a car, he cannot recover because of the motorman's failure to keep a lookout for him, nor on account of a mere failure to sound the gong of the car; that one walking on a street railway track must first look to see if a car is approaching, and if his view is obstructed he must look from a point where by looking he can see the track in such direction; and that if plaintiff stopped on the east side of the east track to permit a wagon to pass him along the street, and while there looked toward another avenue, and could not see the car because his view was obstructed by the wagon, and could not hear the car because of the wagon noise, and after the wagon had passed him he then proceeded onto or dangerously near the track without again looking to see if the car was coming from that direction, he was negligent, and that the motorman's mere failure to keep a lookout ahead did not constitute wantonness. Held, that such instructions were correct. (Jaffe v. Birmingham Ry., Light & Power Co., 52 S. Rep., 311.)

Delaware.—Street Railroads—Collision with Vehicle—Declaration—Sufficiency.

In an action against a street railroad company for injuries sustained when a horse and wagon with which a car had collided was dragged along the street and collided with plaintiff's wagon, counts in the declaration from which it was impossible for the defendant to know, or for the court to determine, first, what act of negligence caused either collision, and, second, whether there was one act of negligence that caused the first collision and another act that caused the second, or whether the act of negligence that caused the first collision was continuing in its nature and was the same act that caused the second collision, were subject to demurrer. (Loteman v. People's Ry. Co., 76 Atl. Rep., 478.)

Georgia.—Carriers—Injuries to Passengers—Perilous Situation—Instructions.

It was not an accurate statement of the doctrine of an emergency created by a carrier of passengers, placing a passenger in a perilous condition, on account of which he leaped from a car, to charge: "If you believe that the plaintiff, at the time that he jumped from the car, was acting under a reasonable apprehension—that is to say, the apprehension of a prudent man—that he was under circumstances where he might receive an injury, he would not be guilty of contributory negligence in jumping from the car." (Georgia Ry. & Electric Co. v. Gilleland, 66 S. E. Rep., 944.)

Indiana.—Street Railroads—Injuries to Travelers—Contributory Negligence—Duty to Look and Listen at Crossings—Question for Jury.

The look and listen rule applicable to steam railroads crossing public highways is not applicable in all its strictness to persons crossing a street railway track in a city street.

Where a street car by which decedent was struck was at the middle of the block when decedent started to cross the open space between the tracks at a crossing, whether he was negligent was for the jury, he being only required to exercise reasonable care under all the circumstances. (Duetz v. Louisville & S. I. Traction Co. (No. 7003), 91 N. E. Rep., 622.)

Kentucky.—Operation of Cars—Care Required.

To relieve a street railroad company from liability for killing a child struck by a car, on the ground that the child came on the track so close to the car that the motorman, by ordinary care, could not stop it in time to prevent the injury, it must appear that the car was run at a reasonable speed. (Netter's Adm'r v. Louisville Ry. Co., 121 S. W. Rep., 636.)

Kentucky.—Master and Servant—Injuries to Servant—Fellow Servants—Street Railway Motorman—Death of Servant—Street Railway Collision—Contributory Negligence.

Motormen of colliding cars of a street railway system, though employed by the same company, are not fellow servants so as to preclude a recovery for injuries to one by the negligence of the other.

In Kentucky there are two exceptions to the rule that all employees of a common master engaged in a common pursuit are fellow servants, viz., where a servant is injured by the gross negligence of another servant superior in authority to him, and where he is injured by the negligence of another servant in a different department or grade of employment.

M., a street railway motorman operating a car ahead of that operated by decedent, left the car barn on time at 6:10 a. m. on the morning of the accident. After proceeding 1300 ft. from the barn at about eight miles an hour he discovered he had forgotten his fare box and started to return to the barn to procure it, having been out three and one-half minutes. Decedent's car was not due to leave the car barn until 6:17, but decedent on going to the barn discovered that M. had left his box, and so he took the box and started to deliver it to M. at a point where he expected to meet him at 6:17. There was a heavy fog, and M. reached the point of collision not later than 6:14½ a. m., the cars coming together with great force and so injuring decedent that he died. Held, that notwithstanding his negligence, decedent was also negligent in leaving the barn ahead of his schedule time, and hence there could be no recovery for his death. (Milton's Adm'x v. Frankfort & V. Traction Co., 129 S. W. Rep., 322.)

Massachusetts.—Carriers—Injuries to Passengers—Evidence—Question for Jury—Gross Negligence.

Where a street car stops, or almost comes to a stop, at the usual place where it stops to take up passengers the jury may find that one attempting to board such a car while the conductor was in the middle thereof facing the rear, with eight or ten people in the car, became a passenger, authorizing a recovery at common law for his conscious suffering resulting from his being thrown from the car suddenly starting with a jerk.

A strong, healthy man about 18 years of age attempted to board a street car, which had stopped, or almost stopped, at the usual place for passengers. The car, while he was in the act of boarding it, started with a jerk, and he was thrown off backward and killed. The conductor was in the middle of the car, facing the rear, with eight or ten passengers. Held not to show that the conductor was guilty of gross negligence, under the statute authorizing actions for death for gross negligence. (Marshall v. Boston Elevated Ry. Co. (two cases), 88 N. E. Rep., 1094.)

Massachusetts.—Collision—Duty of Motorman—Contributory Negligence.

Evidence that the driver of a team, when turning to cross diagonally a street car track to drive off the street, looked and saw a car, 400 or 500 ft. away, coming on a down grade, with an unobstructed view, and that the motorman saw the movements of the team, and that the driver as he continued on his course continued to look and nodded his head to the motorman, makes the question of his negligence contributory to the collision one for the jury, as he might well assume the motorman would slacken speed, he not necessarily being negligent if he made an error of judgment in deciding to cross at once, and travelers on public ways being required to exercise only ordinary care to avoid collisions. (O'Brien v. Lexington & N. St. Ry. Co., 91 N. E. Rep., 204.)

Michigan.—Negligence—Imputed Negligence—Action by Child—Negligence of Parent—Loss of Services of Child—Contributory Negligence of Parent.

In an action by a child for injuries, the negligence of the parent cannot be imputed to the child.

The contributory negligence of a parent will bar an action by him for the loss of services of his child resulting from personal injuries. (Feldman v. Detroit United Ry., 127 N. W. Rep., 687.)

Mississippi.—Collisions — Presumptions — Statutes — Construction of Track—Negligence—Contributory Negligence—Children.

Code 1906, Sec. 1985, providing that, in actions against railroads for damages to persons or property, proof of injury inflicted by the running of locomotives or cars shall be prima facie evidence of want of reasonable care, does not apply to a street railroad.

The rails of all street railroads ought to be flush with the surface of the ground.

A child six years of age, killed by a street car, cannot be charged with contributory negligence, so as to defeat an action by the parents for negligent death. (Pascagoula St. Ry. & Power Co. v. Brondum (No. 13,743), 50 S. Rep., 97.)

Missouri.—Use of Streets by Travelers and Street Cars—Care Required of Motorman.

Neither a driver nor a street railway company possesses a superior right to the part of the street occupied by the tracks, but drivers of vehicles must leave the track to permit the passage of cars.

A motorman may assume that a driver of a vehicle will leave the track in time to permit the free passage of the car. (Gessner v. Metropolitan St. Ry. Co., 119 S. W. Rep., 528.)

Missouri.—Carriers—Companies Liable for Injuries to Passengers—Lease—Effect—Knowledge of Conductor.

Where by an agreement between two street railroads one of them as lessee took possession of the tracks, cars, plant and former business of the other, and continued to operate the road, the lessor company was thereby relieved of liability for the negligence of the servants and employees of the lessee resulting in injuries to passengers.

Where a street car stopped to permit a passenger to alight, and she attempted to do so in the presence of the conductor, he was bound to know that she was in the act of alighting, and to operate the car accordingly. (Westervelt et al. v. St. Louis Transit Co. et al., 121 S. W. Rep., 114.)

New York.—Instructions—Sudden Start.

In an action for negligence in stopping a street car and starting it while plaintiff was alighting, an instruction that if the motorman slackened the speed of the car, and suddenly increased it without notice to plaintiff while she was preparing to alight, the jury might find negligence, nullified a previous instruction that plaintiff could not recover if the car did not stop until after she fell. (McGrane v. Nassau Electric Ry. Co., 118 N. Y. Sup., 896.)

Oregon.—Operation—Care Required—Reciprocal Rights—Contributory Negligence—Burden of Proof.

More care is essential to the proper operation of street cars than is usually required on the part of steam railroads.

The rights of travelers on a street on which street cars are operated, and the right to operate street cars, are reciprocal; and the travelers and the car men must act with due regard for the rights of others, and the public may assume that in the operation of the cars municipal ordinances will be observed.

The burden of proving contributory negligence of a traveler, struck by a street car while attempting to cross the track in front of an approaching car, is on the street railroad. (Palmer v. Portland Ry., Light & Power Co., 108 Pac. Rep., 211.)

Pennsylvania.—Negligence — Dangerous Premises — Trespassers—Electricity—Electric Third Rail—Injury to Trespassers.

Though the owner of premises is not bound to guard or protect a trespasser from dangers lurking thereon, he is liable for an injury to the trespasser, if wilfully inflicted.

Defendant's railroad was equipped with the third-rail electric system, the rail carrying the power being similar to and parallel to the other rails. The rail was not covered or protected, except at crossings and stations, and normally carried 675 volts, which was sufficient to injure or kill a person coming in contact therewith. Plaintiff was between seven and eight years old, and while playing in the back yard of the house of friends he was visiting, which abutted on the right of way, was attracted by flowers growing on the far side of the rails, whereupon plaintiff's companion opened the gate in the right-of-way fence and started to pluck the flowers. Plaintiff in some manner fell on the rail and was shocked and burned, receiving permanent injuries. Held, that there was no implied invitation or license by defendant to children to enter the premises, and that defendant owed plaintiff no duty to cover the rail, nor did the facts show wilful injury. (Riedel et al. v. West Jersey & S. R. Co., 177 Federal Rep., 374.)

South Carolina.—Negligence—Contributory Negligence—Carriage of Passengers—Personal Injuries—Alighting from Car.

A charge that one cannot recover for personal injuries if his negligence concurred with the negligence of the defendant and contributed to the injury as a proximate and immediate cause is correct.

A charge that it is negligence on the part of a passenger to step off of a moving street car when the circumstances are such as to make the danger obvious to a person of ordinary prudence and sense is correct. (Norton et al. v. Columbia Electric St. Ry., Light & Power Co., 64 S. E. Rep., 962.)

Texas.—Use of Tracks—Care Required of Pedestrians.

Though one has the right to use a street car track as a part of the street for crossing or other purposes, he cannot station himself on the track, and remain there heedless until he is struck by a passing car, and claim that he was in the exercise of care. (El Paso Electric Ry. Co. v. Adkins, 120 S. W. Rep., 218.)

Washington.—Operation of Cable Cars—Presumption of Negligence.

A jerk of a cable car, which is an incident of frequent occurrence in the operation of such cars, and consistent with care and proper equipment, does not raise any presumption of negligence. (De Yoe v. Seattle Electric Co., 102 Pac. Rep., 446.)

Washington.—Collision with Vehicle—Contributory Negligence—Questions for Jury.

It cannot be said as a matter of law that one approaching a street railway crossing on a busy street in a populous city and seeing a car approaching on an upgrade at the ordinary rate of speed, half a block away, is guilty of contributory negligence in assuming that he can cross in safety, so as to bar his recovery for injuries through being struck by the car. (Snowdell v. Seattle Electric Co., 103 Pac. Rep., 3.)

Wisconsin.—Injuries to Persons on Tracks—Contributory Negligence.

Where decedent drove his team onto a street railway track in front of an approaching car, or went so near that the car collided with his wagon, without looking and listening for the approach of the car from the rear, when he could by the exercise of ordinary care have seen it in time to have avoided the accident, he was guilty of contributory negligence precluding recovery for his resultant death. (Vetter v. Southern Wisconsin Ry. Co., 122 N. W. Rep., 731.)

LONDON LETTER

(From Our Regular Correspondent)

Leeds, which had the first overhead trolley system in the United Kingdom, will probably be the first city in the United Kingdom to adopt the trackless trolley. Bradford, Watford, Bushey, Rotherham, West Ham, Northampton and Glasgow are also considering the use of the trackless trolley.

It has been decided to take up the surface contact system in Torquay and to install the overhead trolley. The dispute between the Council and the local company at Torquay having been arbitrated, the terms of the award have been published. The Council objected to the company changing the system from the surface contact to the trolley. The ratepayers will have to pay £2,000, the cost of the arbitration and award, as the consent had been unreasonably withheld. The point was raised in the Council that an appeal would hold good, as it was claimed that the arbitrator had no jurisdiction, but the Council will come to terms with the company in spite of this objection.

At a meeting held in Glasgow to protest against the practice of using tramway profits to reduce rates one of the speakers said: "The tramway rate is really the heaviest of all. It is not levied direct; but if the workingman calculates the sum he spends in one year on tram rides he will find that it is the heaviest rate in Glasgow. If there is anything to which the surplus should be put it is to the relief of that rate on the workingman." Several other speakers contended that the people who paid for tramway enterprise in Glasgow were the shareholders, and that they ought to get the dividend in the form of reduced fares. It was asserted that the Caledonian Railway would gain £1,000 by the reduction of the rates, while other railways and large companies would benefit similarly. Three resolutions were passed by acclamation disapproving the action of the Council and calling upon that body to take steps to rectify the inequitable arrangement and suggesting a reduction of fares.

In Leicester and in Manchester the question has arisen as to what extent municipalities can "provide" electric fittings in one case and tramcars in the other. In the Leicester case Justice Nevill decided that the corporation could undertake work incidental and necessary to the delivery of the electric power to the receiver's terminal—the meter—but not beyond. In the Manchester case the ratepayers' association objected to the corporation "making" its own cars, claiming that the municipality was only entitled to "provide" them. An expert in municipal questions considers that the local officers should have specific authority for everything they do, and instanced the attempt by the corporation to carry parcels beyond the terminus of its system.

The Cheltenham Chamber of Commerce has passed a resolution protesting against a proposal to promote a bill in Parliament to give local authorities permission to provide and maintain all kinds of electric fittings for lighting and motive power and to charge for the same, but not to manufacture them. The Town Clerk said that there was a good deal of misapprehension about the bill. It seemed to be the impression that the object was to obtain powers to enable local authorities to compete with the wiring contractors. This was not so. The object was to enable corporations to obtain more consumers. There were a number of mains in Cheltenham that were not fully utilized. By passing this bill the corporation would be able to arrange for wiring, not necessarily doing it itself, and recover from the consumer, the cost being prorated over a number of years. Out of 26 corporations which possessed such powers, only two did wiring. In all the other cases the work was done by contractors. With regard to hiring motors, contractors were not inclined to risk having them thrown back on their hands, whereas corporations could hire them again to others.

At a meeting in York Councillor Morrell, who presided, gave a very favorable account of the tramways in that city. Although the lines there had been in operation only a short time the receipts were sufficient to enable a contribution to be made to the sinking fund. The very people who objected to the corporation constructing lines were now advocating extensions.

A suggestion has come from India that the physical research committee at Kew should collate all the data on rail corrugations presented recently before scientific bodies and with the help of a general grant from all the bodies which are interested in the problem appoint someone to consider further any abnormal cases of corrugation.

Congestion in London continues to increase. It really seems that nothing will meet the case but the banishment of all slow traffic from the streets at certain hours of the day. Then, as has been suggested, the sidewalks could be supported by cantilevers at the level of the first floors of buildings. This would enable foot-passengers to cross streets without risking their lives. It would follow that the display fronts of the shops would have to be shifted to the level used by pedestrians. Carts and carriages could stand under the sidewalk under cover, and those who entered buildings from the carriage level could be taken to the showrooms by elevators or escalators. This would enable the tramways to enter the heart of the city and deliver parcels and goods and do a general express business after business hours.

The London County Council still encounters the same obstacles to its proposals regarding transit lines which are so often used to thwart private enterprise. The principal weapon is the power of veto which the local authorities exercise. The estimate of the Council for its tramway plans in 1911 amounts to £829,040 for construction and equipment and £354,350 for improvements, making altogether £1,183,390 for about 30 miles of single track railway.

In connection with the plans of the City of London for a new bridge over the Thames leading up to St. Paul's Cathedral, the London County Council has offered, on conditions connected with the laying of tramways over the bridge, to contribute £300,000 toward the cost of the structure. The state committee on bridges of the House, at whose cost the bridge and its approaches will be constructed, does not agree to this, mainly, it is supposed, because the Council proposes to charge the expenditure to the rate account, whereby the city, as ratepayer, would have to bear its share of the cost of building the structure.

The triangular conflict between motor buses, tramways and tubes is still going on vigorously in London. The objections to the buses are that they are noisy, malodorous, difficult to catch and that they do not run up to the curb to discharge passengers. The first two objections are being gradually eliminated. The objection about discharging passengers could be met by having fixed stopping places like the trams. The objections to the trams are their noise and their slow speed. This restricted speed is due to vehicles being allowed to occupy main thoroughfares at all hours of the day and night. The size of the cars, the interdict against strap-hanging, and the enforced absence of trailers are also factors in restricting the speed of the trams.

The tube and underground railways, though sorely hit by the competition of the surface lines, are constantly improving their service. It has been found possible to run trains which do not stop at every station. Escalators are being installed at some stations, and the speed of all elevators is to be increased.

With a view to applying for Parliamentary powers in November, the Southend Town Council has provisionally approved the recommendations of the light railways committee for extensions to the tramway system. These recommendations refer to three sections, each of which is to be converted into a circular route. Included in the proposals is a new road 100 ft. wide and extending for nearly 1 mile. A double track tramway will occupy 14 ft. in the middle, the rails being laid upon sleepers, while the track is to be fenced in and screened by shrubs. On each side of the tramway will be a carriage road 22 ft. in width, flanked by a 10-ft. pathway, the 100 ft. being made up by the addition of an 11-ft. shrubbery outside each pathway. Another similar improvement consists in laying a double line of tramways in Leigh Road, also screened by shrubs. A carriageway 18 ft. wide will be provided on each side of the tramway, with 8-ft. pavements. Considerable widening of the existing road is involved by this scheme.

A. C. S.

News of Electric Railways

Bids Opened for Subway Construction in New York with Municipal Funds.

The Public Service Commission of the First District of New York opened bids on Oct. 27, 1910, for the construction of the Broadway-Lexington Avenue, Canal Street and Broadway-Lafayette Avenue subways with municipal funds. The question of operation was not involved. In all 77 bids were received. The Bradley Contracting Company was the only bidder on all the sections in the three routes. The bids were all on the unit basis, and the aggregate figures are not yet available. In the following table the three routes are given arranged by sections with the names of the contractors who bid on the various sections:

ROUTE 5.

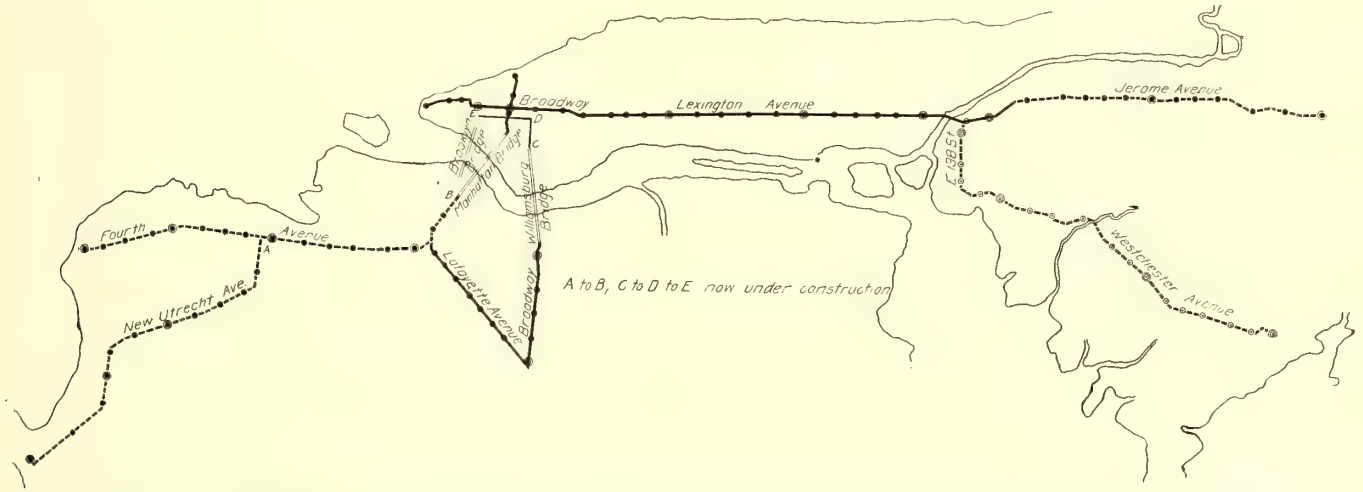
Sec. 1—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 2—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co. (?)
Sec. 2A—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 3—F. L. Cranford; Bradley Contr. Co.; McArthur Bros.
Sec. 4—Bradley Contr. Co.; McArthur Bros.
Sec. 5—Metropolitan Contr. Co.; Bradley Contr. Co.; McArthur Bros.
Sec. 6—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.
Sec. 7—Degnon Contr. Co.; Bradley Contr. Co.; McArthur Bros.; Chas. H. Peckworth.
Sec. 8—Degnon Contr. Co.; Bradley Contr. Co.
Sec. 9—Bradley Contr. Co.

The Canal Street crosstown subway will run from West Street, through Watts Street to Canal Street and thence easterly under Canal Street and under the existing subway to a point 40 ft. east of the Bowery, where it will join the Brooklyn Loop subway. The length of this road is eight-tenths of a mile.

The Broadway-Lafayette Avenue route will run from the Williamsburg Bridge out Broadway, Brooklyn, to Lafayette Avenue and back through Lafayette Avenue to a junction with the Fourth Avenue subway at Fulton Street. The total length of this road, including the tracks over the bridge, is about 8 miles. Thus the total length of subway for which bids were asked is about 18 miles.

The Broadway-Lexington Avenue subway will be double-decked for almost the entire length of Lexington Avenue. The Broadway-Lafayette Avenue subway in Brooklyn and the Canal Street line in Manhattan will be two-track construction, but in the Broadway-Lafayette plans provision is made for the addition of two tracks in the future.

The parts of the tri-borough system for which bidding will be deferred until next year or later are the Fort Hamilton and Coney Island branches in Brooklyn and the Jerome Avenue and Pelham Bay Park branches in the Bronx. These will be largely elevated construction and can be completed in two years after work is begun.



Tri-Borough Subway, New York. The Routes on Which Bids Were Received Are Shown by Solid Lines

Sec. 10—Henry Steers; Bradley Contr. Co.
Sec. 11—Henry Steers; Bradley Contr. Co.
Sec. 12—Behrman & Rodgers; Bradley Contr. Co.; Oscar Daniels Co.
Sec. 13—Brody & Adler; Bradley Contr. Co.; McArthur Bros.; Hugh Nawn Contr. Co.
Sec. 14H—S. Pearson & Sons; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 14K—Arthur McMullin; Bradley Contr. Co.; McArthur Bros.; O'Rourke Contr. Co.
Sec. 15—Godwin Constr. Co.; Bradley Contr. Co.; Hugh Nawn Contr. Co.; Haggerty, Drummond & Co.

ROUTE 20.

Sec. 1—Metropolitan Contr. Co.; Bradley Contr. Co.
Sec. 2—Bradley Contr. Co.

ROUTE 9.

Sec. 1—Degnon Contr. Co.; Bradley Contr. Co.; F. L. Cranford; Patrick McGovern; Newman & Carey.
Sec. 2—Degnon Contr. Co.; Bradley Contr. Co.; Patrick McGovern; Newman & Carey; Hugh Nawn Contr. Co.
Sec. 3—Degnon Contr. Co.; Bradley Contr. Co.; S. Pearson & Sons; Smith, Scott, Harmon & Hickey; Oscar Daniels Co.; Hugh Nawn Contr. Co.; Newman & Carey; Smith, Pennock Contr. Co.; J. H. Holmes; Creamer, Cranford & Donovan; Walter H. Gahagan.

The Broadway-Lexington Avenue route will be constructed with two tracks from the Battery to Chambers Street and four tracks from Chambers Street to and beyond the Harlem River. The route is from the Battery, up Church Street and Vesey Street to Broadway, up Broadway to about Tenth Street and through private property and Irving Place to Lexington Avenue and up Lexington Avenue to 157th Street and River Avenue on the Jerome Avenue branch and to 138th Street and Third Avenue on the Southern Boulevard branch. The length of this road is about 9 miles.

The time for the completion of the Broadway-Lexington Avenue route is 42 months from the time of the delivery of the contract except in the case of Section IV, which is 36 months. Bidders on this work were required to deposit certified checks ranging from $10,000 to $15,000 for each section. The contractor will be required to give a bond from $250,000 to $500,000 for each section. The time for the completion of the Canal Street road is 42 months. In this case bidders were required to deposit a certified check for $15,000, and the contractor will have to file a bond for $500,000 for each section. The time for the completion of the Broadway-Lafayette Avenue route is 30 months. The certified check required from each bidder in this instance was from $10,000 to $15,000 for each section and the amount of bond which will be required from the contractor will be from $350,000 to $500,000 for each section.

The Board of Estimate and Apportionment has indicated that $60,000,000 will be available for rapid-transit construction this year. Of this $45,000,000 will come from the release of self-sustaining subway bonds from the operation of the debt limit under the constitutional amendment adopted at the last election and $15,000,000 will come from the increased margin of debt limit due to the last year's increase in assessed valuation of real estate. With only $60,000,000 available, it was impossible to solicit bids for the entire tri-borough system, the cost of which is estimated at more than $100,000,000. Accordingly, the commission selected the principal parts of that system and the parts which it will take the longest to build.

Welfare Work in Boston

In reply to a request of Mayor Fitzgerald of Boston that it should maintain an ambulance corps, the Boston Elevated Railway through Gen. William A. Bancroft, president of the company, has written a letter to the Mayor showing the activities of the organization in welfare work. The letter points out that for many years the company has made an annual contribution to large hospitals in the Boston district, has paid and is paying the expenses of sick and injured employees and has furnished free medical attendance to many of its men. It has paid the expense of conducting two mutual aid associations among its employees, so that the proceeds of the associations go to their members in sick or death benefits without any diminution whatever for expense. The company has for years pensioned employees no longer able to perform their duties and now has 48 persons in its employ who receive such allowances. Last year the company paid $500,000 in accident claims.

General Bancroft states in his letter that in many cases the company's payments, not only where it has been held liable but elsewhere, have been most liberal, and that they are vastly more than purely legal obligation requires. The company, besides paying $125,000 a year for the privilege of using the streets, etc., contributes annually to the community $1,150,000 in taxes, which help to maintain fire, police, hospital and ambulance facilities. While the company has many physicians in its employ, it contributes for humane purposes, has organized its employees for fire protection, employs many special policemen and maintains a quick service repair department, and it believes that the statutes of the community to which it contributes such large sums ought in the main to afford ample service for such needs as the Mayor suggests. The public and private ambulance service and the public police, health and fire protection service can do better work than any service which the company could maintain. Any service suggested by the Mayor that would be comprehensive enough to be efficient would duplicate the existing public facilities. The company is, however, adopting every precaution which intelligence and experience suggest and is accepting its responsibilities in a humane spirit and continuing to put forth its best efforts to relieve suffering.

Traction Matters and the Political Campaign in Detroit

A feature of the street railway situation in Detroit is the stand taken by the candidates for the various city offices. On Oct. 25, 1910, William B. Thompson, Democratic candidate for Mayor, for the first time defined his position in the matter in an address in which he referred to the Codd-Hutchins franchise ordinance, which was defeated in Council four years ago. He was glad that he shared in voting the Codd-Hutchins ordinance down. He also spoke of the plan to give the Detroit United Railway an extension grant in 1891 to insure rapid transit. The failure to pass this ordinance, according to Mr. Thompson, was followed by the construction of the so-called 3-cent fare lines. Rapid transit came, he said, notwithstanding the defeat of the extension grants. He argued that further extensions will come as needed and advocated carrying the disputed questions to the courts if they can be settled in no other way to the satisfaction of the public. He reviewed the contentions of the past few months and the test that is being made of the claims of the city to rental on the routes on which franchises are said to have expired.

Letters to the newspapers of Detroit indicate that some of the residents feel that the city suffered a considerable loss when the proposition of the company made four years ago and proposing a fare of 2½ cents for certain periods morning and evening was refused.

Alderman Watson has introduced an ordinance in the Council to require the cars on the Jefferson, Sherman, Fort, Michigan-Mack, Hastings and Fourteenth Street routes to carry route signs on the rear and sides. He claims that the company has not lived up to an agreement which was made some years ago to do this. The penalty for violating the ordinance is a fine not to exceed $100, and, in default of payment, imprisonment for a period of not more than three months.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., Nov. 9.

Central Electric Traffic Association—Indianapolis, Ind., Nov. 14.

Alabama Light & Traction Association—Anniston, Ala., Nov. 21, 22, 23.

New England Street Railway Club—Boston, Mass., Nov. 24.

Central Electric Railway Association—Dayton, Ohio, Dec. 1.

Toronto Not to Purchase Street Railway.—At a meeting held on Oct. 24, 1910, the Council of Toronto decided not to proceed further with the negotiations looking to the purchase of the Toronto Railway by the city.

New England Street Railway Club Meeting.—The first fall meeting of the New England Street Railway Club was held at the American House, Boston, Mass., on Oct. 27, 1910. Franklin Woodman, vice-president of the club, presided in the absence of C. H. Hile, the president. The meeting was devoted to a discussion of aviation. The speakers were Adams D. Claflin, president of the Boston Suburban Electric Companies and general manager of the recent Harvard-Boston Aviation Meet, and A. A. Merrill, secretary of the contest committee of the meet.

Police Expenses in Connection with Columbus Strike.—Director of Public Safety McCune, of Columbus, Ohio, has reported to the City Council of Columbus that police expenditures to Oct. 20, 1910, during the strike of the employees of the Columbus Railway & Light Company were $40,114.52, leaving a balance of $9,885.48 out of the $50,000 which was appropriated by Council to pay strike expenses. Included in the reported expenditures were $11,835 for the pay roll, $25,422.72 for rented automobiles, $2,329.53 for meals of policemen who were unable to go home for them while lawlessness lasted and $527.27 for miscellanies, including clothing and uniforms purchased for the special patrolmen. The report has been placed on file.

Exhibit of Denver City Tramway at Electrical Show.—At the electrical show which was held under the auspices of the Colorado Electric Club at the Auditorium, Denver, Col., from Oct. 8, 1910, to Oct 15, 1910, the Denver (Col.) City Tramway had an elaborate exhibit in charge of W. G. Mathews, superintendent of overhead wires of the company. The evolution of the street car system in Denver was portrayed by photographs of the different types of street cars from the horse car to the present electric car. Photographs of the new buildings to be erected at the Central Loop, the suburban terminal depot across Arapahoe Street from the Central Loop and the new office building were exhibited, and evolution in registers and rails was shown. Armatures used in 1889 and those used to-day were also exhibited. A map of the city containing the tramway lines, etc., gave an accurate idea of the number of lightning arresters in use to protect trolley wires. Buttons were given to the ladies asking them not to get off the cars backward. Cartoons reproduced from the Denver *Times* and the Denver *Post* showed the embarrassment of ladies who get off street cars backward.

Progress of Toledo Appraisal.—Carl Nau, of Nau, Tanner & Rusk, who reported on the finances of the Toledo Railways & Light Company, Toledo, Ohio, for the last eight years, explained to a number of members of the Council at Toledo on Oct. 25, 1910, the details of the report. According to Mr. Nau, the natural increase in travel for the next 25 years on a 5-cent fare would make the receipts $7,500,000 in 1935 without a corresponding increase in expenses. The report shows that the gross earnings of the company for 1909 were $1,695,902.06, the operating expenses $958,343.98 and net earnings, without deducting taxes, up-keep and interest on the investment, $737,588.08. The cost of operation in Toledo, without including taxes and interest on bonds, is 13.82 cents per car mile, and a rate of fare fixed upon the present basis of travel and operation would be high in 10 years and prohibitive in 25 years. At the meeting of the directors of the company on Oct. 27, 1910, A. E. Lang, president, said that the inventory of the physical property by Ford, Bacon & Davis, New York, N. Y., would soon be completed, and that the report will be furnished the city and then be made public.

Financial and Corporate

New York Stock and Money Market

NOV. 1, 1910.

The Wall Street market is in the usual pre-election condition of inactivity. Trading is rather light and price changes are, in the majority of cases, unimportant. This is not due to any uneasiness over the outcome of the election, but is attributable to a conservative desire to wait and see what happens.

The bond market continues to be duller than it was a few weeks ago and the money market is considerably closer. Quotations to-day were: Call, 3½@4¼ per cent; 90 days, 4¾@5 per cent.

Other Markets

The activity in traction shares on the Philadelphia market has ceased. Only small lots of Rapid Transit and Union Traction are being traded in and these are at prices only slightly higher than the low level of two weeks ago. Every one is apparently willing to wait until some definite action is taken upon Mr. Stotesbury's suggestions.

There has been quite active trading recently in Series 1 and 2 of the Chicago Railways certificates. Prices have changed very little, although Series 2 has been stronger than Series 1. Other tractions have been practically out of the market.

Massachusetts Electric and Boston Elevated continue to be the traction features of the Boston market. These shares are offered freely almost every day, but prices so far have remained practically unchanged.

In the Baltimore market there has been very little dealing in traction shares during the week, and even the trading in United Railways bonds during the week has not been as brisk as usual. Prices for the bonds are unchanged.

Quotations of various traction securities as compared with last week follow:

	Oct. 25.	Nov. 1.
American Railways Company	a43½	a42¾
Aurora, Elgin & Chicago Railroad (common)	a50	44
Aurora, Elgin & Chicago Railroad (pref.)	a50	a90
Boston Elevated Railway	a128	a128
Boston & Suburban Electric Companies	*14¼	*14¼
Boston & Suburban Electric Companies (preferred)	*72	*72
Boston & Worcester Electric Companies (common)	*10½	10½
Boston & Worcester Electric Companies (preferred)	*36½	43
Brooklyn Rapid Transit Company	77¼	77
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83⅞	83¼
Capital Traction Company, Washington	a130	a129¾
Chicago City Railway	a160	a170
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a75	a77½
Chicago Railways, ptcptg., ctf. 2	a19	a21¼
Chicago Railways, ptcptg., 3	a10	a11
Chicago Railways, ptcptg., ctf. 4	a6	a6
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	*45
General Electric Company	155	155
Georgia Railway & Electric Company (common)	a122	a122
Georgia Railway & Electric Company (preferred)	87	a89
Interborough-Metropolitan Company (common)	22⅞	22⅛
Interborough-Metropolitan Company (preferred)	59½	56⅞
Interborough-Metropolitan Company (4½s)	81½	81⅜
Kansas City Railway & Light Company (common)	a23½	a23½
Kansas City Railway & Light Company (preferred)	*80	75
Manhattan Railway	a143	a143
Massachusetts Electric Company (common)	a20	a20
Massachusetts Electric Companies (preferred)	a85	a85½
Metropolitan West Side, Chicago (common)	a21	*21
Metropolitan West Side, Chicago (preferred)	a64	*64
Metropolitan Street Railway	22	*22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*67½	*67½
Northwestern Elevated Railroad (common)	a22	a23
Northwestern Elevated Railroad (preferred)	a63	a63
Philadelphia Company, Pittsburg (common)	a45¾	a45
Philadelphia Company, Pittsburg (preferred)	42½	a43
Philadelphia Rapid Transit Company	a15⅞	a16¼
Philadelphia Traction Company	a83	a82
Public Service Corporation 5 per cent col. notes	a94½	a95
Public Service Corporation, ctfs	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a65	a65
Third Avenue Railroad, New York	12¾	*12¾
Toledo Railways & Light Company	*8¼	*8¼
Twin City Rapid Transit, Minneapolis (common)	*112½	*112½
Union Traction Company, Philadelphia	38½	a40
United Rys. & Electric Company, Baltimore	a15	a15⅝
United Rys. Inv. Co. (common)	*15	*15
United Rys. Inv. Co. (preferred)	*60	*60
Washington Ry. & Electric Company (common)	a38	a37½
Washington Ry & Electric Company (preferred)	a89	a89⅜
West End Street Railway, Boston (common)	a86	a86½
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	72¾	73¼
Westinghouse Elec. & Mfg. Company (1st pref.)	*129	a124

aAsked. *Last sale.

Annual Report of the Tri-City Railway & Light Company

Gross and net earnings of the Tri-City Railway & Light Company, Davenport, Ia., compare as follows for three years:

	YEAR ENDED DEC. 31.		
	1909.	1908.	1907.
Gross earnings	$2,039,488	$1,819,077	$1,782,356
Operating expenses	1,140,908	1,069,317	1,132,392
Net earnings	$898,580	$749,760	$649,964

The gross earnings of 1909 increased 12.12 per cent over the record of the previous year. Against the net earnings for 1909 there were charged $472,388 for interest and discount on bonds and loans and $50,000 for sinking fund payment, leaving a divisible surplus of $376,192. Dividends of $169,572 were paid on the capital stock, leaving a surplus of $206,620. Joseph F. Porter, the president, says in the report:

"During the coming year, aside from the necessary expenditures for new business and railway extensions and reconstruction, the principal items of construction will be a 6000-kw turbine and accessories for the Moline power station and a new gas generating plant for Rock Island and Moline.

"During the year some of the franchises were changed and amended at our request and a new 20-year gas franchise was obtained in the City of Moline.

"General business, and particularly the business of the various manufacturing industries in the territory served by your company, have very materially improved during the past year and are now in normal condition with every prospect of the continuance of the general prosperity now enjoyed.

"Several interurban railways from interior points to connect with various lines of your railway system are being actively promoted by outside interests.

"The relations between your company and the public and municipal authorities are of a cordial nature, and the loyalty and efficiency of your officers, agents and employees are worthy of your fullest approval.

"During the year a total sum of $521,007 was expended on the property of the various subsidiary companies for construction, betterments, improvements, replacements and renewals, as follows: Railway department, $255,330; electric department, $118,571; gas department, $146,616; heating department, $490; total, $521,007."

The new improvements included a new car house in Davenport, 10 new Tri-City type cars and equipment, built by the Cincinnati Car Company, and approximately nine miles of reconstructed track and special work.

Atlantic Shore Line Railway, Sanford, Maine.—The United States Circuit Court at Portland, Maine, has ordered the sale of the property of the Atlantic Shore Line Railway at Alfred, Maine, on Dec. 1, 1910, under foreclosure proceedings instituted by the Knickerbocker Trust Company, New York, N. Y., as trustee for the holders of the first mortgage bonds of the company.

Boston (Mass.) Elevated Railway.—The stockholders of the West End Street Railway have subscribed to 26,751 shares of common stock of the company out of 27,800 shares of a par value of $50 each authorized to be offered to them by the Railroad Commission at $75 a share on the basis of one new share of stock for every eight shares held. As stated in the ELECTRIC RAILWAY JOURNAL of Sept. 24, 1910, page 482, the new stock is issued to reimburse the Boston Elevated Railway for improvements.

Chicago (Ill.) Consolidated Traction Company.—In relation to the suit brought by Mrs. Adelaide Yerkes, widow of Charles T. Yerkes, to enjoin Louis S. Owsley, executor of the Yerkes estate, from exchanging $4,594,000 of bonds of the Chicago Consolidated Traction Company for new securities to be issued by the Chicago Railways, the Chicago *Tribune* says: "All opposition has been withdrawn to the merger of the Chicago Railways and the Chicago Consolidated Traction Company. There now remain of those who originally started out to circumvent the reorganization plan only the scattered holders of 10 per cent of the general mortgage bonds of the Chicago Consolidated Traction Company, the same class of bonds that are owned by the Yerkes estate, and the members of the Foreman-Harrity commit-

tee. Of these the so-called McHenry holding of approximately 90 bonds is the largest. That these holders will shortly accede to the proposals of the reorganization committee is practically a foregone conclusion. The terms of the settlement have not been made public, but it is intimated that there has been a compromise, and that instead of receiving only 50 per cent of face value of the general mortgage bonds of the Chicago Consolidated Traction Company in 4½ per cent income bonds of the Chicago Railways, the holders of these bonds will realize something more substantial for their holdings." The date for the sale of the property of the company under foreclosure has not yet been set.

Chicago (Ill.) Railways.—At the annual meeting of the stockholders on Oct. 28, 1910, F. L. Hupp, W. H. Clark, W. W. Jones and John Reese were chosen directors to succeed Hempstead Washburne, W. N. Eisendrath, F. H. Rawson and J. W. Gary, retired. The other directors, Henry A. Blair, A. B. Jones, John M. Roach, Wallace Heckman and Seymour Morris, were re-elected.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—The option on the property of the Columbus, New Albany & Johnstown Traction Company, which constituted a part of the assets of the Queen City Savings Bank & Trust Company, Cincinnati, Ohio, which is being liquidated, has been closed by the Eastern representative to whom it was given and the property has been sold for $187,000, the amount of the loan. The option was taken in the name of A. T. Herd, New York, N. Y. The Queen City Savings Bank & Trust Company holds $440,000 of the bonds, $150,000 of the preferred stock and $354,000 of the common stock of the Columbus, New Albany & Johnstown Traction Company as security. Part of the purchase price was in cash and the remainder in 60-day notes.

Georgia Railway & Electric Company, Atlanta, Ga.—The directors of the Georgia Railway & Electric Company have declared a quarterly dividend of 2 per cent on the common stock of the company, payable Nov. 19, 1910, to holders of record on Nov. 15, 1910. The dividend rate since 1907 has been 6 per cent a year.

Hartford & Springfield Street Railway, Hartford, Conn.—The directors of the Hartford & Springfield Street Railway have declared a semi-annual dividend of 2 per cent on the $285,000 of 6 per cent non-cumulative preferred stock of the company, payable on Nov. 1, 1910. On May 1, 1910, the company paid a semi-annual dividend of 1 per cent on the preferred stock, the first dividend paid since Nov. 1, 1907.

Hornell (N. Y.) Traction Company.—The Public Service Commission of the Second District of New York has approved an agreement whereby the Hornellsville Electric Railway, Hornellsville & Canisteo Railway and Canisteo Valley Electric Railway are consolidated as the Hornell Traction Company, which has been authorized to issue common capital stock to the amount of $120,000, which is to be exchanged for the stock of the consolidated companies.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—The report of Harry J. Milligan, receiver of the Indianapolis, Crawfordsville & Western Traction Company, for September, 1910, shows gross earnings of $20,118, operating expenses of $9,821 and net earnings of $10,297. The revenue from passengers amounted to $17,853, the revenue from freight to $1,571 and the revenue from express to $558. Under operating expenses the following items were included: Conducting transportation, $4,097; maintenance of way and structures, $962; rent of tracks and terminals, $1,708. An expense of $706 was incurred for construction, ballasting, grading, etc. On Oct. 1, 1910, the balance on hand was $13,557.

Janesville (Wis.) Street Railway.—T. S. Nolan, representing the bondholders of the Janesville Street Railway, purchased the property of the company recently at receiver's sale for $125,000, subject to $10,000 of receiver's certificates.

Los Angeles (Cal.) Railway.—The stockholders of the Los Angeles Railway have voted to increase the capital stock of the company from $5,000,000 to $20,000,000 and to change the name of the company to the Los Angeles Railway Corporation.

Montreal (Que.) Street Railway.—H. S. Holt, president of the Montreal Light, Heat & Power Company, has announced that the proposed merger of that company and the Montreal Street Railway will not be concluded on account of opposition by the public to the consolidation.

New Orleans Railway & Light Company, New Orleans, La.—The directors of the New Orleans Railway & Light Company have declared a dividend of 2½ per cent on the $10,000,000 of 5 per cent non-cumulative preferred stock out of the earnings of the year which will end Dec. 31, 1910. The dividend is payable on Jan. 16, 1911, to holders of record on Dec. 31, 1910. This is the first distribution since October, 1907, when ⅝ of 1 per cent was paid.

Ocean Shore Railway, San Francisco, Cal.—Judge Van Fleet, of the United States Circuit Court at San Francisco, has postponed the sale of the property of the Ocean Shore Railway under foreclosure to Nov. 18, 1910, and has granted Lilly & Heins permission to appeal from the order of the court which directs that the property of the company be sold.

Oklahoma Railway, Oklahoma City, Okla.—It is understood that negotiations which have been pending for some time for J. G. White & Company, Inc., New York, N. Y., to take over the Oklahoma Railway, as operating managers have been concluded.

Philadelphia (Pa.) Rapid Transit Company.—Action on the plan to have E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., become a director of the Philadelphia Rapid Transit Company and the Union Traction Company, Philadelphia, will not be taken until the report of the special committee of directors of the Union Traction Company composed of Robert A. Balfour and George W. Elkins has been received regarding the proposal of Mr. Stotesbury that the stockholders of the Union Traction Company should guarantee the obligations of the Philadelphia Rapid Transit Company for capital requirements and that a sufficient amount should be appropriated from the earnings of the Philadelphia Rapid Transit Company to maintain the physical integrity of the property properly.

Quakertown (Pa.) Traction Company.—A protective committee consisting of Julius Vetterlein, Theodore J. Lewis, William A. Brown, Albert W. Morton and George B. Atlee has been formed by the bondholders of the Quakertown Traction Company to oppose the proposal of the Lehigh Valley Transit Company to exchange bonds of that company for those of the Quakertown Traction Company in accordance with the terms given in the Electric Railway Journal of Oct. 29, 1910, page 926.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The reorganization committee of the Washington, Baltimore & Annapolis Electric Railway has announced that more than half of the bonds of that company and about an equal number of the bonds of the Baltimore Terminal Company have been deposited with it, as well as a considerable amount of the stock of the Washington, Baltimore & Annapolis Electric Railway.

Winona Interurban Railway, Winona Lake, Ind.—Edward Beyers, Warsaw, Ind., has been elected a director of the Winona Interurban Railway to fill a vacancy in the board.

Dividends Declared

Dartmouth & Westport Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Hartford & Springfield Street Railway, Hartford, Conn., 2 per cent.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent.

New Orleans Railway & Light Company, New Orleans, La., 2½ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1 per cent, common.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Traffic and Transportation

Commutation Rates to the New Pennsylvania Railroad Terminal in New York

The Pennsylvania Railroad has made public the regular and commutation rates of fare which will prevail between points in New Jersey and the new station of the company at Seventh Avenue and Thirty-third Street, New York, N. Y. The following table shows the difference between the present single-trip rates to the existing terminals and the announced rates for the new station:

	New station rates, cents.	Present rates, cents.
Harrison	27	15
Newark	27	17
South Street, Newark	27	17
Waverly	35	30
North Elizabeth	40	30
Elizabeth	40	30
South Elizabeth	40	30
Lindon	48	35
Scott Avenue, Rahway	54	40
Rahway	54	40
Colonia	60	50
Iselin	63	57
Menlo Park	67	60
Metuchen	72	65
Stelton	80	73
New Brunswick	86	78

The increases in commutation rates are shown in the following table:

	New station 50-trip family or firm.	Present rates.	New station 60-trip monthly.	Present rates.
Harrison	$11.00	$6.00	$12.00	$6.00
Newark	11.00	6.00	12.00	6.00
Waverly	14.00	9.00	12.50	6.50
Elizabeth	15.25	10.25	12.50	6.50
Lindon	18.50	13.50	14.00	8.60
Rahway	21.00	16.00	15.00	9.00
Avenel	22.50	17.50	15.50	9.50
Edgar	22.50	17.50	15.75	9.75
Woodbridge	23.00	18.00	16.00	10.00
Spa Spring	23.90	18.90	16.25	10.25
Perth Amboy	25.00	20.00	16.50	10.50
Colonia	22.50	17.50	15.50	9.50
Iselin	23.50	18.50	16.00	10.00
Menlo Park	24.50	19.50	16.50	10.50
Metuchen	27.00	22.00	17.00	11.00
Stelton	30.00	25.00	17.50	11.50
New Brunswick	32.00	27.00	18.00	12.00

The Interstate Commerce Commission has designated Nov. 16, 1910, as the date for the hearing in New York City on the petition of the various bodies which represent commuters in regard to rates over the railroads operating between points in New Jersey and New York. Commissioner John M. Harlan will preside. Edmund Wilson, Attorney-General of New Jersey, will represent the State Board of Public Utility Commissioners in the proceeding, and Frank Lyon will act as attorney for the Interstate Commerce Commission.

Sale of Transfers Between Separate Intersecting Lines Suggested in New York

Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, New York, N. Y., have sent to the Public Service Commission of the First District of New York with the consent of the bondholders' reorganization committee an offer to establish a modified transfer system between the Fifty-ninth Street crosstown line of the Central Park, North & East River Railroad and the north and south lines of the Metropolitan Street Railway. The offer is made pursuant to a transfer order of the commission affecting the two roads adopted Aug. 2, 1910, and extended to Nov. 1, 1910. The receivers sent to the commission a letter from Chairman Tripp, of the reorganization committee, representing the bondholders of the Metropolitan Street Railway, embodying the offer as accepted by the bondholders. Mr. Tripp's letter follows:

"Acting under authority conferred on me by resolutions of the bondholders' committees of general and collateral 5 per cent bonds and refunding 4 per cent bonds in the matter of the order of the Public Service Commission for the establishment of a joint rate between the Metropolitan Street Railway and the Central Park, North & East River Railroad as to the lines of the Metropolitan Street Railway which intersect the Fifty-ninth Street crosstown line of the Central Park, North & East River Railroad, I recommend that the present charge of 10 cents for traffic to and from Fifty-ninth Street and of 15 cents for through traffic via Fifty-ninth Street be reduced to 8 cents and 10 cents, respectively, by the following arrangement:

"1. That the rate between the Metropolitan lines and the Fifty-ninth Street line for those passengers that originate or stop on Fifty-ninth Street shall be 8 cents, the Metropolitan lines collecting 3 cents for each transfer issued to the Fifth-ninth Street line and the Fifty-ninth Street line charging 3 cents for each transfer issued to the Metropolitan lines.

"2. For those passengers who travel on the Fifty-ninth Street line en route from a Metropolitan line to some other Metropolitan line (this journey being in the same general direction) there shall be a charge of 10 cents. In other words, the Metropolitan Street Railway charges 3 cents for a transfer issued to such a passenger, which is good on the Fifty-ninth Street line, and the Fifty-ninth Street line charges 2 cents for an additional transfer, which is good on another line of the Metropolitan Street Railway going in the same general direction.

"The method of the issuance of transfers described above is used simply for the purpose of illustration, and is not intended to suggest a specific method of collection of fares.

"This approval is based upon our desire to meet the wishes of the commission and the public, because the Metropolitan Street Railway cannot afford, from a purely business standpoint, to reduce its already insufficient revenues, and is not to be construed as in any way prejudicing our rights to contest the constitutional right of the Public Service Commission to establish a joint rate between independent companies."

The Central Park, North & East River Railroad has sent to the Public Service Commission a letter agreeing to the terms of transfers between its Fifty-ninth Street line and the intersecting north and south lines of the Metropolitan Street Railway, as proposed by the receivers of that company.

Company Sustained in South Framingham Fare Case

The Massachusetts Railroad Commission has issued a decision sustaining the Milford & Uxbridge Street Railway, Milford, Mass., in the petition of the Framingham Board of Trade for reduced fares between Holliston and South Framingham. The finding states:

"After a hearing the Milford & Uxbridge Street Railway was requested to furnish the Railroad Commission with a report of its income under the newly established fares and, in view of the enactment of the statute making the present financial year a 9-month term, was also requested to tabulate its returns to Sept. 30, 1910, for the purpose of making an exact comparison of financial years of the same duration. This information is now before us and we are convinced, upon a careful review and study of all the evidence, that the existing unit of fare for a single ride is not unreasonable. We believe, however, in view of the close commercial and social relations existing between the towns of Hollister and South Framingham, that some concession should be made with respect to the workingman's ticket, so called. Without undertaking to fix the price arbitrarily we recommend a reduction."

Freight Petition Granted in Massachusetts.—The Railroad Commission of Massachusetts has approved the petition of the Haverhill & Amesbury Street Railway, Merrimac, Mass., to act as a common carrier of baggage and freight in Salisbury, Amesbury, Merrimac, Haverhill and Newburyport.

Wind Shields in Louisville.—The Louisville (Ky.) Railway is placing wind shields on cars which are without rear vestibules to protect conductors and passengers. The shields extend from the front to the rear of the platform along the inside. They were built in the shops of the company.

Clearing Right of Way.—The Indiana Union Traction Company, Anderson, Ind., is clearing its right of way of brush wherever the view of the line is obstructed. In one instance the company bought an orchard on a farm near Alexandria and removed all the trees so as to make it possible for motormen to have an unobstructed view of a curve.

Congestion in Louisville.—Owing to the congestion on Fourth Avenue, the principal retail thoroughfare in Louisville, the Commercial Club of Louisville has asked the Louisville (Ky.) Railway to operate its Fourth Avenue cars north on Fourth Avenue and return by way of Fifth Street. The club has also requested the company to arrange to transfer passengers on suburban cars to its cars.

Date Set for Hearing on Injunction to Prevent Overcrowding in Pittsburgh.—At the joint request of attorneys representing the city and the Pittsburgh (Pa.) Railways in the injunction proceedings which the company instituted against the city to prevent the enforcement of the two ordinances regulating the overcrowding of streets cars Common Pleas Court No. 1 has fixed on Nov. 9, 1910, for the argument.

New Subway Station Opened in New York.—The new terminal station on the West Farms line of the subway division of the Interborough Rapid Transit Company, New York, N. Y., was opened on Oct. 28, 1910, at 12:01 a. m. It will be known as Zoological Park-180th Street station and is the permanent terminal station of the West Farms division. It is equipped for the 10-car express trains and 6-car locals.

Indiana Commission to Recommend Improvements.—The Railroad Commissioners of the State of Indiana conferred with J. L. Jones, Philadelphia, Pa., president of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., on Oct. 24, 1910, about the ability of the company to carry out recommendations which the commission proposes to make for improvement of the physical property of the company.

Proposed Revision of Central Association Passenger Tariff.—The members of the Central Electric Traffic Association have decided to consider the revision of Joint Passenger Tariff No. 3 at a meeting which will be held on Nov. 14, 1910, in the office of the chairman of the association at Indianapolis. A special endeavor is being made to have representatives present from all lines that are interested in the tariff, with the idea of completing the work at this meeting.

Complaint Against Catskill Traction Company Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of Catskill against the Catskill Traction Company regarding the dangerous conditions of track along the State highway in that town. After conversation with the State Highway Commission and other parties interested a satisfactory adjustment of the matter has been made and the roadway placed in safe and proper condition.

"Timely Tips for Patrons of Toledo's Street Cars."—This is the title of an 8-page folder 3 in. x 6 in. issued by the Toledo Railways & Light Company, Toledo, Ohio, principally to inform patrons of the company of the schedules maintained on the various lines of the company. The publication also contains the time over the Toledo & Western Railroad and information regarding the company's owl car schedule, special cars, Toledo Beach and Point Place, express, baggage and freight, the display room and the interurban station.

Switch Targets and Lights in Michigan.—The recent order of the Michigan Railroad Commission regarding the use of switch targets and lights at all main line switches of interurban railroads owned and operated by the Detroit United Railway in Michigan outside of cities and villages confirms the practice which has been followed by the company for some time. The switches on the interurban lines of the company are already equipped with targets and lights, except at places where the tracks run into the highway in villages and hamlets. The order of the commission in this connection was published in the Electric Railway Journal of Oct. 22, 1910, page 891.

Circular on Deportment of Trainmen.—The Railroad Commission of Indiana has recently addressed the following circular to the interurban railways of Indiana, in which attention is called to the complaints that have reached the commission of inattention to passengers on the part of trainmen: "Continual complaints reach this commission of the inattention and rudeness of some of your conductors to passengers on your lines. Whether this arises from the character of some of the men in your employment or the fact that you have not sufficient trainmen to do the work, it is the general demand of the people of the State that it shall be corrected. The commission therefore directs that your superintendents and trainmasters shall proceed at once to supervise this matter of operation and to require and see that your conductors shall extend to all passengers and especially women and children the care, courtesy and attention that should be given in all such cases."

Through Service Over Lake Shore Electric Railway and Western Ohio Railway.—E. W. Moore, president of the Lake Shore Electric Railway, Cleveland, Ohio, has denied that negotiations are under way for the consolidation of the Lake Shore Electric Railway and the Western Ohio Railway. Mr. Moore states that the idea that the companies were to consolidate probably originated in the arrangement made with the Cleveland Chamber of Commerce to establish a through fast passenger and freight service between Cleveland and Lima by a traffic agreement between the Lake Shore Electric Railway and the Western Ohio Railway. In order to do this connection must be made between Fostoria and Findlay over the Toledo, Fostoria & Findlay Railway. The Western Ohio road is constructing a line between Findlay and Fremont which will furnish trackage for the through service, but it is possible that the Western Ohio Company may build a connecting link between Fostoria and Findlay. The plan of wholesale houses of Cleveland to develop business in the western part of the State resulted in the arrangements being made for through service.

Circular Regarding Watches and Time Cards.—The Railroad Commission of Indiana has recently issued the following circular, in which reference is made to the report of the inspectors of the commission about the inclination of motormen to disregard their time cards and watches: "Upon investigation by our inspectors we find that your motormen in many cases do not use their time cards and watches. In one case reported by our inspector he stated that a motorman passed 19 switches, or side tracks, without looking at his watch, and that at no time on the entire trip did he consult his time card. It appears that many motormen and conductors attempt to memorize the time of trains and meeting points at sidings. It is well for them to learn the time of the trains at sidings, but they should never depend on memory altogether and should consult the time card furnished to them that there may be no mistake. They should also look at their watches when they pass stations or side tracks where trains are likely to be met. This is especially necessary, as the companies generally reserve a right to run extra trains at any time without notifying regular trains. The commission trusts that you will take this matter up promptly and direct your men to comply with this circular. Our inspectors will report such omissions to us."

Cincinnati Committee Reports Against No-Seat-No-Fare Ordinance.—The committee on street railroads of the Council of Cincinnati recently asked that action on the no-seat-no-fare ordinance by the Council be indefinitely postponed and that the Director of Public Service be instructed to see that better service is provided during the rush hours. The report of the committee has since been adopted. In advocating the rejection of the ordinance, the committee on street railroads said: "Your committee will state that it is of the opinion that it would be unwise to pass this ordinance for the good and sufficient reason that it would interfere with the citizens of this city by not allowing them to use their best judgment about boarding a crowded car and standing, as it prohibits them from boarding any car that has on it the maximum number of passengers according to the ordinance. Your committee is of the opinion that it would be doing an act of injustice to the people of Cincinnati to recommend this ordinance for passage, as the cars would pass by on stormy nights when the sleet would be falling and the streets would be covered with slush, and the public would be compelled to wait from 30 minutes to one hour, during which time the cars would pass with standing space in at least one-half of them not occupied. Your committee recommends that the Director of Public Service be requested to see that the street car service is improved during the rush hours in the morning and evening, so that the general public can get the best car accommodations that can possibly be given. Your committee further recommends that the ordinance referred to in the foregoing, introduced June 13, 1910, be indefinitely postponed."

Personal Mention

Mr. Ferdinand Williams has been elected president of the Cumberland & Westernport Electric Railway, Cumberland, Md., to succeed the late C. L. Bretz.

Mr. William Everdell, Jr., assistant secretary of the Hudson & Manhattan Railroad, New York, N. Y., has been appointed acting secretary of the company to succeed Mr. Charles W. King, resigned.

Mr. M. Techlilner, formerly dispatcher of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been appointed superintendent of the company with headquarters at Elkhart, Ind.

Mr. R. R. Smith has been appointed general superintendent of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., with headquarters at Erie, Pa., in charge of operation, and not assistant manager of the company, as previously reported.

Mr. F. W. Laas, chief engineer of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., for the last nine years, has resigned to become chief engineer of the Cedar Rapids & Iowa City Railway, Light & Power Company, Cedar Rapids, Ia.

Mr. James E. Cowles has resigned as superintendent of lighting of the Little Rock Railway & Electric Company, Little Rock, Ark., to become manager of the lighting department of the Shreveport Gas, Electric Light & Power Company, Shreveport, La.

Mr. Alfred Craven has been appointed engineer in charge of subway construction by the Public Service Commission of the First District of New York to succeed Mr. George S. Rice, who retired recently to take up private practice as a consulting engineer. At the same time Mr. Craven's designation as acting chief engineer of the commission is continued.

Mr. J. S. Badger, general manager Brisbane Tramways, Brisbane, Australia, spent a few days in New York last week. Mr. Badger was formerly connected with the original Sprague Electric Railway & Motor Company and later with the Edison General Electric Company and was constructing engineer for a number of the early electric railway lines in this country. About 14 years ago, however, he accepted the office of general manager of the Brisbane Tramways, which under his supervision have been developed into one of the most important electric railway systems in Australia. He revisited this country seven years ago and at the time attended the convention of the American Street Railway Association at Saratoga, N. Y. This year he came by way of London and returned to that city on Oct. 29, 1910. Mr. Badger expects to revisit the United States again about Dec. 1 and spend about six weeks here before sailing for Australia.

Mr. R. A. Crume, treasurer, purchasing agent and claim agent of the Dayton & Troy Electric Railway, Dayton, Ohio, has been appointed general manager of the Dayton & Troy Electric Railway, Dayton, Ohio, to succeed Mr. C. M. Paxton, resigned, who has accepted the management of the branch of the Dayton Electrical Manufacturing Company, Dayton, Ohio, in Des Moines, Ia. Prior to his connection with the Dayton & Troy Electric Railway, Mr. Crume was for three years engaged in the manufacturing business. He entered the service of the Dayton & Troy Electric Railway on Dec. 26, 1902, as assistant superintendent in charge of the company's lines in Piqua. In 1904 he was appointed purchasing and claim agent of the company and the following year the duties of general auditor were added to his office. On January 6, 1906, he was elected a director of the company, and in January, 1908, he was elected treasurer of the company, continuing also as purchasing agent and claim agent. On Dec. 1, 1910, Mr. Crume will assume his new position with the company with the title of treasurer and general manager, and to facilitate the work of that office he has arranged to make his headquarters at Tippecanoe City, Ohio, where the shops and power station of the company are located.

Mr. Robert J. Clark has been appointed comptroller of the Kansas City Railway & Light Company, Kansas City, Mo. Mr. Clark entered the employ of the Toronto (Ont.) Railway as pay clerk in 1894 during his second year at the University of Toronto, and was permitted to complete his course. After graduation he remained one year with the Toronto Railway in the comptroller's department and in 1899 was appointed chief accountant of the National Trust Company, Toronto. In 1902 Mr. Clark returned to the office of the Toronto Railway as assistant to the secretary of the Sao Paulo Tramway, Light & Power Company and the Rio de Janeiro Tramway, Light & Power Company, two hydroelectric tramway, light and power companies located in Brazil and developed and owned by Mr. William McKenzie, Toronto, and Dr. F. S. Pearson, New York, and their associates. In 1904, during the visit of Mr. J. M. Smith, the comptroller of the Toronto Railway, to Brazil, in connection with his duties as secretary of the companies at Rio de Janeiro and Sao Paulo, Mr. Clark was appointed acting comptroller of the Toronto Railway. In 1907 Mr. Clark inspected the properties in Brazil for Mr. McKenzie and returned to Toronto in January, 1908. On account of the growth and importance of the Brazilian companies, it was decided in 1908 to open new offices for them, but Mr. Clark decided to remain as assistant comptroller of the Toronto Railway, which position he resigned in October, 1910, to become comptroller of the Kansas City Railway & Light Company.

Mr. Peter E. Hurley has resigned as general manager of the Trenton (N. J.) Street Railway after continuous service from June 24, 1885, during which time he rose from transfer agent to general manager. After serving as transfer agent Mr. Hurley became in turn stable boss in the horse car days, then superintendent, and about 10 years ago general manager. On May 24, 1892, Mr. Hurley ran the first electric car in Trenton. He was also particularly active in building the electric railway through West State Street, the city's wealthy section. Since the introduction of electricity for motive power the Trenton Street Railway has extended its lines into the suburbs, covering practically the territory within a dozen miles of Trenton on the Jersey side of the Delaware River. Mr. Hurley has directed the work of securing rights of way and the construction of these lines. More than 50 of the employees of the company have been with it over 25 years. Mr. Hurley has always come into close contact with the people of Trenton, and expressions of regret at his retirement from the company are general. Mr. Hurley will go into the paving contracting business with the Filbertine Paving Company. To the ELECTRIC RAILWAY JOURNAL Mr. Hurley expressed his reasons for retiring from the Trenton Street Railway as follows: "My only reason for making a change is to get into other business. Twenty-five years is long enough in any one line of work. My relations with the Trenton Street Railway have been most pleasant, and I am leaving the company with the best of feeling for its future welfare."

OBITUARY

David J. Evans, who was prominently connected with one of the constituent companies of the Brooklyn (N. Y.) Rapid Transit System in the horse car days, is dead.

W. D. Smith, general manager, purchasing agent and claim agent of the Athol & Orange Street Railway, Athol, Mass., is dead. Mr. Smith was born in New Salem, Mass., in 1845. In 1850 his parents moved to Athol and he lived there continuously from that time until he died. He served in various public capacities in Athol.

James Jourdan, president of the Brooklyn (N. Y.) Union Gas Company and a director of the Interborough Rapid Transit Company, New York, New York & Long Island Traction Company, New York & Queens County Railway and the New York & New Jersey Telephone Company, died at his home in Brooklyn on Nov. 1, 1910, at the age of 79 years.

Mr. Alexander Henry Davis, the largest single holder of stock in the Louisville (Ky.) Railway, died recently at his home in London, England. For several years prior to 1889 Mr. Davis was president of the Louisville City Railway, but he resigned as president of the company when the Louisville City Railway and the Central Passenger Railway were consolidated. Mr. Davis was represented on the board of directors of the Louisville Railway by Mr. John Stites.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Los Angeles-Western Railway, Los Angeles, Cal.**—Incorporated in California to build an electric railway to connect Hermosa Beach and Culler. Capital stock, $500,000. Incorporators: A. W. Taylor, W. C. Wallace, L. Metzger and M. Conway.

***Springfield & Central Illinois Traction Company, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from Springfield to Nashville, Ill. Headquarters, Springfield. Capital stock, $20,000. Incorporators: I. A. Smith, G. W. White, N. E. McMillan and Alfred Lynch, St. Louis, Mo.; James Gullett, H. B. Williams, John B. Conant, Oscar Ansell and William J. Barrett, Springfield.

***Iowa Traction Company, Oskaloosa, Ia.**—Application for a charter has been made in Iowa by this company to build a 65-mile electric railway to connect Oskaloosa and Tama. Capital stock authorized, $2,000,000. Incorporators: G. E. Wodehouse, Oskaloosa; Jefferson C. Mabey, Albis, and Irving T. Hunter, Newark.

Wicomico Electric & Power Company, Salisbury, Md.—Chartered in Maryland to build a 25-mile electric railway to connect Salisbury, Hebron, Quantico, Wetipquin, Tyaskin, Bivalve and Nanticoke. Capital stock, $500,000. Officers: M. V. Brewington, president; H. James Messick, vice-president; William Cooper, treasurer; Mark Cooper, secretary. Directors: Jesse D. Price, Levin W. Dorman, Whitefield S. Lowe and J. B. Culver. [E. R. J., March 6, '10.]

***Union Terminal Railway, Rockport, Tex.**—Application for a charter has been made in Texas by this company to build a 25-mile electric or steam railway to connect Rockport, Aransas Pass, Navy City, Port San Antonio and to and over Shell Bank and Harbor Island. Capital stock, $25,000. Officers: Charles F. Hoff, Rockport, president; W. H. Verner, vice-president; W. D. Newberry, secretary, and Thomas E. Mathis, treasurer.

***Spokane, Portland & Northern Railway Company, Spokane, Wash.**—Application has been made in Washington by this company for a charter to build an electric or steam railway from Spokane to the international boundary near Nighthawk via Bridgeport and Duffin's Ferry. Incorporators: A. M. Dewey, E. P. Spauling, S. A. Skinner, George D. Needy, A. M. P. Spaulding and Arthur B. Lee, all of Spokane.

FRANCHISES

Alhambra, Cal.—The Pacific Electric Company has been granted a franchise by the Board of Trustees to build an additional track on Huntington Drive, Alhambra.

Oakland, Cal.—The Oakland Traction Company has applied to the City Council for franchises to build several extensions to its lines in Oakland.

Hartford, Conn.—The Norwich, Colchester & Hartford Traction Company, Norwich, has been granted a franchise by the Board of Selectmen to extend its lines over certain streets in Hartford. H. M. Pollock, secretary. [E. R. J., Sept. 24, '10.]

Gary, Ind.—The Gary & Southern Interurban Railway has been granted a franchise by the City Council to extend its tracks in Gary, provided work is begun on the line within six months.

Mt. Carmel, Ind.—The Evansville, Mt. Carmel & Olney Electric Railway, Evansville, has asked the City Council for a franchise to build its tracks through the main street of Mt. Carmel. This proposed 65-mile railway will connect Mt. Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. E. Q. Lockyear, Evansville, secretary. [E. R. J., July 2, '10.]

Covington, Ky.—The Covington, Big Bone & Carrollton Traction Company has asked the Council for a franchise to build its tracks on Second Street in Covington from Johnson Street to the western corporation line. [E. R. J., Oct. 22, '10.]

Springfield, Mass.—The Springfield Street Railway has been granted a franchise by the Board of Aldermen to extend its tracks into the Armory Grounds in Springfield via St. James Street and Magazine Street.

Billings, Mont.—John A. Connolly, representing the Billings Traction Company, has been granted a franchise to build an electric railway in Billings. [E. R. J., Oct. 15, '10.]

Chatham, N. J.—The Morris County Traction Company, Morristown, has been granted a 35-year franchise by the Common Council to build its tracks through Main Street in Chatham.

Syracuse, N. Y.—The Syracuse Rapid Transit Company will ask the Common Council for a franchise to double-track some of its lines in Syracuse.

Utica, N. Y.—The Utica & Mohawk Valley Railway has asked the City Council for a franchise to extend its line from its present terminus in Genesee Street to its North Genesee Street line in Utica.

***Salem, Ore.**—Santiani Valley Development Company, Salem, has asked the Council for a franchise to build an electric railway over certain streets in Salem.

Erie, Pa.—The Northwestern Traction Company, Erie, has asked the Common Council for a franchise to build its tracks over certain streets in Erie. James Burke, president. [E. R. J., Aug. 6, '10.]

Richmond, Va.—The Richmond, Urbanna & Peninsula Railway has been granted a 2-year extension of its franchise by the State Corporation Commission in which to begin construction of its proposed line from Crest Point to Urbanna. John C. Robertson, Chesterfield, Va., president. [E. R. J., Nov. 21, '08.]

***Seattle, Wash.**—J. Frederic Thorne and associates have asked the County Commissioners for a franchise to build a 40-mile electric railway from Kirkland to Tolt.

TRACK AND ROADWAY

Texarkana Gas & Electric Company, Texarkana, Ark.—Press reports state that this company will double-track its entire line through the business section of Texarkana from Hazel Street and Broad Street, extending to Maple Street, Texas. It is also planned to extend the line out beyond Rose Hill, a distance of about 2 miles.

***Fresno, Cal.**—S. N. Griffith, Fresno, is making surveys and is said to have secured financial backing for building a proposed 50-mile electric railway to connect Fresno and Clovis. It is expected to begin construction as soon as the right of way is obtained.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will extend its La Habra railway about 3 miles beyond Yorba Linda, the present terminal. It has completed surveys for an electric railway to Burbank.

Denver (Col.) City Tramways.—It is said that this company will soon begin grading for a new line to Park Hill from Colorado Boulevard and Seventeenth Avenue in Denver.

***Pueblo, Col.**—It is said that surveys are being made to build a proposed electric railway to extend from Pueblo east of La Junta, a distance of about 70 miles. J. S. Vail, Pueblo, is interested.

Connecticut Company, New Haven, Conn.—This company is planning to double-track its line near White Oak in Plainville.

West Chester & Wilmington Electric Railway, Wilmington, Del.—It is reported that this company has secured rights of way and arrangements for construction have been made to build its proposed 17-mile railway to connect West Chester and Wilmington. Lewis Dalmas, Morris Building, Philadelphia, Pa., president. [E. R. J., Feb. 12, '10.]

Chicago (Ill.) Railways.—This company has made a special contract with the Chicago Transfer & Clearing Company, Chicago, Ill., to extend its tracks from its present terminus at the corner of Sixty-third Street and Fifty-sixth Avenue, at Clearing, to the corner of Sixty-third Street and Archer Avenue, at Argo, Ill. The grading for this extension is well under way.

***Savanna, Ill.**—W. Usborne, Chicago, it is reported, is interested in a plan to build an electric railway to connect Sterling, Coleta, Milledgeville and Lanark and from Lanark east and west to Freeport and Savanna.

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company advises that it will let contracts for building the first branch of 15 miles from Palatine to Wauconda. This proposed 150-mile electric railway will connect Palatine, Lake Zurich, Wauconda, Vols, Fox Lake, Round Lake, Gray's Lake, Druce Lake, Gurnee, Waukegan, Lakeville, Antioch, McHenry, Woodstock and Marengo, Ill., and Wilmot and Lake Geneva, Wis. Capital stock, authorized, $1,500,000; issued, $300,000. Officers: Charles H. Patten, Palatine, Ill., president; R. D. Wynn, Waukegan, vice-president; J. K. Orvis, Waukegan, secretary; Theo H. Durst, treasurer, and Henry J. Farmer, Lake Zurich, Ill., engineer. [E. R. J., Sept. 10, '10.]

Southern Michigan Railway, South Bend, Ind.—It is reported that this company will soon build a 4-mile extension to Buchanan, Mich. It is also said to be considering plans for building a bridge over the St. Joseph River at Niles.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—Press reports state that this company will soon place in operation its new line to connect Fort Dodge Junction and Rockwell via Rockwell City, Piper, Rinard, Easley, Gowrie and Lanyon. It has electrified 27 miles of the old Newton & Northwestern Railroad. J. L. Blake, manager.

Hagerstown, Md.—It is reported that L. N. Downs, New York, H. L. Kirby and James B. Kreps, Hagerstown, are making surveys for a proposed 27-mile electric railway to be built from Hagerstown to Clear Springs, Md., and thence to Mercersburg, Pa. [E. R. J., Oct. 22, '10.]

Holyoke (Mass.) Street Railway.—This company, it is said, has begun work double-tracking High Street and Appleton Street in Holyoke.

Wicomico Electric & Power Company, Salisbury, Md.—This company is said to have been assured the necessary capital by foreign capitalists for beginning work on its proposed 25-mile electric railway to connect Salisbury, Hebron, Quantico, Wetipquin, Tyaskin, Bivalve and Nanticoke. The Industrial Engineering Company, Drexel Building, Philadelphia, Pa., is in charge of engineering work. J. D. Price, Salisbury, general manager. [E. R. J., Feb. 27, '10.]

St. Paul-Mankato Electric Railway, Mankato, Minn.—It is reported that this company is securing rights-of-way for its proposed electric railway to connect Mankato, St. Paul and Minneapolis. J. J. Davy, Mankato, engineer. [E. R. J., Nov. 20, '09.]

Electric Short Line Railroad, Minneapolis, Minn.—This company, it is said, will place in operation in November its railway to connect Minneapolis and Medicine Lake. It is also making plans to extend this line to Lake Minnetonka, Watertown and Winsted next year. Frank E. Reed, Glencoe, secretary. [E. R. J., Sept. 3, '10.]

Meridian Light & Railway Company, Meridian, Miss.—It is said that this company is double-tracking its line on Eighth Street in Meridian and that it will probably be extended to Highland Park.

Nebraska Transportation Company, Omaha, Neb.—It is reported that this company has completed surveys and secured the necessary capital to build a proposed electric railway to connect Omaha, Elk City, Arlington, Craig, Oakland and South Sioux City. A branch will be built from Elk City to Clarkson, Stanton, Norfolk, Clarkson and Madison and another branch will be built to Decatur. The Baker Construction Company has the contract for building the line and it is stated that construction will begin in the spring. C. W. Baker, Omaha, Neb., president. [E. R. J., Nov. 20, '10.]

***Riverside Traction Company, Trenton, N. J.**—This company is said to be rebuilding its track between Trenton and Camden.

***Jamestown, N. Y.**—James Hughes and Benjamin Straus, Jamestown, are said to be taking preliminary steps to secure right-of-way for an electric railway to connect Dunkirk and Jamestown via Fredonia, Cassadaga, Laoana, Gerry and Sinclairville. This proposed railway would parallel the Dunkirk, Allegheny Valley & Pittsburgh Railroad.

Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.—It is reported that this company has secured complete right-of-way in Ravenna, where connections will be made with the Ravenna-Akron line of the Northern Ohio Traction & Light Company for Akron and Cleveland. This proposed railway will connect Cleveland, Alliance and Mahoning, and it is expected to start construction work on this electric railway in the near future. [E. R. J., May 22, '09.]

Fostoria & Fremont Railway, Fostoria, Ohio.—This company, it is said, has finished grading and began track laying Nov. 1. This proposed 21-mile electric railway will connect Fostoria and Fremont via Havens, Burgoon, Kansas and Amsden. It parallels the Lake Erie & Western Railroad and will provide a connection between the Western Ohio Railway and the Lake Shore Electric Railway. J. W. S. Riegle, Findley, Ohio, chief engineer. [E. R. J., Aug. 6, '10.]

***Newark, Ohio.**—E. A. Nesbit, Pittsburgh, and A. E. Townsend, Doyleston, are said to be promoting a plan to build an electric railway to connect Newark, Coshocton and Uhrichsville.

Coffeyville-Nowata Railway & Power Company, Nowata, Okla.—This company is reported to have awarded the contract to Robert L. Plunkett, Coffeyville, for building its proposed 23-mile electric railway to connect Coffeyville, Kan., and Nowata, Okla. W. V. Thraves, Nowata, general manager. [E. R. J., Sept. 10, '10.]

Ottawa (Ont.) Electric Railway.—This company is said to be planning to extend its line into the Bayswater district. The company has agreed to build extensions through South Ottawa as soon as a high level bridge is constructed over the Rideau Canal at Bank Street, Ottawa.

Sherbrooke (Que.) Street Railway.—This company's work is progressing rapidly on the extension of its tracks in Sherbrooke. The rails are now being laid on Frontenac Street, while on several other streets excavating is being done.

***Kenneth Square, Pa.**—It is reported that interest has again been revived in the project of building an electric railway to connect Kenneth Square, Londongrove and Coatsville.

***Oxford, Pa.**—M. C. Martin, New York, it is said, is considering plans for building an electric railway to connect Newark, N. J., and Wilmington, Del., and to connect with the railway extending from Philadelphia to Kennet.

Sunbury, Lewisburg & Milton Railroad, Sunbury, Pa.—It is said that this company will soon build four extensions of its tracks amounting in all to about 6 miles near Sunbury. W. H. Lyons, Sunbury, President. [E. R. J., May 1, '09.]

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—This company, it is said, will soon build a 2-mile extension of its tracks from Northumberland to Tuckahoe Springs.

Greenville Railway & Light Company, Greenville, Tex.—This company advises that it has begun construction on its 7-mile electric railway in Greenville. Capital stock, authorized, $300,000. Bonds, authorized, $300,000. It will operate seven cars and its power station and repair shops will be located at Greenville. Headquarters: Conover Building, Dayton, Ohio. Officers: Albert Emanuel, Dayton, Ohio, president; L. A. Clark, Greenville, Tex., vice-president; W. F. Breidenbach, Dayton, Ohio, treasurer, and A. B. Coryell, Greenville, Tex., general manager. [E. R. J., Oct. 15, '10.]

Burlington (Vt.) Traction Company.—It is reported that this company is considering plans to extend its tracks through South Burlington, St. George, Shelbourne and Hinesburgh.

Seattle-Tacoma Short Line Railway, Tacoma, Wash.—This company, it is said, has awarded the contract to Homer Crosby for building an 8-mile extension from Youngstown to Lake Burien.

Spokane (Wash.) Traction Company—It is said that this company is preparing plans to build a 2-mile extension of its Corbin Park line northwest and beyond the city limits.

Middle Island Railroad, Middlebourne, W. Va.—This company is said to have awarded a contract to T. Moore Jackson, Clarksburg, W. Va., for the building of a 11-mile section between Sisterville and Middlebourne. This proposed 60-mile railway will connect Sisterville, Kidwell, Middlebourne, Shirley and Clarksburg. John F. Shore, Middlebourne, secretary. [E. R. J., July 9, '10.]

SHOPS AND BUILDINGS

Beech Grove Traction Company, Indianapolis, Ind.—This company is said to have begun work on the erection of its car house on First Avenue, between Alton Avenue and Bellefontaine Street, Beech Grove. The structure will be 30 ft. x 92 ft., of brick construction and one story high. The cost is estimated to be about $5,000.

Hudson & Manhattan Railroad, New York, N. Y.—This company has filed plans and will soon build a new Grove-Henderson Street station at Grove Street, Jersey City. The structure will be 85 ft. x 35 ft. and 12 ft. high, and of steel and concrete construction. The cost is estimated to be about $6,000.

Cincinnati (Ohio) Traction Company—It is stated that this company has begun the construction of a new station at Rural Avenue and Wayne Avenue on the Millcreek Valley line in Hartwell.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—It is said that this company has completed plans and will soon begin the construction of its new car house on Federal Street, in Youngstown.

Du Bois Electric & Traction Company, Du Bois, Pa.—This company advises that it has placed the contracts for building its car house and repair shop in Du Bois. This structure will also be used by the United Traction Street Railway.

Reading (Pa.) Transit Company.—This company has awarded a contract to H. F. Cilley, Lebanon, for the construction of a new passenger station at Palmyra.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—It is reported that this company will soon let contracts for the construction of an addition to its car house and repair shops in Fairmont. The structure is to be a modern building in every particular. James O. Watson, Fairmont, general manager.

Grafton (W. Va.) Traction Company.—This company reports that it has recently removed its car house from its former location on Main Street to the west end of Grafton.

POWER HOUSES AND SUBSTATIONS

Southern Pacific Railroad, Los Angeles, Cal.—This company has begun work on the construction of a new subsidiary power plant in its West Oakland yards. The structure is 90 ft. x 60 ft. It will be used as a reducing station for the high-power tension wires from the Fruitvale power house. The wires will extend from the Fruitvale power house to the West Oakland structure, where the voltage will be reduced to 1200. Estimated cost of building and equipment will be about $100,000.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.—This company advises that it is building a new substation at Charleston and a new 3-phase 60-cycle power line from its Michigan City power plant to Hammond, Ind. It has purchased from the General Electric Company two 1000-kw motor generator sets and frequency changers with necessary transformers. C. N. Wilcoxon, general manager.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H.—This company reports that it expects to soon purchase one 1000-gal. per minute electrically driven centrifugal type fire pump.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—This company advises that during the next four months it expects to purchase a 360 or 400-hp second-hand Heine boiler, 160 to 175 lbs. pressure. It will also purchase one General Electric 73 motor. J. M. Hamgan, general manager.

Toledo Railway & Light Company, Toledo, Ohio.—This company, it is said, has awarded the contract to A. Bentley & Sons for building a new substation on 408 Front Street, Toledo. The structure will be of brick and concrete construction. The estimated cost of building and equipment is about $15,000.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company advises that it expects to soon purchase 300 kw rotary for 600-volt dc. street railway work with transformers. George B. Wheeler, Eau Claire, general manager.

Manufactures & Supplies

ROLLING STOCK

Lincoln (Neb.) Traction Company is in the market for a snow plow.

Norfolk & Portsmouth Traction Company, Norfolk, Va., is reported to be considering the purchase of 12 cars.

Exeter, Hampton & Amesbury Street Railway, Hampton, N. H., expects to purchase four new noses for its single-truck snow plows.

Macon Railway & Light Company, Macon, Ga., reported in the Electric Railway Journal of Oct. 22, 1910, as considering the purchase of several new cars, has ordered eight cars of the prepayment type from The J. G. Brill Company.

Oklahoma (Okla.) Railway is having four closed cars built by the Danville Car Company. They will be 20 ft. long over bodies and 30 ft. over the vestibules. The specifications include Van Dorn couplers, Hunter destination signs, Consolidated heaters and Brill 21E trucks.

Oakland (Cal.) Traction Company has ordered 60 double-truck car bodies equipped with prepayment platforms from the St. Louis Car Company. They will also be equipped with Brill 39E trucks ordered through Pierson, Roeding & Company, coast representatives of The J. G. Brill Company.

Hudson & Manhattan Railroad, New York, N. Y., noted in the Electric Railway Journal of Oct. 8, 1910, as being in the market for passenger cars, has ordered 30 steel cars from the Pressed Steel Car Company. They will be operated between Newark and New York and will be of the same type and arrangement as those now being used. The Pennsylvania Railroad has also ordered 40 steel passenger cars from the American Car & Foundry Company for the same service.

Elmira Water, Light & Railroad Company, Elmira, N. Y., noted in the Electric Railway Journal of May 21, 1910, as having ordered six closed pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity	28	Destination signs	Hunter
Length of body	20 ft.	Fenders	Providence
Over vestibule	31 ft. 8 in.	Gongs	Brill dedenda
Width over sills	6 ft. 9 in.	Hand brakes	Sterling
Over posts at belt	8 ft.	Heaters	Consolidated
Underframe	wood	Headlights	Neal
Bumpers	Brill	Motors	G.E.-78
Couplers	Brill	Step treads	Mason
Curtain fixtures	Forsyth	Trucks	Brill 21E

TRADE NOTES

T. H. Symington Company, Baltimore, Md., has moved its Chicago offices from the Railway Exchange to 623-625 Peoples' Gas Building.

Federal Storage Battery Company, New York, N. Y., has placed in operation one of its storage battery cars on the Washington, Spa Springs & Gretta Railroad, Washington, D. C.

R. D. Nuttall Company, Pittsburgh, Pa., has recently made a considerable increase in its factory facilities. A new wing has been added to its building at the corner of Garrison and Fayette ways, Pittsburgh, Pa.

Pennsylvania Steel Company, Steelton, Pa., has appointed G. S. Vickory, chief draftsman of the frog and switch department, to the position of acting superintendent of the department, succeeding C. W. Reinoehl, deceased.

Wonham, Sanger & Bates, New York, N. Y., have received an order from the Mobile Light & Railroad Company, Mobile, Ala., for 85 sets of H-B universal life guards to equip all of the cars of that company.

Birmingham Rail & Locomotive Works, Birmingham, Ala., will soon begin operating its new $100,000 plant at North Birmingham. The plant has been in course of construction for several months. It is of steel and concrete construction.

Root Spring Scraper Company, Kalamazoo, Mich., is delivering this week to the Michigan United Railways 100 Root spring snow scrapers, which completes the equipment with this type of scraper of all the cars operating over that system.

American Steel & Wire Company, Chicago, Ill., has under construction at Corey, Ala., a new wire and rod mill, 480 ft. x 1600 ft. The plant, it is estimated, will have a daily capacity of 450 tons of finished product, and will cost about $4,000,000.

Ackley Brake Company, New York, N. Y., reports the receipt of an order from the Rio de Janeiro Tramway, Light & Power Company for 100 Ackley brakes. The company has shipped Ackley brakes during the past few days to Buenos Ayres, Paris, London, Zurich and Brussels.

Vacuum Impregnating Works, Chicago, Ill., have secured a contract from the Chicago City Railway for impregnating 10,000 coils. It is expected that this contract will cover a period of three years. The firm has also secured a contract from the Milwaukee Electric Railway & Light Company for impregnating 1000 coils.

Western Electric Company, New York, N. Y., has decided to spend $1,000,000 in extending its Hawthorne plant. These improvements will consist of telephone and cable shops and will give 300,000 ft. of additional floor space, increasing the Hawthorne capacity 20 per cent. The company employs 24,000 men at present as compared with a maximum of 29,000 in 1906.

Allis-Chalmers Company, Milwaukee, Wis., in its annual report for the year ended June 30, shows profits from operations of $2,576,818, which is a gain of $767,809 over the previous year and exceeds by about $3,000 the returns of 1907-8. A large increase in maintenance and depreciation charges, however, which brought that item up from $1,673,578 to $2,081,086, cut net profits down to $495,732. This is equivalent to 3.09 per cent on the $16,500,000 preferred stock, as compared with last year's showing of eight-tenths of 1 per cent earned in the previous year. The addition of this amount to the previous surplus brought the profit and loss surplus at the close of the year up to $1,017,161.

Ford, Bacon & Davis, New York, N. Y., have just closed a contract with the Westinghouse Machine Company for two 1000-kw turbines and Le Blanc condensers, ten 300-kw 6600-250-volt, 60-cycle motor generators, switchboard, wiring and all electrical auxiliaries for the Clinchfield Coal Company, of Dante, Va. The firm is also asking in behalf of this company for bids for boilers, stacks and feed pumps. The electrical system will consist of a power station and four substations, with power distribution at 6600 volts within a radius of about six miles from the power station. The work is in connection with large coal developments in Virginia.

ADVERTISING LITERATURE

Ackley Brake Company, New York, N. Y., has issued a folder describing and illustrating the Ackley adjustable brake.

Indian Refining Company, Cincinnati, Ohio, is mailing a bulletin featuring the merits of Indian timber asphalt oil for wood preservation.

Dossert & Company, New York, N. Y., have issued an 8-page folder which illustrates and describes a number of new Dossert specialties, particularly a new type of anchor connector for use with strain insulators and a new insulated cover for cable taps.

Bristol Company, Waterbury, Conn., has issued Bulletin No. 126, in which the company's Class II recording thermometers are described and illustrated. Perhaps the most extensive use of these thermometers is for recording the temperature of feed water for steam boilers. A list of several hundred users of the thermometers includes many electric railways, power companies and central stations.

Stone & Webster Engineering Corporation, Boston, Mass., in a book just issued, entitled "Steam Power Stations," shows a number of exterior and interior views, accompanied by plans and elevations of some of the steam power stations which it has designed and built. Among the new plants shown are those of the Seattle (Wash.) Electric Company, Boston (Mass.) Elevated Railway, Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., and Tampa (Fla.) Electric Company.

John C. Dolph Company, Long Island City, N. Y., has issued a catalog describing Dolph insulating varnishes and compounds with directions for using them. Among the many products listed are the following: Coil black insulating varnish, both for air drying and baking; black insulating paint, clear coil varnish for air drying, electric lacquer, elastic vaculite oilproof compound and armature coil compound. A folder containing a price list and index of the company's products, also a special formula inquiry blank, accompanies the catalog.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued its circular 1098 on the subject of switchboard indicating meters. The publication outlines the cardinal points to be kept in mind in the selection of meters. It describes direct-current and alternating-current indicating meters, including frequency meters and power factor meters; synchroscopes, and instrument transformers. The company has issued a revision of its circular 1118 on the subject of its type CCL polyphase induction motors. The circular describes the electrical and mechanical features of these motors and shows some interesting views of their application. It also includes some short descriptions of the various starting devices used with squirrel cage induction motors. Another circular, No. 1122, describes a line of standard grid resistors which are constructed to operate with entire satisfaction under the most severe conditions. In addition the company has issued a circular, No. 1161, on the subject of its type G, belt-driven alternating-current generators. These generators are especially designed to meet the needs of industrial plants and smaller central stations.

NEW PUBLICATIONS

Experimental Electricity. By S. W. Ashe. D. Van Nostrand Company, New York, 1910. 349 pages with index. Price, $2 net.

The author has had wide experience as an instructor among lighting and railway employees whose knowledge of electricity has been confined to the narrow limits of their daily work, such as meter reading and testing, switchboard manipulation, machine attendance and the like. To aid this class of practical students, Mr. Ashe has produced a book which explains electrical facts in the simplest manner. Nevertheless, this volume is also valuable for high school and college laboratories owing to the attention given to original experimental work.

Standard Handbook for Electrical Engineers. Third edition, revised. McGraw-Hill Publishing Company, New York, 1910. 20 sections and index, totaling 1497 pages. Price, $4 net.

The preface to the third edition of the handbook states that it has been revised and brought up to date in practically every department. This process was facilitated through the adoption in the original edition of a unit plan which is a great convenience to the reader. The electric traction section, written by the well-known engineer A. H. Armstrong, has been revised and enlarged, with special attention to the subject of electric locomotives. A valuable addition to the section on "Standards" is offered by the standard specifications for rubber insulation, copper conductors and transformers. The third edition is 200 pages larger than before, with about 40 per cent new material.

Controller Prendergast, of New York, has approved the basis of settlement previously agreed on by the corporation counsel of New York and the Metropolitan Street Railway of special franchise taxes for 1900 to 1909, inclusive, of $5,568,508. From this amount the deductions under Section 48 of the tax law, amounting to $2,653,666, were subtracted, leaving the balance of taxes due the city $2,914,836, to which is added the interest, $835,163, as computed to March 31, 1910, according to the terms of the compromise, $3,750,000. On the principal, interest will be payable from March 31, 1910, to the date of actual payment.

The stockholders of the New York, New Haven & Hartford Railroad, at their annual meeting on Oct. 26, 1910, voted to increase the directorate by two members, making the total 27, and elected a board, of whom the new members are Thomas De Witt Cuyler, representing the Pennsylvania Railroad, who takes Mr. Whittemore's place, and August S. May and Arthur E. Clark, the treasurer and secretary of the company, respectively. The directors organized by re-electing the former officers.

TABLE OF MONTHLY EARNINGS.

Notice—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including taxes. †Deficit. ‡After allowing for other income received. §Includes dividend on preferred stock.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Sept. '10	$224,902	$117,857	$107,044	$43,391	$63,653
	1 " " '09	202,156	102,990	99,166	42,928	56,239
	9 " " '10	1,837,406	1,009,858	827,548	390,161	437,387
	9 " " '09	1,634,172	887,730	746,442	393,342	353,100
ALLENTOWN, PA. Lehigh Valley Tr. Company.	1m., Sept. '10	112,540	49,401	63,139	25,433	37,706
	1 " " '09	100,340	43,521	56,819	26,650	30,169
	10 " " '10	872,076	476,546	395,530	356,860	§140,965
	10 " " '09	800,274	468,933	331,341	345,633	§73,847
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., Aug. '10	58,065	24,185	33,880	13,525	20,355
	1 " " '09	57,593	22,436	35,157	13,060	22,097
	8 " " '10	112,073	47,230	64,843	27,177	37,666
	8 " " '09	108,548	45,027	63,526	26,284	37,242
BATON ROUGE, LA. Baton Rouge Elec. Co.	1m., Aug. '10	9,155	5,855	3,300	1,945	1,355
	1 " " '09	8,681	5,519	3,162	1,951	1,211
	12 " " '10	108,202	69,974	38,228	22,893	15,335
	12 " " '09	94,020	67,378	26,643	.....	.....
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Aug. '10	32,470	21,065	11,405	8,905	2,501
	1 " " '09	36,841	19,175	17,667	8,064	9,603
	12 " " '10	412,022	242,330	169,692	103,200	66,492
	12 " " '09	390,818	222,204	168,614	101,903	66,711
CHAMPAIGN, ILL. Illinois Tr. System	1m., Aug., '10	523,558	294,749	228,809	.....	.....
	1 " " '09	462,266	254,956	207,310	.....	.....
	8 " " '10	3,874,962	2,292,290	1,582,672	.....	.....
	8 " " '09	3,415,017	1,970,832	1,444,185	.....	.....
CHATTANOOGA, TENN, Chattanooga Ry. & Lt. Co.	1m., Sept. '10	77,022	38,386	38,636	23,692	14,944
	1 " " '09	67,806	37,110	30,696	23,512	7,184
	9 " " '10	650,947	333,519	317,428	210,901	106,527
	9 " " '09	574,785	334,462	240,313	193,063	47,250
CHICAGO, ILL. Aur., Elgin & Chic. R.R.	1m., Aug. '10	178,730	87,477	91,254	33,039	58,215
	1 " " '09	163,698	76,448	87,250	29,351	57,899
	2 " " '10	361,118	175,089	186,029	65,608	120,421
	2 " " '09	331,312	154,343	176,969	58,250	118,719
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., Sept. '10	33,647	*18,167	15,480	8,116	7,364
	1 " " '09	31,361	*17,212	14,149	7,850	6,299
	9 " " '10	269,381	*139,046	130,335	72,607	57,728
	9 " " '09	242,206	*128,585	113,621	67,600	46,021
Lake Shore Electric Ry.	1m., Sept. '10	115,009	*54,417	60,592	34,928	25,664
	1 " " '09	108,207	*49,842	58,365	34,804	23,560
	9 " " '10	913,664	*473,160	440,504	313,008	127,495
	9 " " '09	835,062	*439,691	395,370	309,093	86,277
DALLAS, TEX. Dallas Electric Corporation.	1m., Aug. '10	118,257	82,637	35,620	25,659	9,961
	1 " " '09	112,802	72,271	40,532	28,648	11,883
	12 " " '10	1,414,199	934,210	479,989	319,229	160,760
	12 " " '09	1,265,739	791,838	473,901	341,711	132,189
DETROIT, MICH. Detroit United Ry.	1m., Sept. '10	857,441	540,051	317,390	178,802	138,588
	1 " " '09	763,581	477,851	285,730	158,124	127,606
	9 " " '10	7,141,185	4,485,425	2,655,760	1,511,120	1,144,640
	9 " " '09	6,071,637	3,702,532	2,369,105	1,409,507	959,598
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., Sept. '10	93,570	50,224	43,346	‡20,936	22,410
	1 " " '09	87,217	48,267	38,950	‡20,757	18,193
	9 " " '10	810,727	460,815	349,912	‡178,583	171,329
	9 " " '09	723,602	429,984	293,618	‡168,090	125,528
EAST ST. LOUIS ILL. East St. Louis & Suburban Ry.	1m., Sept. '10	211,249	101,989	109,260	48,394	60,866
	1 " " '09	176,402	87,324	89,078	49,345	39,733
	9 " " '10	1,756,761	926,751	830,010	450,695	379,315
	9 " " '09	1,481,078	818,006	663,072	445,112	217,960
EL PASO, TEX. El. Paso Elec. Co.	1m., Aug. '10	46,897	30,730	16,167	8,215	7,952
	1 " " '09	46,447	28,546	17,901	8,259	9,642
	12 " " '10	630,070	363,810	266,260	101,256	165,004
	12 " " '09	567,906	369,541	198,364	93,326	105,038
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., Sept. '10	62,032	18,716	43,316	13,112	30,204
	1 " " '09	47,695	15,094	32,601	12,655	19,946
	9 " " '10	445,992	156,447	289,545	113,627	175,918
	9 " " '09	346,441	119,312	227,129	111,148	115,981
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	m., Aug. '10	140,625	73,926	66,699	45,845	20,854
	1 " " '09	133,412	74,255	59,157	45,112	14,045
	8 " " '10	998,040	563,417	434,623	360,441	74,182
	8 " " '09	905,614	537,475	368,139	338,773	29,366
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Aug. '10	119,813	63,952	55,860	20,301	35,560
	1 " " '09	109,422	57,893	51,529	17,190	34,339
	12 " " '10	1,377,638	743,535	634,102	221,411	412,692
	12 " " '09	1,203,508	667,601	535,907	197,997	337,910
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Aug. '10	124,764	65,932	58,832	25,965	32,867
	1 " " '09	111,295	62,976	48,319	21,679	26,640
	12 " " '10	1,268,767	769,333	499,434	278,143	221,291
	12 " " '09	1,181,351	682,277	499,074	254,495	244,579
HOUGHTON, MICH. Houghton County Trac. Co.	1m., Aug. '10	29,709	13,537	16,171	6,637	9,534
	1 " " '09	32,925	15,588	17,337	6,216	11,122
	12 " " '10	317,014	167,787	149,228	76,978	72,249
	12 " " '09	305,706	165,775	139,931	69,556	70,375
HARRISBURG, PA. Central Penn. Trac. CO.	1m., Sept. '10	68,199	46,848	21,351	.....	.....
	1 " " '09	62,979	44,045	18,934	.....	.....
	9 " " '10	623,109	442,942	180,167	.....	.....
	9 " " '09	564,747	418,640	146,107	.....	.....
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Sept. '10	628,685	365,790	262,895	189,119	73,776
	1 " " '09	584,287	323,079	261,209	172,512	88,697
	4 " " '10	2,491,370	1,488,174	1,003,196	749,726	253,470
	4 " " '09	2,302,242	1,306,500	995,742	690,337	305,405
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Sept. '10	407,650	272,701	134,949	46,785	88,164
	1 " " '09	375,426	241,213	134,213	48,746	85,467
	9 " " '10	3,504,128	2,458,017	1,046,110	421,647	624,463
	9 " " '09	3,154,103	2,067,043	1,087,060	422,970	664,089
Milwaukee Lt., Ht. & Trac. Co.	1m., Sept. '10	154,076	61,602	92,474	54,747	37,727
	1 " " '09	144,942	54,668	90,274	52,183	38,091
	9 " " '10	1,227,795	489,937	737,859	498,176	239,682
	9 " " '09	1,112,207	411,967	700,241	460,809	239,432
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Aug. '10	660,656	298,323	362,333	140,113	222,221
	1 " " '09	641,062	262,479	378,583	140,251	238,332
	8 " " '10	4,925,516	2,365,045	2,560,470	1,121,367	1,439,104
	8 " " '09	4,531,223	2,162,532	2,368,690	1,108,259	1,260,431
NASHVILLE, TENN Nashville Ry. & Lt. Co.	1m., Sept. '10	163,307	89,522	73,785	33,390	40,395
	1 " " '09	155,899	84,444	71,455	33,023	38,432
	9 " " '10	1,341,847	777,993	563,854	302,267	261,597
	9 " " '09	1,266,683	747,129	519,554	295,283	224,271
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Aug. '10	188,834	100,500	88,334	64,866	23,469
	1 " " '09	174,211	96,336	77,874	63,118	14,756
	2 " " '10	385,733	207,553	178,179	131,442	46,738
	2 " " '09	354,438	197,499	156,938	126,469	30,469
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Aug. '10	20,780	11,806	8,973	7,071	1,902
	1 " " '09	19,930	11,281	8,649	6,618	2,031
	12 " " '10	241,341	143,931	97,410	82,864	14,546
	12 " " '09	222,988	130,335	92,653	81,929	10,725
PENSACOLA, FLA. Pensacola Elec. Co.	1m., Aug. '10	24,178	14,483	9,695	5,243	4,452
	1 " " '09	22,205	12,515	9,691	4,371	5,319
	12 " " '10	260,462	153,157	107,306	57,949	49,357
	12 " " '09	235,626	136,388	99,237	51,881	47,356
PHILADELPHIA, PA. American Railways Co.	1m., Sept. '10	350,519	.....	.....	.....	.....
	1 " " '09	323,566	.....	.....	.....	.....
	3 " " '10	1,096,843	.....	.....	.....	.....
	3 " " '09	1,020,013	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry.	1m., Aug. '10	16,057	7,458	8,598	1,602	6,997
	1 " " '09	17,912	11,195	6,717	1,661	5,056
	12 " " '10	121,870	87,016	34,853	21,038	13,815
	12 " " '09	129,734	88,254	41,480	22,963	18,517
PORTLAND, ORE. Portland Ry. Lt. & Power Co.	1m., Sept. '10	490,209	222,582	267,627	150,627	117,000
	1 " " '09	420,777	193,437	227,340	128,924	98,416
	9 " " '10	4,106,489	1,767,269	2,339,220	1,246,965	1,092,255
	9 " " '09	3,547,647	1,651,228	1,896,419	1,111,335	785,084
ST. JOSEPH, MO. St. Joseph Ry. Lt., Ht. & Power Co.	1m., Sept. '10	92,034	46,332	45,702	23,158	22,544
	1 " " '09	88,285	40,809	47,476	22,058	25,418
	9 " " '10	766,750	414,450	352,300	203,759	148,541
	9 " " '09	722,808	374,530	348,278	192,080	156,198
SAVANNAH, GA. Savannah Elec. Co	1m., Aug. '10	56,871	38,681	18,190	18,181	9
	1 " " '09	53,931	36,385	17,547	17,435	112
	12 " " '10	618,104	403,951	214,153	213,940	214
	12 " " '09	610,720	387,043	223,677	209,247	14,430
SEATTLE, WASH. Seattle Elec. Co.	1m., Aug. '10	479,573	258,749	220,824	111,081	109,743
	1 " " '09	610,816	312,119	298,697	108,588	190,109
	12 " " '10	5,720,820	3,366,691	2,354,129	1,290,010	1,064,118
	12 " " '09	5,409,933	3,142,929	2,267,003	1,207,198	1,059,805
SYDNEY, N. S. Cape Breton Elec. Co.	1m., Aug. '10	30,777	15,703	15,074	6,174	8,900
	1 " " '09	26,669	13,805	12,863	6,208	6,656
	12 " " '10	314,788	171,075	143,712	74,015	69,697
	12 " " '09	279,930	168,478	111,453	73,867	37,585
TACOMA, WASH. Puget Sound Elec. Ry.	1m., Aug. '10	173,989	100,169	73,820	52,145	21,675
	1 " " '09	194,383	113,867	80,516	48,800	31,716
	12 " " '10	1,922,895	1,267,097	655,798	602,661	53,137
	12 " " '09	1,785,615	1,190,781	594,834	548,091	46,743
TAMPA, FLA. Tampa Elec. Co.	1m., Aug. '10	50,346	25,070	25,276	5,958	19,318
	1 " " '09	48,468	28,804	19,665	4,594	15,070
	12 " " '10	621,395	345,983	275,412	58,674	216,738
	12 " " '09	579,095	351,939	227,156	55,862	171,294
TOLEDO, OHIO Toledo Rys. & Lt. Co.	1m., Sept. '10	239,860	153,407	86,453	78,192	8,261
	1 " " '09	218,097	121,779	96,318	75,484	20,834
	9 " " '10	2,180,690	1,353,566	827,484	690,710	136,774
	9 " " '09	1,983,635	1,134,049	849,585	652,202	197,383
TORONTO, ONT. Toronto Railway	1m., Sept. '10	428,580	199,503	229,077	.....	.....
	1 " " '09	379,981	178,077	201,904	.....	.....
	9 " " '10	3,195,938	1,634,760	1,561,178	.....	.....
	9 " " '09	2,857,291	1,449,635	1,407,656	.....	.....

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, NOVEMBER 12, 1910 No. 20

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 12, 1910.

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The Election Is Over

With the election excitement out of the way the business of the country will breathe more easily and that is an important consideration to the street railway industry. The issues before the public were complicated in many States by local questions and by the personality of the candidates or of those whom they were supposed to represent. Nevertheless the opposition party laid great stress upon the prevalent high cost of living, and the general rejection of the candidates of the dominant party was undoubtedly due in large part to the feeling—whether correct or not it is not necessary here to consider—that a change in national policies would have a material effect in lowering the cost of materials. If this result should be effected, no interests will benefit more than the railways which operate with fares whose rigidity it is frequently impracticable or impossible to disturb. It is too early to estimate the effect of the election upon public utility legislation in the various States, but there are signs in some States of a disposition to approach the question in a more reasonable way, and we hope that any resulting legislation will be sane and workable.

Car Delay Records

Records of time lost by trains arriving at important terminals have been kept for many years by progressive steam railroad companies. In electric railway practice such records are seldom as valuable when based upon ordinary running conditions into which no breakdowns of equipment enter, for the reason that so much margin has to be allowed in making up schedules for unforeseen delays due to street congestion. No urban electric railway system can operate its rolling stock with the precision which a private right-of-way affords, although in analyzing the efficiency of a given service it is most instructive to investigate the number of setback cars which have to be put in service at important terminal points in order to maintain an even headway at the starting points of the cars. A careful study of the work of setback crews immediately shows that it is very costly in relation to the car mileage covered by them, and so far as this class of service can be avoided much money will be saved. Any delay acts unfavorably all along the line, but the climax of unfavorable conditions is found in the work of the setback crew. Where a company keeps a careful record of the defects of cars causing delays or pull-ins, it is well worth while to determine regularly the hours and minutes lost on the street on account of equipment troubles. Such figures, tabulated by transportation divisions, give a check upon the efficiency of both emergency and operating forces; they enable the management to locate weak spots on the system, and tend to stimulate the car service force to clear troubles in the quickest possible time. On lines where car delays and their causes have been tabulated a material saving has been effected as a result.

For the Information of the Public

In the introductory note to the second annual report of the Board of Supervising Engineers, Chicago Traction, a brief statement is made of the reason for the publication of the valuable studies and records pertaining to the rehabilitation of the surface street railways in the second largest city of the country. It is that the public may be authoritatively apprised of the progress of the work. This principle may well be applied in other railway construction work and even in the routine problems of daily operation. "In our supervisory work we have had to deal with economic problems involving the welfare of the community; with the distribution of labor from its habitation to its place of occupation; with intersectional problems involving the through routes; with commercial problems involving the equitable and prompt distribution of shoppers, and in all respects we have striven to insure the building of a system of street railways that will enable the people to use the streets to the greatest possible advantage." For their recognition of a public interest in the subject, no less than for the technical value of the full accounts of their labors, the members of the board merit the commendation both of the community and of the electric railway industry.

Attempts to Limit the Use of School Tickets

Many electric railways, through either choice or necessity, sell school tickets at such reduced rates that any unauthorized extension of their original purpose becomes serious. Sometimes these tickets are sold in monthly books, valid only when presented by the person to whom they are issued, and sometimes they are sold in strips good for bearer until used. They are always, however, restricted to use on school days and by students only. With the former class of ticket abuse comes principally from the use of tickets at unauthorized times or by unauthorized persons. This evil can be corrected only by watchfulness on the part of the conductor. An attempt was made recently to correct the wrongful use of the second kind of tickets by a railway manager who found that in fair weather the riding from the school in the afternoon was far less than the riding to the school in the morning. The reasons for this were obvious, but as the tickets were sold at half rates the company was practically giving single rides during the morning peak for 2½ cents instead of round-trip rides, with the return trip in the early afternoon, for 5 cents. To correct this condition the plan was adopted of selling for 5 cents two-part round-trip school tickets instead of two single tickets. One of the tickets was marked "Home to School" and every other one was marked "School to Home." The tickets were sold in book form and were so inserted in the covers that when a going ticket was detached the one next available was the return ticket. Consequently, those who walked home lost the use of the return half of the ticket and practically paid full fare for the morning ride. The change aroused such opposition that the management finally concluded to return to the usual method of selling books of school tickets good in either direction. Although in this instance the reform failed, the lesson is valuable because it teaches the importance of stopping this loss in the future. A provision for the sale of school tickets at reduced rates is often incorporated in electric railway franchises, but the company should always protect itself carefully by seeing that the tickets are properly used.

RHODE ISLAND AND CONNECTICUT COMPANIES

A comparison of the operations of the Connecticut Company and the Rhode Island Company for the fiscal year ended June 30, 1910, similar to that for the previous year which was published in the issue of the Electric Railway Journal for Nov. 6, 1909, page 962, shows results that are of interest because the properties are under common ownership. The figures which we give are taken, except so far as the mileage is concerned, from the last annual report of the New York, New Haven & Hartford Railroad, the controlling corporation, and were published in the Electric Railway Journal for Oct. 8, 1910.

In the present comparison it is better to depart a little from the method necessarily followed by the company because of corporate changes and to combine for our purposes the results stated for the Connecticut Company with those of the Housatonic Power Company. The latter company assumed control as of March 1, 1910, of the gas, light and water departments formerly operated by the Connecticut Company, and we assume that its operations for the last four months of the fiscal year are confined largely to these operations.

With the combination of results that we have outlined the total revenues (excepting only "other income") of the Connecticut and Housatonic companies for the last year were $8,347,302. This is an increase of $358,470, or 4.5 per cent, over the previous year. All the departments of the business did not contribute uniformly toward this increase. Passenger earnings gained $359,107 and express earnings $48,298. Mail earnings about held their own, chartered car earnings fell off a little, earnings from the sale of power showed a gain of $7,148, and decreases were shown of $12,968 on park operations and $6.820 on advertising. Another decrease was in miscellaneous receipts, including gas, light and water. The revenues from these sources from the beginning of the fiscal year to Feb. 28, 1910, were $740,436. By addition of the operating revenue, other income and $39,977 revenue from outside operation of the Housatonic Power Company for the remainder of the fiscal year we have a total of $1,153,108, representing a permissible calculation as to the approximate earnings from these sources for the full year. This sum is $26,674 less than the total revenues from miscellaneous sources in the 1909 fiscal year.

The Housatonic Power Company has undoubtedly been organized to prosecute operations on a broader scale than was followed by the Connecticut Company in its incidental conduct of these utilities, and its revenues may be expected to increase materially.

Operating expenses of the Connecticut Company, plus those of the Housatonic company, were $4,905,366 last year, an increase of $599,762 over the preceding year. It may be observed that over one-half of this increase went into maintenance, indicating the pursuance of an improved standard. Expenditures for maintenance of way and structures increased $261,941 and for maintenance of equipment $68,169. Operation of power plants and of cars cost, respectively, $31,580 and $111,339 more than in the previous year. General expenses were increased $20,302 and miscellaneous expenses were $106,431 larger.

The net combined income of the two properties applicable to taxes, rentals, etc., was $3,450,619, and this was $232,609 less than the corresponding result for the preceding fiscal year. Taxes, rentals and interest amounted to $474,882, an increase of $435,969, and this heavy addition to these charges lessened still

further the net income remaining for the year. This income, for the combined properties, was $2,975,738, or a reduction of $668,577 from the surplus of the preceding year.

Results that were similar as to gross earnings, but different in net returns, are seen by comparison of the operations of the Rhode Island Company. In the 1910 fiscal year this company earned $4,440,809 gross, or 6.7 per cent more than in the previous year. Its gain was largely in passenger earnings, which increased $259,539. But there were also gains of $14,240 in freight and express revenue, and increases in earnings from mail, chartered cars, sale of power and miscellaneous sources, with a small decrease in the revenue from advertising. Operating expenses were $2,537,686 last year, an increase of $223,732, and it is a feature of this statement also that the large part of the additional expenditure was put upon maintenance of way and structures. To this account $118,278 more was charged than in 1909. The maintenance of equipment expenditure was $947 smaller, operation of power plant cost $7,169 more, operation of cars $36,387 more, and general expenses $62,845 more. The net earnings of $1,903,123 in 1910, or $56,292 above the record of 1909, were augmented further by an increase of $29,941 in other income, making total income of $1,965,237, or $86,233 greater than in the preceding year. Taxes, rentals, etc., were $1,391,671, or $18,126 less than in 1909, so that the resulting net income was $573,565, or $104,358 greater than in 1909.

There does not appear to have been an increase in the mileage of either of the companies during the fiscal year. With 755 miles of track the gross earnings of the Connecticut Company, combined with the Housatonic results, averaged $11,056 per mile, or $475 more than in the preceding year. The Rhode Island Company averaged for its 319 miles of track $13,921 per mile, or $878 per mile more than in the previous year.

The operating ratio was 57.1 per cent for Rhode Island, and for Connecticut, with results reconstructed as explained, it was 58.8 per cent. In analysis of those operating expenses which appear to be applicable in almost their entirety to the transportation business we separate the corresponding earnings in the Connecticut Company results. That is to say, we apply the expenditures for maintenance, operation of cars and power plant and general expenses directly to all the earnings save those from miscellaneous sources, now chiefly part of the Housatonic property. From this standpoint it is found that the proportion of earnings expended for operation was divided as follows: Maintenance of way, 11.6 per cent; maintenance of equipment, 7.2 per cent; operation of power plants, 10.9 per cent; operation of cars, 24.1 per cent; general expenses, 8.1 per cent. The total, owing to the method of compilation, gives a ratio of 61.9 per cent. Ignoring in a similar way miscellaneous operations of the Rhode Island lines, the following proportions of revenues from operation were expended: Maintenance of way, 7.2 per cent; maintenance of equipment, 5.9 per cent; operation of power plants, 8.5 per cent; operation of cars, 23.7 per cent; general expenses, 12.2 per cent; total, 57.5 per cent.

It appears from these figures that the Connecticut Company's expenditures for maintenance were an appreciably larger proportion of what we assume to be the real street railway operating revenues than the corresponding outlay in Rhode Island, but that its costs of operation, both of power plant and cars, were greater. It is of additional interest to state that per mile of track the Connecticut Company expended $1,105 for maintenance of way and the Rhode Island Company $992.

MEETING STEAM RAILROAD COMPETITION AT BOSTON

The construction in large cities of fast transit routes to provide for the rapid entrance and exit of suburban traffic is growing to be an important factor in successful competition with steam railroads serving outlying territory. An excellent example of such a route is the new Forest Hills elevated line in Boston, whose opening followed the inauguration some years earlier of a distinctly competitive elevated service from Dudley Street and Sullivan Square into the business district. By these lines a considerable patronage which formerly utilized the steam railroads serving the nearer suburban areas of Roxbury, Dorchester, Malden and Everett has been diverted to the Boston elevated system.

Similar results are anticipated in the Cambridge subway, which the Boston Elevated Railway Company is now building between the Charles River and Harvard Square, and in the subway authorized by recent law under the Charles River embankment in the Back Bay district. In the Cambridge subway but three stops will be made en route, including the terminal, the line being distinctly designed to accommodate through traffic from outer suburbs into Boston with the establishment of extensive transfer facilities at each end of the route. The operation of cars in the form of train units in this subway will provide for a maximum carrying capacity and will cut 15 minutes from the running time between Harvard Square and Park Street. Without question this shortening of the schedule will deflect to the Boston elevated a large traffic at present depending upon a steam service reaching into the outer suburbs of Arlington, Belmont, Watertown, Waverley and Waltham. If the so-called Riverbank subway is built according to present plans it will provide an entrance and exit for large semi-convertible cars making through runs to suburbs lying from 5 miles to 7 miles west of the business district and will permit, according to estimates, a reduction of 10 minutes in the running time between points in Newton, Brighton, Allston and Brookline and the center of Boston. Even if the route of this subway as planned should be altered as a result of a discussion now pending, the line would still be designed for rapid transit through service. The number and location of stations remain to be determined, but presumably there will be but a few stopping points between Park Street and the Charlesgate district, where the line will be brought to the surface.

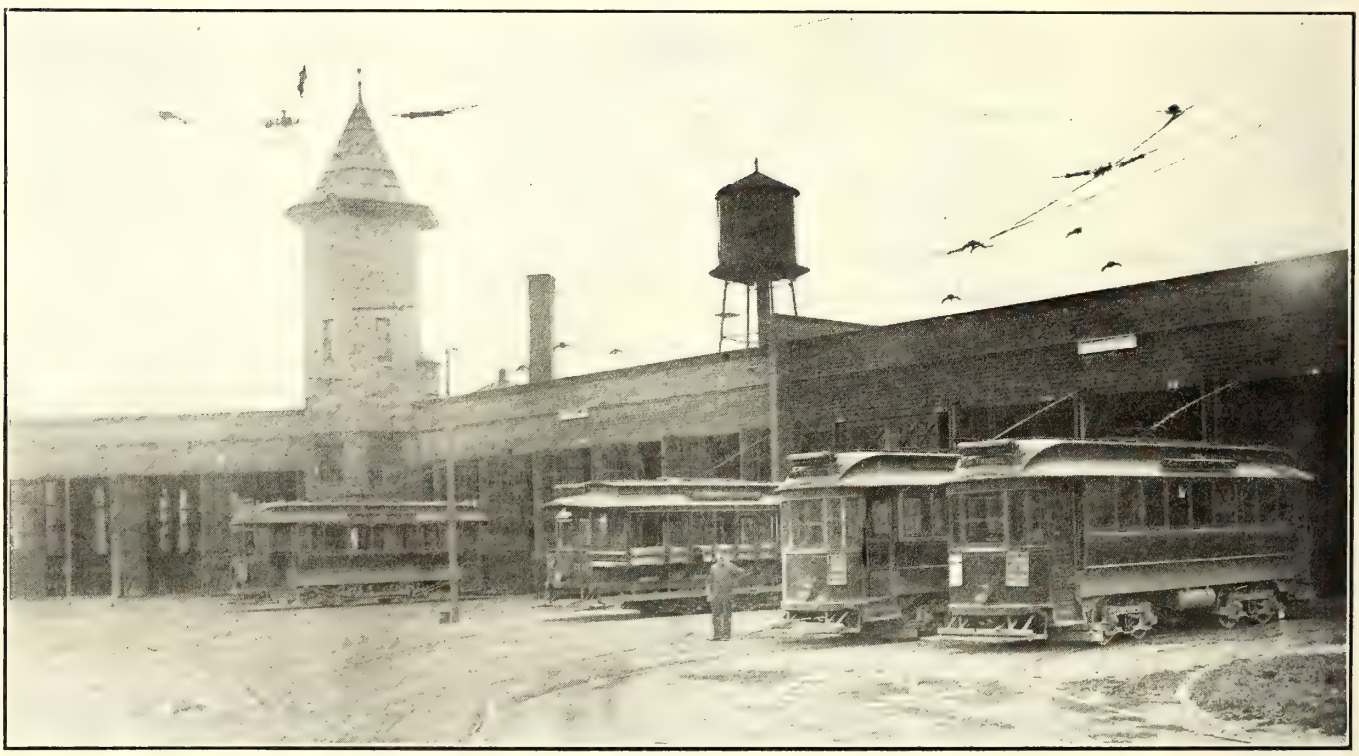
Reductions in running time of the amounts quoted between the business center and suburbs 5 miles to 10 miles distant are certain to shorten the total time of transit so much that unless close train connections of the express type are made in the immediate vicinity of a steam railroad station the suburban patron will save both time and money by utilizing the highly frequent trolley service available. The establishment of a rapid transit route through the last mile or two of the urban territory does away with the discomforts and delays due to slow movement on the streets, and thus persons who cannot afford to take any but the quickest cars and trains are led to patronize the traction system with its ramifying distribution facilities. In smaller cities, where a subway or elevated is not feasible on account of the cost, the results sought can be approximated by using a side street parallel and close to the main street of the city and thereby avoiding the difficulties of operation that are caused by the congestion of the main thoroughfare.

CAR MAINTENANCE PRACTICE AT WALTHAM, MASS.

Electric railway service in the western suburban territory immediately outside the transportation field of the urban lines centering in the heart of the city of Boston is performed by the Middlesex & Boston Street Railway Company and its affiliated lines. Beginning at Newton and Watertown the Middlesex & Boston lines provide a service extending westward through Wellesley, Waltham, Natick and the South Framingham district to Westboro, with various local branch-line facilities, while the Lexington & Boston affiliated system furnishes transportation from the Arlington district to Lexington, Bedford and Concord. The system covers a territory, roughly, 25 miles long by perhaps 15 miles in average width and, outside the larger centers of population which it serves, it meets the requirements of an efficient cross-country service carried on mainly upon the highways and characterized by a varied patronage and a normal car interval of from 10 to 30 minutes. On account of the extent of the system it has been found expedient to subdivide the rolling stock maintenance facilities and to rely upon the repairs which can be effected at several important division centers, rather than to attempt to concentrate all maintenance work in a single large shop. The resulting costs of car maintenance compare favorably with those of other Massachusetts systems serving thinly populated districts outside a few large centers. The average cost of car and car equipment repairs for the year ended Sept. 30, 1909, was approximately 2.4 cents per car mile on the Middlesex & Boston lines.

A representative maintenance installation of the company is located at its car houses in upper Main Street, Waltham. At this point are repaired the cars operated in the Newtons, Waltham and Waverley. Another local repair shop which is under the same supervision is located at Auburndale, in the western part of Newton, at Norumbega Park. Cars operated in Newton, Wellesley, Natick, South Framingham, Needham and Watertown are in general repaired at Auburndale. As the Auburndale and Waltham car houses are only about 4 miles apart, the company has lately taken up the work of centralizing the heavier repairs at Waltham, with the exception of truck maintenance and winding, which are principally handled at Auburndale. At Natick, Homer Street, Newtonville and Lexington the associated companies maintain additional facilities for car repairs and the storage of supplies, the latter being centralized on a large scale at Newtonville. All car repairs for the lines extending westward to the town of Westboro are handled at Natick. The Lexington car house takes care of car maintenance for the Lexington and Concord districts, including the through-car service between Boston and Lowell via Arlington Heights. The repair work at Waltham and Auburndale is under the immediate supervision of Joseph O. Gauthier, that at Natick is under the direction of John Hurlyck, and the Lexington shop work is under the supervision of John Waugh. Each of these executives reports, as a general foreman of car repairs, to the local division superintendent, who in turn is in close touch with the general manager of the different companies, Carl A. Sylvester, whose headquarters offices are at Washington Street, Newtonville.

The Waltham shops are an integral part of a car house plant near the business center of the city and are located centrally with respect to the operation of the various routes dependent upon its facilities. The property consists of a group of frame buildings with twelve car-storage tracks in the operating side and three shop tracks, offices of the superintendent of the division and his assistant, lobby for trainmen, boiler house, paint, oil, inspection, machine and sub-storage quarters. The car house proper is divided into two sections separated by a brick fire wall, the outer section being 200 ft. long, and the next section, with the shop, being 180 ft. in length. The total length of trackage in the car house is 1740 ft. and in the shop 540 ft. The outer walls of the car house and shop are of timber and wooden sheathing construction. The operating offices are located in a tower between the car house and the repair shops and, at the rear, a lobby for trainmen is in regular service, with locker and exceptionally good lavatory facilities. Access to the various storage and shop tracks from the main line outside the yards is had by two entrance and exit tracks of short length from which switches are run to the subdivided tracks of the buildings. The central tower is 60 ft. in height and provides excellent observation facilities for the operating officer in charge of car movements.

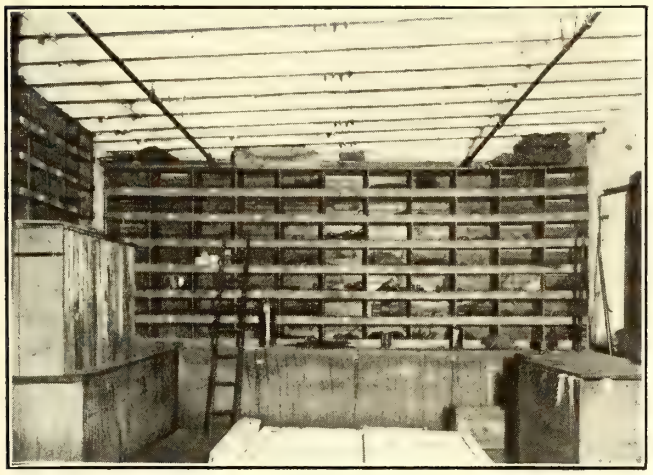


Middlesex & Boston—Exterior View Waltham Shops

FIRE PROTECTION

Every track in the buildings is equipped with a pit, and an installation of over 1100 automatic sprinkler heads manufactured by the General Fire Extinguisher Company has been made. The

water supply is drawn from the mains of the city, and the immediate service for the sprinkler heads is taken from a wooden tank of 20,000-gal. capacity mounted on a steel framework about 80 ft. above the track level. This tank is served with water under normal city pressure of 70 lb. per square inch and is provided with a 1½-in. intake pipe and a 6-in. delivery pipe, with 1¼-in. steam line operated under cold-weather conditions to prevent the contents of the tank from freezing. The delivery



Middlesex & Boston—Sub-Store Room in Waltham Shops

pipe is carried downward from the tank to the ground in a wooden box lining, with inside paper surfacing to preserve the flow in the winter season. Sprinklers are installed in all pits about 15 in. above the pit flooring, which is of concrete construction. The pit sprinkler heads are about 4 ft. apart horizontally, and are supplied with water through ¾-in. piping. The rest of the sprinklers are installed over the tracks near the roof, a clear space of about 17.5 ft. being allowed above the rail and about 6 in. below the roof timbers. The main lines serving the overhead sprinklers are 1¼ in. in diameter, and in the car house proper the system is maintained under pressure by compressed air furnished by an automatic compressor driven by a 1½-hp, 500-volt direct-current Crocker-Wheeler motor. There are no side sprinklers in the plant. Three electric gongs are installed in connection with the sprinkler system and a private fire-alarm box is located on the property. Chemical extinguishers of the hand type, sand pails and fireproof doors of the self-closing type are also installed in the different divisions of the property. Skylight windows are in general of wired-glass construction. There are three hydrants on the grounds, and three stands of hose with about 200 ft. in each. The oilroom, containing combustible material, and the paint storage room are built of brick and, in the case of the former, the walls are carried up above the adjoining roof structure to a height of about 4 ft. Monthly fire drills are held and about 30 seconds is required for the force to attach the hose and turn on the water after the gong sounds.

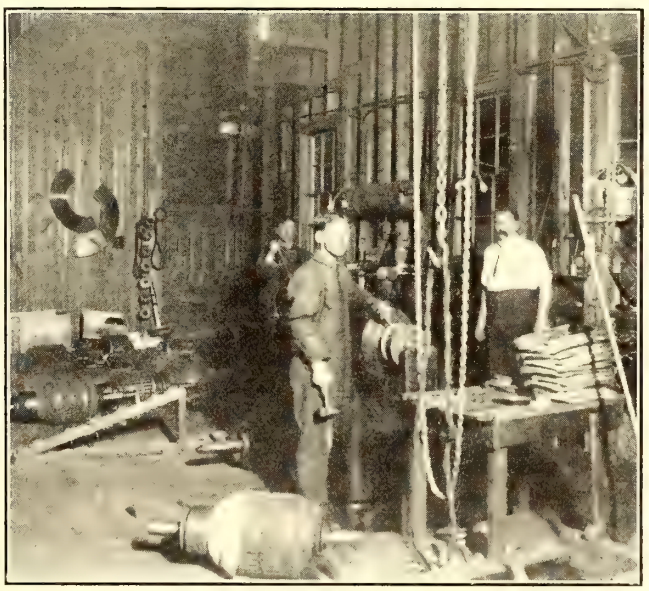
HEATING AND LIGHTING

The car house and shops are heated by steam coils in the pits, three coils of pipe being run longitudinally on each wall of each pit and supplied with live steam from two Kendall boilers of about 150 hp combined rating through appropriate reducing-valve connections. Draft is provided by a brick stack 70 ft. high and 4 ft. square inside. The boilers are run at 40 lb. pressure, and the steam distribution for heating is carried out at about 4.5 lb. A Warren duplex feed pump delivers city water and drips to the boilers. Soft coal is burned and two firemen are required, one being on day and the other on night service. Large swinging doors are provided at every track entrance. Radiators are installed in the office, lobby and lavatory.

The shop section is lighted with 12 inclosed-arc lamps run in three circuits of four each, in series off the railway supply. There are also numerous 16-cp incandescents in use, three-light clusters being common in the shop and single-light fixtures along the car-house walls. As no inspection or repair work is normally done at night no special electric lighting has been installed in the pits. When pit work has to be done under unfavorable conditions of illumination small portable oil lamps are used.

MACHINE SHOP AND INSPECTION DIVISION

The machine shop and inspection division occupies a space of about 110 ft. long by 50 ft. wide at the southern end of the building. The first 40 ft. of the shop is devoted to car washing and surface repairs and adjustments, a concrete floor being provided with a slight pitch leading to five catch basins at the sides of the three tracks which enter this section of the property. Stand pipes and hose connections facilitate washing at this point and the drains are collected in an 8-in. tile pipe and discharged into a brook at the rear of the property, after a run of about 80 ft. Beyond the car-washing division the shop tracks are carried over pits, with wooden floors between and concrete pit bottoms. At the rear of the machine shop the tracks are carried into a carpenter and paint shop about 80 ft. long, where all the woodwork and painting for the Middlesex & Boston lines are performed. The power-driven equipment of the shop is rather limited on account of the subdivision of repairs referred to in the first paragraph of this article. It consists of an engine lathe, grinder, drill press and grindstone, all driven by belt from a single line shaft belt-driven by a 5-hp 500-volt Westinghouse direct-current shunt motor running at 1500 r.p.m. This equipment is mounted close to the wall on the south side of the shop and takes up remarkably little space considering the number of cars which depend upon it for service. A Cutler-Hammer motor-starter is in service and ample facilities for bench work are a feature of the shop. The pit tracks in the shop are served by eight 2-ton and two 1-ton Triplex hoists. For removing armatures in pit work a portable jack mounted on a carriage is used, the armature body being arranged to rest on rollers having exactly the shape of the field poles of the same size of motor. A convenient feature of the bench work is the provision of a zinc sink used in the cleaning of motor and axle bearings. This is recessed into a bench to a depth of 1½ in., and is 7 ft. long and 3 ft. in width. By its use all oily drips



Middlesex & Boston—Electric Winding Department in Auburndale Shops

from journal boxes during cleaning or dismantling can be saved, and when desired a pan can be utilized so that the oil can be in part at least used twice. This simple arrangement adds much to the cleanliness of the shop work. A similar plan is utilized in the lamproom of the shop, in connection with the filling of oil lamps. A view of the zinc sink used in the machine shop is published on page 984. Round-bottomed sand pails are hung over the bench for fire protective uses.

CARPENTER SHOP, PAINT SHOP AND STORAGE ROOM

The woodworking department contains no machine tools, all this kind of maintenance being done outside, together with the manufacture of truck springs, the removal and replacement of car wheels, manufacture of trolley wheels and miscellaneous brass and iron foundry work. Excellent natural lighting is provided in the carpenter and paint shop. At the side of the carpenter shop is located a sub-storeroom containing about 200 stock bins, compartments for window-glass storage, cupboards and boxes. The bins are installed against the walls, and half are 18 in. x 18 in. x 11 in. in size and the balance 12 in. x 12 in. x 11 in. in dimensions. The sub-storeroom is provided with an automatic fire door and a chemical fire extinguisher equipment, with sprinklers as shown in the accompanying illustration. The stock kept here includes lamps, tape, trolley wheels, glass, bolts, truck and motor fittings, brushes, fuses, switches, bearing metals, brake parts, and miscellaneous car-body fittings. The contents of this storeroom are regularly charged against the shop in connection with periodical trips of a stock car to and from the main storage department at Newtonville and no attendant is maintained at Waltham. There is also a fireproof room for cleaning and filling lamps, as mentioned above, and adjacent to it are an oilroom and a paint storage room. A coal bunker of 100 tons capacity completes the auxiliary shop compartments. The lamproom is provided with a wired-glass skylight, and the oilroom has an arched brick ceiling without opening at its top. Double fusible link fire doors are installed in the oil room and both oil and lamp rooms have concrete floors.

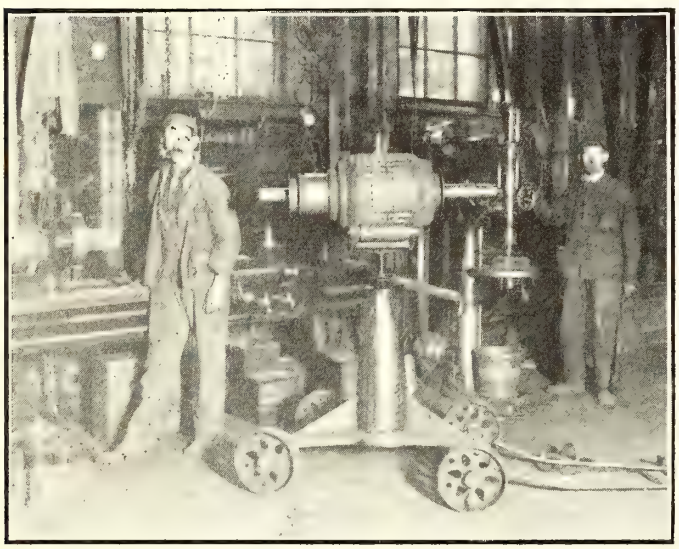
FORGE AND BLACKSMITH SHOP

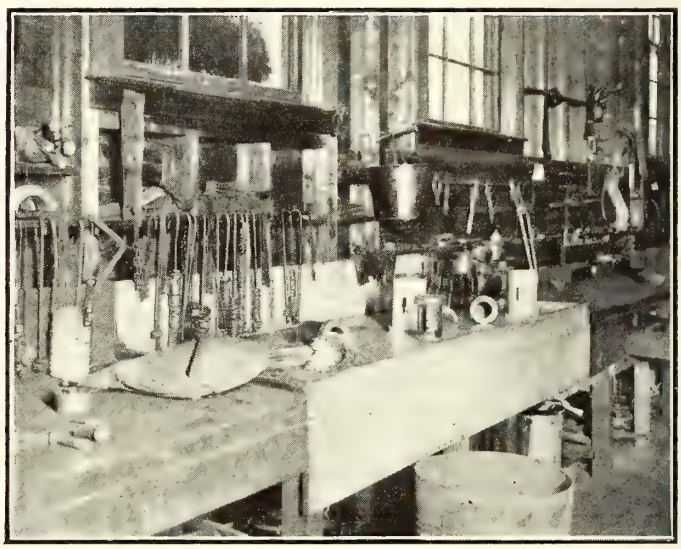
A small forge shop is in service at Waltham in connection with the relining of bearings and light repair on trucks. The shop is equipped with one forge, with a blower driven by a ½-hp direct-current motor which forces air into the fire through a 3-in. pipe. Bearing metal is poured into shells on a bench near the forge and no scraping is required to secure the ordinary fit.

At Auburndale a central blacksmith shop 18 ft. long by 10 ft. wide is in service for all the heavier forging, including that required for line and power station repairs, ironwork for the road department, horse shoeing, etc. The forge blower is driven by a ½-hp motor, and arrangements are made for hand-driving in case of a failure of the electric supply. The forge is of home-made timber construction, filled with earth, and supplied with air by a Champion blower. One man and, when necessary, a helper handle the forge work at Auburndale. At these car houses is also an armature-winding room, equipped with a drying oven operated by car-heating coils and the usual winding lathes and benchwork facilities. This department is run six days a week and utilizes the services of three winders. A 1-ton hoist with overhead runway is provided to enable armatures to be carried diagonally across the winding room to the repair benches. The company does not manufacture armature coils, but makes its own field coils and winds magnet coils and miscellaneous equipment of small capacity. The company has installed fiber shields in its controllers, one being placed horizontally above the contact cylinder and fingers and the other vertically around the outside of the contacts to prevent flashing to the case. The fiber thickness is 1/16 in. and this arrangement has been most successful in preventing short circuits of the kind which are disastrous in their effect on passengers.

CAR CLEANING

For car cleaning the company uses an old eight-bench open car fitted up with a motor-driven air compressor. The car is driven by a WP-50 motor with rheostatic control and a double-contact switch enables the rheostat to be used in connection with the compressor motor, which is a GE-800. The motor, compressor and storage tank are all mounted on old wooden ties and the motor drives the compressor by a belt which connects a 5-in. pulley with a 42-in. flywheel mounted on the latter, which is of Rand manufacture and of the duplex type with vertical cylinders. Cooling water for the compressor cylinder jackets is provided by a single barrel of water connected with the cylinders by a ½-in. pipe at top and bottom. The flow is secured by gravity and maintained by the heating of the water outside the barrel contrasted with that inside. About 18 in. difference in height exists between the supply and receiving ends of the cooling water pipe. The storage tank is 42 in. in diameter and 6 ft. long. In addition to blowing out cushions and controllers, this equipment is used as a vacuum cleaner by the addition of a simple Y in the piping near the nozzle of the air delivery line. The air compressor delivers at a pressure of 100 lb. per square inch. Attached to one end of the Y is a flexible pipe terminating in a flat copper nozzle with a ¼-in. slot, which is passed over the surface to be cleaned in the manner of an ordinary brush. The stream of air passing the Y in the delivery pipe establishes a suction after the manner of an injector pump.





Middlesex & Boston Street Railway—Armature Lift and Zinc Sink for Cleaning Armature Bearings

MAINTENANCE OF SMALL PARTS

The company manufactures its own rheostat frames and assembles its grids and mica washers upon them. In this way a saving of about half the cost of each resistance box is effected. The grid frames are made of sheet steel, bent and drilled in the blacksmith shop. The total cost per box complete is about $4.50. Another recent practice which has resulted in the saving of considerable labor and material is the use of case-hardened steel bushings in all brake rigging and truck castings at the wearing parts where attachments are made. Shelby seamless steel tubing is cut to the proper lengths and the hole in the lever or other member is drilled 1/64 in. smaller than the bushing and forced into it by a driving fit. The life

of the wearing part is raised to about two years by this means and a saving of about $8 per car per year is effected in the case of brake-shoe head hangers. Under the old plan the company plugged the holes with soft steel and then drilled them, but the fit was never as lasting. The hangers cannot be heated for an expansion fit of the bushings without danger of cracking them. The life of the material is so much increased by this method of using bushings that the company is applying it to new hangers as well as old ones. The life of brake-shoe heads is now about two years on these lines. The company uses hard and soft types of Taylor brake shoes and obtains a life of about 10,000 miles with the former. It also employs a soft Bemis shoe and is now getting a life of about 4000 miles from it. The standard trolley wheel is now the 4½-in. Hall and a life of 7000 miles is obtained. Griffin cast-iron car wheels 33 in. in diameter are employed and the present average life is 38,000 miles. A life of 9000 miles is now being obtained from motor brushes and from 15,000 to 20,000 miles are being secured from pinions. The life of the few steel-tired wheels that the company employs runs to approximately 100,000 miles, with a reduction in diameter from 33 in. to 31½ in. The life of bearings of the axle type is about 20,000 miles. Armature bearings, commutator end, are giving a life of 60,000 miles and at the gear end a life of 20,000 miles is being obtained.

Cars are inspected thoroughly, but without dismantling, every 350 miles, or about once in three days' run. This inspection includes oiling and about 18 cars per day are thus inspected at Waltham and Auburndale. The company uses "Perfection" waste saturated with oil, but puts no oil into the journal box. Controller fingers are renewed every two years, when the controller is taken entirely apart, the contacts being scraped and shellacked. The old segments are cut down and used in the smaller cars. The only night work done in the shop except in emergencies is car cleaning and the filling of sand boxes, all sand being screened before being put in the box. The company is using a type of box in which all the working parts are above the level of the car floor. The standard axle used by the company is 4 in. in diameter except in the case of cars having WP-50 and GE-800 motors, when the diameter is 3⅜ in. The standard journal on the majority of the cars is now 4 in. x 8 in. in dimensions. Most of the controllers are the K-10 type. Resistances are thoroughly overhauled on box cars every three years.

sand cars are maintained at each shop. Besides the motors already named, the company uses the GE-67 and GE-1000 and the Westinghouse 12-A and 101-B. An 18-ton coal car and the compressor car above noted are also assigned to Waltham

Form 473. 7-1-09 C Pr. 20M

St Ry. Company

MOTORMAN'S DAILY CAR REPORT

19

Cars in Good Condition: No.

CAR BODY	CAR NO.	CAR BODY	CAR NO.	MECHANICAL	CAR NO
Bell		Signs		Snow Scraper	
" Cord		Step or Hanger		Snow Scraper Hook	
Cards, Adv. & Pub.		Tr. Catcher		Springs Journal	
Curtain		Tr. Cord		Squealing	
Cushion		Tr. Pole		Wheel	
Dasher		Tr. Springs		**ELECTRICAL**	
Door, Car		Tr. Wheel		Bucking	
Door Hook		Ventilators		Cable	
Door Vestibule		**MECHANICAL**		Charged	
Draw Bar & Cage		Air Brake Fuse		Cir. Breaker	
Draw Bar Rest		Air Brake Switch		Controller	
Fender		Air Gauge		Fuse Box	
Fender Castings		Air Compr.		Fuses	
Floor		Air Pipe Leaking		Head Light	
Glass		Air Valves		Heater or Switch	
Gong		Axle		Overhead Switch	
Grab Handle		Brake Dog		Motor	
Hand Strap or Rail		Brake Handle		Motor Flash	
Lifeguard		Brake Rod		Motor Sus.	
Register Rod		Brake Shoe		Lamps	
Register Rod Handle		Brake Staff		Lead Wires	
Roof Leaks		Brakes		Light Sw or fuse	
Running Board		Gear and Casing		Pump Gov.	
Sand Box or Spout		Hot Box		Resistance	
Seats		Shaking		Reverser	
Side Bar		Car Dirty		Sign Lights	
Car Derails					

Motorman No

Motormen will make out the above report *at the close of each day* and deposit same in box provided at superintendent's office at the same time as *Conductor* deposits his work, noting car numbers opposite the description of condition of each car

The above cars have been examined and put in proper condition.

19

Foreman

Motorman's Daily Car Report

RECORDS

At Waltham complete records are kept of the date of all major repairs on each car, motor armature, etc., the life of motor bearings, pinions, mileage of trolley wheels, brake shoes, car wheels, etc. There is also in operation a system of keeping watch of car defects which has been productive of much good. Motormen are required to make out daily reports of the condition of cars which they operate, as shown in the accompanying blank, which has space for the recording of about 75 troubles. These defect slips are turned in to the foreman of repairs and upon them are based daily reports of cars in service which are sent to the office of the general manager, including a separation of troubles causing pull-offs and those which do not tend to interrupt the continuous service of a car. A monthly summary is also made of the defects causing pull-offs. The record of defects and their classification is kept in the office of the shop foreman, where it can be seen at all times, and the improvement in car operation is evident from the accompanying figures from November, 1909, to August, 1910.

DEFECT RECORD—MIDDLESEX & BOSTON STREET RAILWAY COMPANY—PULL-INS FROM NOV. 1, 1909, to JULY 31, 1910

	DIVISION NO. 1 (WALTHAM)									DIVISION NO. 2 (AUBURNDALE)								
	1909		1910							1909		1910						
	Nov.	Dec.	Jan.	Feb.	March.	April.	May	June.	July.	Nov.	Dec.	Jan.	Feb.	March.	April	May.	June.	July.
Air brake	0	2	7	3	4	1	1	5	4	9	17	10	9	2	4	1	6	4
Brake	6	5	5	8	4	4	9	3	1	13	10	14	15	16	9	5	5	3
Motor	8	8	15	17	14	12	13	11	6	17	11	12	11	17	29	29	23	17
Lamp circuits	1	2	0	2	1	1	3	1	1	7	4	5	10	6	5	3	1	3
Arc light	1	1	2	1	1	2	1	0	0	0	0	0	0	1	3	0	1	0
Trolley	1	1	3	1	3	1	0	2	2	19	6	1	2	3	6	0	4	6
Glass	1	1	1	2	2	1	4	0	0	2	4	2	6	3	3	0	0	0
Gong	1	0	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0
Body	4	5	3	3	4	4	3	1	1	7	11	4	4	3	4	5	4	1
Gear	1	2	0	4	4	2	1	2	1	0	4	4	2	0	1	1	1	1
Hot journal	1	5	5	1	9	1	1	2	1	12	9	11	11	4	2	3	1	0
Controller	0	3	3	2	3	4	5	0	1	19	16	6	2	6	6	7	3	3
Resistance	2	1	1	0	1	0	0	0	1	1	2	2	0	1	0	0	2	2
Brake staff	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heater	0	1	0	1	0	0	0	0	0	1	3	3	7	1	1	0	0	0
Register	0	1	1	2	0	4	3	1	6	3	0	0	0	0	1	8	8	2
Fuse box	0	0	0	0	0	0	0	0	0	1	0	2	4	0	0	0	0	0
Circuit breaker	0	0	1	0	1	0	0	0	0	1	4	2	0	0	2	2	0	0
Journal box	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Broken axle	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Split switch	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	0
Truck	0	0	2	3	0	1	0	0	1	0	0	3	2	2	1	1	0	0
Sand box	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Cable	0	0	0	0	0	1	0	1	0	0	0	14	17	0	6	1	1	0
Total pull-in	30	41	53	52	52	39	45	29	27	112	108	97	106	67	82	66	61	42
Cars in service	849	871	835	841	867	915	1,120	1,127	1,124	724	733	732	733	711	712	1,078	1,241	1,351
Per cent pull-in	.03½	.04¾	.06⅓	.06⅓	.06	.04¼	.04	.01½	.02⅓	.15⅓	13⅓	.13	.14½	.01½	.11¼	.06½	.04	.03 1/10

The Auburndale shop has specially assigned to it for maintenance 27 box cars, 22 of which are double-truck units, and 50 open cars, 46 being equipped with double trucks. At Waltham there are 18 double-truck and 17 single-truck box cars and 24 double-truck and 10 single-truck open cars. Five snow plows are assigned to Waltham and seven to Auburndale and two

The shops at Waltham are at present provided with one assistant foreman, two car washers, five pitmen, five men employed in general overhauling and two night men with one fireman. At Auburndale an assistant foreman, five pitmen, one car washer, three armature winders and one blacksmith constitute the force. The general foreman at Waltham has charge of both shops.

OGDEN RAPID TRANSIT COMPANY

The railway system of the Ogden Rapid Transit Company at Ogden, Utah, is an interesting example of a combination of city lines, branches to pleasure and scenic points and lines for handling freight and produce from the surrounding country. The system at present comprises 36 miles of track, of which that on Washington Avenue and Twenty-fifth Street, the two principal streets of Ogden, is double-tracked.

The most interesting portion of the system is the line that



Ogden Rapid Transit—Ogden Canyon Line, Showing Steel Truss Bridge and Roadbed Construction

was placed in operation a year ago last summer in the canyon of the Ogden River. This canyon has long been famed among tourists as well as among the residents of Utah for its exceptional scenic features. The lower end of the canyon is particularly rugged and picturesque, and the few spots where it widens out have been utilized for resorts, camping sites and summer homes. The county commissioners have for several years maintained an excellent wagon road in the canyon, but about two years ago the officials of the Ogden Rapid Transit Company, realizing the possibilities of the canyon as a revenue producer, began the construction of an electric line to "The Hermitage," a popular hotel and resort in the canyon.

The company was already operating a branch to a sanitarium near the mouth of the canyon. This line was extended along the bank of the river and for the most part on the side opposite the wagon road. For the greater portion of the distance the roadbed had to be blasted out of solid rock, and concrete banks and walls had to be built to hold the grade. Nearly all the post holes for the trolley line also had to be prepared by blasting. A fair idea of the heavy construction necessary may be gained from the fact that the 3 miles of line in the canyon cost $100,000.

The total length of the line from the union depot in Ogden is 7 miles, and in that distance the road rises 700 ft. to a 5000-ft. elevation at the upper end. The maximum grade is 4 per cent, and this extends for a distance of about 2000 ft. The prevailing grade is 2¾ per cent, and the maximum curvature is 30 deg. There are not many cuts on the line, but such as have been made have also required fills of rock, the deepest of them being about 16 ft. The line crosses the river three different times in the canyon, at one point by means of an 80-ft., steel plate-girder bridge. Rails weighing 48 lb. are used, and five sidings are provided so that a 10-minute headway can be maintained if desired.

Side-bracket suspension is used for the trolley with Ohio Brass fittings and Roebling's No. 00 trolley wire. The line is fed from the central station in Ogden by means of five No. 0000 feeders, three of which run through to the end of the line.

The heaviest traffic which has been handled by the road during any single day was on July 4 last, when 7000 passengers were carried. The average Sunday and holiday travel numbers about 1800 passengers, with half that number during weekdays. These figures apply to the months of June, July and August, during which a 20-minute headway is maintained. During the winter months the schedule is extended to 1 hour and 20 minutes.

It is planned next year to extend the line 8 miles farther up the canyon to Ogden Valley, touching the Idlewild and Oaks resorts, and reaching the towns of Huntsville, Eden and Liberty in the valley above. This extension will entail nearly as heavy construction as that of the part now in operation.

The company is now completing an extension north from the city to Brigham City, 22 miles from Ogden, which will add 12¼ miles to a line that already extends north to Utah Hot Springs. In Brigham City a branch 1 mile long will be built to connect with the Oregon Short Line depot. The construction of the extension will be of the side-bracket type, with Ohio Brass and



Ogden Rapid Transit—Ogden Canyon Line

Roebling's fittings and wire and with 50-lb. rails. It is planned to maintain an hour-and-a-half service on this line, the distance between Ogden and Brigham City being covered in 1 hour, including stops at Willard, Parry and Utah Hot Springs en route. It is planned eventually to extend this line to Logan, about 20 miles farther on, and connect there with the line of the Logan Rapid Transit Company, owned by the same interests, which is now operated between the railroad depot and the State Agricultural College.

POWER EQUIPMENT

The company receives its power from a central steam station in Ogden and also from a water-power plant located at Willard, 13 miles north of the city. The Willard plant consists of a 450-hp Allis-Chalmers turbine operating under an effective head of 1200 ft., the water being taken from a conduit 1¼ miles in length. A 300-kw, 2300-volt generator furnishes light for Willard City and power for the railway system, the latter being transformed to 20,000 volts for transmission to Ogden, where it

is converted to railway voltage by means of a 300-kw motor-generator. A 450-hp steam plant in Ogden is used to supplement the water-power current.

ROLLING STOCK

The company has a total of 37 cars, several of which have been recently purchased. Six of the new cars are of St. Louis manufacture, 46 ft. over all, equipped with four GE inter-pole motors and K35D controllers, operating at 700 volts. Four of



Ogden Rapid Transit—Ogden Canyon Line Terminal

these are provided with smoking compartments and toilets, and seat 46 passengers. The other two cars are of the semi-convertible type, seating 48 passengers. They have a rated speed of 38 m.p.h. The equipment also includes three inclosed trailers from the American Car Company, 40 ft. over all, seating 40 passengers and provided with electric heaters. These, with the new motor cars, are used on the Canyon and Brigham City lines. The company's rolling stock also includes a McGuire-Cummins snow sweeper and a 32-ton GE-St. Louis electric locomotive equipped with four 60-hp motors.

TRAFFIC

The company has developed a considerable freight business on its lines to the north of the city, where one of the richest



Ogden Rapid Transit—Ogden Canyon, Showing Construction Adjoining County Road

fruit and agricultural sections of Utah is tapped. In the past season there were handled over the system from North Ogden and the fruit-raising settlements north of Ogden 100 carloads of peaches and grapes. These were all turned over to the Oregon Short Line at Five Points, 3 miles north of Ogden. During the season the company hauled 350 cars of sugar beets, and from 30 to 40 cars of canned goods, from the same section. On the Plain City line, which branches off at Five Points and runs northwest, there were handled over 700 cars of sugar beets. This line is now operated by steam, but if the company's present plans are carried out, the line will be equipped with electricity in the near future.

OFFICERS

The Ogden Rapid Transit Company has the following named officers: President, David Eccles; vice-president, M. S. Browning; treasurer, H. S. Rolapp; secretary, Geo. H. Matson; directors, R. B. Porter and H. H. Spencer; superintendent, J. W. Bailey; master mechanic, W. V. Reed. Acknowledgment is hereby made for courtesies extended by Superintendent Bailey in the preparation of this article.

A BULLETIN ON FUEL VALUES

"The Volatile Matter of Coal" is the title of the first bulletin to be issued by the new Federal Bureau of Mines. The authors, Horace C. Porter and F. K. Ovitz, conducted their investigations at the Pittsburgh station while it was under the technologic branch of the Geological Survey, the work being a continuation of the fuel investigations begun several years ago at the Louisiana Purchase Exposition, St. Louis, Mo. The results obtained at that plant showed that the work of determining the fuel values of the coals and lignites in the United States with a view to increasing efficiency in their utilization would be incomplete if it did not include systematic physical and chemical researches into the processes of combustion. Hence in their later investigations the authors carried on such researches, concentrating attention on those lines of inquiry which promised results of greatest economic importance. This bulletin is therefore a report on an investigation of the volatile matter in several typical coals—its composition and amount at different temperatures of volatilization.

Quoted directly the authors say: "The investigation has already shown that the volatile content of different coals differs greatly in character. The volatile matter of the younger coals found in the West includes a large proportion of carbon dioxide, carbon monoxide and water, and a correspondingly small proportion of hydrocarbons and tarry vapors. The older bituminous coals of the Appalachian region yield volatile matter containing large amounts of tarry vapors and hydrocarbons, difficult to burn completely without considerable excess of air and a high temperature. Coal of the Western type, moreover, gives up its volatile matter more easily at moderate and low temperatures than that of the other type. The volatile matter produced at medium and low temperatures is rich in higher hydrocarbons of the methane type, such as ethane and propane, which contain a larger portion of carbon than is present in methane.

"These facts help to explain the difficulty of burning Pittsburgh coal, for example, without smoke, the low efficiency usually obtained in burning high-volatile Western coals, the advantage of a preheated auxiliary air supply introduced over a fuel bed and the advantage of a furnace and boiler setting adapted to the type of fuel used. They bear directly also on the question of steaming 'capacity' of coal for locomotives, the designing and operation of gas producers for high-volatile fuels and the operation of coke ovens and gas retorts.

"The results show further that certain bituminous coals of the interior and Rocky Mountain provinces give promise of good yields of by-products of coking, notably ammonia and high-candle-power gas, comparing favorably in these respects with the high-grade coking coals of the Eastern province. They show also that inert, non-combustible material is present in the volatile products of different kinds of coal to an extent ranging from 1 per cent to 15 per cent of the coal."

The bulletin will be of interest to fuel engineers, designers and builders of gas producers, superintendents of power plants, railway master mechanics and those engaged in the suppression of smoke.

The bulletin may be obtained by applying to the director of the Bureau of Mines, Washington, D. C.

SHOP RECORDS IN RICHMOND, VA.

The management of the Virginia Railway & Power Company believes strongly in keeping systematic records of car troubles and using definite inspection and overhauling methods instead of relying upon the foreman's say-so that this or that car can stay out on the line a little while longer. About March, 1908, the company adopted a basis of 1000-1100 miles

INSPECTION.

Car No..... Date Due..... Date Inspected.....

ITEM.	WORK DONE.	SIGNATURE.
Trolley		
Light and Heater Circuits		
Cables		
Lightning Arresters		
Circuit Breakers		
Controllers		
Relays and Contactors		
Rheostats		
Electric Bells		
Motors		
Armature & Axle Bearings		
Air Brakes		
Hand Brakes		
Brake Rigging		
Draft Rigging		
Sand Boxes		
Foot Gongs		
Fenders		
Gates, Screens, etc.		
Grab Handles		
Registers and Fittings		
Car Body and Fittings		
Trucks		
Journal Boxes		

Fig. 1—Richmond Records—Type of Inspection and Overhaul Blank

for inspecting and washing cars, and a basis of 50,000 miles for overhauling cars by taking out and disassembling the motors, stripping the controllers to the backboards, renewing truck parts and bolts, retouching the car body, etc. The result of this policy has been a most gratifying decrease in the number of repairs, as will be seen from the examination of the records later reproduced. Those who fear the clerical expense of a record system may be astonished to learn that the statistics for some 320 car equipments are kept up without trouble by one man.

The mileage reports are obtained in the usual way from the dispatcher's daily slips on the performance of all cars. The figures as received are entered on a loose-leaf ledger sheet divided vertically for months and horizontally for the days of each month. Each sheet corresponds to a certain car number and the figures are integrated daily until the inspection or overhauling mileage has been reached. In that event the foreman is notified on the form shown in Fig. 1, a white copy being used for inspection reports and a yellow one for overhauling. When the work has been done the sheet must be returned with the signature of every shopman concerned, while the back of the form serves for the foreman's signed statement of supplies used. This form is supplemented by one on which the shop foreman gives a record of all cars received, all cars removed and all cars remaining for attention.

Instead of employing separate mileage forms or cards for each item recorded, it has been found feasible to use a single blank arranged as shown on Fig. 2. This is a loose-leaf sheet only 9¼ in. high x 11½ in. wide over all, with certain common headings, besides individual headings for different kinds of trouble with coils, commutators, motor shafts, pinions, bands, bearings and wheels. A combination form like this can effect quite a saving in the printing bill of a small or medium-sized company. It will be understood, of course, that only the history of one article is recorded on one sheet. The same blank is used to make up for the general superintendent a monthly summary of all troubles coming under the several headings, including a comparison with the same month of the preceding year.

Fig. 4 is reproduced from the actual armature repair records of the company for December, 1908, and December, 1909. Not only does this show the careful watch kept on

ARMATURE	ARMATURE	ARMATURE
	No. ..... Type.....	No. .....
No.	Defects.....	Type.....
	.....	Taken out of Car No.
Type.....	Repairs begun.... Completed.....	
	Material used.....	.....
Put in Car No.	.....	Date.....
	.....	Trouble.
.....	.....	.....
	Make of coils.....	.....
Date.....	Hours.....	.....
Signature	Signature	Signature

Fig. 3—Richmond Records—Armature Tag

the behavior of each make of car equipment, but also the trouble reductions due to the continued practice of mileage maintenance and inspection. Similar records are kept of armature and axle bearings, wheels, etc.

Particular attention is given to following up armature troubles. For this purpose the three-part armature tag reproduced in Fig. 3 is shown. The right-hand portion is filled out and signed by the inspector who removed the armature; the middle portion gives the shopman's report on the defects remedied, accompanied by a labor and material statement; and the last portion records the final disposition of the repaired armature.

The motorman and conductor's daily report, Fig. 5, and the usual type of car pull-in report form the basis for a monthly statement of car failures. The term "failures" really is too strong for this record, because even such items as broken glass and bent guards are listed. The actual pull-ins or service breakdowns do not exceed three or four a month. According to the mileage for December, 1909, this would mean only one pull-in for every 140,772 car miles or every 187,696 miles. Even on the basis of all recorded troubles there was but one failure for every 2887 miles operated. The company began to get in December, 1909, the beneficial results of its system of inspection on a mileage basis, and the records show the improvement effected.

RECORD OF..... (TYPE) (ARTICLE) No.....

Car No.	Put In	Taken Out	MAKE	CAUSE OF REMOVAL																						MILEAGE	
				COILS		COMMUTATOR				SHAFT					PINION		BANDS		BEARINGS			WHEELS						Part	Total
				Short Circuit	Open Circuit	Short Circuit	Rough	Flat	Worn Out	Cut	Sprung	Loose Sleve	Thread	Worn Out	Loose	Worn Out	Loose	Broken	Loose Babbitt	Melted	Worn Out	Turned	Turned Flat	Broken Flange	Broken Spoke	Bent Axle	Broken Axle	Worn Out		

Fig. 2—Richmond Records—Head of Combination Blank for Mileage of Electrical and Mechanical Equipment

Most of the records described in this article, as well as the shop time sheet reports, are used in making up loose-leaf page records of the labor and material expended on individual cars and their motor and truck equipments. Each side of the record is divided into six rectangles covering respectively the first six and last six months of the year. The rectangles in turn have columns for labor and material charges, under specific account numbers. This record has proved a valuable guide for studying the comparative merits of the different types of rolling stock operated by the Richmond company.

SUMMARY OF CHANGES.

December, 1909-1908.

		CAUSE OF REMOVAL																
		Coils.			Commutator				Shaft.			Pinion.	Bands.					
		Short Circuit.	Open Circuit.	Ground.	Short Circuit.	Rough.	Flat.	Ground.	Worn Out.	Sprung.	Loose Collar.	Broken.	Loose.	Worn Out	Loose.	Broken.	Change.	Overhauled.	Number of Changes.
		ARMATURES.																	
G. E. 57	1909....						2	3		1						1		7	18
	1908....		4			2									2	1			16
G. E. 58	1909....	2																	2
	1908....																		0
G. E. 62	1909....		1					1											2
	1908....				1														1
G. E. 67	1909....	4	2	6			1	17										4	43
	1908....	3	7		3	2	4									6			46
G. E. 90	1909....																		3
	1908....					3	5												10
G. E. 1000	1909....																	6	6
	1908....																		0
West. 49	1909....	1	2	1	6	1	1	3			1								15
	1908....		8				2												10
West. 101-B.	1909....																	2	3
	1908....					3													4
West. D-1	1909....	1																	1
	1908....																		0
Chris. AA-1	1909....	1																	1
	1908....	2	3	1	2					1							3	1	13
	Total 1909.	9	5	7	6	1	4	24		1	1					1		19	94
	Total 1908.	5	22	1	6	10	11			1					2	7	3	1	100

Fig. 4—Richmond Records—Summary of Armature Troubles on Combination Form

The foregoing forms and data were furnished through the courtesy of C. B. Buchanan, general superintendent of railways, Virginia Railway & Power Company. The records are prepared under the direction of C. C. Johnson, who in the unusual two-fold capacity of superintendent of equipment and purchasing agent has found these various forms an invaluable help.

MOTORMAN AND CONDUCTOR'S DAILY REPORT.

Car No. ....Line.

PARTS OF CAR MARKED OUT NEED ATTENTION.

All O. K.	Trolley.	Brakes.	Gongs.	Hood Supporters	Doors.
Motors.	Trolley Wheel.	Brake Handles.	Signs.	Hand Straps.	Steps.
Bearings.	Trolley Rope.	Sand Boxes.	Ventilators.	Register.	Grab Irons.
Gears.	Lamps.	Couplers.	Headlight.	Register Rope.	Floor.
Gear Cases.	Truck Wheels.	Bumpers.	Gates.	Bells.	Hoods.
Controller.	Axle Boxes.	Fenders.	Platform.	Windows.	Seats.
Hood Switch.	Lightning Arresters.	Pilots.	Heaters.	Blinds.	Wheel Guard.
		Dash.		Resistance Box.	

Time taking car..... Time leaving car.....

.....190 .....Motorman

.....Conductor

Fig. 5—Richmond Records—Car Crew Report on Defects

An effective way used by a Southern railway to maintain the platform where the motorman stands is to insert flush with the flooring a patch of steel 10 in. x 14 in. in area and 1-in. thick.

POWER PLANT IMPROVEMENTS AT PORTLAND, MAINE

Current for the operation of the cars of the Portland Railroad Company's urban lines is supplied from a power station located about a mile north of the center of the city, on a site where tidewater is available for condensing purposes and where fuel can be delivered by barges. This station delivers exclusively a direct-current output at 550 volts, and has for several years illustrated a design of plant adapted to combined reciprocating engine and turbine operation. The company installed here two of the first direct-current steam turbo-generators for 550-volt service, the machines being of the vertical type. The company is now completing the installation of two 500-kw Curtis-General Electric generators built for horizontal operation. These machines are of the four-stage type and deliver current to the busbars at 550 volts, when operating at full load and at a speed of 1800 r.p.m. The generators are provided with commutating poles and the field winding is disposed upon four coils in addition to the former. The commutators are provided with insulated rings to prevent spreading under the action of centrifugal force. At present these machines are being operated non-condensing pending improvements to the auxiliary system mentioned below.

The other units in the station consist of a 1500-hp Rice-Sargent vertical cross-compound engine direct-connected to a 1050-kw generator, and two 400-kw generators direct-driven by horizontal cross-compound Allis-Corliss engines. The normal capacity of the station is 3050 kw. The speed of each engine is 100 r.p.m. Steam is supplied from a boiler plant of 2200 hp rating, there being four 250-hp units, two 350-hp units and one 500-hp unit. The boilers are being equipped with Taylor stokers.

Until the present turbines were purchased the station was provided with an independent condensing equipment for each of the prime movers in service. The result was a maze of piping under the engine room, with complications in operation and maintenance. The company is now completing the installation of a simple condensing system of the ordinary barometric type, there being one condenser for the reciprocating engine units and one for the two horizontal turbines. Each engine discharges its exhaust into a 24-in. trunk line carried through the basement to the outside wall of the engine room, where the two barometric condensers are installed. The two turbines discharge through 26-in. pipes into a 36-in. exhaust main, which also leads to the corresponding barometric condenser at the north end of the building. The two condensers discharge into a single hot well, each having a 14-in. tail pipe.

The injection water for the condensers is taken from Portland harbor through three 14-in. pipes, which deliver into a 24-in. cross-header. Each pipe is provided with a small bleeder valve for destroying the vacuum when it is cut off from service, a main service valve and a covered strainer. Two pumps

are shortly to be available for handling the injection water. The present service is handled by a Dean duplex horizontal double-acting pump connected with the supply header by a 24-in. pipe line and discharging into the injection lines through a 20-in. pipe. A 42-in. Dean centrifugal pump is now being installed for operation by a 550-volt direct-current motor, and the supply for this pump is to be drawn from the header by a 20-in. pipe, the discharge being of the same size. Beyond the two pumps the injection water delivery lines are to be cross-connected so that either pump can be used to supply the condensers, the injection water being furnished to each outfit by a 14-in. supply pipe. A vacuum as high as 29 in. has already been obtained with this equipment under favorable conditions, and the basement of the engine room has been almost entirely cleared of small piping.

INVENTORY OF PHYSICAL RAILWAY PROPERTY OF TOLEDO COMPANY GIVEN TO CITY

An inventory of the physical railway property of the Toledo Railways & Light Company, prepared by Ford, Bacon & Davis, of New York, was filed with Mayor Whitlock, of Toledo, by the company on Nov. 1. The inventory was submitted by the company in accordance with a request made by the City Council of Toledo in July.

A letter of Ford, Bacon & Davis, addressed to Albion E. Lang, president of the company, accompanied the inventory. The letter, which is as follows, gives a general list of work and expense items entering into the construction cost of a street railway, which in addition to the physical property should be included in an appraisal:

"In accordance with your request of July 5 we beg to advise you that we have completed the inventory of the railway property of your company. In the consideration of this inventory the following points should be borne in mind:

"1. The date of the inventory is as of Oct. 1, 1910. There is included, however, additional property which had been purchased prior to this date, the delivery or installation of which will occur after this date.

"2. This inventory has been prepared from the records of the company supplemented by inspection on the ground, which has been made in as much detail as the time allowed us has permitted. In a matter so complex as this it is possible that some items have not been listed, which may be found by further investigation.

"3. This inventory has been made sufficiently detailed for the proper identification of the property of the company for the purpose of inspection for valuations. Such inspection will develop the detailed specification upon which the property should be priced. For instance, our description of cars and buildings shows in a general way the type of car or building, but does not attempt to include all of the parts, fixtures and accessories composing the finished car or building.

"4. This inventory is intended to show only property within the city limits, except as noted below, in actual use by the railway department of your company. There are a number of items, however, which, although required for the railway operation, are nevertheless used jointly by other departments of your company and by other companies. The proportion allotted to railway department uses of items such as power houses, underground conduits, feeders, poles, etc., will have to be determined by methods of usual practice, modified in so far as necessary by local conditions. In the case of power houses the machinery used exclusively for commercial lighting and power has been omitted.

"5. Track and overhead line construction amounting to 6.18 miles of single track owned by your company is outside of the city limits. As this, however, is part of the city system, we have included it in this inventory.

"6. The Casino property has not been included as real estate inasmuch as the company owns this as one of its investments, but as it was acquired for park purposes for the development of the company's business it should properly be valued as a portion of the railway property. There are other investments of the same general character which should also be considered in a valuation of this property.

"7. A description of the pavement outside of the franchise requirements has been included for the purpose of facilitating estimates upon the cost of reproduction new of the track work.

"8. This inventory includes only those items of physical property which can be labeled and inspected. In the construction of this property there are many further work and expense items necessarily incurred which should be included in a valuation, whether the matter be viewed from the standpoint of cost of production through the period of development or cost of reproduction new at this date.

ITEMS ENTERING INTO CONSTRUCTION COST

"A general list of the work and expense items entering into the construction cost of a street railway should include the following, of which the inventory which we submit comprises only part of sections 2, 4, 5 and 6:

"*I. Company's overhead charges upon construction.*
- "1. Executive organization's work and expenses, including:
  - "1. Accounting expenses. 2. Office expenses. 3. Storeroom and stable expenses. 4. Permits of authorities and city inspection.
- "2. Legal work and expenses.
- "3. Technical work and expenses.
  - 1. Company's engineering organization. 2. Consulting engineers. 3. Architects. 4. Testing and outside inspection.
- "4. Interest during construction.
- "5. Taxes during construction.
- "6. Wear and tear during construction.

"*II. Land, including private right of way and sites for power houses, car barns, shops, terminals, etc.*
- "1. Assessed value.
- "2. Additional sales value.
- "3. Additional value for railroad purposes, including
  - "1. Plottage. 2. Contiguity factor. 3. Special value for railroad purposes due to location.
- "4. Overhead charges for acquisition of land, such as
  - "1. Brokerage. 2. Legal work and expenses. 3. Technical work and expenses. 4. Title insurance. 5. Loss on portion of site not necessary. 6. Loss on buildings discarded.

"*III. General contractor's overhead charges and profits.*
- "1. Work and expenses of contractor's general organization and office.
- "2. General superintendence, watching and lights.
- "3. Fire, accident and liability insurance during construction.
- "4. Maintenance and use of tools.
- "5. General contractor's profits.

"*IV. Material and labor comprising the physical construction and equipment.*
- "1. Inventory priced on basis of subcontracts.
- "2. Physical extras, incidentals and contingencies.

"*V. Stock, tools and supplies.*
- "1. Inventory priced.
- "2. Incidentals.

"*VI. Working capital, including*
- "1. Cash on hand. 2. Accounts and bills receivable. 3. Prepaid accounts. 4. Lands and buildings not used in operation.

"9. In addition to the above enumerated property there are work and expense items which must necessarily be considered in arriving at the total value. These can be valued only by experienced and competent men who will be able to arrive at the cost of a street railway property as a whole, constituting a going concern and including the cost of securing the necessary rights and capital for construction and the development of the business to its present magnitude ready for modern, adequate service to the city of Toledo.

"10. In addition to the above items we would also call your attention to the unexpired franchises of the company."

HEARING ON BOSTON TRANSIT MATTERS

As a joint board the Railroad Commission of Massachusetts and the Boston Transit Commission gave a hearing on Nov. 1 on various propositions pending for the extension of rapid transit facilities in Boston. In addition to these matters, which have been referred by the Legislature to the two commissions for consideration and report, the joint board also considered the proposed consolidation of the Boston Elevated Railway and the West End Street Railway. President William A. Bancroft, of the Boston Elevated Railway, stated the position of that company.

President Bancroft described the development of transportation facilities in Boston since the operation of horse cars and explained how some awkward situations had arisen in which the company needed the co-operation of the community in order that proper solutions might be found. The management had conducted its construction work upon broad plans. President Bancroft urged the consolidation of the Boston Elevated and West End companies and spoke favorably of an extension from South Boston to Dorchester and in opposition to the West End loop, through Scollay Square and Bowdoin Square. The community served by the system was like a wheel with the business heart of Boston as the hub. In little over 12 years, since the Elevated company assumed operation of the property, it had done in track mileage three-fifths as much as had been done in the 42 years previously and in actual investment more than twice as much. Other extensions might be made upon the general design already adopted, providing for other sections of the community direct routes to and from the business heart of Boston. Within a reasonable time the company was willing to assume a rapid transit thoroughfare from Park Street to Dorchester by way of the South Station and South Boston. It was essential, however, to this undertaking that extensions be given to the leases of the Tremont Street subway, the East Boston tunnel and the Washington Street tunnel and also that a single control of the Elevated and the West End properties be effected.

The permanent investment had been increased from $25,960,000 in 1898 to $81,440,400 in 1909, with authorized extensions which would bring the total investment up to $112,633,000 by 1914, when the street railway property would show an investment of $1.00 for every $20 of taxed wealth in the community. The company was somewhat disappointed at the failure of the public to read carefully the advertisements which it had been printing for the last few weeks in order to show the community what enormous strides had really been effected in the last 12 years. The intolerable system of competitive horse car lines gave way to a comprehensive electrical service under a single management under the régime of the West End company, while the Boston Elevated had carried the work farther, developing elevated, subway and tunnel lines forming rapid transit trunk routes between the business center and the suburban districts, with unparalleled transfer facilities and a close articulation of surface, overhead and underground lines. The free transfer was removed from politics and the arangements with respect to compensation taxes for the use of public franchises were greatly improved by the Boston Elevated régime. The company had added about 600 cars to the system. The seating capacity of cars had been increased from 22 to 52, and the 5-cent fare extended to the benefit of the health and comfort of the community.

If the company should assume additional obligations for additional facilities it must consider not only the amount of additional capital required and the additional charge because of obligations assumed, but also the probability of any increase or diminution in cost of operating the properties as they now exist. If the leases of subways were not renewed a substantial rearrangement of the entire system would be necessary and this would involve large additional expense and possibly loss of revenue.

Such uncertainty necessarily made the prudent manager less willing to enter into new undertakings which might require years for completion and before a fair return would be earned thereon. The leases might be renewed upon expiration, but it was conceivable that they might not be. The only reason that President Bancroft had heard suggested why the leases should not be extended was that the rates of interest might change and that a rental which might be fixed now might not be fair after 40 years. Such an argument would prevent anybody from concluding any arrangement for any number of years. The city's bonds for subways ran, say, 40 years, and bore a fixed rate of interest. The certainty of long-time arrangements more than offset any possible gain from slight change in interest rates.

The company was subject in its operation of subways to the control of the State through the Railroad Commission. No one doubted that this control was sufficient at all times to insure a proper performance by the company of its duties to the public.

The Elevated and West End systems were a unit so far as equipment and operation were concerned. Neither system could convey by itself the major part of its passengers from their point of departure to destination. The advantages to the public of a single control of the properties were indisputable. The only question was with respect to the terms of consolidation. The question before the joint board had reduced itself to whether a modification of the act of 1908 should be effected so as to provide for an 8 per cent dividend on the second preferred stock of the West End company or a consolidation be postponed indefinitely. The lease would end in 11 years and in undertakings for rapid transit that was a short period. Plans and provisions must be made for many years ahead, but they could not be made in the face of uncertainty as to the future, especially with uncertainty as to whether or not the surface system would be separate from the elevated system.

Under the terms of the lease, the Elevated company must return the West End property equipped and provided with its own power so that it could be operated as a separate system. The two systems interlaced each other and to provide each with separate power would involve both wasteful expenditure of capital and wasteful operating expense. It was recognized as fundamental that a public-service corporation should operate its property in the most economical manner with due regard to the requirements of the public and that all waste should be avoided. Stone & Webster had estimated that if power requirements increased as in the past there would be an actual waste in 1918 in duplicate provision of $600,000, and that the amount would be still greater at the expiration of the lease in 1922. The two systems could not be operated as at present until the expiration of the lease, for the planning and construction of power stations and distributing systems would require years. In providing for additional power the company must know whether or not the two systems were to be a unit. An additional power plant was necessary at once. The company had purchased a large tract of land in South Boston for $300,000 in order to produce power economically. The construction of this power station and its accompanying provisions would mean an expenditure of nearly $3,500,000. If the two properties were separated, a considerable part of the expenditure would be wasted. The alternative was to provide separate power stations for the two properties at a considerable increase and waste in capital expenditure and operating expenses.

Another difficulty would arise in the division of subways between the surface and elevated systems at the expiration of the lease. The Elevated company had no desire to pay more for the West End system than was necessary, but it was a plain business proposition. The Elevated company believed that it was much better to take over the West End property on the basis of 8 per cent dividends for the second preferred stock than to delay consolidation further. If it was a good proposition for the Elevated company it was equally good for the public. The question was what was best to be done. The dividend rate of 8 per cent was not unreasonable. That was paid by the West End company prior to the lease of the property by the Elevated company, and was recognized by the general laws of 1906 as reasonable in so far as they provided for

a division with the State of dividends in excess of 8 per cent. The actual amount paid by the common stockholders of the West End company for shares of stock of a par value of $50 was $61.24 per share and a dividend of 8 per cent meant a net return of 6½ per cent on the investment. Nearly one-half of the stock had been paid in since 1891 at an average price of $76.23 per share.

The proceeds from the stock which was paid in at par before 1891 had been invested at the time of the electrical equipment of the West End property, when the success of the enterprise was problematical. Eight per cent was not an unreasonable return upon the investment in an undertaking which was wellnigh a sheer hazard at the time. No interest or dividends were being paid upon any franchise value or upon anything but actual cash invested in the property.

After the conclusion of the statement of President Bancroft the hearing was adjourned until Nov. 8.

ARBITRATION IN PHILADELPHIA ON "LOYAL MEN"

A board of arbitration decided this week a question growing out of the Philadelphia car men's strike of no little importance to the street railway world in general. What the arbitrators were called upon to do was to define the meaning of "loyal men" as applying to the settlement of the February-April strike. Their decision, which supported the company's contention, establishes a precedent in cases of dispute as to what relation, with respect to seniority, strikers who return to their employment bear to men employed during a strike.

The Philadelphia arbitration was the outcome of the claim first put forth in August last by the returned strikers that they were entitled to seniority rights immediately following the Philadelphia Rapid Transit Company's "loyal men," which, the former strikers asserted, meant that they were to yield precedence only to the men who were in the service when the strike began. It was further claimed that no man employed by the company during the strike was a "loyal man" and that, therefore, all such men should be displaced (but not necessarily discharged) in favor of the men who were on strike.

To these claims the company asserted that it had always considered as loyal men those who had permanently entered the service at regular wages during the strike and remained thereafter. It conceded that professional strike breakers, hired at excessive wages for temporary service, were not to be considered as coming under the definition of loyal men. Upon the refusal that this position involved to give the seniority that they demanded to the returned strikers, it was agreed that the whole question hinging upon the definition of what constituted "loyal men" should be referred to arbitration, and that the arbitrators should decide where the men who came back after the strike were entitled to be placed.

As one arbitrator the company nominated John G. Vogler, a Philadelphia business man in no way interested in or connected with the street railway business; while the union men, who are, of course, the only element concerned in the attempt to secure a reversal of the company's position, nominated Raymond Robins, a Chicago lawyer, who has been to a greater or less degree affiliated with the labor movement, as their representative on the board. If these men failed to agree, they were to select an umpire, but none proved to be necessary.

Hearings before Mr. Robins and Mr. Volger were begun on Oct. 25 and concluded on Oct. 27. Daniel T. Pierce represented the company, while the spokesman for the men was C. O. Pratt, of the Amalgamated Association.

The agreement upon which the arbitration was based read as follows.

"Oct. 17, 1910.

"It is hereby mutually agreed by President C. O. Kruger, representing the Philadelphia Rapid Transit Company, and the committee representing their employees that the following proposition shall be submitted to a board of arbitrators, as already agreed upon, for their consideration and decision. Their decision, after a complete hearing, rendered in writing, to be accepted by both parties hereto as final.

"At the time the strike was settled it was agreed and understood that the men returning to work should be placed behind what the company was pleased to term its 'loyal men.'

"At the expiration of the three months' limit the employees asked to be placed behind the 'loyal men,' their understanding being that 'loyal men' were those employees who were in the service of the company prior to Feb. 19 and did not go out on strike. The company declined to so place the men, claiming that 'loyal men' included those men who were in the company's service and did not go out on strike, also all employees who had been hired permanently prior to the time the strike was settled, April 18, 1910, and that the men are now properly placed in accordance with the terms of settlement.

"The board of arbitrators shall determine where these men who returned under the terms of the strike settlement properly belong.

"It is further agreed that each party hereto shall pay the expenses of their own arbitrator and that both parties hereto shall jointly share and share alike the expense of a third arbitrator (should one be required) and such other necessary expenses as may be incurred by the board of arbitrators.

[Signed]

Peter Driscoll,
Chairman Grievance Committee.

Charles O. Kruger,
President of Philadelphia Rapid Transit Company.

H. B. Barron,
Secretary Grievance Committee.

At the hearing Mr. Pratt called 12 witnesses, all motormen and conductors, who testified that their understanding was that by "loyal men" was meant only those men who were in the company's employ before the strike and remained in service. Some of these witnesses stated that this understanding was based upon the fact that the $25,000 which the company distributed after the 1909 strike was given only to "loyal men" of this description, and that the company had followed the same rule in granting vacations this year; that is, it had given vacations, as it gave the bonus, only to men who were in its employ before and worked through the strike.

President Driscoll and Secretary Barron, of the Philadelphia Local 477 of the Amalgamated, also took the stand and stated that President Kruger, of the Transit company, had, in a conversation on April 25, defined "loyal men" as being those who were in the service before the strike. The men's case was completed by a statement from Mr. Pratt in which he asserted that the company's general counsel, in a conversation with W. D. Mahon, had defined "loyal men" as being those who were in the company's employ when the strike was called on Feb. 19; that he had understood from I. H. Silverman—to whose efforts as intermediary the settlement of the strike was ultimately due—that the returning strikers would immediately follow in seniority the men in the service on Feb. 19. It was understood, Pratt claimed, although he did not say that Mr. Silverman had made any promises in so many words to this effect, that the union men should be preceded only by "loyal men" and that the use of the term in this connection excluded men employed during the strike.

Ellis Ames Ballard, the company's general counsel, was its first witness. He emphatically denied that he had ever given the reported definition to Mr. Mahon. He stated further that throughout the strike he, all the other officials and the members of the board had been of one mind, that the men employed during the strike should not be displaced for the benefit of strikers.

President Kruger with equal emphasis denied that he had ever made the statements attributed to him by Driscoll and Barron, the president and secretary of Local 477. Mr. Kruger testified that at the time referred to he had defined the three classes of men with which the company had to deal as (1) the men who were in the service before and remained throughout the strike, (2) the men employed during the strike, and (3) the strikers

who had come back under the settlement of April 17, when the men voted to stay out, but were ordered back to work by their executive committee without any understanding whatever except that until they got regular runs (which it was believed would be within three months) they would be paid $2 a day, and that time out on strike would not be counted against them in respect to pension and insurance rights. Mr. Pierce, who was Mr. Kruger's assistant, took the stand and corroborated Mr. Kruger's statement. As to the distribution of the 1909 bonus and the giving of vacations, Mr. Kruger said that the company had been governed in the distribution of these favors by the usefulness and not by the loyalty of the men who received them.

I. H. Silverman also testified for the company. He stated that at no time had he promised that the returning strikers should have seniority over men employed during the strike; that he had never defined "loyal men," but that he had always been told by the company's officials that they would not displace or demote men employed during the strike at regular wages and upon promises of permanent employment. He also denied that he had ever given any estimate of the number of men that would have precedence over the strikers. W. D. Mahon, international president of the Amalgamated, appeared unexpectedly at the hearing and in reply to questions stated that Mr. Ballard had never given the definition attributed to him by Mr. Pratt, and that, so far as his (Mahon's) opinion went, the only "loyal men" were those who were loyal to their rights and went on strike.

In his summing up Mr. Pratt claimed that the men had established their case by showing that the company by its distribution of the bonus and vacations had always excluded men employed during a strike from the "loyal" classification; that the understanding of the men and his understanding was due to this and the further fact that Mr. Kruger had, in spite of his present denial, made the statement testified to by Driscoll and Barron. For these reasons and because seniority was a matter of right which the men did not surrender by going on strike, Mr. Pratt asked that the arbitrators decide that the former strikers be placed on the runs now held by the men who had been employed during the nine weeks' strike and remained with the company since then.

The company's position, as stated by Mr. Pierce in his argument, was that the "understanding" of the men and their leaders had no bearing on the case unless it could be shown that the company had made promises or statements or performed acts that justified such an understanding. It was asserted that there was no evidence of such promises, statements or acts; that the company's position had always been from the first minute that the question was brought up, long before the strike ended, that it would never demote the men who had fought its battles and enabled it to operate its cars in spite of assault, dynamiting and the most cruel use of the boycott. As to the statement attributed to Mr. Kruger, Mr. Pierce asked the arbitrators to consider whether it was likely that the president had reversed the policy of his company, himself and his board of directors and made a statement that would involve the breaking of promises to men employed during the strike.

DECISION

The decision, which was announced Nov. 8, recognizes all men who were permanently engaged or hired at the regular wage rate of 22 cents an hour from the beginning of the strike from Feb. 19 until April 1 as "loyal men." Such men will retain their priority rights except that they must return to the barns at which they were hired originally. Such men as were hired after April 1 and up to the end of the strike will not be considered "loyal men" and will lose their priority rights. The decision, which has been accepted by both sides, follows:

"We, the arbitrators appointed under a letter dated Oct. 17, 1910, by and between the Philadelphia Rapid Transit Company and the committee representing employees, do find as follows:

"All motormen and conductors employed prior to the strike and who remained with the company during the strike and are now in the employ of the company, shall be returned to those barns at which they were employed prior to the date of the strike.

"All motormen and conductors employed during the strike and up to April 1, 1910, inclusive, who were working at the regular rate of wages, namely, 22 cents per hour, and who received no other compensation, shall remain at those barns and upon those lines where they are now employed.

"All of the foregoing motormen and conductors shall be considered as having priority rights at their respective barns and upon their respective lines.

"All motormen and conductors who went out on the strike of Feb. 19, 1910, and who are now in the company's employ, shall take their respective places following the aforesaid.

"All changes shall be made in accordance with the foregoing on or before Dec. 1, 1910.

(Signed) "JOHN G. VOGLER.
"RAYMOND ROBBINS."

SUGGESTIONS ON STIMULATING LONG DISTANCE TRAVEL

BY E. C. VAN VALKENBURGH

In the course of a recent trip of about 2000 miles by electric railway between Chicago and New York, described in the ELECTRIC RAILWAY JOURNAL for Sept. 24, 1910, the writer was impressed with the difficulty of obtaining advance information in regard to timetables of connecting lines. It seems to him that the railway passenger agent and the conductor should stand in the same relation to the passenger or prospective passenger as the clerk or traveling salesman bears to the customer and prospective customer of the retail or wholesale house. A successful man of either of these classes must not only know his own line of goods but must also be familiar with the use to which these goods are put and their advantages over similar or competing lines. The passenger agent and the conductor are the selling representatives of the railway company, and therefore should be thoroughly informed regarding the extent and responsibilities of the electric railway field. To accomplish this, the following suggestions are made: Electric railway companies should exchange timetables and traffic literature of all kinds, particularly with connecting roads. This matter should be on file in the office of the general passenger agent, and, where possible, a brief statement of the most important connections and other information of interest to the traveler should be printed in the form of a leaflet or circular. Each conductor should then be supplied with a copy of this circular so that he can answer questions in regard to the connections made with other lines. The general passenger agent's office should be supplied with good maps of connecting roads, and copies of these maps should also be displayed in the waiting rooms and ticket offices of the company.

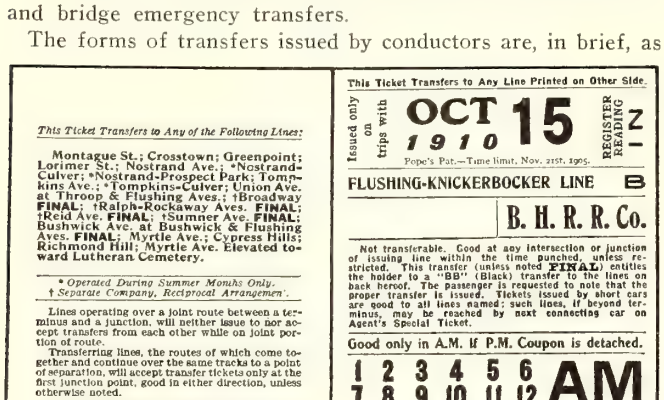
Passenger agents should also be encouraged to travel over connecting lines so that they will be familiar through observation with the country traversed and the service given. This practice should be extended to conductors as far as possible, and they should at least know something about all the divisions of their own company. A great many passengers will not take the trouble to apply to the general passenger agent's office for this class of information, and, while the company may not feel called upon to provide its conductors with all of the information which can be secured from the general passenger agent, yet they should be able to answer simple questions.

It is now possible to reach by electric car nearly all of the larger cities and points of interest in the Central, Eastern and Atlantic States, and the practice of spending a vacation in touring by electric car is growing in popularity. It could be made very much more popular if the practice was encouraged by electric railway companies.

NEW BROOKLYN TRANSFER SYSTEM

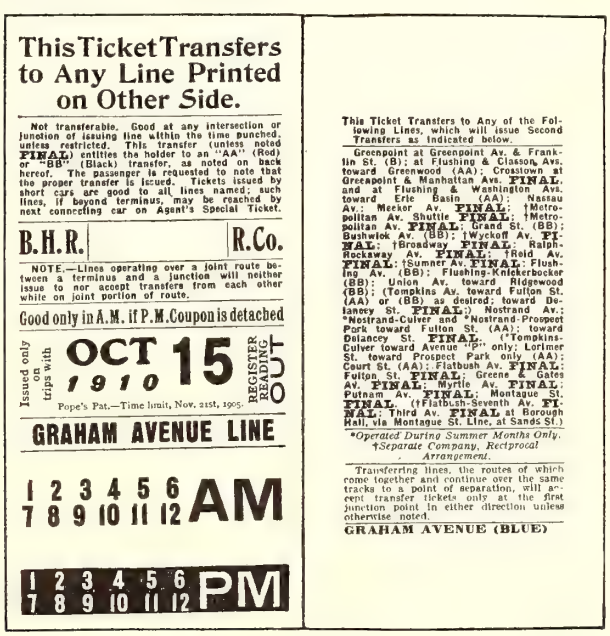
Under the new transfer system adopted on Oct. 15, 1910, by the lines comprised in the Brooklyn Rapid Transit System four types of transfers are issued by conductors and two types by transfer agents. There are also various forms of transfers for emergency use, including the car-to-car, bridge "buffalo" and bridge emergency transfers.

The forms of transfers issued by conductors are, in brief, as



Brooklyn Transfers—Front and Back of One of Cash Tickets

follows: Cash transfers, second (or direction) transfers, continuing trip tickets and conductors' special transfers. With the exception of one line yellow tickets are used on the outbound trip and green tickets on the inbound trip. On the excepted line, the Graham Avenue line, dark red and blue are used. The cash transfers are good in either direction at all intersections and junctions of transferring lines unless otherwise noted on the tickets. The front and back of the green cash transfers are illustrated herewith. The size of the original is 2 7/16 in. by 3⅛ in.



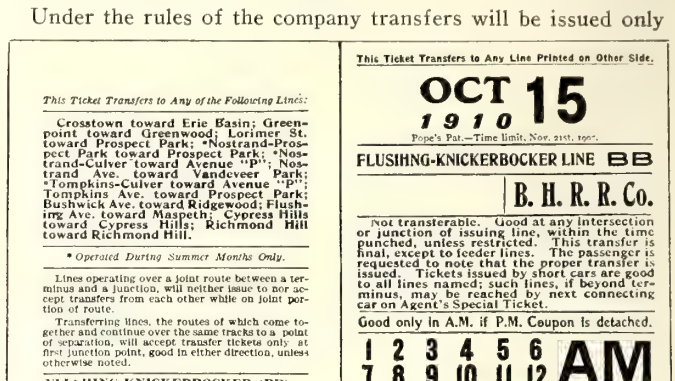
Brooklyn Transfers—Front and Back of Ticket Issued for Cash to Passengers on the Graham Avenue Line

The front and back of one of the direction transfers are illustrated herewith.

The continuing trip tickets are issued only by conductors on feeder lines for cash fares and, unless otherwise noted on the tickets, entitle the holders to cash transfers on connecting lines of the same company. The conductors' special transfers are issued to feeder lines on second or direction transfers from lines of the same company and also for certain other specified feeder lines from which and to which the privilege of a fourth ride is extended to passengers of the same company.

Of the types of transfers issued by agents, the continuing trip ticket, illustrated herewith, entitles the holder, unless otherwise noted, to a cash transfer. The transfer agents' special ticket is issued only from short to through cars. No transfer is issued on this ticket.

Under the rules of the company transfers will be issued only



Brooklyn Transfers—Front and Back of One of the Direction Tickets

when requested by passengers at the time of payment of fare.

The notice issued to conductors in connection with an explanatory booklet regarding the new system, signed by William Siebert, superintendent of surface lines, says, in part:

"In issuing transfers up to and including 12 o'clock noon the conductor will detach the p. m. coupon and punch on the a. m. time limit the hour to which the ticket is good.

"To fix this time limit the conductor will punch the next or succeeding hour, depending upon the time necessary to reach



Brooklyn Transfers—Cut on Left Is Continuous Trip Ticket Issued by Transfer Agents—Cut on Right Is Car-to-Car Emergency Transfer

the last transferring line on that trip, including a reasonable allowance for the headway of the connecting line.

"Under no circumstance will a conductor issue to a passenger a transfer ticket on which the time limit has been punched in two places. Should a conductor punch the wrong time on the transfer, he must not try to rectify the mistake by punching it a second time, but will issue another ticket, turning in the mis-

punched transfer with his mutilated tickets. All mutilated and mispunched tickets will be turned in with the unusued transfers.

LINES ON JOINT ROUTES

"Lines operating over a joint route between terminus and a junction will neither issue to nor accept transfers from each other while on joint portion of the route.

"Transfers are good only on date printed thereon; at intersection or junction of issuing line (unless restricted); within the time limit punched, and are not transferable.

"Transfers punched at 12 o'clock p. m. (midnight) will be accepted until 2 a. m. of the following day.

"The conductor will not accept a transfer, continuous trip or emergency ticket on which the time limit has either expired or been repunched, but will call the passenger's attention to the expired or repunched time limit and demand a cash fare, failing to pay which the passenger will be required to leave the car.

"If a transfer is presented for passage at a place other than a transfer point the conductor will not accept it, but will demand a cash fare from the passenger, failing to pay which the passenger will be required to leave the car.

"When a passenger presents a direction transfer at a transfer point, which transfer is not good in the direction that the car is proceeding, the conductor will so inform the passenger and inquire if the passenger desires to leave the car. If the passenger refuses, the conductor will demand a cash fare, failing to pay which the passenger will be required to leave the car.

"Transferring lines the routes of which come together and operate over the same track to a point of separation will accept transfers from each other only at the first junction, good in either direction, unless otherwise noted.

"In disputes concerning transfers the conductors must enforce the rule, but will inform the passenger that if any rule of the company has been violated the matter will be adjusted at the general office."

CONTROL OF MONTREAL STREET RAILWAY PASSES TO NEW INTERESTS

A new board of directors was elected at the annual meeting of stockholders of the Montreal Street Railway on Nov. 2. Control of the company has been secured by interests identified with the Canadian Light & Power Company, which has under construction a hydroelectric plant on the St. Lawrence River. It is reported that the property of the two companies will be consolidated.

The new directors are as follows: E. A. Robert, J. W. McConnell, D. Lorne McGibbon, F. Howard Wilson, J. M. Wilson, W. C. Finley and George G. Foster. The directors have elected the following officers: President, E. A. Robert; vice-president, J. W. McConnell; general counsel, H. A. Lovett; secretary, Patrick Dubee; general manager, Duncan McDonald.

An account of the meeting of stockholders, published in the Montreal *Gazette* of Nov. 3, says in part:

"Owing to the fact that L. J. Forget had not fully recovered from his recent illness his fellow-directors advised the Senator to take no risks, consequently K. W. Blackwell, vice-president, occupied the chair. The vice-president, in speaking of the future, said that the present board had decided not to stand for re-election and would offer no ticket. Mr. Blackwell said they were handing over a splendid property to their successors and the outgoing directors were proud of their work while in office and proud of the company's present position. During the busy evening hours the company ran 600 cars and he believed that in eight years time they would have 1200 in commission. Mr. Blackwell concluded by wishing the new directors every success in the undertaking they were about to assume.

"Robert Meighen, a director under the old control, arose and said his reason for joining with his co-directors in the negotiations with the Montreal Light, Heat & Power Company was because a syndicate had been formed for the purpose of controlling the Montreal Street Railway, with the avowed object of amalgamating the Canadian Power Company and the Montreal Street Railway. One of the chief promoters called on him and submitted the program they intended to adopt.

"While opposed to mergers, he felt that the only thing to do at the moment was to coincide with the other members of the board to negotiate with the Montreal Light, Heat & Power Company to put a counter proposition forward, which in his opinion would be more beneficial. He believed that public opinion was so strong that no matter who controlled the street railway they would not attempt to make any amalgamation with any power company at the present time.

"'The next business, gentlemen,' said the chairman, 'is the election of directors.' The scrutineer announced that as only one ticket had been nominated and one ballot cast the gentlemen were unanimously elected.

"Mr. Blackwell committed the officials and men generally to the care of the new directors, as the old régime, he said, had always made it a point to care well for the employees of the corporation while in office.

"Congratulations were then the order of the day, and no hard feeling was visible, at least on the surface.

"Mr. Robert stated that a number of gentlemen interested in the company had increased their stock holdings until they now controlled a majority of its shares. They believed that the company has a very prosperous future before it; and that, with continued efficient management, it could be made one of the best street railway properties on the continent. It would be the aim of the new board of directors to invest additional capital in extending the street railway lines and in improving the service to meet all legitimate requirements of the citizens and civic authorities, conserving at the same time the interests of the shareholders.

"After the meeting concluded K. W. Blackwell, the former vice-president, stated that after the old directors had looked over their proxies they came to the conclusion that the Robert group had 49,500 shares and expected to have a couple of thousand more at the meeting, and as the men then in power only had from 30,000 to 35,000 there was only one thing to do, viz., to hand over the direction of the Montreal Street Railway Company to the men who had secured control."

HISTORY OF THE MONTREAL STREET RAILWAY

A brief history of the principal events in the development of the Montreal Street Railway system during the period from 1861 to 1910 is contained in the annual report of the company for the fiscal year ended Sept. 30, 1910. A review of the report for the last year is published elsewhere in this issue. An abstract of the history, which relates to the physical and financial development of the company, the progress in relations with the employees and the traffic conditions, follows:

"With the close of its present fiscal year the Montreal Street Railway concludes its first half century of activity. It is a far cry from the Montreal of 1861 and the Montreal City Passenger Railway incorporated in that year, with its few miles of horse cars and omnibuses, to the metropolis and the hundreds of miles of electric road of to-day. The half century has been one of most extraordinary progress and prosperity for both the city and the company, whose histories are naturally closely interwoven, since the prosperity of the one is inevitably dependent upon that of the other.

"A retrospect tells a story of uninterrupted progress and improvement which will prove interesting to those familiar with the company's history, and instructive to the many to whom the street railway of to-day is merely a part of the accepted order of things in the city's life. It tells a story of civic growth which has been rendered possible to a large extent by the activities of the company in extending its lines, and thus annihilating distance and making suburbs more available than nearby streets were before it started operation.

"In 1861 Montreal had a population of but 91,000, and with its suburbs 101,439. To-day Montreal with its suburbs has a population of approximately 600,000.

"They were men of courage and far-sighted ideas who in

1861 decided that the time had come when Montreal needed a street railway. The population was small, business was a mere fraction of that transacted to-day, while the climatic and topographical conditions were perhaps as forbidding as could be found in any city in the world. The company they founded used horses. Stables were its power stations, and in winter the service was kept up by sleighs, and in the late fall and early spring by omnibuses. They started with six miles of track, eight cars, a few horses and one stable. To-day they could point to an electric system with many hundreds of cars which are not merely modern, but so far in advance of the times that the greatest cities of the United States and the world are paying tribute by the adoption of the same style of cars for their services.

"Their first attempt at modernizing Montreal resulted in the construction of 6½ miles of single passenger track, with eight passenger cars, a stable and car house, which cost altogether some $80,000, and the company closed its stock books when 2500 shares at $50 each had been sold for $125,000.

"To-day the company operates over 144 miles of track, and controls and operates subsidiary companies with some 86 miles of track, a total of 230 miles.

"The manner in which Montreal's population has grown since 1861 shows that, while the increase was always steady, the really rapid progress dates from 1891, about the time the electric car service was put in. The increase has been as follows:

1861, city and suburbs	101,439
1872, city and suburbs	155,865
1881, city and suburbs	178,237
1891, city and suburbs	261,302
1901, city and suburbs	376,402
1910, city and suburbs (estimated)	600,000

"This period of latter growth has witnessed a vast improvement of the city in every way, the amount of taxable property for the year 1909 being $259,500,000, with $68,500,000 exempt.

"This year the city treasury received from the company $387,264 as a percentage of its earnings and taxes, or more than four times as much as the total cost of the original system as built in 1861.

BEGINNING OF THE SYSTEM

"The Montreal Street Railway was born with little ceremony or anything else to mark the beginning of a new epoch for Montreal when, on May 18, 1861, the Provincial Legislature adopted a law incorporating the Montreal City Passenger Railway Company 'for the purpose of constructing and operating street railways in the city and parish of Montreal.' On Aug. 17 at a meeting of subscribers Alex. Easton was awarded the contract for building the first section of road, comprising 6 miles of single track and an equipment of eight passenger cars, a stable and car shed.

"Work was started in September, ground being broken on the 18th. The arrangement was that Mr. Easton should build the line and operate it for a time under lease. By Nov. 27, 1861, part of the line was sufficiently advanced to be opened. The road met with immediate success, and was well patronized, although the service, naturally, was slow and the cars infrequent.

"Matters having progressed thus far, a meeting of the directors was held on Nov. 5, 1861, when the company's stock books were ordered closed, 2500 shares having been subscribed at $50 a share, representing a capital of $125,000.

"In the following year construction work was continued, and by June 10, 1862, another line had been completed. This was equipped with three horse cars. On this same day the company declared its first dividend, at the encouraging rate of 12 per cent per annum for the first year.

"On July 4, 1862, the company terminated the lease with the contractor, and took over the actual operation of the road, with considerable profit, the earnings far exceeding the lease price.

"The advantage of the car line was so much appreciated by the public that in 1863 the company applied to the city for power to build lines on additional streets.

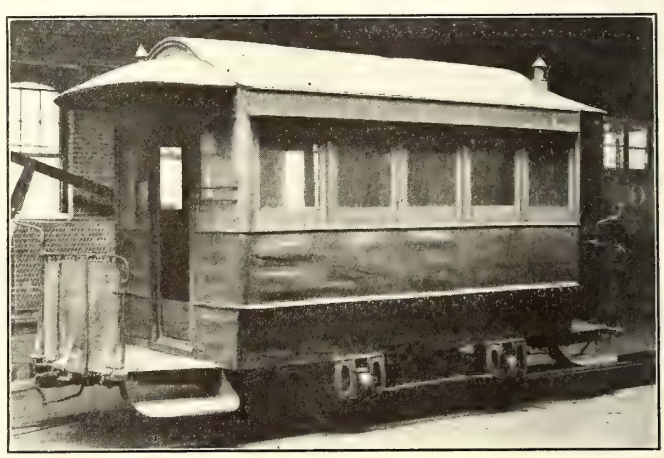
"During 1863 the company carried 1,066,845 passengers, scarcely 1 per cent of the number carried to-day. It was regarded, however, as an excellent showing, and the company started to build 6 miles more track. During 1864 1,485,725 passengers were carried, an increase of about 500,000 for the year.

"The winter service was being kept up by sleighs, the tracks and appliances preventing the cars from running. The company had eight sleighs at this time, with five more being built. There were no heating appliances, and in order to keep the passengers warm each sleigh was provided with about a foot of pea straw, in which the people buried their cold feet.

"During the early days the cars were run in a rather happy-go-lucky fashion. Time was of little object. The cars would stop anywhere to take up passengers, and if one wanted to get off and talk to a friend or do a little shopping, the obliging conductors would wait and give their horses a rest. But the demands of business were getting too much for this, and in June, 1865, the board decided that in future the cars should not be stopped to allow passengers to go into stores and make purchases and return again, because this kept other passengers waiting.

"It was found that the wages paid were too high, and in August, 1865, the conductors were reduced from $30 to $25 a month. The conductors petitioned for a return to their old pay of $1 a day, but this was refused, and the directors reduced the pay of drivers from $25 to $20 a month.

"For many years matters went along smoothly and quietly until the twenty-sixth annual meeting, in 1886, when an event occurred which subsequently meant a good deal for the company, although little noticed at the time. This was the election of the present president, L. J. Forget, as a director.



Type of Horse Car in Use in Montreal Prior to 1892

"During all this time the mileage of the company had not increased very greatly, amounting to only 12½ miles by 1892. At this time the company was operating 82 regular sleighs during the winter season.

"The year 1892, however, marked the most important period in the company's history, the beginning of the electric era, which has produced such wonderful results in the past 18 years. It was not without violent opposition that the subject was discussed. Several directors, supported by many of the shareholders, declared that the thing was impossible and would ruin the company, and some of the directors even went to the length of resigning rather than countenance such a project. So if the first directors of the company, in 1861, were men of courage and enterprise, how much more so were those who backed up the change to electricity in face of the great cost and doubtful outcome!

"At the adjourned special meeting of May 17, 1892, a tender for electric car service was submitted and considered clause by clause and finally approved of and adopted and ordered to be transmitted to the city clerk, together with the sum of $25,000 deposit.

"The city accepted the company's terms, and the work of electrifying the service was started without delay.

"The work of conversion was especially interesting in this city, owing to the climatic difficulties to be overcome. Meteorological records had shown that the average snowfall for each of the 16 winters from 1875 to 1891 was 118 inches; the greatest fall of 173 in., or over 14 ft., taking place in the winter of 1886-87.

"Another exceptional difficulty was that of grades. For instance, Amherst Street rises 50 ft. in a distance of 800 ft.; St. Denis Street rises 47 ft. in a distance of 700 ft.; St. Lawrence Street rises 68 ft. in a distance of 1500 ft.; Beaver Hall Hill, 60 ft. in a distance of 900 ft., and Windsor Street, 70 ft. in a distance of 1500 ft., while on Guy Street and Côte des Neiges Hill there is a rise of 350 ft. in a distance of 5150 ft., with a maximum grade of 11 per cent for about 100 ft.

"It was during 1903 that the formation of the Mutual Benefit Association was inaugurated, which has since proved of great benefit to the employees and greatly strengthened cordial relations among them.

INCREASE OF CAPITAL

"In 1908 $292,000 debenture bonds were redeemed, and $2,238,666 debenture bonds and another $1,000,000 of stock were issued, bringing the capital up to $10,000,000 stock and $4,420,000 bonds, where it stands to-day.

"The marvelous story of the progress of the company since the introduction of electric traction in 1892 is best told in the following striking summary:

"In 1892 the track mileage was 12½ miles; at the present time the total single track mileage is 144¼ miles, exclusive of subsidiary companies. The rails used in 1892 were of 30-ft. lengths, weighing 56 lb. to the yard, as against rails of 60-ft. length, weighing 96 lb.

"When in 1892 the company started its electric operation the entire service was run from a single power station. By 1894 with two power plants the company was using six 650-hp Corliss compound Laurie engines, belted to the different generators. At present the power capable of development by the company for its cars is 11,400 kw generated by steam, and 9613 kw purchased water power, a total capacity of 21,013 kw, as compared with 1200 kw in the original installation.

"In no department has the progress of the company been shown more effectively than in rolling stock. Of course it would be useless to contrast the present cars with those of the horse régime; they are so far apart that comparison does not exist. In 1892 the road was equipped with cars which, luxurious as they seemed when contrasted with the old horse outfits, were only 20 ft. in length. Outside of the application of motive power, their main equipment was the conductor and motorman, with lever and cumbrous hand brake. The electric appliances were crude. The cars were fast enough, but they were not particularly reliable and not any too safe. The most modern cars now being turned out are 51 ft. long. The factor of safety has been enormously improved. The adoption of the 'pay-as-you-enter' principle has simplified the collection of fares, saved time at stopping points, decreased the number of accidents and furnished additional comfort to the passengers.

"In 1892 there was an average of eight cars in the service. By 1904 this had grown to an average of 300, while at the present time the company has 600 cars running. Moreover, the passenger capacity of these cars has much more than doubled.

"The contrast between the modest original stock issue of $125,000 and the present capitalization of $10,000,000 is sufficiently striking. What makes it the more impressive, however, is the fact that by far the greater part of this capital has been added since the electrification of the road and its subsequent development.

"After 31 years of existence as a horse car system the capital of the company had increased in 1892 only to $900,000. Then followed the electric era. The following shows the increases since 1892, when the capital was $900,000: 1893, $1,100,000; 1894, $2,000,000; 1897, $1,000,000; 1900, $1,000,000; 1903, $1,000,000; 1906, $2,000,000; 1908, $1,000,000; total, $10,000,000.

"The company owns a majority of the stock and all of the bonds of the Montreal Park & Island Railway Company, having a mileage of 49.64 miles, leases and operates the Suburban Tramway & Power Company (now called the Public Service Corporation), all of whose stock and bonds it owns, of 6.12 miles, and also owns all the stock and bonds of the Montreal Terminal Railway, 30.27 miles.

"The army of employees of the company are as well looked after as those of any system on the continent, and it is largely due to this that the relations between the men and the company have generally been so friendly. Instead of $30 to $35 a month, which the drivers and conductors were paid before the electrification of the company, a liberal schedule of wages is now paid.

"In addition to this the men have an employees' mutual benefit association. This was formed in 1903. It was strongly encouraged by the company, whose officials take an active interest in its progress and contribute handsomely to its funds, while the annual street railway men's picnic at Dominion Park in aid of this organization has become one of the big events of the year.

"In 1892 the number of passengers carried totaled 11,631,386, as compared with 60,281,834 in 1904 and 107,241,406 in 1910. The transfers used in 1892 were 5,994,113, as compared with 17,915,242 in 1904 and 36,437,123 in 1910.

"The average fare in 1892 was about 5 cents, as compared with less than 4 cents in 1910. This is not an advantageous showing for the company, but is a personal advantage to the public, and is accounted for by the purchase of more tickets. It must also be borne in mind that the company is steadily increasing its mileage, consequently a passenger may travel fully 10 times the mileage to-day as compared with 1892 at a cheaper rate of fare.

"The service given by the company is admitted to be the equal of any on this continent. This is more remarkable when we take into consideration the hilly character of our city, the number of narrow streets, the topographical layout, and the severe winter weather with its heavy snowfall. The rates charged are less than in American cities."

DELAYS TO TRAINS IN THE HUDSON TUNNELS

The Hudson & Manhattan Railroad is now operating more than 2200 trains a day in the tunnels under the Hudson River between New York, Jersey City and Hoboken. This is the largest number of trains operated daily on any double-track railroad in the world. During the rush hours the headway of trains in and out of the Cortlandt Street terminal station is only 1 minute, and the maximum headway of trains between the hours of 6 a. m. and 12 midnight is 2½ minutes. In order to maintain the schedule for this very frequent service it is essential that even the shortest delays be prevented as far as is possible. Another reason why delays to trains are particularly to be avoided in the Hudson tunnels is the fact that trains are run from the stations on the Sixth Avenue branch and from the Cortlandt Street terminal to connect with trains of the steam railroads leaving the stations in Jersey City and Hoboken, and all of the railroads whose stations are reached by the Hudson tunnels now advertise the leaving time of the tube trains in their time tables. It is very important therefore that a tube train which is scheduled to make a connection with a steam railroad train shall be on time to the minute.

The Hudson & Manhattan Railroad has a very thorough method of following up and fixing responsibility for delays to trains from any cause. Every detention of a train or failure of any part of the equipment which might cause a detention under ordinary circumstances is reported by the train crews to the trainmaster. The trainmaster makes a daily report of such occurrences to the general superintendent, giving the time, location, nature and cause of the detention. These reports are examined each day by the chief clerk in the general superintendent's office, and a copy of the statement from the trainmaster concerning each detention is sent to the head of the department which, in the opinion of the trainmaster, was responsible for the detention. These daily reports are investigated promptly by the heads of the departments affected, and a

statement is returned to the general supeintendent's office, acknowledging the cause of the delay and stating the action taken to prevent a repetition of it, or shifting the blame in whole or in part on some other department. At the end of each month the general superintendent goes over all of the trainmaster's reports of detentions and the explanations of the department heads, and compiles a table showing the number of detentions and the total number of minutes of detention chargeable to each of the different departments. A copy of this table is sent to the head of each department, with a circular letter of comment by the general superintendent. Two typical letters sent out with this monthly statement are re-printed:

"September 9, 1910.

"To Mr. D. Sage, Chief Engineer.
" Mr. P. V. See, Superintendent of Car Equipment.
" Mr. J. F. O'Rourke, Trainmaster.
" Mr. C. S. Klumpp, Assistant to General Superintendent.
" Mr. M. H. Collins, Supervisor of Signals.
" Mr. L. G. Smith, Chief Electrician.

"Dear Sir:

"We were unfortunate during the month of August to have a cable blow-out causing a delay of 118 minutes. With this exception the work of all departments was excellent.

"The power house again leads with a clean sheet.

"Car equipment, with 20 minutes, is excellent.

"Signals, with 21½ minutes, is also excellent.

"The transportation and substation departments suffered owing to the carelessness of some of their men.

"Thanking you for the earnest efforts you are making to make our service the very best, I remain,

"Yours truly,

(Signed) "E. T. Munger,
"General Superintendent."

"October 6, 1910.

"To Mr. D. Sage, Chief Engineer.
" Mr. P. V. See, Superintendent of Car Equipment.
" Mr. J. F. O'Rourke, Trainmaster.
" Mr. C. S. Klumpp, Assistant to General Superintendent.
" Mr. M. H. Collins, Supervisor of Signals.
" Mr. L. G. Smith, Chief Electrician.

"Dear Sir:

"I have before me the detentions for the month of September, 1910. The number of detentions was 29 and the total minutes detention 85½. This can be compared with the month of September, 1909, in which month we had 42 detentions, amounting to 171 minutes. The months are directly comparable, for in the month of September last year we opened up the southern division, and in the month of September this year we opened up the western division.

"Transportation has 18 minutes' detention this year against 50 minutes last year.

"Car equipment has 18 minutes this year against 64 minutes last year.

"The signal department has 10 minutes this year against 43 minutes last year. This is a big improvement for all of the above.

"Ten minutes' detention on signal breaks all records, and I wish to congratulate and thank the signal department.

"We are now running 2078 trains a day, which makes the above comparisons all the better.

"The power house and substations again come to the front with a clean record, and I wish to congratulate and thank all of the employees in these departments for their good work, and hope they will keep it up.

"Again thanking you all, I remain,

"Yours truly,

(Signed) "E. T. Munger,
"General Superintendent."

Praise is given when praise is due, and attention is called to any conditions which in the opinion of the general superintendent require special action.

Table I is a summary of the detention reports for eight months, beginning February, 1910. The minutes of detention shown in the table are the minutes of detention to the first train encountering an obstruction or delayed by failure of any part of the equipment. It will be readily understood that with such a close headway a detention of even one or two minutes to one train will cause a delay to a number of following trains, and in case of long detentions it may be some time before all the trains can get back to their normal schedule. The best record for any month since the road was in operation was made in July, 1910, when there were 20 detentions for a total of 64½ minutes. Occasionally some serious break-down will cause a long detention, which brings the monthly total above the average. Thus in August a cable blow-out caused a single delay of 118 minutes, chargeable to maintenance of way. With this exception the record for August compares favorably with July or September. A great improvement has been made during 1910, as shown by a comparison with the total number of minutes of detentions during the four months previous to February, 1910. In October, 1909, the total detentions were 463 minutes; in November, 1909, 211 minutes; December, 1909, 366½ minutes, and in January, 1910, 145 minutes.

TABLE II.—TRAINS OPERATED AND TRAINS LATE AND ON TIME.

Month.	Total Number Trains.	Number Trains Late.	Per Cent.	Number Trains on Time.	Per Cent.
September, 1910	58,333	257	0.45	58,076	99.55
August, 1910	45,043	148	0.33	44,895	99.67
July, 1910	44,755	121	0.27	44,634	99.73
June, 1910	43,600	258	0.60	43,342	99.40
May, 1910	45,859	220	0.48	45,639	99.52
April, 1910	44,721	237	0.53	44,484	99.47
March, 1910	46,259	375	0.82	45,884	99.18
February, 1910	41,443	320	0.77	41,123	99.23

The classification of detentions by departments is made very carefully. The transportation department, for example, is charged with all detentions due to errors in the routing made by the signal men in the interlocking towers, failure to load or unload trains promptly and failure to have trains made up in time to leave terminals. The best record made by this department was in May, when it was charged with no detentions. All failures of car equipment due to defective materials or workmanship in making repairs, or to inadequate inspection, are charged to the car equipment department. As will be seen from an examination of the totals, the delays chargeable to this department are greater in number than almost any other department, but they are of comparatively short duration. In no one month since the record was begun has the car equipment department escaped with a clean record. The maintenance-of-way department is charged with all delays due to defective tracks and switches, third-rail and third-rail jumper cables. In February no detentions were charged against this department, and the average for the last eight months is small.

TABLE I—CLASSIFICATION OF HUDSON AND MANHATTAN TRAIN DETENTIONS BY DEPARTMENTS FOR EIGHT MONTHS OF 1910

	September		August		July		June.		May		April		March		February	
	No.	Total Min.	No.	Total Min.	No.	Total Min.	No.	Total Min.	No.	Total Min.	No.	Total Min.	No.	Total Min.	No.	Total Min.
Transportation	6	18	5	19	3	6½	7	15	0	0	..	5	..	12½	..	2
Car equipment	7	18	6	20	4	19½	12	12½	11	45½	..	7	..	35½	..	21
Maintenance of way	3	17	3	125	1	2	1	10	3	5½	..	6	..	10½	..	0
Signals	4	10	7	21½	4	13	7	21½	7	11½	..	67	..	41½	..	41
Power house	0	0	0	0	0	0	0	0	0	0	..	0	..	0	..	0
Substations	0	0	4	13½	1	2	0	0	0	0	..	5	..	6	..	0
Construction	2	7½	0	0	0	0	0	0	1	2	..	2	..	0	..	10
Signal construction	7	15	0	0	1	2	0	0	2	3½	..	0	..	0	..	0
Miscellaneous	0	0	0	0	5	18	0	0	0	0	..	5	..	3½	..	11
Ticket bureau	0	0	0	0	1	1½	1	3	0	0	..	0	..	0	..	0
Total	29	85½	25	199	20	64½	28	92	24	68	..	97	..	109½	..	85

Delays due to defective signals, including the automatic stop apparatus, have averaged about the same for the last five months. The power house has had an absolutely clean record for eight months, and there have been very few delays chargeable to substations. The detentions listed under miscellaneous include all those which cannot justly be charged to any one of the operating or engineering departments.

Table II shows the number of trains operated by months, the number of trains late and on time, and the percentages. This table is interesting in connection with Table I, because it shows the cumulative delays to trains on account of the several detentions given in Table I. Thus in August, while the total detentions were very much larger than for July, the number of trains which were late is only slightly greater. For the purpose of compiling this table a train is considered to be late which arrives at either terminal one minute or more behind its scheduled arriving time. No allowance is made for a train which arrives at a terminal late, but leaves on time.

THE BASIS OF VALUATION IN CASE OF MUNICIPAL PURCHASE OF STREET RAILWAYS

BY SIDNEY OSSOSKI, SECRETARY FINANCE COMMITTEE, CHICAGO RAILWAYS COMPANY

Developments of the last few years in connection with various proposed schemes of federal, State or municipal control and supervision over semi-public utilities, and taxation and rate making for these properties, have made the subject of valuation one of the utmost importance not only to investors, but to the public generally.

With street railways the question has arisen most frequently in connection with the settlement of controversies over the companies' rights in the streets and the extension or renewal of franchises upon terms which are intended to reserve to the municipalities effective control over the companies by the reservation of an option to purchase at certain stated periods and at an agreed valuation.

The valuation of the street railway properties in Chicago and Cleveland will serve as an example of the methods employed. An inventory is made of the physical properties with prices as of day of inventory; then certain percentages are added as allowances for overhead charges, which may be considered as money spent in the necessary production of the physical property and in placing it in operation—namely, such charges as engineering, superintendence and incidentals. To the inventory price thus determined there is added the value of the remaining life of the franchises; this value is reached by capitalization of the estimated net earnings for the remaining term, discounted to date of the valuation, and based upon the existing rate of fare, taxation and service rendered.

This method of valuation is open to the criticism that, outside of the small overhead charges above referred to, it fails to give full and proper recognition to certain intangible elements of value, consisting of expenditures which do not appear tangibly in the physical property, but are necessary to its creation and development.

In no scheme of evaluating railway or railroad properties, whether only proposed or brought to conclusion as in Chicago, have the valuation commissions and municipal authorities who prescribe the terms of the grant taken any account of appreciation. The commissions do not recognize the additional value of real estate for railroad purposes, such as (1) location value for railroad purposes; (2) necessity of discarding part of the real estate purchased; (3) additional cost of condemnation of property. The municipal authorities, in turn, require reserve funds for depreciation purposes, but will concede no advantage to the company arising from increase in property values. In Chicago, a rapidly growing city of 2,200,000 people, the real estate investment (not including buildings) for railway purposes amounts to approximately $4,500,000. What the increases in value will amount to at the time the ordinances expire it would be difficult to say. But should the city purchase at that time, or authorize a licensee to purchase, as authorized in the ordinance, the company would turn over a rehabilitated property at a figure which was arbitrarily fixed at the beginning of the term (namely, an agreed fixed price at which the valuation commission "inventoried" the property, plus the cost of all expenditures for rehabilitation and extensions, as prescribed in the ordinance). The purchasers would take the property with its increased real estate values without the payment of a dollar of allowance for such increases, the item of appreciation having been entirely omitted from the calculations of the valuation commission.

In an appraisal of properties that may in future be acquired by the municipality the following elements of value must be considered, in addition to the purely physical property: (1) Special circumstances and conditions rendering the use of property profitable or unprofitable; (2) present earning power; (3) future earning power; (4) intangible elements such as cost of promotion, engineering and legal expenses prior to and during construction, and cost of financing; (5) development expenses, cost of experimentation, and obsolescence, resulting in the premature abandonment of devices due to changed conditions; (6) appreciation of real estate; and (7) going value, taking into consideration the losses suffered during the development period.

Even on the physical side of the problem, the tendency of engineers is to underestimate the cost of a project. This fact reveals itself in the case of such great public enterprises as the Panama or the Suez Canal and holds good in the main throughout the list of less prominent projects. It is particularly true in the railroad field, whether steam, surface, subway or elevated. Enterprises like the London tubes, which were originally projected by the engineers to cost not to exceed from $1,000,000 to $1,500,000 per mile (route length), ultimately cost over $2,500,000 and in some instances over $3,000,000 per mile.

In what respects the commissions and municipalities have fallen short in their recognition of the principles above enunciated will appear below. In Chicago a valuation was put upon the street railway properties by a commission composed of B. J. Arnold, Prof. M. E. Cooley and A. B. Du Pont. This was probably the first enlightened attempt to place a valuation on a public utility corporation's property in order to determine a basis for possible municipal purchase in the future. Under this valuation the following percentages were added as "overhead charges" to the inventory value, as representing intangible or non-physical values: On track, electric power distribution system and buildings, 15 per cent; on power plants, 10 per cent; on cars and car equipment, 5 per cent. In addition to the reproduction value of the property, there was added, to cover legal expenses, interest during construction, brokerage and contingencies, 10 per cent. Nothing, however, was added to the following items: Real estate, patent rights, ordinary shop machinery and tools, stores, supplies, office furniture and fixtures, horses, wagons, miscellaneous items.

Among other disputed items in the Chicago settlement was that of paving. The question was as to whether anything should be allowed to the companies in the way of additional valuation on account of expenditures for paving over several hundred miles of right of way. The contention on the part of the city was that no allowance should be made, because the paving, although paid for by the companies, was the property of the city, and the expense thereof was in the nature of additional compensation for franchise rights.

This contention entirely overlooked the fact that the paving obligations of the companies created an expenditure which the companies were entitled to amortize. The questions of ownership of the pavement, and of whether the cost is a part of the permanent value of the properties, are entirely immaterial. The fact remains that the companies were obliged to make extensive expenditures for paving, which either constitute an addition to capital or else represent franchise value. If these expenditures represent franchise value, the meaning is that the cost of paving has been met out of the net receipts above operating expenses, taxes and interest charges. In either event, however, the companies are clearly entitled to an allowance on account of such

expenses, precisely as they are entitled to an allowance on account of intangible values, such as development expenses and the cost of experimentation. The fact that the companies have been unable to create an actual amortization fund as a provision against loss at the termination of the grant should not weigh against them, unless it can be shown that the money applicable to such a fund was improperly dissipated. It should never be forgotten that items like the foregoing, which do not add to the permanent value of a property, must be paid for out of somebody's pocket. If they have been paid out of net receipts the owners of the property have thereby been deprived of so much in dividends which must at some time be made up to them, or reimbursed by amortization. If, on the other hand, these items represent an expenditure of capital funds, there is equal reason for making good the amount thereof to the company, in order that the investment may remain intact, which, in all justice, is the investor's due.

In Europe, whence we inherit these schemes of corporate valuation, which are really merely an emanation of the socialistic and paternalistic tendencies of certain European countries, some distinctly novel features of valuation are to be observed.

In the case of the elevated-underground road of Berlin, including both the original line and the extension from Potsdamer Platz now under construction, the conditions of reversion and purchase are as follows: The franchise for the entire system extends 90 years from 1897. At the expiration of the franchise term the entire roadway, including tunnels, elevated structures and stations, reverts without payment to the city. The rolling stock, power stations, workshops, office buildings and other property remain with the company, but can be purchased by the city on payment of full value plus a bonus of 10 per cent. The city also retains the right to purchase the entire property of the company at certain fixed periods prior to the expiration of the franchise. Such purchase may take place in 1927 (30 years after the granting of the original franchise) and each 10 years thereafter, up to 1977. In case the city decides to exercise this privilege, it must notify the company of its decision two years prior to the date of taking, and such notice once given cannot be withdrawn. The basis of valuation for purposes of purchase is fixed at 25 times the average net receipts for five years prior to such purchase. The valuation, however, shall not be less than the book value of the property. The franchise defines to some extent the method of determining the net receipts and provides for a supervision and audit of the company's accounts in order to safeguard the city's interests. In case the company fails to carry out the accounting methods prescribed by the city, the latter may take the structural value instead of the earnings as the basis of valuation in purchase. If the purchase takes place in 1927, the price paid is to be 25 times the net receipts (which shall not be less than the book value of the property) plus a bonus of 37½ per cent on the cost of the road; in 1937 the valuation will be the same plus a bonus of 12½ per cent, instead of 37½ per cent; in 1947 the valuation will be 22 times the net receipts; in 1957, 19 times; in 1967, 16 times, and in 1977, 12 times the net receipts. In 1987 the entire structure goes to the city without payment.

The policy of the Prussian State has heretofore been in favor of extensions of franchises about to expire, even in cases where, as in Berlin, the city has attempted to reserve to itself the right to take over the property without compensation at the end of the franchise period. This conflict of authority between the city and the State is, however, more apparent than real, for the reason that the city has never formally contested the authority of the State in these matters, and in practice has yielded to the State all of its claimed prerogatives.

In England the first provision adopted looking toward the acquisition of street railway properties through purchase by the municipalities was contained in the tramways act of 1870. The purchase price or basis of valuation there prescribed was the structural value of the property, less depreciation, with no allowance for franchise value or good will. Under this act the Board of Trade is permitted to modify these provisions as to valuation and purchase, and has accordingly adopted more equitable terms in recent years.

Under the light railway act of 1896, which is supplemental to the tramways act, the municipal purchase price has been fixed at the "fair market value as a going concern," and this provision is likewise subject to modification.

Some attempt has been made to make a distinction between a valuation for the purpose of establishing a rate and a valuation for the purpose of fixing a price in the event of municipal purchase. It is contended, for example, in a rate case, that the object of allowing a sufficiently large overhead charge is to make sure that the capital receives its return; whereas in fixing a municipal purchase price the capital is assured of its rate of return, and the question is simply, "What justly and truly ought the capital to be to-day?" But this contention loses sight of the fact that in both instances the value we are trying to find is not only the cost of reproduction of the physical property, but likewise how much has been added to physical value by all of the intangible elements which previous earnings of the company have not been large enough to enable the company to amortize. In other words, it is quite as proper in the one instance as in the other that every dollar that has gone into the property for the purpose of creating its present earning capacity should be protected. It is not alone physical property that should be represented in capital, but consideration should be had for all the other elements as well, and it is no answer to say that these other elements should have been amortized out of the surplus earnings of the company. The question is rather, "Were the past earnings of the company applicable to such purposes diverted to other uses?" And in the consideration of this question the rights of the investors to a reasonable return on the investment should not be overlooked.

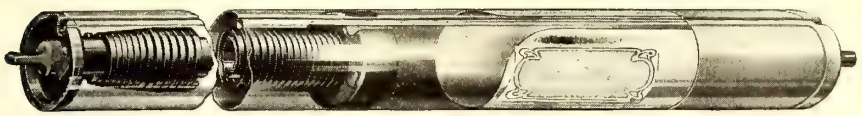
In a rate case, no less than a purchase, an attempt to discard any of the elements which have gone to make up the sum total invested in the creation, construction and development of the properties is confiscation.

In theory as well as in practice the original cash investment in any street railway system never is fully represented in the physical properties after the first wheel begins to turn, for from that moment depreciation sets in. To the argument that a depreciation fund should be accumulated to preserve the capital intact, the answer is that there is no record of any new railway that was able to earn enough to pay operating expenses, provide for necessary maintenance and upkeep, and furnish proper service, while setting aside a reserve fund for depreciation. The investor in the properties of public service corporations is unlike the investor in other kinds of property, by reason of the fact that the former's investment is primarily not in lands or buildings or rolling stock, as such, but in a business in which the physical property employed is but an incident and the right to operate is the all-important factor, constituting, as it does, a natural monopoly in which fluctuations of property values play absolutely no part. He regards the security of his investment as dependent upon the earning power of the property and not, like the owner of lands or buildings, upon fluctuations in value or the possible rise and fall of a market. From his point of view the question of the age or condition of his property is of importance only as it bears upon the property's earning capacity. Necessarily, therefore, he will be the first to understand that he cannot afford to let his property run down so as to injure its earning power, and he will be the first to wish to guard against any such result to the fullest extent the earnings permit, and in doing so he has not only often to deprive himself of his dividends, but must actually in frequent cases supply further sums wherewith to conserve the property and prevent greater losses.

It must accordingly be plain to everyone that it is absurd to allow investors only the depreciated value of their properties, for this is tantamount to penalizing them for maintaining and operating a property that happens to be one that renders a service to the public. In other words, they are asked to suffer a loss for providing the public with something that the public wants, and which is in innumerable ways a public benefit and necessary to comfort and convenience.

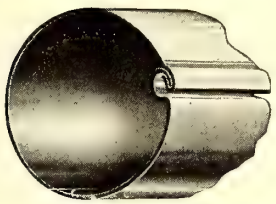
ALL-METAL CURTAIN ROLLER

The Curtain Supply Company, Chicago, Ill., is offering to the trade its Rex all-metal roller, which is shown in the accompanying illustration. All the parts of the roller are made of metal by dies and are therefore uniform and correct. The roller barrel is closed by a seam instead of being soldered in the usual manner. This process produces a barrel of absolutely uniform diameter, allowing the curtain to be wound up evenly along its entire length. It also prevents the barrel from opening at the joint. The end caps and pins, which are pressed in one piece from metal, give assurance that the end pins will always occupy a position at the center of the barrel. As the pins are part of the end piece they cannot get out of alignment. This construction allows the roller to revolve on its axis and eliminates all wabbly motion. On account of its peculiar construction the groove is never clogged with solder and has a round instead of a sharp cutting edge. The grooves also mate and match perfectly, rendering it easy to apply the curtain to the roller.

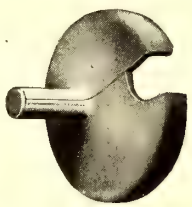


Roller Complete

The plug ends are made of metal with spring extensions which bear against the inside of the roller barrel and produce an even and smooth holding adjustment, at the same time permitting the roller to be readily lengthened or shortened at will. This prevents all swelling or shrinking of the wooden plug and the consequent difficulties arising therefrom. The mandrel is of hollow metal and is strong, avoiding the liability of breaking. The metal bung affords a durable and smooth working bearing and is stronger than the ordinary wooden bung. The springs are stronger than the usual spring and have more turns, thus making less variation than usual in the spring tension when the curtain is at the top and bottom of the window. The brackets are made of formed metal and are therefore solid and uniform.



Section of Tubing



End

The Curtain Supply Company is manufacturing these rollers in all lengths of standard diameters.

TELEPHONE INSPECTION SYSTEM IN ATLANTA

A private telephone exchange is maintained by the Georgia Railway & Electric Company, Atlanta, Ga., to keep in touch with the transportation inspectors throughout the system. As these inspectors are scattered over a large territory, it is very desirable for headquarters to know at all times just where they are or where they may be expected at a given time. The practice is for the inspectors to report at stated intervals from different stations just as watchmen do in a factory. When the inspector calls up he names the box from which he will make his next report and the time he expects to do so. If, for any reason, he cannot carry out the daily program assigned to him, he explains the situation by telephone. For instance, he may have to return on account of a broken switch or some overhead trouble. This method of having the inspectors report in order from certain boxes is also of great advantage to the central office when men are wanted in emergencies.

NEW ADJUSTABLE PIPE WRENCH

The accompanying illustration shows a new pipe wrench, brought out by the Wright Wrench & Forging Company, Canton, Ohio, and known as the "Stover pipe wrench." It is a quick-adjustable wrench, with an automatic grip that cannot flatten the pipe and has an instant release which with the automatic opening makes it impossible to lock on a pipe. It requires but one hand to adjust it instantly to any size pipe and one can get a firm and positive grip the first trial, which is stated to be impossible with any other adjustable pipe wrench. The advantages of a pipe wrench which can be adjusted and operated with one hand will readily be appreciated by pipe fitters, who frequently work in dark and insecure places where it is necessary to hold a lamp or grasp some object for support.



Adjustable Pipe Wrench

The 14-in. ¾-lb. Stover pipe wrench is stated to be lighter than any other pipe wrench on the market, and 25 per cent stronger, and will grip any pipe from ⅛ in. to 1½ in. The arc on which the jaw moves gives it an automatic grip on any size pipe within the range of the wrench and with an instant release. The wearing parts are all interchangeable and can be easily replaced at the expense of a few cents. The grip is the only part to wear out on this wrench. There are no screws or pivot pins such as are used in wrenches of the overhanging-bar type.

NEW CARS FOR THE OKLAHOMA RAILWAY COMPANY

The Oklahoma Railway Company has recently purchased from the Danville Car Company four single-truck cars of the type shown in the accompanying illustration. The length of the car body over the end panel at the sill is 20 ft. and over the platform crown piece 30 ft., the length of each platform being 5 ft. The extreme width of the car at any point does not exceed 7 ft. 10 in. The bottom framing consists of 3¾-in. x 7-in. wood sills, plated with ½-in. x 8-in. steel, 3¾-in. x 6-in. end sills and 2¾-in. x 5⅛-in. center cross joists. The body framing includes 3¾-in. corner posts and 1¾-in. side posts. The main and concave panels of the sides of the car are sheathed with No. 14 sheet steel. The end panels are also of sheet steel. The inside finish and sash framing are cherry, and the ceiling finish is three-ply veneer decorated birch. The windows are fitted with Pantasote curtains and Forsythe ring fixtures.



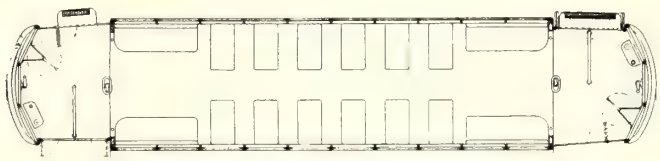
Single-Truck Car for Oklahoma Railway

The car body is provided with independently operated double sliding doors at each end. The vestibule has two-leaf folding doors at four corners of the car, but has steps at diagonal corners only. These steps are of the Stanwood type and are located at the motorman's left. Bumper shields are provided by Brill angle-iron buffers which are supported on extended knees. The drawbars are of the Van Dorn type No. 21½.

The bodies are mounted on Brill No. 21-E trucks, having 8-ft. wheelbase and carrying 33-in. diameter cast-iron wheels with ⅜-in. tread and ⅞-in. flange. The axles are 4¼-in. diameter. The equipment of the car will include battery push-button system, Consolidated car heaters, Hunter destination signs and Crouse-Hinds incandescent headlights. The roof sash are stationary, as ventilation is provided by Perry ventilators which are installed as shown in the illustration.

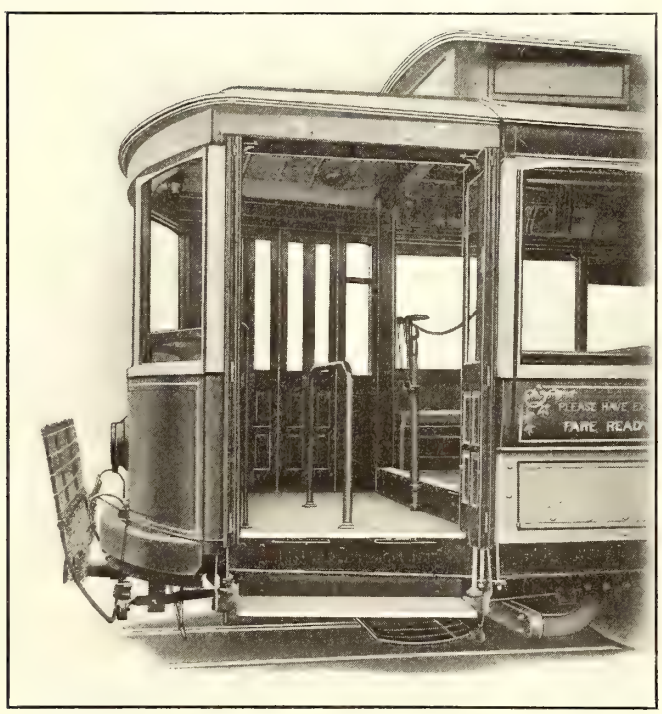
PAY-WITHIN CARS IN WASHINGTON, D. C.

The Capital Traction Company, Washington, D. C., has recently ordered from the Jewett Car Company for immediate delivery 20 new cars of the pay-within type, to be equipped with folding platform doors and steps. This company has had 15 pay-within cars equipped with sliding platform doors and folding steps in service on its Chevy Chase line for more than a year.



Washington Pay-Within Cars—Floor Plan

The new cars are 41 ft. long over all and have 6-ft. 6-in. platforms on each end. The platform entrances are closed with four-part double folding doors which when open give a space 48 in. wide in the clear. The exits are closed with a two-part single folding door, which when opened gives a maximum clear space of 30 in. Both sets of doors are manually operated, the control lever for the motorman being placed to the right of the controller and directly in front of him. The conductor's control lever is mounted on a stand which is directly in front of him as



Washington Pay-Within Cars—Platform Doors Open and Step Down

he stands just inside the car body. The doors and steps are connected by a system of levers so as to operate together.

Passengers enter the car by the rear platform, paying their fare to the conductor before entering the car body. They leave ordinarily by the front door, though in cases of emergency, or when the car is crowded, the conductor allows passengers to leave the car by the rear platform, in such cases merely dropping the chain which runs from his stand to the side of the car. Outgoing and incoming passengers do not become confused on the rear platform because of the iron railing that extends half way across the platform. This railing greatly facilitates loading and unloading.

When the doors of the car are in either the opened or closed position they are locked, thus rendering either accidental opening or closure an impossibility. They are swung on self-aligning vertical ball bearings which allow free and easy operation, and the doors are so connected to the operating levers that slight pressure exerted on either the door or the step prevents closure and avoids accidents due to pinching a passenger. The doors are fitted with metal guides at the top and bottom to insure and maintain proper alignment. The four-part folding doors on the entrance side of the platform open outwardly, while the two-part doors on the exit side fold inwardly.

The cars are being built under license from the Pay-Within Car Company, of which the Electric Service Supplies Company, Philadelphia, is general sales agent. The Pay-Within Car Company also furnished the door and step-operating mechanism with which the cars are fitted.

ASPHALT OIL TIMBER PRESERVATIVE

The Indian Refining Company, Inc., Cincinnati, Ohio, is making a wood preservative called Indian "Timberasphalt." This is said to be a non-inflammable, non-volatile compound containing about 65 per cent asphalt. It is offered as an efficient and economical substitute for the more costly creosote oils. The stable asphalt contents of this oil when once injected into or absorbed by the wood form a preservative which cannot be eliminated. The oil is slow-flowing at high atmospheric temperatures and, therefore, must be heated before application. Its coefficient of expansion is much less than that of creosote oil and it will not bleed from the wood under normal conditions because it remains slow-flowing and viscous at the highest atmospheric temperatures. Hence the sap wood, which is the most susceptible to the action of decay organisms, is thoroughly protected from the entrance of fungi. If any bacteria are present before the treatment they will be destroyed because the wood has been made proof against moisture, heat and air.

Two grades of oil are manufactured to suit the requirements of the consumer. "Timberasphalt" No. 1 is so viscous that it is necessary to use cylindrical pressure apparatus to secure the required penetration. "Timberasphalt" No. 2 oil has the properties of No. 1, but its viscosity is so reduced that it can be applied by the brush or open-tank methods. It can be used as a preservative paint where external appearances are a minor consideration. In the open-tank method, the wood is immersed in hot oil at a temperature of 212 deg. Fahr. for several hours. As the preservative cools to about 150 deg. Fahr. there is a contraction and a partial vacuum due to the condensation of the remaining air and water in the cellular spaces of the wood tissues. Thus atmospheric pressure forces the oil into the wood.

Among the pioneer users of this preservative are the Santa Fé and Mexican Central railroads, which employ it for ties. The Northern Pacific Railroad, Chicago, Burlington & Quincy Railroad, the Pennsylvania Railroad east of Pittsburgh and others are using it for ties, poles and cross-arms. This oil is absorbed by the average mixed oak, beach, elm and gum ties to the extent of from 2 gal. to 2½ gal. per 6-in. x 8-in. x 8-ft. tie. Creosote at approximately 8 cents per gallon and at an injection of 2 gal. per tie costs 16 cents for oil alone, whereas asphalt oil at approximately 4 cents per gallon and 2 gal. per tie costs only 8 cents per tie. The same proportional economy is obtained in the treatment of poles and cross-arms. The company's investigations have further shown that a maximum full-cell treatment may be economically used with asphalt oil. This requires from 6 lb. to 8 lb. per cubic foot and insures excellent penetration. On the other hand, creosote oil if injected for maximum full-cell treatment would be far too expensive for the average consumer.

News of Electric Railways

Details of Triborough Subway Bids in New York

On Nov. 3, 1910, the Public Service Commission of the First District of New York made public the aggregates of the bids which were opened on Oct. 27, 1910, for the construction of the Broadway-Lexington Avenue, Canal Street and Broadway-Lafayette Avenue subways with municipal funds. Twenty-one sections are embraced in the three divisions, and the total of the lowest bids, which were on a unit basis, for the three divisions was $85,437,570. This is about $3,000,000 in excess of the cost as estimated by the engineers of the commission and is for construction only. A summary of the bids by routes and sections follows:

ROUTE 5—LEXINGTON AVENUE.

Sect.	Bidders.	Bids.	Lowest Bids.
1	O'Rourke Company		$5,863,194
	McArthur Brothers	$5,881,946	
	Bradley Company	6,978,338	
	Degnon Company	8,697,447	
2	McArthur Brothers		7,677,464
	O'Rourke Company	7,761,173	
	Bradley Company	9,065,007	
	F. L. Cranford	9,906,668	
2A	Bradley Company		2,323,542
	F. L. Cranford	3,086,908	
	McArthur Brothers	4,435,564	
3	Bradley Company		3,619,315
	McArthur Brothers	3,802,444	
	F. L. Cranford	3,978,901	
4	Bradley Company		3,716,304
	McArthur Brothers	4,305,933	
5	Metropolitan Company		2,419,127
	Bradley Company	2,473,159	
	McArthur Brothers	2,958,465	
6	Bradley Company		3,634,213
	McArthur Brothers	4,300,023	
	Degnon Company	4,443,561	
7	C. H. Peckworth		2,750,463
	Bradley Company	3,870,333	
	McArthur Brothers	4,953,157	
	Degnon Company	4,955,764	
8	Bradley Company		3,369,484
	Degnon Company	4,107,228	
9	Bradley Company		2,447,479
10	Bradley Company		3,253,072
	Henry Steers	4,476,855	
11	Bradley Company		3,132,195
	Henry Steers	4,159,085	
12	Oscar Daniels Company		2,825,740
	Behrman & Rodgers	3,397,802	
	Bradley Company	3,474,080	
13	Bradley Company		4,071,416
	Hugh Nawn Company	4,209,594	
	Brody & Adler	4,628,702	
	McArthur Brothers	4,892,484	
14K	Arthur McMullen		4,823,513
	McArthur Brothers	5,534,965	
	O'Rourke Company	6,109,858	
	Bradley Company	6,362,166	
15	Haggerty-Drummond Company		3,820,129
	Godwin Company	4,154,360	
	Bradley Company	4,336,925	
	Hugh Nawn Company	4,414,642	
			$59,746,656
14H	McArthur Brothers		5,748,608
	O'Rourke Company	6,119,934	
	Bradley Company	6,396,054	
	S. Pearson & Son	8,500,000	

ROUTE 20—CANAL STREET.

1	Metropolitan Company		$4,601,644
	Bradley Company	$5,979,657	
2	Bradley Company		9,164,909
			$13,766,554

ROUTE 9—BROADWAY-LAFAYETTE AVENUE.

1	Newman & Carey		$4,265,424
	Bradley Company	$4,318,700	
	Degnon Company	4,764,782	
	F. L. Cranford	4,926,512	
2	Patrick McGovern		4,676,941
	Bradley Company	4,726,259	
	Degnon Company	4,802,919	
	Newman & Carey	4,937,874	
	Hugh Nawn Company	5,022,709	
3	Walter H. Gahagan		2,981,992
	James H. Holmes	3,240,437	
	Patrick McGovern	3,311,827	
	Degnon Company	3,411,697	
	Bradley Company	3,455,583	
	Smith, Scott, Hannan & Hickey	3,471,897	
	Creamer, Cranford & Donovan	3,575,278	
	Oscar Daniels Company	3,575,485	
	Smith & Pennock Company	3,668,568	
	Hugh Nawn Company	3,813,727	
	Newman & Carey	3,822,764	
	S. Pearson & Son, Inc.	5,066,937	

Route 9	$11,924,359
Route 5	59,746,656
Route 20	13,766,554
Grand total	$85,437,570

The Chamber of Commerce of New York adopted on Nov. 3, 1910, a report on the proposed triborough subway route presented by its special committee on rapid transit. The report calls attention to the crisis which has been reached and says that the absence of any bids for construction, equipment and operation of the triborough system raises the question "whether the city shall construct this route at its own expense without any possibility of estimating upon what terms contracts for equipment and operation may be obtained until after completion and the actual investment of such huge sums of city money."

The committee estimates the total cost of the triborough route for construction only at $178,500,000 plus 10 per cent for extras and contingencies and 10 per cent for interest during construction, or a total of $209,600,000. It estimates the cost of equipment at $35,000,000 to $40,000,000. From the experience of the last five years a liberal estimate of the increase in assessable value for the next five years would be $300,000,000 per annum, the report says, providing a borrowing capacity of $30,000,000 per annum. If one-half of this total could be applied to rapid transit purposes, it would take more than nine years to provide funds for the route without extensions into the Bronx north of 138th and 157th Streets and south of Fortieth Street, Brooklyn, to Fort Hamilton and Coney Island, and more than 12 years with the extensions. On the subject of earning power, the report says:

"While this subway has, your committee believes, been estimated to have a daily carrying capacity of 1,200,000 passengers, with congestion approximating conditions now existing in the present subway, assuming for argument's sake that from the start it should carry a daily load amounting to 360,000,000 passengers per annum, the gross income at a 5-cent fare would be $18,000,000.

"Assuming operating expenses from the start on the favorable basis of 45 per cent, the operating net income would be $9,900,000 per annum.

"The fixed charges of interest and sinking fund figured at 5 per cent on cost of route and equipment without the extensions would be $10,000,000, or on the completed route $12,250,000, thus showing a large deficit under peak load conditions, to be increased by such an amount as traffic may fall below this maximum.

"The existing subway has carried during its last fiscal year ending June 30, 1910, 269,000,000 passengers. On this basis of traffic the deficit on the route without extensions would be $2,602,500 per annum, or with extensions $4,852,500 per annum.

"No estimate is possible of what additional deficit might have to be met by taxation resulting from municipal operation if the city should eventually be forced to resort to that course."

Proposal to Remove Unused Horse Car Tracks in New York City

The receivers of the Metropolitan Street Railway, New York, N. Y., addressed the following letter on Nov. 3, 1910, to the Public Service Commission of the First District of New York regarding the desire of the commission to have the various unused horse car tracks of the company removed:

"Your commission has on several occasions expressed its desire that the various unused horse car tracks of the Metropolitan Street Railway and its various lessor companies should be removed from the streets.

"Recognizing the fact that the continuance of these tracks in the streets is a source of friction and annoyance, we have taken up with the joint committee on reorganization of the Metropolitan Street Railway the question whether some or all of these tracks cannot be removed. We are assured by the joint committee that any efforts which may be made in this direction will have the approval of the committee and endeavors are being made to get consent of the various lessor companies to the removal of their unused tracks.

"Our object in writing you at this time is to say that we are now in a position to consent to the removal of all of the unused horse car tracks of the Metropolitan Street

Railway and probably of those of the Broadway & Seventh Avenue Railroad.

"No suits have been brought by the Attorney-General to compel the removal of these unused tracks; but the same object can be achieved by an agreement between the city, the State and the companies defining the conditions upon which the tracks shall be removed, such agreement to be, of course, subject to the approval of the court.

"If the proposed procedure has your approval, we shall be obliged if you will let us know with whom the questions of detail shall be discussed."

The Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y., has agreed to discontinue the horse railway on Eighty-sixth Street between Riverside Drive and Amsterdam Avenue, the line on Pleasant Avenue from 109th Street to 110th street and 109th Street from First Avenue to Pleasant Avenue and on Twelfth Avenue from Fourteenth Street to Forty-second Street. The company will relinquish its franchise rights to these lines.

Offer Accepted for Extension of Interborough Rapid Transit Company's Line

The Public Service Commission of the First District of New York has accepted the offer of the Interborough Rapid Transit Company to operate the Steinway tunnel under the East River between the Grand Central Station and Long Island City in return for permission to third-track the company's elevated lines. The agreement includes:

1. The opening for operation of the so-called Steinway tunnel under an arrangement whereby the title to the completed tunnel, which it is estimated cost about $8,000,000, will vest in the city and the tunnel be operated by the Interborough Rapid Transit Company under conditions generally similar to those under which it is operating the present subway, and with a transfer between the subway and the Steinway tunnel without increase of fare, thus placing Queens County within a 5-cent fare zone.

2. The third-tracking of the Second Avenue elevated line from City Hall station to 129th Street.

3. The third tracking of the Third Avenue elevated line from Pearl Street and New Chambers Street to about 147th Street and the construction of a new bridge across the Harlem River and of a four-track elevated road between the Harlem River and 145th Street for the joint use of the Second Avenue and Third Avenue lines; also the construction of a two-track connection between the Third Avenue line at about 143d Street (thence through Willis Avenue and Bergen Avenue) and the West Farms division of the subway at about Brook Avenue.

4. The third tracking of the Ninth Avenue elevated line from Rector Street to 155th Street.

5. The construction of a two-track road from a connection with the Second Avenue elevated line across the Queensboro Bridge to the Queensboro Bridge Plaza, with provision for carrying passengers from the Queensboro Bridge Plaza in Long Island City to any point on the Second Avenue line for a 5-cent fare.

6. The construction of an elevated railroad from a connection with the Third Avenue elevated line at Pelham Avenue through Webster Avenue, Gun Hill Road and White Plains Road to Becker Axenue.

7. The construction of a two-track elevated extension of the Ninth Avenue elevated line across the Harlem River and to connect with a line over Jerome Avenue at about 194th Street.

The Board of Estimate and Apportionment has fixed Nov. 11, 1910, as the date for a public hearing on the proposed agreement between the Interborough Rapid Transit Company and the Public Service Commission.

Agreement Regarding Trafficway in Kansas City, Mo.

Following a conference held recently between officers of the Metropolitan Street Railway, Kansas City, Mo., and the Mayor of Kansas City, the president of the public utilities commission, the counsel to the commission and the city counsel, the following statement was issued regarding the terms arranged between the company and the city in relation to the construction of the West Twelfth Street trafficway, over which the Metropolitan Street Railway desires to operate: "It has been agreed, subject to the approval of the Twelfth Street Trafficway Commission and the Common Council, that special tax bills shall be issued to pay $475,000 of the cost of reducing the grade and constructing the viaduct. This is equal to the amount of the city's issue of bonds. The special tax bills will be payable in 10 equal annual instalments and the Metropolitan Street Railway agrees to pay them as they become due as its contribution to the cost of the entire improvement, to be reimbursed by any company succeeding to the right to operate street cars on Twelfth Street. The cost of the grading and building of a viaduct will be between $725,000 and $750,000. This plan will enable the administration to apply $200,000 or more of the bond money to the payment of the property damages and relieve the benefit district proportionately. The details will be worked out by counsel and ordinances immediately prepared to effectuate this tentative agreement."

Appraisal of Property of the United Railways of St. Louis.—James E. Allison, vice-chairman and chief engineer of the Public Service Commission of St. Louis, has announced that the appraisal of the property of the United Railways of St. Louis which is being made by the commission will be completed by Jan. 1, 1911.

Another Strike Conviction in Columbus.—Thomas Hannon was found guilty on Nov. 4, 1910, of throwing stones at cars during the recent strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, and was sentenced to serve a term of two years in the penitentiary. This makes the tenth conviction in the riot cases. As five men pleaded guilty, 15 men have been sent to the penitentiary or the Mansfield reformatory for disorderly conduct during the strike.

Through Routes in Chicago Necessitate Changes in Elevated Structure.—Terms have been arranged by which the Northwestern Elevated Railroad, Chicago, Ill., which owns the Union Elevated Railroad, operating the loop used by all the elevated lines in Chicago, will remove the 20 pillars of the loop structure which prevent the operation of through routes by the surface railways. It is estimated that it will cost about $200,000 to complete this work, and the cost will be borne by the Chicago Railways and the Chicago City Railway. It is hoped to complete the work by Jan. 1, 1911.

Situation in Detroit.—The Michigan Supreme Court has not rendered a decision in regard to the injunction sought by J. L. Hudson and others to prevent the proposed Moore municipal ownership amendment from being submitted to the voters of Detroit and the amendment will not be submitted at the regular election. The date for voting upon this amendment was originally set for Aug. 15, 1910, but a number of business men obtained a temporary restraining order and the case was taken to the Supreme Court. Mayor Breitmeyer has received a communication from B. S. Ross, consulting engineer, with offices in the Hodges Building, Detroit, stating that Eastern capitalists that he represents are willing to furnish $7,000,000 or $8,000,000 to construct a subway from some point on Woodward Avenue to the new terminal station of the Michigan Central Railroad, provided the city will agree to grant a long-term franchise.

Suit to Determine Interpretation of "Public Utility."—A suit is about to be brought in court to determine the legality of the commission's interpretation of a "public utility" as defined under the Public Utilities Law. The Public Utilities Law states that the term "public utility" shall mean and embrace "every corporation, company, individual, association of individuals, their lessees, trustees or receivers appointed by any court whatsoever, and every town, village or city that may own, operate, manage or control any plant or equipment, or any part thereof, within the State, for the conveyance of telephone messages or for the production, transmission, delivery or furnishing of heat, light, water or power either directly or indirectly to or for the public." The suit was filed by the executors and trustees of the estate of E. Harrison Cawker, deceased, of Milwaukee, against the Railroad Commission. They seek to restrain the commission from enforcing upon them the provisions of the Public Utilities Act, or in any manner interfering with the operation of the heat, light and power plant of the Cawker Building.

Financial and Corporate

New York Stock and Money Market

Nov. 7, 1910.

The Wall Street market to-day was in practically the same condition that has existed for the past fortnight and traders were inclined to be very conservative on the day before election. The volume of transactions was small and the price changes were insignificant. The tendency for the past week has been mostly toward higher prices, but the advances have been small. The steel stocks have been among the strongest on the list and the common especially has been buoyant.

The bond market is duller than for the past few weeks and quotations have been a trifle lower. The money market is somewhat improved from last week. Rates to-day were: Call, 2½@4¾ per cent; 90 days, 5@5¼ per cent.

Other Markets

Interest in traction shares in the Philadelphia market has been rather small during the pre-election trading. There seems to be an evident disposition to await the final decision on reorganization plans. Price changes for both Rapid Transit and Union Traction have been insignificant.

In the Chicago market there has been some light trading in Railways certificates, series 1 and 2, but price changes have been small. Other tractions have been practically out of the market.

There has continued to be some trading in Massachusetts Electric and in Boston Elevated shares in the Boston market during the past week. No changes of moment have been recorded in prices.

In Baltimore there have been no transactions in traction shares in the past week, but United Railways bonds have continued fairly active at former prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 1.	Nov. 7
American Railways Company	a42¾	a43
Aurora, Elgin & Chicago Railroad (common)	44	a45
Aurora, Elgin & Chicago Railroad (pref.)	a90	a90
Boston Elevated Railway	a128	a128
Boston & Suburban Electric Companies	*14¼	*14¼
Boston & Suburban Electric Companies (preferred)	*72	*72
Boston & Worcester Electric Companies (common)	10½	*10½
Boston & Worcester Electric Companies (preferred)	43	*43
Brooklyn Rapid Transit Company	77	77¾
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83¼	83¼
Capital Traction Company, Washington	a129¾	a128½
Chicago City Railway	a170	*170
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a77½	a77
Chicago Railways, ptcptg., ctf. 2	a21¼	a21
Chicago Railways, ptcptg., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a6	a5½
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a73½
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	*45	a58
General Electric Company	155	154½
Georgia Railway & Electric Company (common)	a122	a121¾
Georgia Railway & Electric Company (preferred)	a89	*89
Interborough-Metropolitan Company (common)	22⅛	22¼
Interborough-Metropolitan Company (preferred)	56⅞	58¾
Interborough-Metropolitan Company (4½s)	81⅞	81⅞
Kansas City Railway & Light Company (common)	a23½	a23½
Kansas City Railway & Light Company (preferred)	75	a75
Manhattan Railway	a143	a142½
Massachusetts Electric Company (common)	a20	a21
Massachusetts Electric Companies (preferred)	a85½	a86
Metropolitan West Side, Chicago (common)	*21	*21
Metropolitan West Side, Chicago (preferred)	*64	*64
Metropolitan Street Railway	*22	*22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*67½	*67½
Northwestern Elevated Railroad (common)	a23	a23
Northwestern Elevated Railroad (preferred)	a63	a60
Philadelphia Company, Pittsburg (common)	a45	a45¼
Philadelphia Company, Pittsburg (preferred)	a43	a42
Philadelphia Rapid Transit Company	a16¼	a15¾
Philadelphia Traction Company	a82	*82
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	*109	*109
Seattle Electric Company (preferred)	*98½	*98½
South Side Elevated Railroad (Chicago)	a65	65
Third Avenue Railroad, New York	*12¾	13½
Toledo Railways & Light Company	*8¼	a8
Twin City Rapid Transit, Minneapolis (common)	*112½	a111
Union Traction Company, Philadelphia	a40	a39½
United Rys. & Electric Company, Baltimore	a15⅝	*15⅝
United Rys. Inv. Co. (common)	*15	14¾
United Rys. Inv. Co. (preferred)	*60	*60
Washington Ry. & Electric Company (common)	a37½	35¾
Washington Ry. & Electric Company (preferred)	a89⅜	a89⅜
West End Street Railway, Boston (common)	a86½	a87
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	73¼	73¾
Westinghouse Elec. & Mfg. Company (1st pref.)	a124	*124

a Asked. * Last sale.

Chicago Consolidated Traction Company

The sale of the property of the Chicago Consolidated Traction Company, which has been set for Nov. 30, 1910, will include all the property of the company, embracing that covered by the general mortgage of 1899, all properties owned previous to Feb. 27, 1899, by the North Chicago Electric Railway, North Side Electric Street Railway, Cicero & Proviso Street Railway, Chicago Electric Transit Company, Ogden Street Railway, Chicago & Jefferson Urban Transit Company and Evanston Electric Railway and also all properties owned by the Chicago North Shore Street Railway. The following official announcement has been made regarding the acquisition of the property of the Chicago Consolidated Traction Company by the Chicago Railways:

"As a result of several weeks' negotiations with bankers and other interested parties, the officials of the Chicago Railways are assured means for completing the rehabilitation of the property of the Chicago Railway pursuant to its ordinance, as well as for the acquisition and rehabilitation of the property of the Chicago Consolidated Traction Company pursuant to the requirements of the ordinance of Oct. 10 last.

"The opposition threatened by certain holders of or parties interested in certain of the $6,750,000 of 4½ per cent bonds of the Consolidated Traction Company has been rendered negligible by reason of the fact that more than 90 per cent of the entire issue of said bonds has been purchased and paid for in cash at $300 per $1,000 bond flat and delivered to interests which are friendly to the Chicago Railways.

"The same friendly interests have completed arrangements for the acquisition of the Harrity judgment of $1,344,685. The Chicago Railways can, therefore, state that the ordinance of Oct. 10, 1910, will be accepted.

"Counsel for Mrs. Yerkes state that, as owner of one-third of the Yerkes estate, which held $4,594,000 bonds, she will claim that the estate is entitled to the full principal of the bonds with two years' interest. Judge Baldwin in the Circuit Court on Oct. 28, 1910, granted a temporary injunction preventing Executor Louis S. Owsley from disposing of the bonds of the estate. Suit was also begun in the Supreme Court in this city to prevent the delivery of the bonds to the purchasers."

Minority Stockholders Object to Philadelphia Financing

Minority stockholders of the Union Traction Company, Philadelphia, Pa., who oppose the conditions for refinancing the Philadelphia Rapid Transit Company which E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., has outlined as essential if he should accept the solicited election to the directorate of that company, have made public through Isaac A. Pennypacker the following terms which they propose to insist upon in connection with the plan for refinancing the Philadelphia Rapid Transit Company:

"Union Traction's 6 per cent rental from the Philadelphia Rapid Transit Company must not be reduced.

"Minority holders shall have representation in the Union Traction Company's directorate.

"Bonds (debentures are being considered) must be short term and not of the length of the life of the city's contract with the Philadelphia Rapid Transit Company, as proposed, and a sinking fund must be provided for their retirement.

"Loans on bonds must be limited to a specific sum in any one year, and bonds must be disposed of in such a way that if the Philadelphia Rapid Transit Company defaults the Union Traction Company will be liable for only what has been spent on improvements.

"The Union Traction Company must know how the funds thus obtained are spent and will insist that every dollar be used in improving the Philadelphia Rapid Transit Company's property.

"The Union Traction Company must supervise the expenditure of the moneys derived through a bond issue, and to this end the directors of that corporation shall have full control over the funds. A voting trust for the stock of the Philadelphia Rapid Transit is suggested.

"An examination of the physical property of the operating company is demanded."

Annual Report of the Montreal Street Railway

Gross earnings of the Montreal Street Railway in the fiscal year ended Sept. 30, 1910, increased 12.33 per cent over the previous year, while operating expenses increased 8.88 per cent and net earnings 17.13 per cent. The earnings for two years compare as follows:

Year ended Sept. 30:	1910	1909
Gross earnings	$4,352,551	$3,874,838
Operating expenses	2,455,301	2,255,019
Net earnings from operation	$1,897,250	$1,619,819
Interest from Montreal Park & Island Railway.	85,878	55,606
Total income	$1,983,128	$1,675,425
Fixed charges:		
City percentage on earnings	$278,085	$260,203
Interest	175,421	179,725
Rental leased lines	6,472	5,821
Taxes	48,000	*.....
Total	$507,978	$445,749
Net income	$1,475,150	$1,229,676
Dividend, 10 per cent	1,000,000	976,332
Surplus	$475,150	$253,344
From which has been appropriated:		
Contingent account	$250,000	$175,000
Fire insurance fund	25,000	25,000
Transferred to surplus account	$200,150	$53,344

*Taxes 1909 in operating expenses.

L. J. Forget, the president, says in his statement to shareholders:

"Your directors appropriated $25,000 from the surplus earnings as a credit to the fire insurance fund. The interest on the investments for the year amounted to $26,767. The amount now at the credit of the fund is $521,560.

"During the past year the company secured an amendment to its charter authorizing the construction and operation of underground railways. Preliminary plans for construction have been prepared by the well-known firm of Jacobs & Davies, of New York, and the question will be taken up with the city during the coming year.

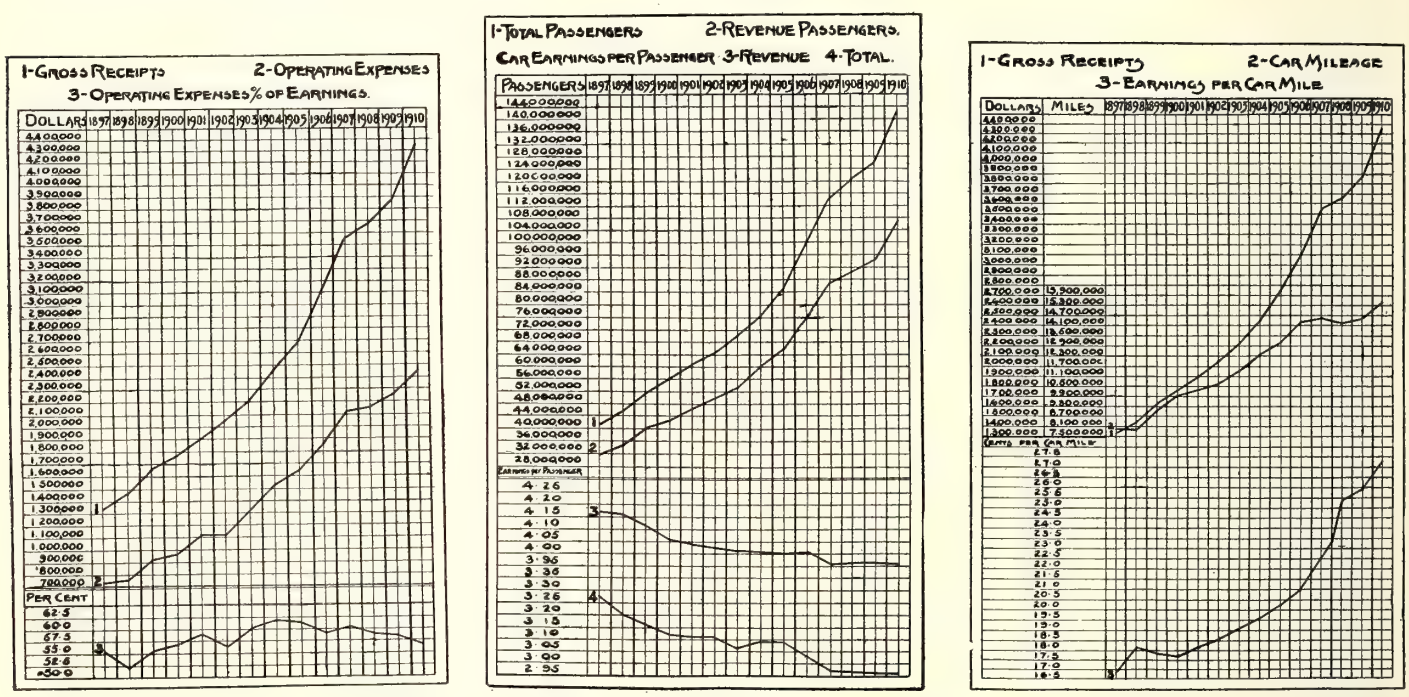
"Owing to the continued rapid growth and congestion of the city, your directors again took up the question of securing additional routes which would relieve the present congestion, but regret that no definite action has been taken as yet by the city. It is hoped, however, that the matter will receive early attention. The delay has added to the difficulties of operation in, at best, a difficult and dangerous city to operate in.

"Your directors are pleased to report that the Supreme Court of Canada rendered judgment in favor of this company's appeal from the decision of the Board of Railway Commissioners for Canada, relative to the rates of fares from Côte des Nieges to the city. The City of Montreal has appealed from this decision to the Privy Council.

"During the past year negotiations were entered into between your directors and the directors of the Montreal Light, Heat & Power Company with a view to bringing about closer relations between the two companies. The scheme submitted did not, however, receive the support of the shareholders of either company to the extent anticipated, and has been abandoned; and your directors have been notified by the Montreal Light, Heat & Power Company of their withdrawal from any further negotiations in this connection.

"The property has been maintained in a high state of efficiency, and a considerable sum has been spent in the upkeep of the tracks and rolling stock. The power plants and buildings are in excellent condition, it being the policy of your directors to spare no efforts or expense in this direction; yet, notwithstanding this, the surplus earnings of the company are the largest in its history. There has also in addition been carried over to the credit of the snow account a substantial balance toward this year's expenses. Notwithstanding the above the operating expenses percentage of earnings have decreased.

"The large expansion of the company's business necessitated the erection of new shops for the construction and repair of cars, etc., and work in connection therewith has been commenced. These shops are to be completed during the coming year, and will be most complete and up to date in every respect.



Diagrams in Annual Report of Montreal Street Railway

"The company has paid to the city of Montreal taxes and percentages on earnings amounting to $387,264, on account of snow removal $50,919, a total of $438,183, being an increase over the previous year of $51,998.

"The company has recently received a proposition from the Montreal, Light, Heat & Power Company offering to make a contract to furnish additional power to this company, but owing to the annual meeting of shareholders being so near at hand, your directors decided to leave the matter to the incoming board to deal with."

Gross earnings of the Montreal Park & Island Railway amounted to $337,764, an increase of $57,271 over the preceding year, and of the Montreal Terminal Railway to $132,313, an increase of $23,697.

Traffic statistics compare as follows:

Year ended Sept. 30	1910	1909
Expenses—per cent of earnings	56.41	58.20
Passengers carried	107,241,406	95,376,373
Car earnings per passenger—cents	3.95	3.96
Transfers	36,437,123	32,285,208
Total passengers carried	143,678,529	127,661,581
Car earnings per pass, total carried—cents	2.95	2.96

Atlantic Shore Line Railway.—The committee which is acting in behalf of the holders of the 4 per cent refunding bonds of the Atlantic Shore Line Railway dated 1906, the second mortgage 6 per cent bonds of the company dated 1909 and the first preferred stock of the company has given notice that these bonds and the preferred stock must be deposited under the plan of reorganization by Nov. 21, 1910. If the bonds are not deposited they will take their pro rata share of the proceeds of the sale. As stated in the ELECTRIC RAILWAY JOURNAL of Nov. 5, 1910, page 969, the property of the company will be sold under foreclosure at Alfred, Maine, on Dec. 1, 1910.

Babylon (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized the Babylon Railroad to issue $21,500 of bonds additional to those authorized on Sept. 14, 1910, to be sold at not less than 85. The proceeds are to be used to pay for construction work and various expenses attendant upon the organization of the company.

Los Angeles (Cal.) Railway Corporation.—The Los Angeles Railway Corporation, which recently succeeded the Los Angeles Railway, is reported to have concluded negotiations to take over all the city lines of the Pacific Electric Railway, Los Angeles, Cal.

Massachusetts Electric Companies, Boston, Mass.—The Railroad Commission of Massachusetts has approved the issue of coupon or registered bonds by the Boston & Northern Street Railway to the extent of not more than $266,000 at par and by the Old Colony Street Railway of not more than $25,000. The bonds are payable in 50 years from date and bear interest at 4 per cent a year, being necessary for the payment of certain floating indebtedness of the companies.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, in the United States Circuit Court, has signed a supplemental decree in the case of the Farmers' Loan & Trust Company as successor to the Morton Trust Company against the Metropolitan Street Railway, Adrian H. Joline and Douglas Robinson as receivers of the Metropolitan Street Railway, the New York City Railway and others. Judge Lacombe holds that the mortgage given by the Metropolitan Street Railway to the Morton Trust Company dated March 21, 1902, is a valid mortgage constituting a claim upon all of the property of the Metropolitan Street Railway and orders that the special master be directed to sell all of the interests of the Metropolitan Street Railway in the Dry Dock, East Broadway & Battery Railroad, the Fulton Street Railroad, the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, Second Avenue Railroad, Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, the Third Avenue Railroad and the Union Railway and also the Central Park, North & East River Railroad. The special master is also directed to settle all demands, claims and contracts against the Metropolitan Street Railway pending further direction of the court.

Virginia Railway & Power Company, Richmond, Va.—Nathaniel V. Campbell has been elected a director of the Virginia Railway & Power Company to succeed the late Charles S. Whelen.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—Justice Pennewill, in the Chancery Court at Wilmington, Del., has issued a decree which provides for the sale of the property of the company between Wilmington and New Castle under the first mortgage of the Wilmington & New Castle Railway, which was dated 1896, for $150,000 and given to the Real Estate Trust Company, Philadelphia, Pa., as trustee. The company is a consolidation of the Wilmington & New Castle Railway and the New Castle & Delaware City Railway, and operates 16 miles of line.

Dividends Declared

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Metropolitan West Side Elevated, Chicago, Ill., quarterly, ¾ of 1 per cent, preferred.

Traffic and Transportation

Reduction of Fare Ordered on Syracuse, Lake Shore & Northern Railroad

The Public Service Commission of the Second District of New York has ordered the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., to reduce its fare from stop 26 to Fulton, Oswego County, from 10 cents to 5 cents. The fare had been 5 cents up to June, 1909, when it was raised to 10 cents. The order was made on a complaint presented by residents at stop 26, who alleged that the charge was unjust and unreasonable. The commission in an opinion by Commissioner Decker held that the 10-cent fare complained of between stop 26 and Fulton, a distance of 3.82 miles, tends under the circumstances to discourage instead of encourage business and is not advantageous to the company or to the public; that such 10-cent fare is unreasonable and unjust and that the former 5-cent fare between those points should be restored. The commission also ruled as follows:

"As a general proposition, and leaving out of view cases where service may be required irrespective of profit considerations, a just and reasonable railroad fare should produce adequate return to the carrier, it should afford the greatest possible service to the public for the money paid, it should not interfere unnecessarily with the convenience of the public, and if possible it should encourage the passenger business."

Referring to the zone system of fares on electric railways as opposed to a mileage basis the commission said that this is a convenient and in general a just method of fixing passenger fares on such lines, but it is sometimes subject to criticism in that where fares are based on multiples of 5 cents the passenger just outside of a zone limit pays that much more than the passenger who is just inside of the zone limit, so that two passengers pay materially different amounts for nearly the same service. This result, the commission says, should be avoided as far as practicable, since it not only subjects passengers to inconvenience but is against the interest of the company in that its object of securing additional revenue in so fixing the zone limit in large measure may be defeated.

Accidents in New York in September

The Public Service Commission of the First District of New York has issued the following summary of accidents which occurred in September, 1908, 1909 and 1910, on the railways within its jurisdiction.

September.	1908	1909	1910
Car collisions	155	187	93
Persons and vehicles struck by cars	889	1010	1300
Boarding	588	581	735
Alighting	1068	931	1158
Contact electricity	39	32	31
Other accidents	2284	1897	2122
Totals	5023	4638	5439
INJURIES.			
Passengers	2098	2027	2360
Not passengers	586	571	479
Employees	526	455	652
Totals	3210	3053	3491
SERIOUS (included in above).			
Killed	34	28	33
Fractured skulls	9	10	11
Amputated limbs	6	4	8
Broken limbs	36	41	34
Other serious	225	145	162
Totals	310	228	248

Time Placards.—The Rochester, Syracuse & Eastern Railroad and the Auburn & Northern Electric Railroad, which are owned and operated by the Beebe syndicate, have issued placards 14 in. long by 5½ in. wide which show the running time of both local and limited trains between Syracuse and Rochester and Auburn and Rochester.

Accident Campaign in Seattle.—The Seattle (Wash.) Electric Company has inaugurated a campaign of education addressed particularly to the school children of Seattle, looking toward minimizing accidents, which are due primarily to carelessness and to ignorance of children regarding means for protecting themselves when crossing tracks or alighting from street cars.

Ft. Wayne & Wabash Valley Traction Company to Increase Wages.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has announced that on Jan. 1, 1911, it will increase the wages of all motormen and conductors on its line in Ft. Wayne, Ind., 1 cent an hour. The new wage scale runs from 19 cents to 22 cents an hour, depending upon the length of service, and will affect about 200 men.

Accident on Brooklyn Bridge.—Traffic on the elevated lines of the Brooklyn (N. Y.) Rapid Transit Company which operate over the Brooklyn Bridge was suspended from about 5:20 p. m. to 7:30 p. m. on Nov. 4, 1910, on account of a car being derailed at the stub terminal at the Manhattan end of the structure.

Evidence Presented in Investigation of Accident on the Indianapolis & Cincinnati Traction Company's Line.—Charles L. Henry, receiver for the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., appeared before the Railroad Commission of Indiana on Nov. 4, 1910, as a witness in an investigation of an accident which occurred on the line of the company at Connersville on Oct. 13, 1910, when a conductor named Ratcliffe suffered a broken leg and Carl Hunt, a motorman, lost his life. Upon the evidence given by Mr. Henry Ratcliffe was discharged. The commission has not reached a decision in the case.

Freight and Passenger Stations Combined at Dayton.—W. S. Whitney, general passenger and freight agent of the Ohio Electric Railway, Cincinnati, Ohio, has announced that after Dec. 31, 1910, the transfer of all freight and baggage between various divisions of the company at Dayton, Ohio, will be eliminated on account of the consolidation of the different Dayton freight and passenger depots at Third Street and Kenton Street. The operation of both passenger and freight trains from the one terminal will add greatly to the convenience of the traveling public and will eliminate the delays to freight shipment incident to the transfer by wagon which was necessary heretofore.

Traffic at the Indianapolis Terminal Station.—During October, 1910, 15,794 interurban passenger cars were handled at the Indianapolis Traction & Terminal Station, an increase of 1187 over October, 1909. The number of freight cars handled from the station during October, 1910, was 1898. The number of passengers handled at the station, both in- and out- bound, was 4,209,243 during the nine months which ended on Sept. 30, 1910, an increase of 379,485 over the corresponding period of the preceding year. The number of pieces of baggage handled at the station during the nine months which ended on Sept. 30, 1910, was 91,181, an increase of 21,961 pieces over the same period in 1909.

Limited Service Over Indiana Roads.—The Chicago, South Bend & Northern Indiana Railway and the Winona Interurban Railway, Winona Lake, Ind., have arranged to operate trains as far as Peru, Ind., where direct connections will be made with the limited cars of the Indiana Union Traction Company which are operated to Indianapolis. The company will not, however, be able to offer through service to Indianapolis this year. The Chicago, South Bend & Northern Indiana Railway and the Winona Interurban Railway formerly operated limited trains to Warsaw, but the new service will extend from Michigan City to Peru, Ind., a distance of 100 miles. Four trains will be run in each direction beginning Nov. 10, 1910.

Indiana Union Traction Company to Increase Wages.—The Indiana Union Traction Company, Anderson, Ind., has announced that on Jan. 1, 1911, it will establish the following scale of wages for the men employed on the interurban lines of the company: Twenty cents an hour for the first year, 21 cents for the second year, 22 cents for the third year, 23 cents for the fourth year, 24 cents for the fifth year, 25 cents for the sixth year, 26 cents for the seventh year, 27 cents for the eighth year and 28 cents for 10 years or more. The old rate graduated from 18 cents to 25 cents an hour, according to the length of service. The advance in wages for the men on the city lines follows: Seventeen cents an hour for the first six months of service, 18 cents for the first year, 19 cents for the second year, 19½ cents for the third year, 20 cents for the fourth year, 21 cents for the fifth year, 22 cents for 10 years or more. This is an increase of 1 cent over wages paid formerly on the city lines of the company. This is not a fixed wage scale. The discarded scale has been in effect for three years.

Personal Mention

Mr. H. A. Baymiller has been appointed auditor and traffic manager of the Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio, to succeed Mr. H. H. Stephenson, resigned.

Mr. Kenyon B. Conger has been elected assistant secretary of the Hudson & Manhattan Railroad, New York, N. Y., to succeed Mr. William Everdell, Jr., who has been elected secretary of the company.

Mr. A. C. Kelly, who went to Argentina in 1909 to report on the electrification of the suburban lines of the Buenos Ayres & Pacific Railway, has been appointed chief electrical engineer of the company, with headquarters at Buenos Ayres.

Mr. William Everdell, Jr., whose appointment as acting secretary of the Hudson & Manhattan Railroad, N. Y., to succeed Mr. Charles W. King, resigned, was announced in the Electric Railway Journal of Nov. 5, 1910, has been elected secretary of the company.

Mr. A. J. Glynn, who has been connected with the mechanical department of the Illinois Traction System, Peoria, Ill., for the last three years, has resigned as master mechanic of the southern division of the Illinois Traction System. Mr. Glynn will be located for the present in Decatur, Ill., where he has business connections.

Mr. J. H. Leary, for many years chief dispatcher for the Southern Pacific Company at the Oakland Mole and at the depot at Third Street and Townsend Street, San Francisco, Cal., has been appointed superintendent of the Central California Traction Company, San Francisco, Cal., to succeed Mr. A. D. Miller, resigned. Mr. Leary will have his headquarters at Stockton, Cal.

Mr. T. P. McCrery has been elected treasurer of the Toledo, Port Clinton & Lakeside Railway, Toledo, Ohio, and a director of the company. Mr. McCrery had charge of the property during construction and became general manager of the company when the road was placed in operation. Subsequently he resigned from the company because of ill health. He succeeds the late George Breymann as treasurer of the company.

Mr. Charles E. Phelps, Jr., has been appointed chief engineer of the Public Service Commission of Maryland. Mr. Phelps was born on Jan. 31, 1871, in Baltimore and completed a course in electrical and mechanical engineering at the Johns Hopkins University in 1894. He served as superintendent of electrical construction for the David E. Evans Company from 1894 to 1898. After some private contract work in Pittsburgh and Erie, Pa., and Wilmington, Del., for two years, Mr. Phelps was appointed chief engineer upon the organization of the present electrical commission in Baltimore on Oct. 1, 1898. While chief engineer of the electrical commission he represented a number of cities in technical matters relating to electrical public service corporations principally. In 1906 Mr. Phelps and Mr. Theodore Stebbins were selected by the National Civic Federation to conduct the investigation of municipal ownership and operation of public services which was carried on by the federation.

Mr. George G. Porter has resigned as master mechanic of the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J. No successor will be appointed because the road has been purchased by the Public Service Railway. Mr. Porter began railroad work with the Pullman Company, with which he was connected for seven years in different departments of its work at Pullman. In 1893 he became associated with the West Chicago Street Railway Company, first in the paint shop and later in the electrical department. Six years later he went abroad to accept the office of foreman painter of the George F. Milnes Company, Limited, car builders, and before he left that company was general shop foreman of the car building and paint shops. In 1904 Mr. Porter received a flattering offer which he accepted from the Underground Electric Railways Company, Limited, to become chief car-building inspector, and he afterward organized a shop and inspection force for the maintenance and overhauling of equipment of that organization. Three years ago he returned to this country and immediately became associated with the New Jersey & Hudson

River Railway & Ferry Company at Edgewater as master mechanic, the position which he has just resigned. Mr. Porter has not announced his future plans.

Mr. Edmund Arthur Robert, who has been elected president of the Montreal (Que.) Street Railway to succeed Mr. L. J. Forget, was born in Beauharnois, Que., on March 3, 1864. He was educated at the Montreal High School and Montreal Business College and commenced his business career in 1881 with Greenshields, Limited, a dry goods house. After nine years' experience in this business he and his two brothers took over the small woolen mill operated up to that time by his father at Beauharnois. This small mill eventually grew into the Dominion Woollen Manufacturing Company, Limited, of which Mr. Robert became managing director. Mr. Robert took a great interest in the water power used at Beauharnois in the operation of the mills there, and together with some associates acquired a water power in the St. Lawrence River known as the Bisson Point power. This right was eventually sold to the St. Lawrence Light & Power Company, better known as the Chambly Company, and affiliated with the Montreal Light, Heat & Power Company. In 1901 Mr. Robert commenced negotiations with the Ottawa government for a lease of the Beauharnois Canal to develop power and transmit it electrically to Montreal and the surrounding district. In 1907 the negotiations for the lease of this property from the government were concluded. After obtaining this concession Mr. Robert formed the Canadian Light & Power Company and served as vice-president and managing director of the company. He was largely responsible for the formation of the syndicate which obtained the control of the Montreal Street Railway.

OBITUARY

E. R. French, superintendent of the Central Division of the Public Service Railway, which includes the lines in Elizabeth and Cranford, is dead. Mr. French was graduated from the Waterbury High School and attended the Massachusetts Institute of Technology. He entered the employ of the Public Service Railway upon completing his studies at the Massachusetts Institute.

L. C. Smith, president of the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., died at his home in Syracuse on Nov. 5, 1910. Mr. Smith was born at Torrington, Conn., on March 31, 1850. In 1877 he began to manufacture breech-loading firearms and in 1890 organized the Smith Premier Typewriter Company, of which he was president until it was sold to the Union Typewriter Company. In 1903 he organized the L. C. Smith & Brothers Typewriter Company and was elected president of the company.

Sir J. Clifton Robinson, who retired early this year as managing director of the London United Tramways, London, England, died suddenly on Nov. 6, 1910, in New York, of heart disease, while returning to the Waldorf-Astoria, where he was a guest. Sir Clifton arrived in New York on Nov. 5, 1910, from Canada, where he had gone to inspect railroad interests held by the Charing Cross Bank of England. Following his retirement from the London United Tramways Sir Clifton was retained by Speyer & Company to investigate railroad matters for them in the East. Sir Clifton was born in Birkenhead, England. His tramway work was begun in England in 1860, when he became associated with the late George Francis Train in the construction of the first tramway in Europe, at Birkenhead. Later he came to America and remained here five years, serving with several street railway companies. In 1871 he returned to Europe and in 1884 supervised the construction of the Highgate Cable Tramway, London, the first cable line in England. He was also connected with the Dublin Southern Railway, London United Electric Tramways, Imperial Tramways, Bristol Electric Tramways, Metropolitan District Railway, Underground Electric Railways, Limited, London, England, and the Corris Railway. Sir Clifton was knighted in 1905 by the late King Edward for his public services in tramway construction. On Aug. 30, 1910, Sir Clifton celebrated the fiftieth anniversary of his connection with tramway construction. This date was also coincident with the fiftieth anniversary of the establishment of tramways in the United Kingdom. An extended biography of Sir Clifton was published in the STREET RAILWAY JOURNAL of Nov. 30, 1907.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Alabama Traction Company, Montgomery, Ala.—Incorporated in Alabama to build a 25-mile electric railway in Montgomery and eventually extend it to other towns. The company advises that material has been ordered and work will begin soon. Power for the line will be leased. Capital stock authorized, $1,000,000; stock issued, $250,000. Officers: Charles G. Abercrombie, Montgomery, president, general manager and superintendent; Charles Woodward, Wakefield, vice-president; John J. Flowers, Montgomery, vice-president and treasurer. All communications to be sent to Charles G. Abercrombie, Montgomery. [E. R. J., Oct. 8, '10.]

***Alberta (Alta.) Electric Railway.**—Incorporated in Lethbridge, Alta., to construct interurban railways to the American boundary and between McLeod, Calgary and Medicine Hat.

***Fox & Illinois Union Railway, Aurora, Ill.**—Incorporated in Illinois to build an electric railway from Yorkville to Morris, Ill., with connecting lines at Dwight and Sandwich. Headquarters, Aurora. Capital stock, $20,000. Incorporators: John Meredith, Joshua Rhodes, Frank M. Zimmerman, Henry H. Evans and Ralph C. Putnam, all of Aurora.

Queen City Transit Company, Traverse City, Mich.—Application for a charter has been made in Michigan by this company to build an electric railway in Traverse City. Capital stock, $3,000,000. L. K. Gibbs is interested. [E. R. J., Dec. 18, '09.]

Consolidated Traction Company, Philipsburg, Pa.—Incorporated in Delaware to build an electric or steam railway from Philipsburg to Curwensville via Blue Ball, Wallacetown, Bigler, Woodland and Clearfield. Capital stock, $100,000. It is reported that operations will start in about a month. W. Ellis Shomo is interested. [E. R. J., May 21, '10.]

***Alta & Jordan Valley Railroad, Alta, Utah.**—Incorporated in Utah to build a 16-mile electric or steam railway from Sandy to Alta. Capital stock, $200,000. Incorporators: D. J. Williams, M. A. Williams, Wm. F. Williams, B. F. Cummings and E. W. Cummings.

***Janesville Traction Company, Madison, Wis.**—Incorporated in Wisconsin to build interurban lines in to the territory surrounding Janesville. Capital stock, $125,000. Incorporators: Thomas Nolan, William Murphy and J. L. Burke.

FRANCHISES

Birmingham, Ala.—The Alabama Railway & Electric Company has applied to the City Council for a franchise to build its tracks over certain streets in Birmingham.

Oakland, Cal.—The Southern Pacific Company will ask the City Council for a franchise to electrify the Seventh Street line at once.

Council Bluffs, Ia.—The Omaha & Council Bluffs Street Railway, Omaha, has asked the City Council for a franchise to extend its lines in Council Bluffs.

***Ft. Scott, Kan.**—H. L. Phillips, C. E. Cory and associates, it is said, will ask the City Council for a franchise to build an electric railway in Ft. Scott. This is part of a plan to build a railway to connect Ft. Scott and Pittsburgh. They will soon apply for a charter.

Louisville, Ky.—The Louisville Railway has applied to the General Council for a franchise to build an extension to its line in Louisville.

***Kansas City, Mo.**—It is stated that W. D. Miles will ask the Council for a franchise to build an electric railway on certain streets in Kansas City.

Jamestown, N. Y.—The Jamestown Street Railway has applied to the Council for a franchise to build an electric railway on Willard Street and to double-track its lines on Main Street and Second Street.

*New York, N. Y.—The Bronx Traction Company has applied to the Board of Estimate and Apportionment, New York, for a franchise to build an extension of its electric railway on White Plains Road, from Morris Park Avenue to Gun Hill Road. Nelson P. Lewis, chief engineer.

Seattle, Wash.—The Seattle-Tacoma Electric Railway has received from the County Commissioners an extension to its franchise of three months' time in which to begin the construction of its electric line between Seattle and Tacoma.

TRACK AND ROADWAY

Tucson Gas, Electric Light & Power Company, Tucson, Ariz.—This company is said to be considering plans for building about 2 miles of track on the East Speedway in Tucson.

Pacific Electric Railway, Los Angeles, Cal.—Press reports state that this company has placed in operation its new 4-track electric system between Los Angeles and Pasadena. It begins at Indian Village, near Eastlake Park, and ends at El Molino Junction, outside the city limits of Pasadena.

Fairview Interurban Railway, Delta, Col.—This company advises that it has secured all right-of-way and most of the grading is done for its proposed 25-mile electric railway to connect Delta, Cedaredge and the Fairview coal mines. Capital stock, $250,000. Its power house and repair shops will be located at Delta. Charles G. Montz, 1154 Clarkson Street, Denver, is interested. [E. R. J., Oct. 22, '10.]

*Waterbury, Conn.—Surveys have been made and rights-of-way secured for building a 10-mile electric railway to connect Waterbury and Milldale. Charles H. Preston, Jr., 136 Grand Street, Waterbury, is said to be interested.

West Chester & Wilmington Electric Railway, Wilmington, Del.—It is reported that this company will let contracts within the next 10 days for the construction of its railway between West Chester and Wilmington. Lewis Dalmas, Morris Building, Philadelphia, Pa., president. [E. R. J., Nov. 5, '10.]

Washington Railway & Electric Company, Washington, D. C.—It is said that this company will build an extension of its double track line to Congress Heights. It is expected to begin work in the spring.

Carnesville (Ga.) Railway.—This company advises that its proposed 20-mile railway to connect Toccoa, Carnesville and Red Hill will be operated by steam. W. S. Erwin, Carnesville. [E. R. J., Oct. 29, '10.]

Kankakee & Urbana Traction Company, Kankakee, Ill.—Press reports state that the stockholders of this company will hold a meeting on Nov. 22 for the purpose of increasing the capital stock from $200,000 to $2,500,000. Preliminary arrangements have been made to begin construction soon on this 125-mile railway between Kankakee, Urbana, Villa George, Camargo and Charleston. W. J. Brook, Kankakee, president. [E. R. J., July 2, 10.]

Evansville, Mount Carmel & Olney Electric Railway, Evansville, Ind.—This company is said to have sold enough bonds to insure the building of its railway as far south as Lancaster, Ill.

Ft. Wayne & Toledo Electric Railway, Ft. Wayne, Ind.—It is said that this company has secured all equipment and will begin construction soon on its 44-mile railway to connect Ft. Wayne and Maysville, Ind., and Hicksville, Bryan and Toledo, Ohio. R. T. Bastress, general manager. [E. R. J., Sept. 17, '10.]

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.—Press reports state that this company has completed and placed in operation a second track between Gary and the State line, a distance of 11 miles. It is expected to continue the double track through Gary and eventually the entire route will be a double-track system.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—This company has completed surveys and will let contracts next spring for building its proposed 20-mile extension from Waterloo to Dike via Cedar Falls.

Winnipeg, Salina & Gulf Railway, Salina, Kan.—This company advises that its railway will be operated by steam and not by electricity. [E. R. J., Oct. 29, '10.]

Paducah (Ky.) Traction Company.—It is said that this company is considering plans to extend its tracks 3 miles to Lone Oaks.

Frederick (Md.) Railroad.—It is reported that this company expects to extend its tracks in Frederick City on Market Street and Patrick Street to afford local service in connection with the interurban line.

*Commonwealth Power Company, Lansing, Mich.—It is stated that this company intends to build an electric railway from Lansing to Battle Creek via Charlotte, Olivet, Potterville and Millet. It is the intention of the company to begin work in the Spring. W. A. Foote, Lansing, president.

Michigan United Railways, Lansing, Mich.—This company, it is said, will compete this fall $55,000 worth of track work in Lansing and Jackson. This will include replacing single track with double track and installing the tracks in new Jackson terminal building and car house

Morris County Traction Company, Morristown, N. J.—It is stated that this company has begun construction for the continuation of its tracks from Morristown to Madison, a distance of about three miles.

Charlotte Electric Railway, Light & Power Company, Charlotte, N. C.—This company is said to be building an extension of its tracks in Charlotte extending down Tryon Street to Palmer Street to connect with the Lakewood line on West First Street, thereby forming a complete loop in Ward 3.

*Youngstown, Ohio.—John McClure, Poland, is reported to be considering plans for building an electric railway to extend from Poland to Boardman and there to connect with the Youngstown & Southern Railway.

Muskogee (Okla.) Electric Traction Company.—This company is said to be considering plans for building a 9-mile extension of its Alta Vista line through the brick yards and Crekola to Taft. It is probable that it will cross Pecan Creek over a county bridge.

Portland Railway, Light & Power Company, Portland, Ore.—It is reported that this company will soon build a 3½-mile extension of its Cazadero line in Portland.

*Lock Haven, Pa.—It is reported that plans are being considered for building an electric railway to connect Lock Haven and Avis.

Wilkes-Barre (Pa.) Railway.—It is said that this company has decided to expend $500,000 in improving the service on the various lines running through the Wyoming Valley.

Dallas (Tex.) Standard Traction Company.—Official reports state that this company has just placed in operation 1 mile of track from Mount Auburn addition to a point where connection will be made with the lines of the Dallas Electric Corporation. Capital stock, authorized, $10,000. Bonds, authorized, $10,000. Power to operate the line will be leased from the Dallas Electric Light & Power Company, and it will also use the repair shops of that company. Officers: E. A. Lancaster, Dallas, president and general manager; J. B. Martin, vice-president; R. A. Groves, 336 Commerce Street, Dallas, secretary, and W. O. Siler, treasurer. [E. R. J., Oct. 29, '10.]

*San Antonio, Tex.—Press reports state that a company has been organized with a capitalization of $2,000,000 to build an interurban railway between San Antonio and Austin with several branches. The railway is to obtain power from Marble Falls.

Yakima Valley Transportation Company, North Yakima, Wash.—It is reported that this company has begun work on the extension of its tracks on Second Avenue, from Yakima Avenue to Pine Street, in North Yakima.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—It is reported that surveys will soon be made by this company for an extension of its railway from Clarksburg to Northview. S. B. Miller, Fairmont, chief engineer.

*Martinsburg, W. Va.—It is reported that surveys are being made for the purpose of building a proposed electric railway to connect Martinsburg, Hedgesville and Tomahawk.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—Press reports state that this company has purchased Armory Hall in

Marysville and will build on the site a combination freight and passenger depot. It is also reported that this company will soon build a station near Rancho Del Paso.

Los Angeles (Cal.) Railway.—It is reported that this company intends to build new car houses at Hawthorne, on the Los Angeles & Redondo line.

Illinois Traction System, Champaign, Ill.—This company has prepared plans and specifications for a new freight house and storeroom at Granite City, Ill., near St. Louis. Fireproof structural materials will be used. The building will be 122 ft. x 50 ft. and two stories high. The foundations and floors will be of concrete, the second floor being carried by 9-in. and 7-in. I beams. The side walls will be made of buff brick, inclosing concrete window sills and lintels. Steel trusses spanning the second story will support a fireproof roof of concrete placed on Hy-rib reinforcing and covered with interlocking tile. The first floor will be subdivided into a freight room and office section 55 ft. by 47 ft. 2 in., a storeroom 39 ft. 5 in. x 47 ft. 2 in. and two rooms approximately 23 ft. square for a substation and a meter room. The second floor will be subdivided into rooms for storage purposes. Hollow tile will be used for partition walls.

Michigan United Railways, Lansing, Mich.—This company has commenced the building of a new car house at Jackson. It will occupy ground space 264 ft. x 132 ft. and will have a frontage on two streets and will contain eight tracks with the necessary pits and machine shop. The cost is estimated to be about $60,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is reported that this company will spend $1,000,000 during the coming year in the erection of new car houses and shops and other improvements in the southern part of Akron. The old car house on Main Street will be abandoned when the new building is completed. Charles Currie, general manager.

Portland (Ore.) Railway, Light & Power Company.—It is stated that this company is considering plans for the erection of a large car shop at Portland for the construction and repairing of its cars. The company will probably build another clubhouse for the use of its linemen on the block bounded by Hawthorne Street, Clay Street, Water Street and First Street in Portland. The structure will be 100 ft. x 200 ft., of reinforced concrete construction, and it will be used by the lighting department of the company. A modern garage will be in the basement.

Ogden (Utah) Rapid Transit.—This company, it is said, will soon build car houses to be located several blocks from the County Court House in Brigham City.

POWER HOUSES AND SUBSTATIONS

Southern Pacific Railroad, Los Angeles, Cal.—This company is said to have awarded to William Brothers & Henderson the contracts for constructing a substation at the west side of Bay Street and Sixth Street in Oakland. The structure will be of concrete and will cost, it is estimated, $35,000.

Illinois Traction System, Champaign, Ill.—This company is receiving bids on additional rotary converter substation equipment for the Jacksonville Railway & Light Company, Jacksonville, Ill.

Worcester Consolidated Street Railway Company, Worcester, Mass.—This company is installing at its power plant in Millbury two heavy duty boiler feed pumps, capacity of supplying 3600-hp boilers, and a copper coil feed water heater of 3500-hp capacity, made by the C. H. Wheeler Manufacturing Company.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company, it is said, is considering plans for building a large power house in Akron or vicinity.

Lehigh Valley Transit Company, Allentown, Pa.—This company is said to be asking bids for one 5000-kw turbine with boilers, condensers and auxiliaries. The bids are being requested through the company's consulting engineers, Ford, Bacon & Davis, New York.

Wilkes-Barre (Pa.) Railway.—It is reported that this company will build a new addition to its present power house on South Main Street in Wilkes-Barre.

Manufactures & Supplies

ROLLING STOCK

Northern Ohio Traction & Light Company, Akron, Ohio, is reported to be considering the purchase of several new cars.

New Orleans Railway & Light Company, New Orleans, La., expects to receive this week the first of 50 new cars which are being shipped from the plant of the St. Louis Car Company.

Norfolk-Portsmouth Traction Company, Norfolk, Va., which was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 5, 1910, as considering the purchase of several new cars, has ordered 10 cars from The J. G. Brill Company.

Michigan United Railways, Jackson, Mich., has ordered eight single-truck car bodies equipped with Brill 21-E trucks from the G. C. Kuhlman Car Company. The Michigan United Railways will install 30 Peter Smith hot-water heaters in its city cars this fall.

Richmond & Henrico Railway, Richmond, Va., has ordered four cars from the Southern Car Company and 20 closed cars from The J. G. Brill Company instead of 16 cars from the Southern Car Company, as reported in the ELECTRIC RAILWAY JOURNAL of Oct. 29, 1910.

Ottawa (Ont.) Electric Railway has ordered 18 vestibuled, semi-convertible car bodies 33 ft. 6 in. long from the Ottawa Car Company, Ltd. The cars will be 45 ft. 6 in. long over all and will have pay-as-you-enter platforms. Brill 27-F E double trucks and Westinghouse 101 B-2 four-motor equipments have been specified.

Illinois Traction System, Peoria, Ill., has just received the following new interurban equipment: Four motor express cars and 32 express trail cars, and has on order the following interurban equipment: Thirty-five express trail cars, 50 coal cars, 25 box cars, 2 sleeping cars, 2 passenger cars with motors, 5 passenger trail cars with observation ends and 4 combination baggage and express cars equipped with motors and designed for hauling sleeping cars. It has also ordered from the Danville Car Company 29 single-truck closed cars for distribution among the local properties. The company is building at its Decatur shops eight interurban snow plows, two of which are designed for use on the Chicago, Ottawa & Peoria Railway in Northern Illinois.

Bangor Railway & Electric Company, Bangor, Me., has ordered from The J. G. Brill Company one 30-ft. baggage and express car and two semi-convertible vestibuled motor cars. The baggage car will be equipped with four G. E. 80 motors, Brill 27 M. C. B. trucks, Peacock hand brakes, Brill Dedenda gongs and Neal-Kirby headlights. The specifications for the semi-convertible cars follow:

Seating capacity.....44	Destination signs....Hunter
Length of body....30 ft. 8 in.	Gears .....split
Over vestibule....40 ft. 1 in.	Gongs.....Brill Dedenda
Width over sills..8 ft. 1½ in.	Hand brakes.....Peacock
Over posts at belt..8 ft. 4 in.	Headlights..... Neal-Kirby
Body .....wood	Motors.....G. E. 80
Underframe .....wood	Registers...Sterling Meader
Axles.....A. E. R. A. Std.	Sanders.....Brill dumpit
Bumpers.....Brill angle iron	Seats.....Brill Winney
Center bearings..Symington	Seating material.....rattan
Control system...G. E. K-10	Step treads.....Stanwood
Couplers .....Brill	Track scrapers.....Root
Curtain fixtures..Cur. S. Co.	Trolley base.Sterling-Ridlon
Curtain material, double coated sheeting	Trucks...Brill 27 M. C. B. 1
	Wheels, Standard Steel Wks.

TRADE NOTES

Harbison-Walker Refractories Company, Pittsburgh, Pa., has appointed Kenneth Leaver chief engineer.

Chicago Bearing Metal Company, Chicago, Ill., announces the appointment of H. H. Hiland as general sales agent, effective Oct. 15.

Railway Materials Company, Chicago, Ill., is having plans prepared by Bacon & Huber, Toledo, Ohio, for an addition to its plant in Toledo. The new building is to be 60 ft. x 140 ft., and is to be used as a foundry.

O. M. Edwards Company, Syracuse, N. Y., has moved its New York office to Room 1232, New York Life Building, which is located at 346 Broadway.

Duff Manufacturing Company, Pittsburgh, Pa., has purchased the entire plant of William Forgie, Washington, Pa., also all rights and privileges of making oil-well jacks. The Forgie line will be added to the present line of Duff products.

Birmingham Frogless Switch Company, Birmingham, Ala., has been incorporated with a capital stock of $11,000. The incorporators are: S. E. Risher, president; Charles T. Stacks, vice-president, and W. C. Hawkins, secretary and treasurer.

Davis-Expansion Boring Tool Company, St. Louis, Mo., has changed its name to Matthews-Davis Tool Company. The officers of the company are as follows: W. N. Matthews, president and treasurer; E. E. Davis, vice-president and general manager; Claude L. Matthews, secretary.

Allis-Chalmers Company, Milwaukee, Wis.—At the annual meeting of the stockholders of this company, Nov. 3, Frank O. Wetmore was elected a director to succeed William W. Allis, retired. At the meeting of the directors the old officers were re-elected.

McKeen Motor Car Company, Omaha, Neb., has recently shipped two 70-ft. gasoline motor cars, one to the Southern Railway and the other to the Chicago, Rock Island & Pacific Railway. This makes a total of 90 McKeen cars in service in the United States and Mexico.

G. S. Ackley, president of the Ackley Brake Company, New York, N. Y., and the British Ackley Brake Company, London, England, will sail on Nov. 19, 1910, for Buenos Ayres and will travel through the Argentine Republic and other South American countries in the interest of his company.

Goldschmidt Thermit Company, New York, N. Y., has elected Dr. F. H. Hirschland vice-president. William C. Cuntz, mentioned in a recent issue of the Electric Railway Journal as successor to E. Stütz, vice-president and general manager, will be general manager and treasurer of the company.

Rooke Automatic Register Company, Providence, R. I., reports that its registers have made an excellent record on the Fifth Avenue omnibus line in New York, where they collected last year the fares of practically 6,000,000 passengers. A 10-cent fare is charged on the automobile buses that operate on Fifth Avenue, New York, and the Rooke register is used on all of these automobile buses.

Blake Signal & Manufacturing Company, Boston, Mass., has received from the Illinois Traction System a contract for the equipment with the Blake block signals of 100 miles of track between Springfield and St. Louis. There will be 80 dispatcher's signals on this section, one at each siding. This is the first part of a comprehensive plan for equipping the Illinois Traction System with block signals, which has been approved by the management.

Forsyth Brothers Company, Chicago, Ill., announces that owing to constantly increasing business in its different railway devices, including its specialties in metal formation for cars, it has acquired 23 acres of land at Harvey, Ill., upon which it has begun to erect a new plant. The property is located on several large roads, from which switches will be run into the property. The company expects to have at least one building with new machinery installed therein ready for occupancy before the first of the coming year.

Western Electric Company, New York, N. Y., reports that the Southern Pacific Railroad has adopted the telephone method of dispatching trains on its Shasta division. Telephones are now being used over a 206-mile section of the main line between Ashland, Ore., and Red Bluff, Cal., and a branch of 85 miles from Weed, Cal., to Klamath Falls, Ore. The apparatus for this dispatching system has been furnished by the Western Electric Company.

St. Louis Car Company, St. Louis, Mo., has several hundred cars in its shops and new orders are coming in daily for early delivery. A notice appears in another column of the 50 cars which the company has just finished for the New Orleans Railway & Light Company. With the increased working capital which the company expects under the re-organization plan published last week the capacity of the plant at St. Louis will be considerably increased.

Railway Steel Spring Company, New York, N. Y., has elected Frederick F. Fitzpatrick president, succeeding William H. Silverthorn, deceased. Scott R. Hayes, general sales agent, will succeed Mr. Fitzpatrick as vice-president of the company. H. H. Scovill has been elected assistant secretary. Jacob K. Griffin has resigned as superintendent of the company's plant at Latrobe, Pa. It is understood that he will continue his connection with the company, serving in an advisory capacity.

ADVERTISING LITERATURE

G. C. Reiter, Canton, Ohio, is distributing a folder describing and illustrating a complete line of gongs for street cars. Attention is called particularly to several types of rotary or multiple ringing gongs.

Nachod Signal Company, Philadelphia, Pa., has issued a booklet entitled "Nachod Spells Safety." It contains illustrations of Nachod signals in operation on electric railways, together with illustrations of the signal box and contactor, and explains their construction.

Packard Electric Company, Warren, Ohio, is distributing a folder describing rubber friction tapes and splicing compounds. The company has also issued price list No. 11 of insulating cloth and bias-cut cambric tape and price list No. 30 of Packard insulating varnishes.

D. & W. Fuse Company, Providence, R. I., has issued Bulletin No. 114, in which is covered the company's line of subway boxes for both low and high-tension service, including equipment for inclosed fuses and various combinations for connecting up subway lines where fuses are not required.

Trussed Concrete Steel Company, Detroit, Mich., has published the 1910 edition of Kahn system standards. This is the fourth edition of the book and contains numerous additions and revisions so as to include the best and most modern ideas on reinforced concrete designing and estimating, waterproofing, etc. The chapter on waterproofing has been re-written and new sets of tables for hooped columns and footings have been added. The publication also contains data on the various Kahn system products for reinforced concrete, steel lath, fireproofing, steel windows and other uses.

The J. G. Brill Company, Philadelphia, Pa., has issued a new car and truck catalog, No. 192, in which are shown upward of 125 different types of city, interurban and work cars. For the most part the cars illustrated have been built since 1908 and they represent, therefore, the latest and best types. They include closed, semi-convertible, convertible and open cars, both single and double-truck. In addition to the exterior views 48 interior views showing seating arrangement, ceilings and finish are given. Accompanying the exterior view of each car is a statement of the length of body, length over platforms, length of platforms, window centers, seating capacity and approximate weight of body. The last pages of the book show Brill trucks and car specialties, including seats, fare boxes, sanders, bumpers, gongs, track scrapers, brake handles, drawbars and truck parts. A number of detachable order blanks are bound in next to the back cover.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued circular No. 1189 on hand-operated unit-switch control. The circular contains complete wiring and piping diagrams and describes the details of the apparatus. Another folder just issued by the company briefly describes Westinghouse auxiliary contactor control equipments. Folder No. 4184 outlines a few of the company's practical and successful results in improvements made to the various parts of its railway motor. It also shows comparative advantages of interpole versus non-interpole railway motors and box-frame versus split-frame motors. The company has also published bulletin No. 1510, entitled "Twentieth Century Electric Railway Equipment." It contains more than 40 illustrations showing cars and locomotives of various systems throughout the country which are using Westinghouse railway equipments. The publication includes a description and illustrations of interpole railway motors and parts.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, NOVEMBER 19, 1910 No. 21

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 19, 1910.

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A Focus of Transportation Systems

The completion of the Hudson & Manhattan tube system to the junction of Thirty-third Street, Broadway and Sixth Avenue, New York, makes that point the most highly developed transportation intersection in the world. On the lowest tier is one of the two deep double-track tunnels of the Long Island and Pennsylvania railroads. On the next level above are the subway trains and present terminal station of the Hudson & Manhattan Railroad. Directly above this station, on the street surface, are the tracks of the Sixth Avenue and Broadway divisions of the Metropolitan Street Railway. These lines cross the Pennsylvania tunnels at Thirty-third Street and intersect at less than 50 ft. north of the corner. Finally the Sixth Avenue elevated tracks make the fourth level of tracks to cross this focus of electric railway systems. When the Hudson & Manhattan Railroad is extended to the Grand Central Station another and in some respects a more complicated situation will be presented, because, while the Pennsylvania tracks will be absent, the street pavement will cover the present subway, the Hudson & Manhattan and the Steinway tunnel, all at different levels.

Advanced Scientific Research

The annual report of President Schurman of Cornell, presented last week to the Board of Trustees of that university, contained an earnest plea for the extension of graduate school instruction and the establishment of a department of research. According to President Schurman, it is in this direction that the highest future of the American university lies, because it is through the scientific investigator that human knowledge is enlarged and progress in civilization made possible. Such extension of the work of a university should also act as a great intellectual stimulant upon the rest of the students and even of the faculty. Indeed, it might form the solution of the problem, recently considered in an address by President Lowell of Harvard, and also in the report of an alumni committee at Yale, of the best way of increasing the incentive to scholarship in the general undergraduate body. The influence upon industrial progress should also be enormous. To realize this one has only to think of what the effect would have been at the present time in the science of electrical engineering if for the past 20 or even 10 years a corps of trained investigators in a completely equipped laboratory had been engaged in adding to the world's knowledge upon such subjects as the action of electricity under different conditions, the laws of thermodynamics, the strength of materials and the chemistry of fuels. President Schurman thinks that it would take $20,000,000 to endow such a school as he describes. The interest on this amount would be $1,000,000 a year and the results, judged even from the single standpoint of national economy, should be far above that figure.

Short-Haul Suburban Business

A single-track, low-speed suburban line offers some traffic possibilities which may be lost by careless or inefficient attention to schedules. On lines of this character the transportation of city commuters from the suburban station to their homes is a desirable business. It is short in haul and is pretty regular in volume, except in time of storm, when it increases greatly. The largest amount of traffic possible can be realized from this source only by careful attention to details that are important because they concern the personal convenience of the passengers. First, if it is possible without unreasonable delay to others, the passengers who leave incoming trains should find cars waiting. Second, cars with passengers bound for the station should have a deserved reputation for "making trains." Third, cars with homeward-bound passengers should not be subject to regular delays because the meeting points of cars operating in opposite directions are badly placed or the meeting time is left to the haphazard choice of indifferent trainmen. These delays exhaust the patience of riders. Even if it is not possible to remove entirely these elements of friction, a reduction in the occurrences that vex the public will increase patronage.

The Proposed Boston Electrification

The long-awaited reports of the New York, New Haven & Hartford Railroad and the New York Central & Hudson River Railroad on the proposed electrification in the Boston Metropolitan District have been made public and are given in abstract in this issue. An idea of the extent of the project involved is shown in the total figures of cost, which, for the roads concerned, amount to a little over $40,000,000, not including the credit which would be allowed for the steam equipment displaced. This for the New York Central & Hudson River Railroad amounts to about 15 per cent of the cost of the new equipment. It was not estimated by the New York, New Haven & Hartford Railroad for its own line or for the Boston & Maine Railroad, of which it is the lessee, because the company states that there is no direct opportunity for the utilization of so large an amount of equipment of this special type and its value to resell would be so doubtful that a valuation was not practicable. It is not surprising that the size of these estimates of cost is staggering to the railway companies. The New York Central & Hudson River Railroad explains that the receipts from its present suburban service in the district involved do not pay operating expenses and the company does not look with equanimity upon the addition of an annual expense for fixed charges of more than $500,000, unless higher fares can be charged. The New York, New Haven & Hartford Railroad also complains of the expense and states that up to the present the electric train service on its New York electrical zone has not only failed to earn the interest on the capital invested, but has also increased the cost of operation. Part of this condition, it says, is due to the operation of freight trains by steam, but how great an improvement would result from complete electrical operation and whether there has been an increase in gross receipts since electric power was adopted the company does not say. Neither does it give the details of the higher operating expenses mentioned. The company is not entirely opposed to the change, but recommends its introduction, if at all, gradually, with subsequent extension as rapidly as may be consistent with the financial conditions and the public needs.

SIGNALS FOR INTERURBAN ROADS

Since the sequence of disastrous collisions between interurban cars which occurred less than two months ago a decided change has taken place in the attitude of interurban railway managers toward automatic block signals and other safety devices. Widespread interest is now being manifested in every kind of apparatus designed for safeguarding train operation, and several roads have made known to signal manufacturers their desire to purchase some form of signal apparatus which will effectually assist the dispatchers and the train crews in their work and prevent the recurrence of such accidents in the future. The Illinois Traction System has appropriated $150,000 for signals to be installed immediately, and other interurban roads in the Central and Western States contemplate proportionately large expenditures. They have come to the conclusion that protection by signals of some sort is necessary from the economical as well as the humanitarian standpoint.

Few single-track electric interurban roads as yet have made a thorough study of automatic block signals as applied to their operating conditions. The problems involved may be divided into those which affect the movement of trains, such as location and spacing of signals, and those which relate to the details of the apparatus employed for giving the signal indications. To some extent both have been largely solved by the experience of the steam railroads and such electrically operated roads as the New York subway, the Hudson tunnels and the Long Island Railroad.

It may be of interest to summarize briefly the classes of signal apparatus which are available and are being studied by the interurban roads interested in safety devices of this kind. In the increasing order of degree of safety afforded they may be classified as follows:

(1) Centrally controlled dispatcher's signals, (2) automatic block signals operated by trolley contacts, (3) automatic block signals operated by track instruments, (4) automatic block signals with track-circuit control, (5) automatic block signals with track-circuit control and train stops, (6) the electrically interlocked staff system. None of these signal systems will fully supplant train dispatching on single-track roads, although the automatic block signals which have been installed on the single-track sections of many of the Western steam railroads have made possible the closing of a number of intermediate telegraph stations.

The question uppermost in the mind of every interurban railway manager who is considering block signals is: How much will they cost? The installation of automatic block signals with track-circuit control suitable for protecting a single-track interurban line with stub-end sidings about 2½ miles apart would cost between $1,200 and $1,500 a mile, according to the number and arrangement of signals at each siding. If a home and distant signal for each direction and a circuit controller on the switch were installed at each siding the cost would be nearer the higher figure. An electrically interlocked staff system would cost to install about $250 to $300 per mile. These figures, of course, are based on average requirements and the cost might be more or less according to the special arrangement of the signals on account of curves or other obstructions. They indicate, however, that the general impression regarding the high cost of adequate automatic block-signal protection is erroneous. This impression, no doubt, has been

gained because of the more complicated signal installations which are thought to be necessary by the steam railroads. The cost for maintaining automatic block signals with track-circuit control is less than $50 per mile of road per year, when a signal maintainer is paid $90 per month. The percentage of signal failures with an installation of this kind is infinitesimal. The steam railroads have made records of as high as one signal failure per 700,000 movements, and these failures are almost invariably false danger indications.

It has been the experience of the steam railroads in the Western States which are operating long stretches of single track with automatic block signals (the Harriman lines alone have equipped over 6000 miles of single track) that when the signals are first installed considerable opposition has been manifested by the enginemen. It has been found uniformly, however, that this opposition has disappeared entirely after two or three months, when the men have had an opportunity to become accustomed to the movement of trains in accordance with the signal indications. Many instances have been cited where committees of enginemen have called upon the managements of new lines and demanded that block-signal protection be given them. The enormous development of automatic block signaling on single-track roads in the West also has shown that when the signals are properly located the rate at which opposing trains can be dispatched over the road is not decreased, but is actually increased. It is obvious that as the distance between sidings is lessened the delays to opposing trains are decreased and the shorter the length of the blocks between sidings the faster is the movement of traffic in the same direction.

The electrically controlled staff system has been used on a number of steam roads where the greatest safety of train movement is desired, often at the sacrifice of running time. A staff system has been installed to protect trains operated over long single-track bridges and in tunnels, with an installation of electrically interlocked staff machines at the end of each block. The trainman may deposit a staff in the machine so as to clear the block which has just been passed through and procure a staff for the next block in advance in less than 10 seconds. Staff machines may be used with or without operators. The assistance of operators, however, reduces the time required for inserting and removing the staffs from the machines and hence increases considerably the average train speed. Provision is made in modern electric staff machines for operating trains in sections with permissive blocking for traffic moving in the same direction. This is done by using a sectionalized staff or tablet, one part of which is given to the crew of each section of a train at the entrance to the block. All of the parts must be assembled and inserted in the machine at the outgoing end of the block before an opposing train can remove a staff and proceed through the block.

Expert signal engineers who are now studying interurban conditions with a view to recommending adequate signal protection state that there is a strong possibility that a cheap but entirely safe staff system can be designed for high-speed interurban roads. Such a system would not unduly impede train movements and would not permit any trains to enter a block which was occupied by one or more opposing trains. The use of the staff system in connection with automatic block signals in the snow sheds of the Southern Pacific Railway is said to have increased the traffic capacity of the single track more than 100 per cent.

Safety is the chief aim when any system of signals is to be installed. It is far better to rely solely on present train dispatching methods than to install a signal system which is unreliable and may result in false indications or serious delays to traffic when any element fails. We believe that the requisites demanded by the steam railroad for automatic block signaling apply equally to the conditions of the average high-speed interurban road. If the interurban roads have reached the point where the necessity for block-signal protection is admitted, they can make no mistake in adhering to the standards which have been set by the steam railroads as the result of long experience. Any system of signals which falls below these standards is of doubtful value as a permanent investment.

THE READING POWER STATION

The reconstruction of the power system of Reading, Pa., described in this issue, was brought about by the necessity of generating power more economically and the desirability of increasing the sale of energy for lighting and industrial purposes in a rapidly growing territory. The new station possesses quite a number of unusual features. The odd plan whereby the high-tension switches, control apparatus and local substation are housed in a longitudinal extension of the turbine room was determined by the shape of the available plot. This condition, however, did not prove a handicap to the proper control of the generating units, as the switchboard operator can overlook the turbine room from one end instead of from the side. A notable structural feature is the arched roof, which is more typical of foreign designs than of the customary American standards. This kind of roof is more graceful than the monitor and not more costly when built up of short spans, as in this installation. Special roof ventilators, of course, are required in this construction.

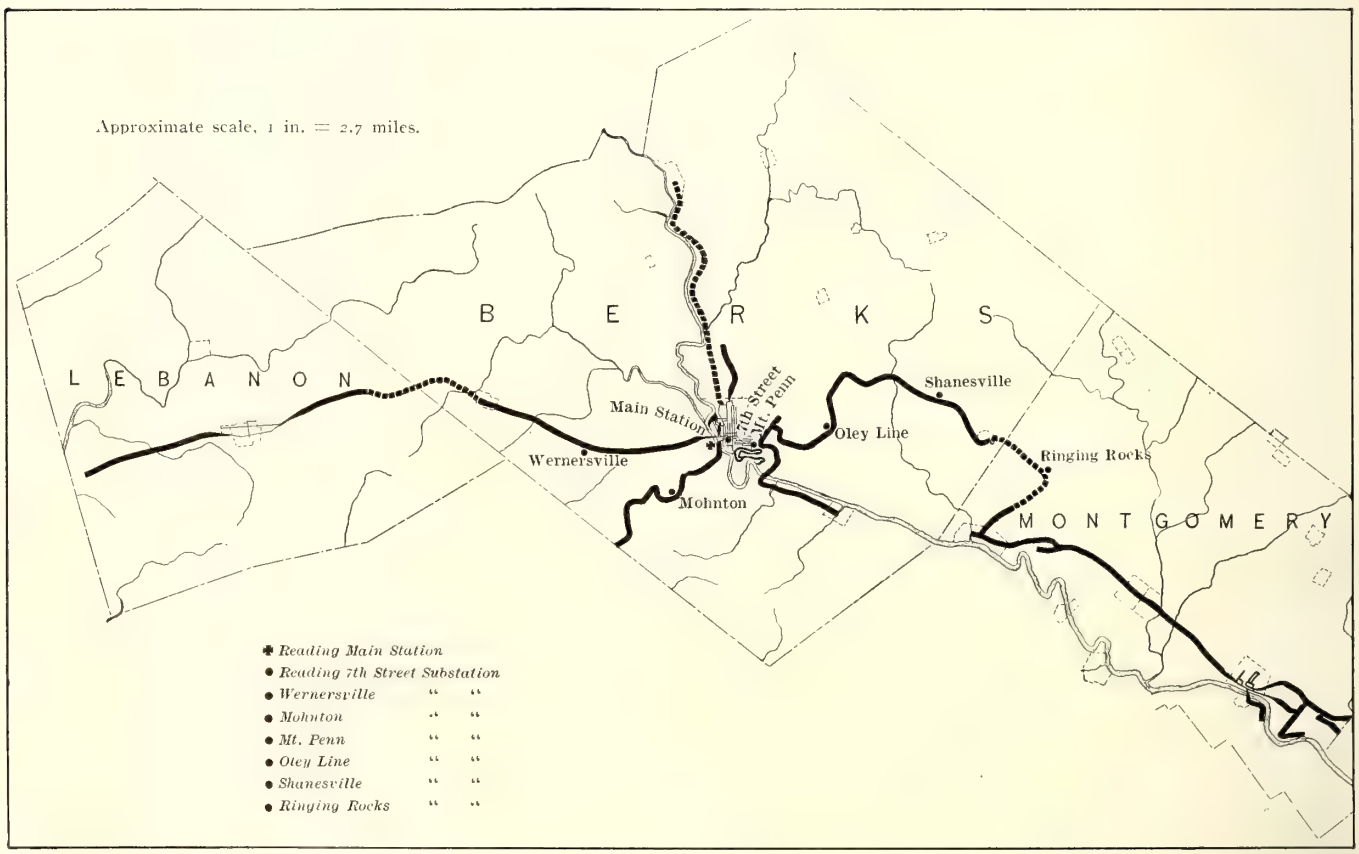
The steam piping is not only very simple, but it also embodies a recognition of the fact that the use of turbines demands different standards in pipe diameters. In a reciprocating-engine plant allowance must be made for the shocks due to the intermittent use of steam and the piping must be large enough to handle maximum amounts for short periods. These conditions do not apply to turbines because steam is delivered to them at a uniform rate of flow. If the Reading plant was operated with reciprocating engines using superheated steam, the pipe line would have had to be of approximately 25 per cent greater area, and if the reciprocating engines used non-superheated steam, it would have had to be of 40 per cent greater area. The present turbine units are all of the horizontal type, but the generating room is of ample height to permit vertical turbines in the future, should engineering and commercial factors make such a change desirable. Incidentally, this provision made it feasible to have a higher boiler room and greater coal storage.

The standardization of rotary converter equipments throughout the entire distributing system centering about Reading is most commendable from the standpoint of service continuity. Considered theoretically, some of the individual substations may not have the most economical size of unit, but it was considered more important to be able to interchange or substitute apparatus promptly and to keep down the number of supply parts. In such a scheme the portable substation holds an important place as a reinforcement at any point where the energy requirements are very irregular from day to day.

NEW POWER GENERATING AND DISTRIBUTING SYSTEM IN READING, PA.

The Interstate Railways Company is a corporation of the State of New Jersey, with headquarters in Philadelphia, under which are combined a large number of public service corporations in the States of Pennsylvania, New Jersey and Delaware. The most important group of these subsidiaries is formed by about a dozen railway and lighting companies in and about Reading, Pa., all of which are now leased to the Reading Transit Company. Among the underlying companies of the transit company is the Metropolitan Electric Company, of Reading, which acts as the sole generator and distributor of current to the following public utilities: Reading Traction Company, Reading Power Company, Reading Electric Light & Power Company, Reading & Southwestern Street Railway Company, Front & Fifth Street Railway Company, Birdsboro Street Railway Company, Oley Valley Railway Company, Adamstown & Mohnsville Electric Railway Company, Neversink Mountain Railway Company and Neversink Mountain Light & Power Company.

The foregoing corporations serve the entire County of Berks, and also parts of Lebanon and Montgomery Counties. The population served by the Reading Transit Company is about 150,000. The officers of this company are as follows: President, H. G. Louser; vice-president and general manager, W. A. Rigg; treasurer, H. H. Reigel; engineer, C. C. Long.



Reading Power Improvements—Railway Lines in Three Pennsylvania Counties Supplied with Power from Reading

OLD AND NEW POWER CONDITIONS

The power system in use before the construction of the generating station described hereinafter consisted of a main generating plant on Seventh Street, Reading, composed of four brick buildings, which had been constructed from time to time as the needs of the system required. Three buildings were devoted to engines and generators and one was used for boiler rooms and miscellaneous purposes. The total capacity of this plant was about 7000 hp. Not only was this output insufficient for this rapidly growing territory, but the generating equipment itself had become antiquated. Outside of this plant were two rotary substations to which high-tension current was supplied by means of 25-cycle inverted rotaries which took current from the railway generators.

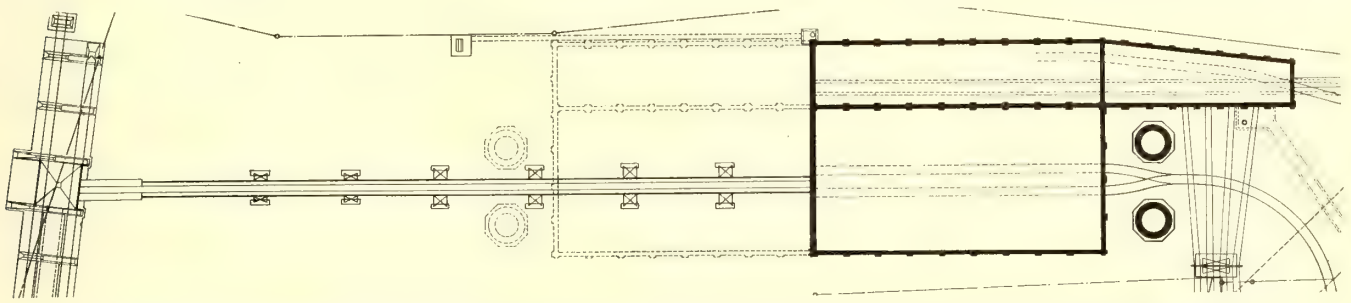
As shown on the map, the generating station at Reading serves practically all the territory included in Berks County. This is accomplished by means of high-tension feeders to the two substations already in operation at Shanesville and on the Oley line, and to four new ones located at Ringing Rocks, Wernersville, Mount Penn and Mohnton. A portable substation is provided also for emergency conditions. Each substation has one 500-kw rotary and air-blast transformer except Mount Penn, which has two units, and the main substation on Seventh Street, Reading, which has four 500-kw units. Under the old system the Shanesville and Oley line stations received current at 15,000 volts, 25 cycles, and consequently it was necessary to change their apparatus to suit the new conditions.

The light and power systems in Reading have been left undisturbed as far as possible, the only change being the withdrawal of all two-phase motors and the substitution of single-phase and three-phase motors. The Edison three-wire d.c. lighting system, serving the central portion of the city, was shifted from the generators in the old plant to the lighting rotaries in the new main substation at the same site. Future extensions of light and power service will be made from the three-phase a.c. lines wherever possible. The street-lighting system in Reading is composed of magnetite arc and tungsten incandescent series lamps. From 40 per cent to 50 per cent of the total power output is for railway service.

LOCATION OF THE NEW POWER HOUSE

The new power house is located in West Reading along the Schuylkill River, adjacent to the Pennsylvania and Philadelphia & Reading railroads. These railroad connections furnish excellent facilities for the delivery of building material, machinery and fuel. The shape of the plot made it necessary to lay out the different portions of the power station in a rather unusual manner. There was only room enough between the Pennsylvania Railroad's main line right-of-way and the property line opposite to permit the construction of the boiler and turbine rooms, which are 174 ft. x 88 ft. and 174 ft. x 38 ft. respectively.

A more favorable building cross-section could not be secured because the adjoining property was in litigation. To provide room for the rotaries, transformers and switch apparatus it was, therefore, necessary to build an annex running on to the narrow river end of the property. This annex is 113 ft. long, 38 ft. wide at the turbine room end and 26 ft. wide at the front. If the building had been located far enough back to allow sufficient width to place the switch gallery between the turbine and boiler rooms not enough room would have been left to allow extensions. Furthermore, the increased length of the condensing-water duct and the additional excavations required by the upward slope of the land would have added materially to the cost of the plant. The natural slope of the land at the river end was so slight that a comparatively level area was available for most of the space needed for the power house and only a relatively small amount of excavation was required to provide sufficient drainage area from the building under ordinary conditions. The basement floor grade of 87 was placed above ordinary floods, only slightly below bad ones and near enough to the highest recorded flood grade of 94.5 to permit complete protection for the turbine-room basement auxiliaries, while the lift for the circulating water pumps at the extreme low-water grade of 74.5 was within reasonable limits.

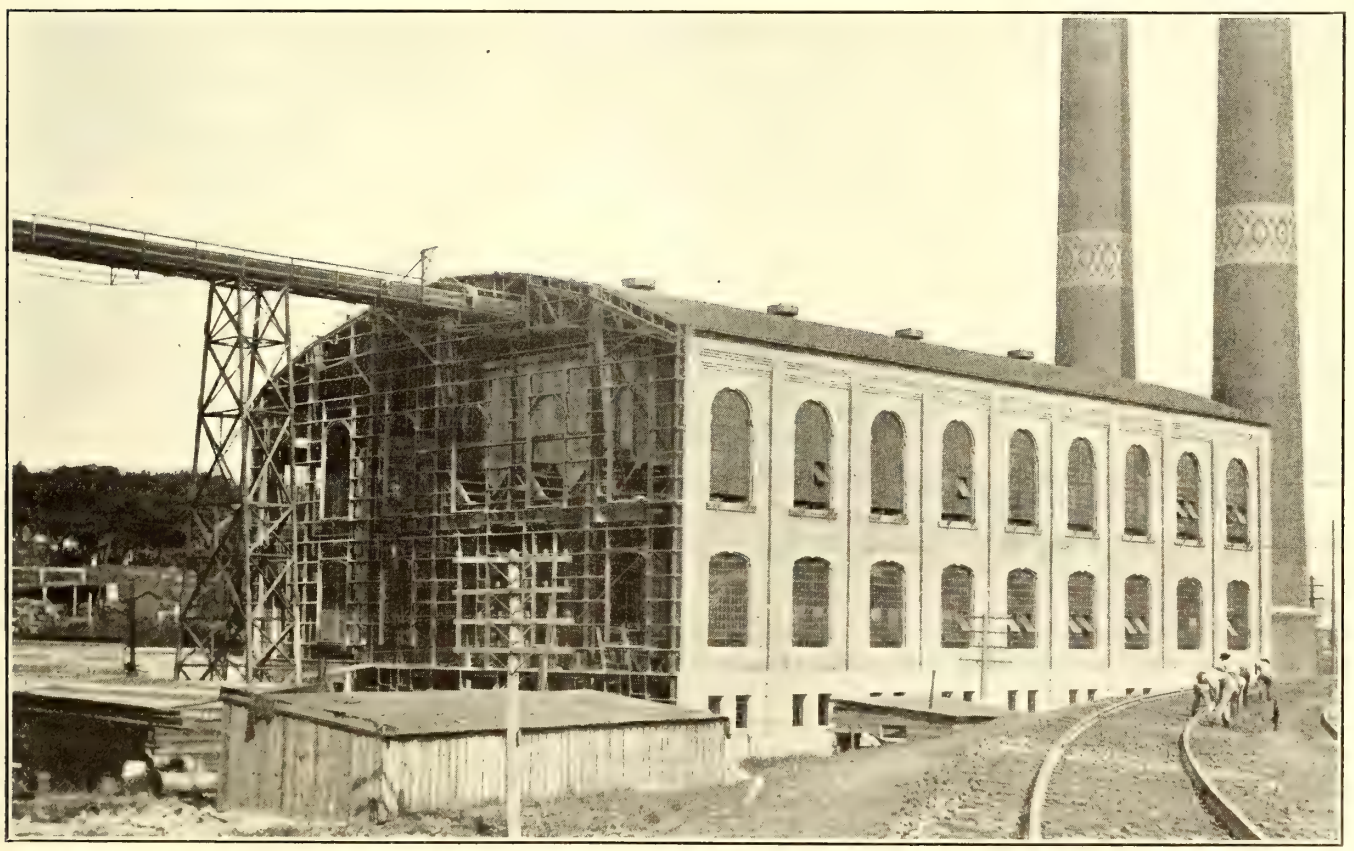


Reading Power Improvements—Present and Future Outlines of the Power Station, Coal Handling Facilities, Etc.

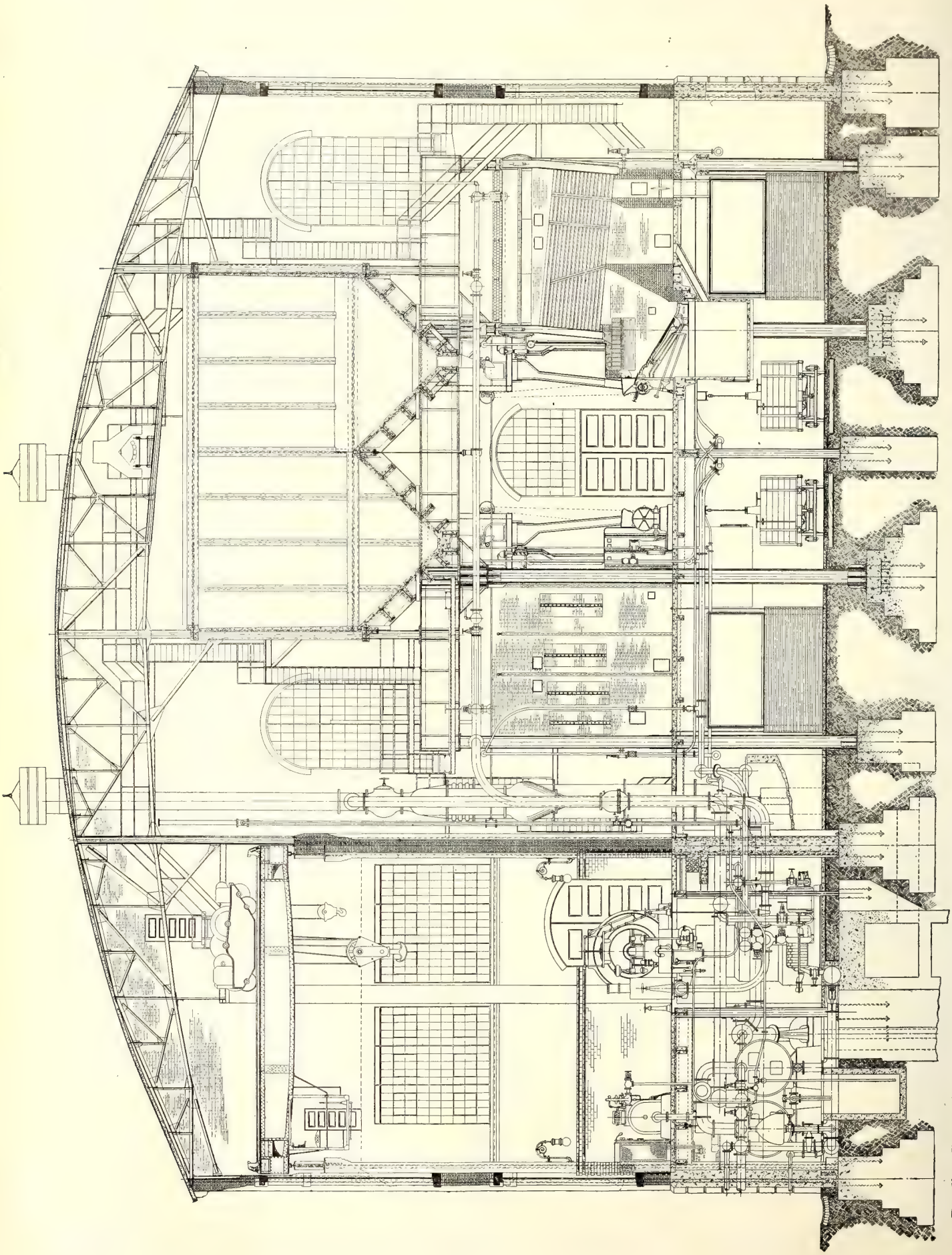
To protect the auxiliaries from water at the maximum high-water level during the spring freshets, it was necessary to waterproof the turbine-room basement to an elevation of 8 ft. higher than the present basement floor. All the stairways and other openings were placed above the maximum high-water line except the opening in the end adjoining the switch house, where provision was made for a railway track to deliver machinery. At this track entrance there is installed a wooden gate which is always in place except on the rare occasions when it is necessary to bring machinery parts under the floor hatch in the turbine room.

CONSTRUCTION AND DESIGN OF THE POWER HOUSE

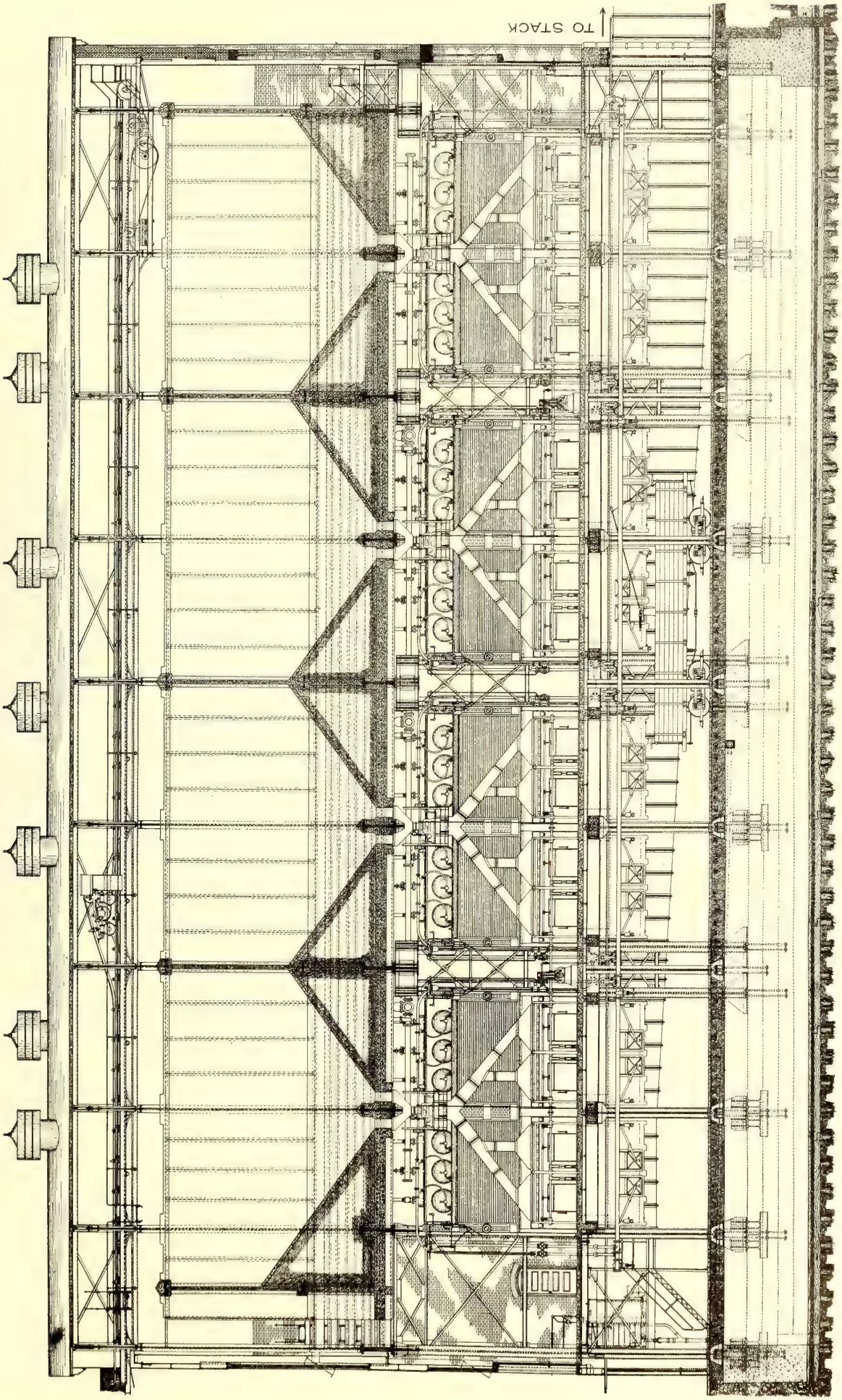
The power house is a steel-frame structure with brick walls resting on concrete basement walls which are carried up to the level of the first floor. The foundations are of rock, concrete-capped piling or solid ground, the differences being due to the extremely irregular geological formation at this place. As the low-water level of the river was 74.5 at grade, the bottom of the foundation was taken at grade 74 in order to make sure that the piling would always be moist. Concrete basement walls were chosen in preference to stone to give the finished building the proper architectural effect. The brick walls above the first floor are thick enough to take approximately half of the wind pressure on the sides of the building, leaving the steel framing



Reading Power Improvements—Rear of Main Station, Showing the Conveyor Run and Temporary End in Process of Erection



Reading Power Improvements—Cross-Section Through the Power Station, Showing the Principal Construction and Equipment Features of the Boiler and Turbine Rooms



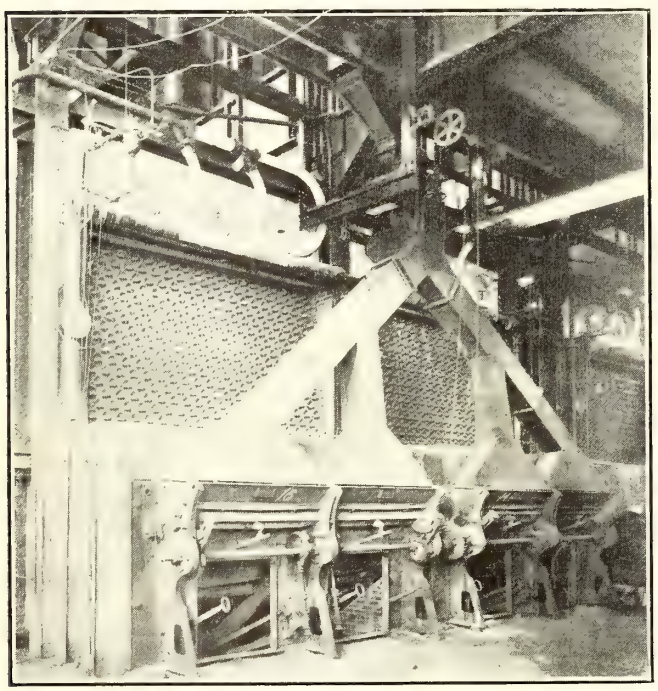
Reading Power Improvements—Longitudinal Section Through Boiler Room

to take the other half. Allowance for wind pressure was an important factor in the construction, as Reading is located in a mountain valley subject to frequent storms.

The top of the structure has an unbroken curved roof, which is quite a variation from the ordinary power-house construction. This type was adopted in order to avoid all gutters, to simplify possible extensions and to attain a more graceful appearance. The supporting truss, although apparently continuous, is made in five sections which are supported by the various column systems carried up to it. The clearance required for the coal conveyor was such that the bottom chord of the roof truss could be curved, with the dual object of improving the architectural appearance and bringing the depth of the unit trusses within the proper shipping height.

The roof framing carries 3-in. reinforced concrete Roebling slabs covered with three-ply roofing felt. Owing to its curved form, the slope of the roof varies from flat at the center to about one-quarter pitch at the sides, which is considered within the limits of safe practice for asphalt roofs. The roof of the switchhouse annex has a slope of ¾ in. per foot and is supported by the usual shallow Pratt truss, with sloping top chord.

The switch house, as an annex to the main building, has different panel lengths to suit the electrical apparatus, and it



Reading Power Improvements—View of Boiler and Stoker Arrangements

therefore required different treatment. It was decided to build this portion with flat top lights and to use flat top parapets slightly lower than the main building instead of the curved roof of the latter.

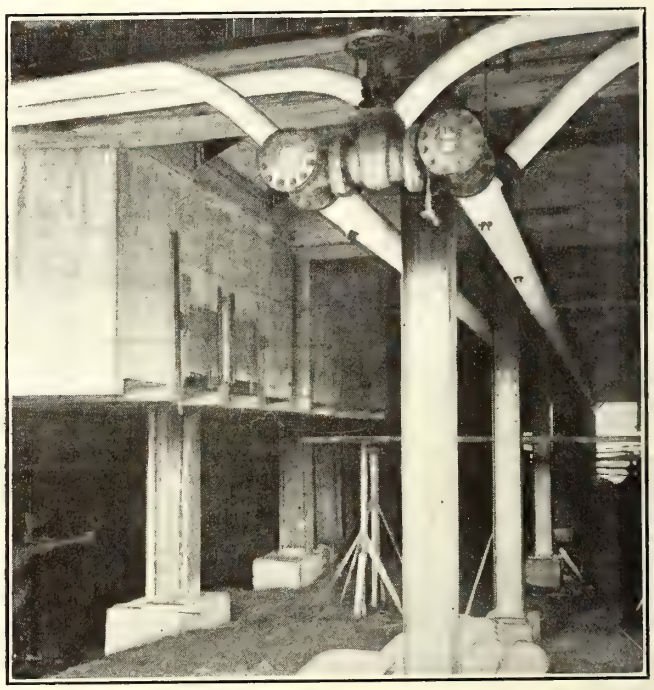
The question of future extensions determined to a great extent the general design of this station. It is so arranged that extensions up to double the present capacity can be made, and the additional pair of chimneys required will be placed at the extended end in the same relation to the building as the present pair. The final boiler installation will be symmetrical about the present end bay.

According to the original plan the temporary wall at the extension end of the power house was to be of brick, laid in lime mortar to facilitate removal. The revival of business, however, created such an increased demand for power that it seemed likely that an addition to the present structure would be required very soon. Consequently, a partition of sheet metal supported on girts and columns and stamped to represent brick work was installed instead of a brick wall. This construction lends itself more readily to dismantling, as the bolted connections can be removed and re-erected as often as desired.

BOILER-ROOM CONSTRUCTION DETAILS

The boilers are hung from columns which form a part of the steel building framing, and the coal bunker rests upon girders supported by the front and rear columns of the boiler settings. The side columns of the coal bunker are carried from these girders up to the roof framing, which they help to support. The boiler columns, together with the wall columns, support the first floor and the ash bins and flues underneath.

The width of the coal bunker was determined by the proper relation of the space between the boiler fronts to the space required between the boiler fronts and the walls, as well as by the proper division of the roof into separate truss units. As a result, one side of the coal storage is placed on the center line of the building and the other side is symmetrical about the center of the firing floor, so that it is one-third of the width of the building. The coal storage capacity is about 3900 tons. The coal bunker is made of concrete slabs, supported by steel beams, and is divided into compartments by cross-girders and vertical beams. Each compartment is directly over two opposite batteries. The ash bins are hung from the first floor beams. They are constructed without the customary sloping bottom to secure the benefit of maximum capacity during the period of spring freshets.



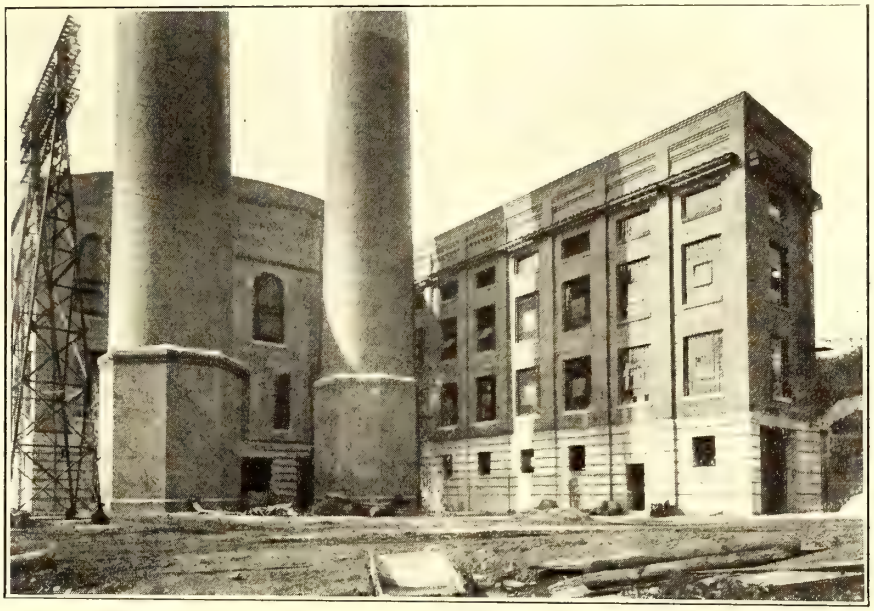
Reading Power Improvements—Ash Bins and Steam Piping in Basement

A complete system of walkways reachable by a stairway at each end of the boiler room was installed for operating the main steam valves. The walkways on each side are cross-connected. At each end of the building additional stairways of easy ascent run from these boiler walkways to the conveyor runways and machinery platform; an extension is carried through the middle wall and the turbine room, over to the switch-house roof, by which the main roof can be easily reached. A floor hatch is placed at the chimney end of the boiler room for convenience in transmitting parts for repairs to the machine shop in the switch-house basement. Parts can be lowered through this hatch by a chain hoist almost directly onto the trucks in the basement and hauled on the level to the machine shop.

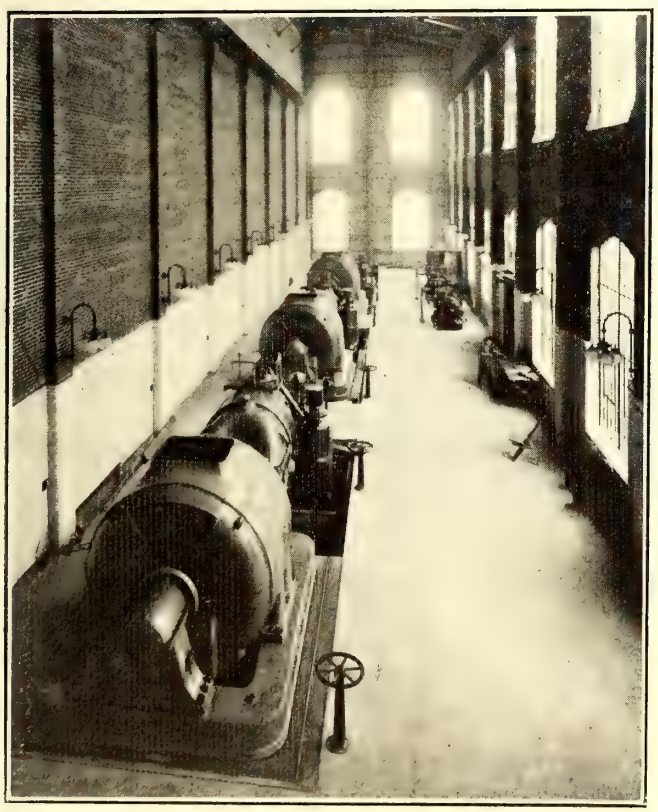
At the extension end of the building a clear floor space of 15 ft. has been left between the boiler setting and the temporary wall. The first two columns in this wall are designed for future boiler columns, so that in the completed plant there will be a 15-ft. clear space crossing the firing floor at right angles. Underneath this space, sparated by the ash-car tracks, which run through the aisles between the front boiler columns, there

are mezzanine floors with lavatories and lockers for the operators. These mezzanine floors are placed above high-water level and the space underneath them is available for future temporary extensions of the flues leading to the present chimneys. However, such extensions are to be used only until additional chimneys are installed, when the flues will end at the mezzanine floors as at present. The flues are placed directly under the boilers and are made up of steel plates, reinforced by angle ribs. They are 13 ft. wide with a level top and taper from a depth of 12 ft. 6 in. at the chimney end to half this depth at the mezzanine bay, which lesser depth is still large enough to permit the operation of an additional battery of boilers. The flues are supported directly from the floor girders and are anchored to the boiler columns at the chimney end.

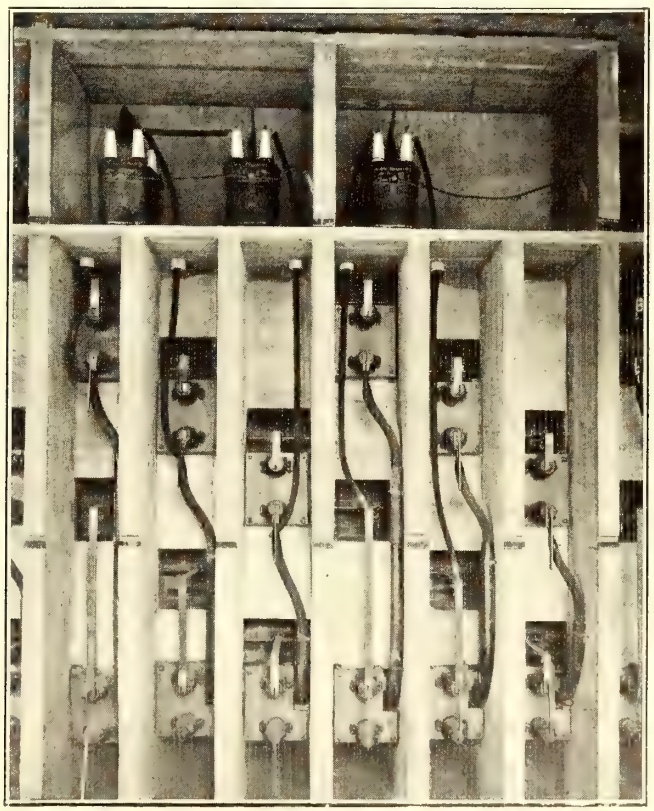
Roof ventilation is attained by eight 48 in. Burt monitor ventilators. Three more ventilators of the same construction are installed on a line with four of these to receive the atmospheric exhaust pipes from the condensers. To obtain the best light and side ventilation for the building large windows were planned with relatively small window panes and large ventilator areas. The "Fenestra" sash, made by the Detroit Steel Products Company, proved adaptable to these requirements. In addition, the end walls were designed so that large-sized doors would come at each end of the firing floor, while the coal bin was stopped a few feet from each end of the building to permit good ventilation through the upper windows and the roof ventilators.



Reading Power Improvements—Front of Main Station, Showing Switch House Annex at Right and High-Tension Tower at Left



Reading Power Improvements—The Turbine Room



Reading Power Improvements—High-Tension Cells

SWITCH HOUSE ANNEX

The switch house contains a machine shop in the basement, rotary converters, transformers and office on the first floor; the main switchboards and oil switches on the second floor, and lightning arresters on the third or top floor. The construction here is similar to the usual brick and steel office building, except that the narrowness as compared with the height made careful provision necessary to resist the side wind pressure. Hence all floor girders were knee-braced throughout. The end frame, since the walls were brought back to the column centers, was sufficiently braced by the deep girders which carry the walls.

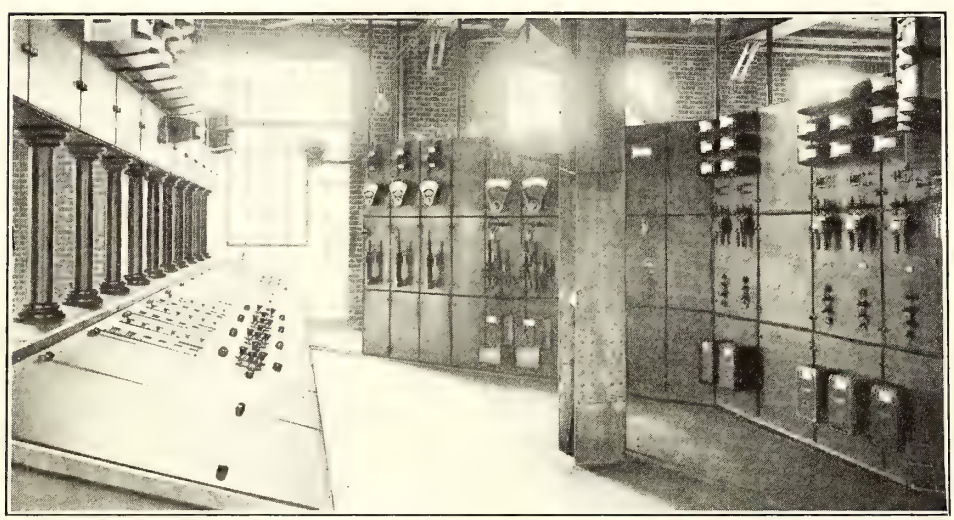
On account of the inclination of the property line at this side of the building it was necessary to incline one side of the switch house, reducing the width from 38 ft. at the turbine-room end to 26 ft. at the outer end. In addition to this the railroad track in the turbine-room basement, in order to reach the main-line railroad on the river bank, was curved sufficiently

to necessitate offsetting the interior columns at the narrow end. The sloping sides make each roof truss different, while the offsetting of the interior columns in combination with the sloping sides, and the small crane run in the four bays at the inner end over the first-floor transformers, also make each column different from every other. The air duct necessary under the transformers was united with the cable gallery coming through the wall from the turbine-room basement. Reinforced concrete construction was adopted for this latter combination as the most satisfactory means of supporting the weights imposed and of furnishing enough working space to reach the transformer leads.

BOILER AND TURBINE EQUIPMENT

The principal equipment in the boiler room consists of 16 625-hp Edge-Moor horizontal water-tube boilers set two per battery. These boilers are equipped with Wetzel stokers driven from line shafts, each furnishing power for two batteries. The stokers are driven by a small vertical engine, but a complete spare stoker-engine unit is installed to provide for breakdowns. These stoker engines, the air compressor and the house service water pumps mentioned later are the only reciprocating mechanisms in the entire power house.

Each battery of boilers has a coal scale delivering to the two stokers through a Y-connection, so that for running boiler tests the coal consumed by any one boiler can be accurately determined; and in case of a test of a turbine unit the coal required for the number of boilers furnishing steam for that unit can also be determined.



Reading Power Improvements—Benchboard and Switchboard Looking Over the Turbine Room

Two radial brick chimneys of the Alphons Custodis type are now in service. Each chimney is 242 ft. high x 14 ft. inside diameter, and, as previously described, has a steel rectangular flue carried under the first floor connected to eight boilers. This arrangement gives one extra pass for the flue gases in the boiler settings. It was therefore decided to dispense with economizers as being of questionable value under the operating conditions presented.

The turbine room now contains three 4500-kw Allis-Chalmers horizontal turbo-generators delivering 13,200-volt, 60-cycle, three-phase current. These turbines take saturated steam at 200 lb. pressure. Their steam consumption guarantees per kw-hour are based on a pressure of 190 lb. at the throttle of the turbine and a vacuum of 28 in.: 2500 kw, 17.6 lb.; 4500 kw, 16.4 lb.; 5000 kw, 16.6 lb. These outputs are based on a power-factor of 80 per cent. Exciting current is furnished by two 100-kw GE horizontal turbine-driven units furnishing direct current at 125 volts.

By referring to the illustration on page 1021 of the turbine room it will be noted that the machines have been placed in a single line parallel to the longitudinal walls of the building. This arrangement leaves a clear space in which parts to be installed or dismantled can be moved with the crane to and from the hatchway without interfering with the machines in operation. The turbine room is served by an 80-ton Shaw crane.

As provision for further growth may require larger turbine units and as it was not considered best to confine the possibilities to a horizontal type, the turbine room was built high enough to admit the installation of the largest vertical turbine unit which might be required. Advantage was taken of this possibility to provide the large coal storage previously described by keeping the rest of the building up to the height of the engine room.

An interesting feature of the lighting of the turbine room is the use of four-light clusters of 75-watt tungsten lamps in single frosted globes. These give much steadier illumination than arc lamps and avoid considerable maintenance, such as trimming, globe cleaning, etc.

STEAM PIPING

As shown in the accompanying drawings, the piping layout between the boilers and the turbines is so arranged that it has the advantages both of a unit system and a duplicate main system, while being simpler than the latter. It is possible under all conditions to get enough boilers connected to furnish steam for any one turbine no matter what boilers are out of commission. The arrangement of the main steam pipes over the boilers is as follows: The boilers in each row are connected to a line running lengthwise over each set of boilers and the steam for the turbines is taken by cross-connections between two sets of boilers in each row. By an arrangement of valves where these cross-connections are made any turbine unit can be tested with two or four boilers by the closing of three valves, still leaving the other boilers connected to operate other units. While a turbine is being tested it may be desirable to operate its auxiliary from another steam source. This can be done by closing one valve in the turbine-room basement.

Owing to the fact that the turbines operate with a constant flow of steam it was possible to use smaller piping than if it had been necessary to supply the more fluctuating demands of reciprocating engines. The 6-in. steam connections from the boilers are joined to 8-in. mains. A 10-in. pipe is used to cross-connect the mains at the places where steam is taken for the turbines. The 12-in. pipe from each cross-connection leads to that point in the turbine basement where the connections to the auxiliaries are made, whence a 9-in. pipe leads to the turbine throttle. In laying out the piping diameters the requirement at the turbine end was taken as the starting point instead of planning from the boilers.

All piping to the turbine exciters is carried under the floor, so that none is visible in the turbine room except the risers through the floor to the machine. This gives the turbine room a remarkably light appearance and avoids all trouble from drips and escaping steam.

AUXILIARIES

In the turbine-room basement two Cochrane feed-water heaters and three Jeansville five-stage centrifugal boiler-feed pumps are placed at the end of the present building in such position that when additions are made to the plant the end turbine-room wall, which is of brick, may be taken down and a duplicate system of heaters and pumps installed symmetrically along the line of the temporary end wall, thus keeping this apparatus in the middle of the completed plant.

Provision is made in the basement of the turbine room for

the house service water by two steam-driven duplex pumps furnished by the Jeansville Iron Works. A single-cylinder steam-driven compressor furnishes the compressed air used for cleaning out the boiler tubes and for blowing dust out of the switch cells and machine frames. This compressor, by the way, is the only piece of apparatus transferred from the old plant to the new one.

The condensing equipment consists of the Allis-Chalmers Company's Tomlinson barometric jet condensers with two heads on each condenser. This arrangement was used to take advantage of the difference in diameter between these heads and what would be required if a single head were used. The combined guarantees for the turbines and condensers are sufficient to insure good results without air pumps. Each condenser has its own centrifugal steam turbine-driven circulating pump, but these pumps are connected with a main so that by means of cut-off valves one pump may be made to supply the needs of another condenser if necessary.

The circulating water is taken from the Schuylkill River in a rectangular duct 6 ft. square which runs into the building directly under the turbine foundations. On top of this duct there is a similar 6-ft. x 6-ft. return duct, into which the hot wells discharge through openings in the foundation wall. On account of the conditions at this site, the hot wells had to be constructed so that they would not be affected by floods. This necessitated the raising of the exhaust pipe connections over the condenser heads to the barometric distance above the possible flood level.

The boiler-feed supply is taken from a dam in Wyomissing Creek at a point nearly 1 mile distant. A large pipe was necessary on account of the low head between this dam and the feed-water heaters. This pipe line was constructed of discarded boiler shells, which were available for low-pressure purposes. The shells varied in diameter from 30 in. to 40 in. and were jointed by means of concrete envelopes. In this way it was found possible to get head enough to allow the feed water to run into the heaters by gravity, and from the heaters to the pumps with sufficient head to allow them properly to handle hot water. The boiler-feed system consists of three Jeansville five-stage centrifugal pumps driven by Kerr turbines. These pumps have a capacity of 700 gal. per minute at a pressure of 260 lb. The piping from these pumps consists of duplicate mains from the pumps down the length of the boiler-room basement. Each boiler has a front connection to one main and a rear connection to the other main, so that no possible breakdown of the piping short of a total disablement can prevent the feeding of any boiler. The feed water can be taken directly to the pumps in case the heaters are out of service. In emergencies and as a feature of the regular practice of this plant the circulating-water main is connected to the boiler-feed supply, so it is available in case of the failure of the supply line and can be periodically administered to the boilers as a purge for removing scale. The front feed connections to each boiler have a Vigilant feed-water regulator, furnished by the Chaplin-Fulton Company, which also supplied the pump governors for the boiler-feed and house-service pumps.

All of the auxiliaries exhaust at atmospheric pressure, the exhaust steam being used to heat the boiler feed water.

COAL AND ASH HANDLING

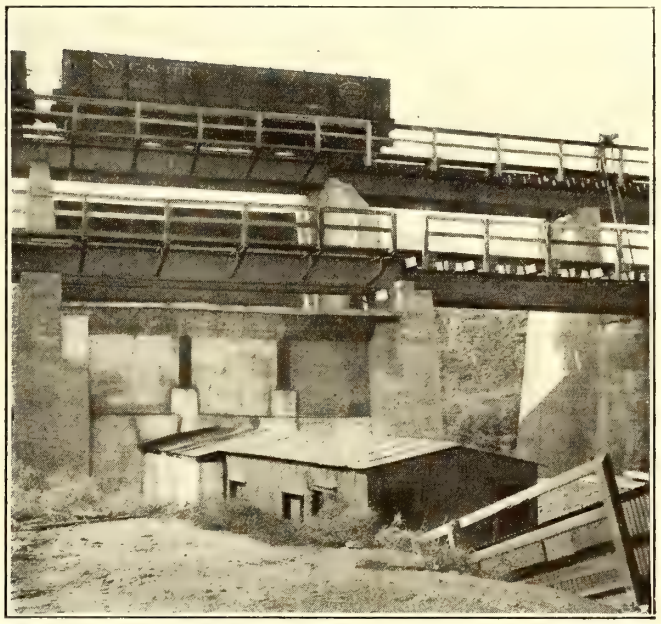
Coal is delivered over spurs from the Pennsylvania and the Philadelphia & Reading Railroads, which run side by side at different levels on the same set of reinforced-concrete piers, over the coal storage platform and a track hopper which dumps direct to the crusher, whence the coal goes direct to the power-house bunker via a 24-in. belt which has a capacity of 180 tons an hour.

The surplus coal for outside storage is dumped between the concrete piers which support the dumping tracks. Directly under these piers there is a concrete structure which contains a tunnel with roof openings leading to a 36-in. belt conveyor. Ordinarily these openings are closed by cut-off gates. When stored coal is to be used the cut-off gates are opened from the floor of the conveyor tunnel by means of chains which enable the operator to control the amount of coal for the reclaiming conveyor. A loading device in the tunnel regulates the flow of coal to the belt. This conveyor delivers coal to the crusher for transmission to the power house via the 24-in. belt previously mentioned. The latter belt attains the level of the lower chord of the power-station roof truss back far enough from the building to permit extending the structure in such a way that it would be necessary to disturb only the lower part of the conveyor support. This support consists of wooden bents on concrete piers. Coal to all divisions of the bunker or to any one of them is delivered by a traveling conveyor tripper. All of the coal-handling machinery was furnished by the Robins Conveying Belt Company, New York.

Ashes are dumped directly from the ash hoppers underneath the stokers into full-size ballast motor cars, which run through the basement. These ashes can be taken away for fills or dumped at any convenient point without rehandling.

HIGH-TENSION DISTRIBUTION AND UNDERGROUND CONDUIT SYSTEM

The main generator leads are carried in conduit along the basement wall into the switch-house basement and up the wall to the second floor to the switch cells. The underground feeders are taken in conduits directly down the wall and out through the foundation wall into a manhole, which is the entrance to the underground system hereinafter described. The conduits for the house-service feeders are also carried up the wall from the second floor to the third floor, which contains the lightning arresters. In general all the high-tension wiring in the building is run in fiber conduit covered with concrete. To keep the window openings clear all conduits between the first and second floors are grouped in the spaces between the windows, the concrete being made to give the effect of wide pilasters.



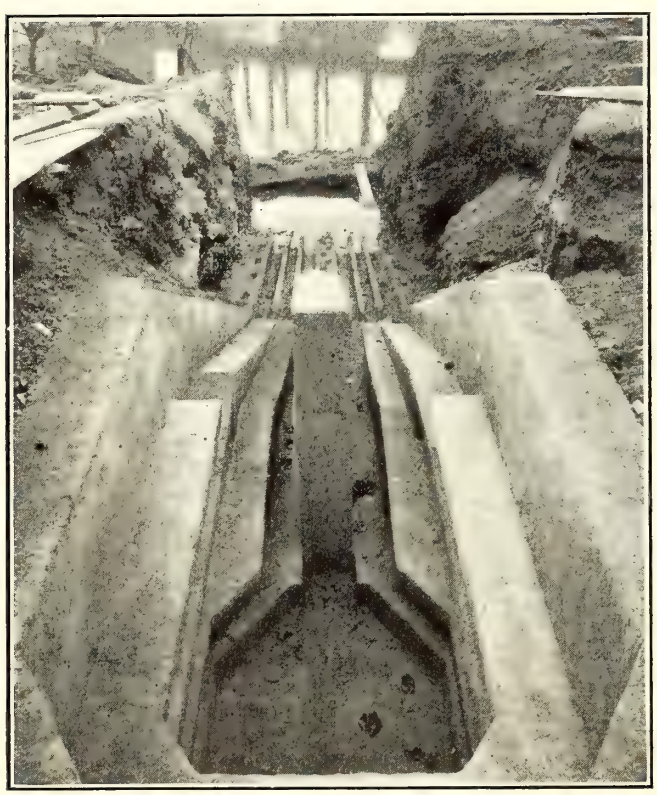
Reading Power Improvements—Tracks on Two Levels for Coal Delivery

The outgoing high-tension lines are taken out through 16-in. circular openings in the walls, the wires being supported on insulators both inside and outside. The outside insulators and supports are designed for dead-end strains. Provision is made for taking eight three-phase high-tension circuits out of the switch house over the Pennsylvania main tracks in front of the building and from there distributing the circuits to the various substations. To accomplish this two extra heavy dead-end steel line towers were built to hold the maximum unbalanced load of 9000 lb. which the railroad company's standard specification required. The insulator clamps are designed to cover as far as possible the worst conditions of breakage and still to keep the wires in the proper position.

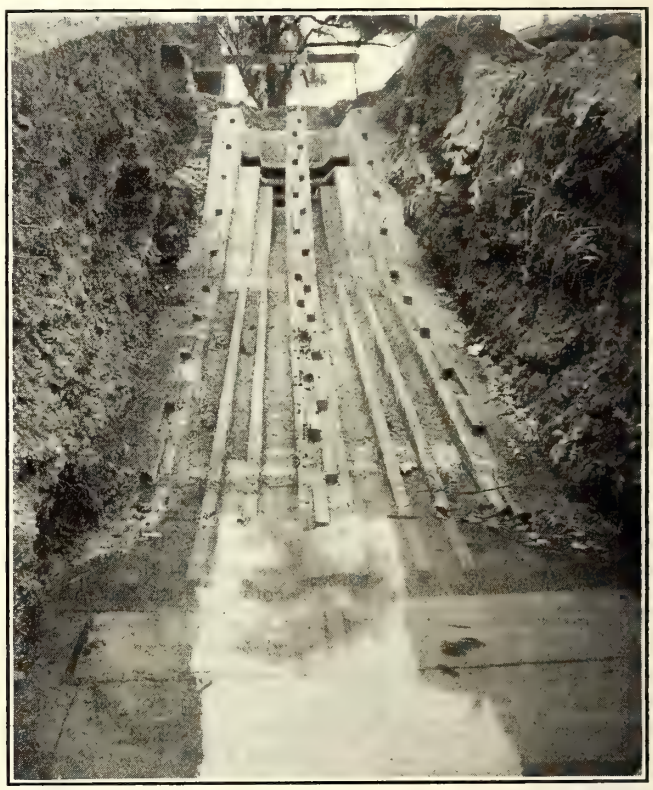
As the new station was built on the far side of the river at

a distance of about 1 mile from the old plant, which has been converted to a main distributing station, it was necessary to provide a conduit system for the six three-phase feeders to the main substation in question. These feeders are carried under the river and underground through the streets of Reading except where they cross the Schuylkill Canal. On reaching this canal the feeders are brought to the surface and carried across alongside the highway bridge on a special bridge built by the American Bridge Company. This bridge has a decking over the conduit envelope which can be used as a sidewalk.

The accompanying views show some interesting features in regard to the underground approaches at the river bank on the Reading side. One novel construction is that going out from the river up to the first manhole. The cables are brought up out of the slots on to the shelves at the sides of the manholes by a system of sloping shelves. In another construction (not illustrated) the submarine cables from the power plant to the river are placed in a single layer in slots in the floor of the tunnel and are covered with removable concrete slabs. From the tunnel these cables pass through fiber conduits embedded



Reading Power Improvements—High-Tension Conduits, Looking Toward the River



Reading Power Improvements—City Side Entrance from the River for Underground System

in the concrete basement walls of the station up to the switches. The present installation comprises four three-conductor submarine cables, leaving available the remainder of the ducts for additional cables, either single conductor or otherwise. This underground line also has provision for a telephone cable connecting the power plant to the main substation and a metallic ground connection from the railway grounds in Reading to the power plant and the main substation.

SWITCH-HOUSE EQUIPMENT

The first floor of the switch house or annex building is level with the turbine-room floor. At present it contains two 500-kw Westinghouse railway rotaries and the necessary air-blast step-down transformers with provision for one more rotary and transformer equipment. There are also two transformers for the house supply of lighting and power with space for a third installation. A hand crane of 6-ton capacity is to be provided for handling this apparatus. The engineer's offices are located at the outer or front end of this floor.

The second floor is laid out for high-tension oil switches as follows: Three present generator switches, three future generator switches, two spare switches, one auxiliary bus switch, one incoming water-power switch, four present underground switches, two future underground switches. The remaining switches are for outgoing overhead feeders. These switches and the bus compartments are arranged in the shape of a horse-shoe, one set being placed along the south wall and the other along the north wall. The switch cells face the outer walls with a 4-ft. aisle between the cells and walls. Instead of the usual brick and slab design these cells are made of concrete, except the floor slabs, which are of the customary slate. This construction weighs much less and consequently saved steel in the floor framing. On the rear side of the cells is the bus structure which contains the main and auxiliary bus. This bus structure, which is original with this plant, consists of separately molded concrete cells set into a space in the barriers, which are of concrete like the switch cells. The switch connections are laid in barriers on the floor in the walkways between the cells and the wall and are covered by a false floor of removable slabs.

As noted in the list of high-tension switches, there are two spare switches (one per row) and an auxiliary bus switch. In case of trouble the spare switch in each set takes the place of a regular switch by means of the auxiliary bus. Through the employment of the two spare switches and the auxiliary bus any overhead feeder can be independently operated from any one turbine.

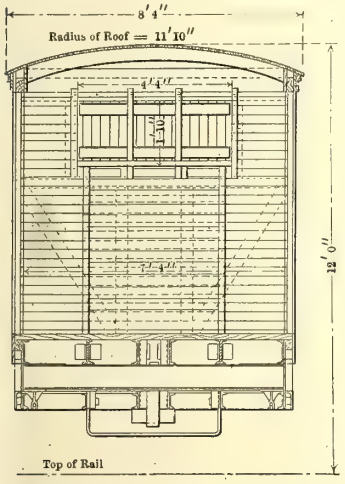
The benchboard for the generator and field-control system is also on the second floor. It faces the window opening into the turbine room. This board has an open space over the bench and under the instrument board so that the operator can get a good view of the main floor. The main switchboard, which faces the benchboard, is curved as shown in one of the accompanying views. The control wiring for the switches is in iron conduit embedded in the concrete floor; that for the generator fields runs down the wall into the basement, where it follows the main generator leads.

The third floor contains the GE electrolytic lightning arresters of all outgoing overhead lines and for the incoming water-power lines. All the switching apparatus and control

equipment for the main station and for all the substations were furnished and erected by the General Electric Company.

HOUSE POWER AND LIGHTING

All the lighting and power circuits in each room of the power station are controlled from conveniently located slate-lined steel-panel cabinets. The feeders for these cabinets are taken from the main house-service switchboard on the first floor of the switch house. Alternating current at 110 volts and 220 volts is supplied to these circuits from the house-service lighting transformer. The power requirements are as follows: One 40-hp motor in the roof structure to drive the 24-in. conveyor belt, one 75-hp motor in the coal pocket pit to drive the crusher and the 36-in. belt and two motors for driving the centrifugal fans for the air-blast transformers. Direct current at 500 volts is taken from one of the railway rotaries to operate the crane motors.



Section Through Portable Substation

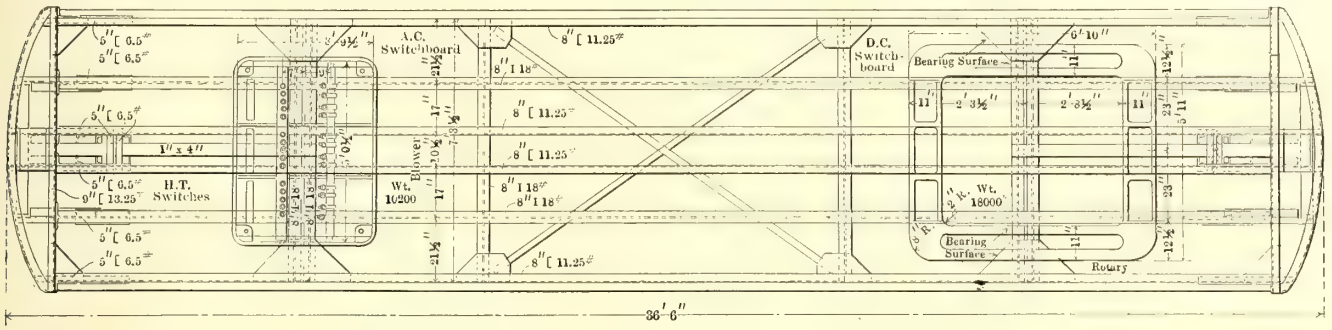
MAIN SUBSTATION

The old central power plant consisted of three buildings facing Seventh Street and a boiler house in the rear. The first of these buildings, a three-story brick structure with wooden floors and wooden columns, contained a line shaft on the first floor belted to a large Corliss engine in the adjoining building. The same floor had seven small engines driving 28 bi-polar generators on the floor above. The second building was a brick wall, steel-frame structure with a traveling crane. It contained three vertical engines direct-connected to railway generators and a similar set for the Edison three-wire system; also the belted Corliss engine previously mentioned. The third building contained three large horizontal cross-compound direct-connected units and two small engines, each belted to a pair of generators.



Reading Power Improvements—Portable Substation

To adapt these buildings for a main substation it was determined to reconstruct the first building, substituting steel for the wooden floors, columns and roof trusses. This building as reconstructed contains high-tension oil switches as follows: Six incoming feeders from the underground system, six 600-volt rotary converters, eight 250-volt lighting rotary converters, eight 2300-volt lighting and power transformers, two auxiliary switches, two bus section switches, one arc system switch.



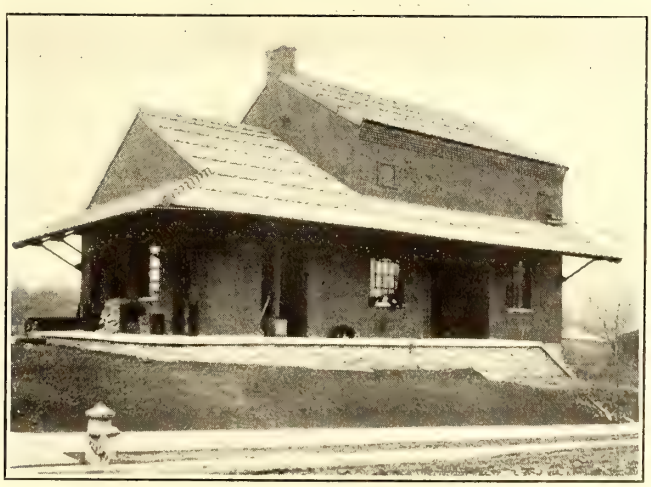
Reading Power Improvements—Plan of Portable Substation

On the second floor is the benchboard, the lighting rotary switchboard, the railway rotary switchboard, 2300-volt a.c. light and power switchboard and 26 pairs of interlocking 2300-volt oil switches distributed in pairs as follows: eight transformer switches, twelve lighting feeders, six power feeders. The lighting feeders are regulated by GE feeder regulators.

On the third floor are the lightning arresters for the 2300-volt lighting and power feeders and three static dischargers for the three sections of high-tension buses.

The remodeling of this first building was complicated by the necessity of keeping in operation all of the small generators on the second floor. It was also necessary to adopt a column spacing which would interfere as little as possible with the location of the new apparatus and the line shaft pulleys on the first floor. The new columns were pulled up into place through holes on the second and third floors and the connecting steel floorbeams were set in position a few at a time. To do this each machine on the second floor had to be raised and placed upon blocking equal to the thickness of the future concrete covering over the floorbeams and each machine belt had to be lengthened so that the operation of the plant was hindered in no case. These machines were relocated during the low-load periods of the day. Having installed all the steel structure in this manner, it was necessary only to leave openings in the concrete floor to accommodate the belts until such time as the machine should be entirely removed and the installation of the switches begun.

The old wooden floors were used as construction forms for the concrete floor. As the steel floorbeams were placed 2 in. above the top of the old floor, it was an easy matter to build up the forms and to remove the wooden columns and floorbeams from below on completing the concrete structure. It is interesting to add that no steel contracting company cared to bid



Reading Power Improvements—Stony Creek Substation

upon the erection of this work under the conditions outlined, but it was successfully carried through by the company's men under the direct charge of C. C. Long, engineer of the Metropolitan Electric Company.

The second building, which contains the traveling crane, was adapted for railway and lighting transformers and rotaries and the street lighting incandescent and arc system. The present installation consists of four 500-kw railway rotaries and transformers with provision for two futures; five 500-kw lighting rotaries and transformers with provision for three futures; four 750-kw, 2300-volt transformers with provision for four futures; four 16-kw regulating transformers for series incandescent tungsten lighting and 12 75-light mercury arc rectifiers and transformers, with provision for eight future sets. This building was lengthened two bays, duplicating the original structure, by removing two batteries from the old boiler house.

The load of the old station would not allow the withdrawal of any of the generating apparatus, so it was necessary to install sufficient new machinery with connections to permit the removal of everything from the first building. However, this did not require a large capacity because the small bi-polar units in the first building took up a great deal of space for their output.

In the second building enough room was available to install one lighting transformer and rotary converter, which, through a temporary switchboard, replaced all bi-polar machinery in the first building. The arc machines were replaced by a lighting transformer temporarily located in the second building. This apparatus could thus be used as soon as the first generating unit in the new plant was ready to furnish current.

By this arrangement all the machinery was cleared out of the first building, allowing the construction of the switch cells, switchboards, etc., to go forward without any interruption. Then, having installed all of the high-tension switches in the first building, the various transformers and rotaries for the lighting and railway systems were gradually placed in the second building to take the place of the direct-connected units as fast as they were removed. The third building and the remainder of the boiler house have been rendered available for other purposes.

All the apparatus in this station was furnished by the General Electric Company with the exception of the 600-volt rotaries and transformers which were furnished by the Westinghouse Electric & Manufacturing Company.

OTHER SUBSTATIONS

All of the four small substations mentioned in the earlier part of this article are of the general construction typified by the view of the building at Stony Creek on page 1025. These structures are built of brick and steel with a roof and platform cover of Bonanza cement tile. All of these substations are furnished with waiting rooms and freight-handling facilities. The portable substation illustrated is a car 36 ft. 6 in. long over all and 8 ft. wide. The underframing is of steel, but the body is of wood. One side of the car has a double door 9 ft. wide, while the other is supplied with a 2-ft. 8-in. opening. The arrangement of the apparatus inside the car is shown on the plan.

CONSTRUCTION AND ENGINEERING

The foundation of the power station was constructed by Sims & Company, Philadelphia, Pa. The steel framing was fabricated and erected by the Phoenix Iron Company. The reinforced concrete floor and roof were constructed by the Roebling Construction Company and the brick walls by George W. Beard & Company, Reading, Pa.

The entire power rehabilitation, together with the electrical, mechanical, structural and architectural designs of all the buildings mentioned, was done by Walter J. Jones, consulting engineer, New York.

A large department store in St. Louis now operates a finely equipped 'bus to meet all interurban cars of the Illinois Traction System at that company's new terminal at Twelfth Street and Lucas Street. The 'bus carries passengers free to the store.

FEEDER CALCULATIONS FOR THE CHICAGO STREET RAILWAYS

The second annual report of the Board of Supervising Engineers, Chicago Traction, describes in detail the careful study made when calculating the power and return circuits for the recently rebuilt lines of the Chicago City Railway and the Chicago Railways.

The feeder calculations made for the Chicago Railways have been upon the basis of the 1200 cars provided in the traction ordinance, it being proposed to revise the figures as soon as estimates can be had of the probable car service requirements at the end of the rehabilitation period, which on this system will be the winter of 1910-1911.

The basis of all feeder calculations is given in Board Resolution No. 562, shown in the following:

"The subject of feeder requirements for the Chicago Railways Company was then taken up for consideration, and after discussion it was the sense of the board that the direct-current feeder copper for the Chicago Railways and the Chicago City Railway should be figured on a basis of 75 amp per car between the direct-current busbars of substations or power houses and the point of delivery at the car; it being understood that it is the intention of both roads to carry the voltage somewhat lower than 600 volts at the station busbars until such time as through the elimination of low-voltage motors and otherwise they are able to raise the voltage to 600 volts. After discussion the following resolution was unanimously adopted:

"'Resolved, That the system of secondary or direct-current electrical conductors or feeders for the Chicago Railways and the Chicago City Railway shall be calculated and plans made therefor by the chief engineer of the work on the following basis.

"'(1) That the direct-current busbar at power houses or substations will be operated at approximately 600 volts.

"'(2) That an allowance of 40 kw in power-house and substation capacity for each standard double-truck car of the type approved by the Board of Supervising Engineers, weighing approximately 26 tons light, or its equivalent, will be provided at each direct-current busbar.

"'(3) That in calculating the copper for current-carrying capacity an allowance of 75 amp for each standard double-truck car, as described above, or its equivalent, shall be allowed.

"'(4) That an average* drop of 50 volts will be allowed between the direct-current busbars and the center of gravity of the trolley section, due provision being made for suitable tie lines to take care of emergency cases.

"'(5) That the carrying capacity of insulated underground cables shall be calculated upon the following basis:

	Lead-Covered	Paper-Covered	Triple-Braided Waterproof
1,000,000 circ. mil cable, amp.	800	1,000	1,250
500,000 circ. mil cable, amp.	500	600	625
350,000 circ. mil cable, amp.	375	425	325
4/0 cable, amp.....	...	...	325

In arriving at the kilowatts and amperes per car stated in the foregoing resolution a series of tests was made jointly by representatives of the Chicago City Railway, the Chicago Railways and the Division of Electrical Transmission and Distribution. Tests were first made upon a single car by equipping it with instruments and stationing observers upon it to record the results in actual operation on different kinds of service. Tests were also made upon groups of 18 to 76 cars operating on an isolated trolley section of 1 mile or more in length by stationing observers to note the cars entering and leaving the section and also to take readings on station switchboards of the current and voltage on the feeders to the sections at 15-second intervals.

TESTS UPON A SINGLE CAR

Car tested—Chicago City Railway pay-as-you-enter car No. 5446.

Scale weight—55,800 lb., or 27.9 tons.

Motor equipment—Four 40-hp GE-80 motors.

Motor control—K-28-E.

*This refers to the average maximum for the two-hour morning and evening rush periods. In a majority of cases the drop is less than 50 volts.

Gear ratio—69:17 or 4.06:1 with 33-in. wheels.

Air brakes—With 16-ft. compressor set for range of 60 lb. to 85 lb.

Heaters—Electric, consisting of 14 truss-plank heaters, 4 panel heaters, 2 platform heaters.

Lighting—18 16-cp side lights, 3 32-cp center lights, 1 16-cp platform light, 1 32-cp headlight.

It was assumed that the average maximum condition for which feeders should be provided would be when a car was operating with motors, compressor, lights and two points on heaters. On this basis the individual and section tests compare as follows per car:

	Average
Individual car tests—	
Kilowatts at car	43.81
Amperes at car	79.66
Section tests—	
Kilowatts at station	42.40
Amperes at station	73.00

The calculations for feeder requirements for the Chicago City Railway system are briefly outlined. This system is used because the calculations have been practically completed during the year.

(1) From the proposed operating schedules the total number of cars which were required during the "rush" hours was distributed and plotted upon a skeleton map of the system, which is called a "spot map." The afternoon maximum period is usually the heaviest service period, so that the car distribution for two hours of what is styled the "p. m. rush" was used on this map.

(2) The trolley sections were then drawn and the number of cars on each multiplied by 75, which gives the total average maximum load for each individual trolley section in amperes. This amount was placed in a small circle at the center of gravity of the trolley section (see Fig. 1).

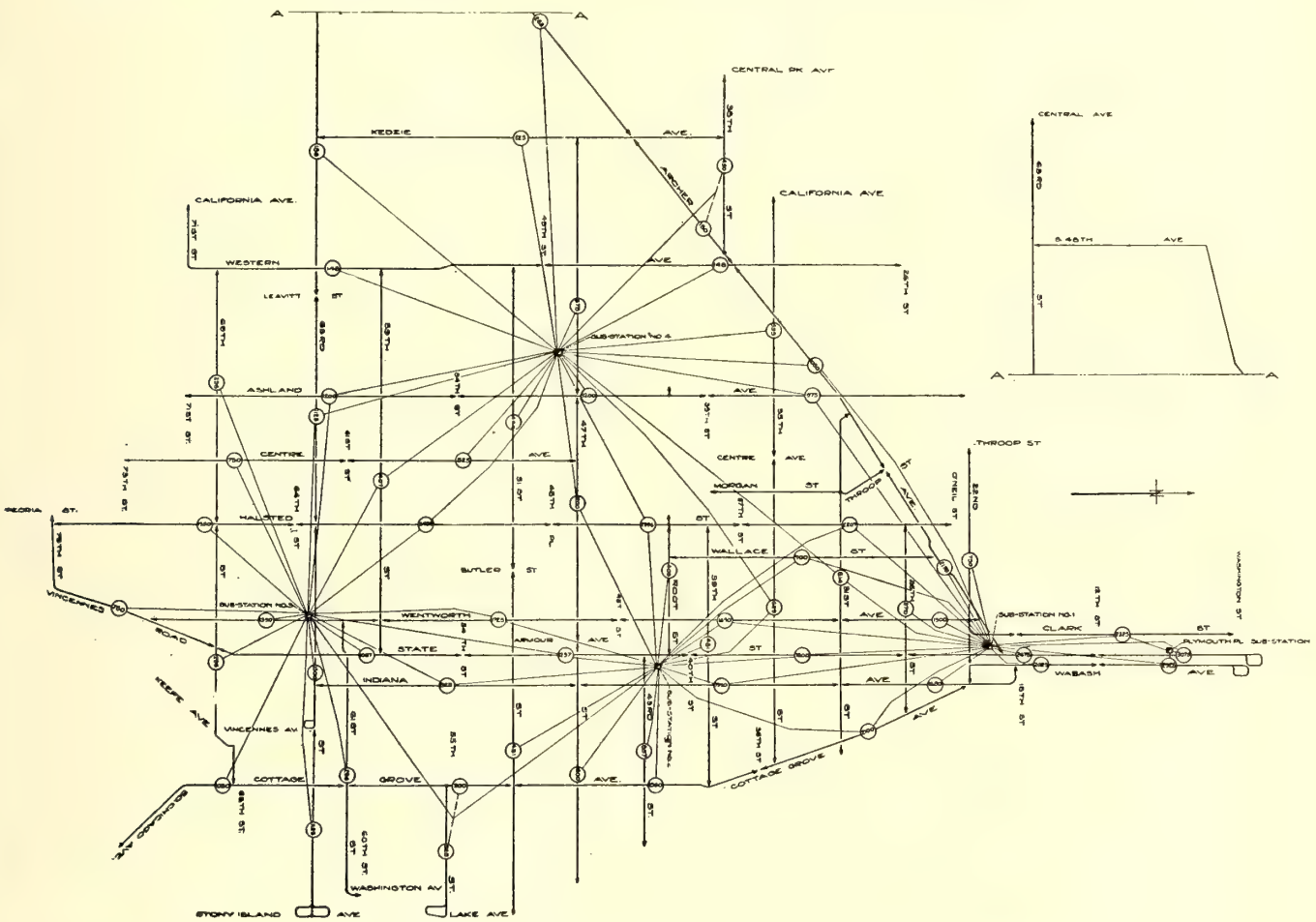


Fig. 1—Trolley Section Map and Spider Diagram

SUMMARY OF FIFTEEN TESTS ON SINGLE CAR MAY 28 TO JUNE 1, 1908

	Average
Passengers, crew and observers	30.4
Weight in tons, car and live load	30.03
Schedule speed in miles per hour	8.91
Volts at car	494.
Heater energy in kilowatts—	
First point (5 tests)	2.87
Second point (5 tests)	5.01
Third point (6 tests)	7.74
Lighting energy in kilowatts (5 tests)	1.61
Total energy in kilowatts at car—	
Motors and compressor	37.19
Motors, compressor and lights	38.80
Same with 1 point heat	41.61
Same with 2 points heat	43.81
Same with 3 points heat	46.54
Amperes at 550 volts at car motors, compressor, lights and 2 points heat	79.66

SUMMARY OF SECTION TESTS JUNE 11, 1908

Two Hours' Maximum Service

	Average
Number of cars on section	62.7
Amperes to section at station	3430.00
Amperes per car at station	55.45
Adding 10 per cent for winter load	61.00
Adding 12 amperes for lights and 2 points heat	73.90
Kilowatts at station	32.5
Adding 10 per cent for winter load	35.8
Adding 6.62 for lights and 2 points heat	42.4

(3) A study was then made of the proper location of stations. The best probable locations were selected and a calculation of load centers was made by finding the combined center of gravity of the loads about a given station. If a given system was to be fed by a single power house, the system load center was also determined, which showed the most economical location so far as distribution of copper was concerned for the generating station. If the locations chosen were not the most economical for distribution of copper, studies were made of comparative costs for other locations where the company might have property or where real estate for substation purposes might be obtained to advantage.

(4) After the station locations were definitely settled and the sections to be fed from each station were decided upon, a "spider diagram" was added to the drawing, which then became a drawing of record, and showed at a glance what sections were fed from any given station and what average maximum load was to be expected upon that section.

(5) The most desirable routes for the cables were then de-

termined, drawn upon a diagram and the distances measured from station busbar to the load center of each trolley section.

(6) The size of each feeder was then calculated in accordance with the requirements of Resolution No. 562 (already given in full). The known elements are:

(A) Load in amperes.
(B) Distance in feet.
(C) Drop in potential, 50 volts, more or less.
(D) Unit sizes of cables and carrying capacity of each.

From these the size of cables was calculated or read directly from the curves (Fig. 2) without calculation.

The curves shown in Fig. 2 may be used (1) to find the drop when the distance, current and circular mils are given; (2) to find the circular mils when the distance, current and drop are given, or (3) to find the distance when the current, drop and circular mils are given.

The following examples illustrate the use of the curves:

(a) Find the drop on a 500,000 circ.-mil cable, 5000 ft. long and carrying 450 amp. Follow the 5000-ft. ordinate up to the 500,000 circ. mil radial line, then horizontally until the 450-amp ordinate is crossed. This intersection at 47.5 gives the volts drop.

(b) Find the circular mils cross-section of a cable to carry 800 amp 8000 ft. with 30 volts drop. Follow the 800-amp ordinate up to the 30-volt line, then horizontally until the 8000-ft. ordinate is crossed. The location of this intersection gives the size as 2,250,000 circ. mils.

(c) Find the distance a 1,500,000 circ. mil cable will carry 600 amp with a 40-volt drop. Follow the 600-amp ordinate to the 40-volt curve, then horizontally to the 1,500,000 circ. mil line. The ordinate through this line gives the distance as 9350 ft.

The curves are plotted on the assumption that the resistance of 1000 ft. of a 98 per cent pure copper cable of 1,000,000 circ. mil cross-section is 0.01056 ohm.

(7) A certain number of the more important trolley sections are fed from two separate stations in such a way that in case of the shut-down of one station or of accident to one feeder the cars on the section could still be operated from the other station or by means of the other feeder. These are designated as "tie sections" and in addition to the above advantages are so proportioned and calculated that on the whole system in case of the shut-down of one or two stations a certain proportion of the cars can be carried on the remaining stations by interconnecting through these tie lines.

(8) Where the ordinances required feeders to be placed underground it was necessary to lay out underground conduit lines. A diagram is used for this, the number of cables over a given section being represented arbitrarily by the numerator of a fraction and the number of ducts by the denominator. Extra ducts are installed in all conduit lines where practicable to provide for future growth without tearing up pavements. The percentage of extra ducts will vary for different locations, depending upon the estimates of future requirements.

(9) The following comparative estimates of the positive feeder system of the Chicago City Railway and the Chicago Railways are as of Feb. 1, 1909, and represent about the completed system under the ordinance rehabilitation of the South Side company, but the North and West Side system will probably be modified by the addition of two or more new substations.

Company.	Number of Cars Double Truck Equivalent*	Total Cost of Positive Feeders	Cost Per Double Truck Car
Chicago City Railway..	908	$978,285.00	$1,078.00
Chicago Railways.....	1,200	1,302,350.00	1,085.00
Both companies.....	2,108	2,280,635.00	1,082.00

* This includes some single-truck cars, which for convenience are reduced to a number of double-truck equivalents, based upon the comparative power consumption of single-truck and double-truck cars.

These figures include only the positive feeders from the station to the load center of each trolley section and are based upon the number of feet of 1,000,000 circ. mil equivalent for all underground feeders at $1.25 per foot in place, and upon the number of feet of 500,000 circ. mil equivalent for all overhead feeders at 35 cents per foot in place.

NEGATIVE RETURNS

With the track construction adopted, which requires, as also do the ordinances, that the conductivity of the rail joints should be equivalent to the conductivity of the rail, a very liberal return circuit is provided for all rehabilitated car tracks. Four electrically welded 129-lb. rails of the composition used are equal in conductivity to 6,000,000 circ. mil of copper. On a double-track line an auxiliary cable of 1,000,000 circ. mil. capacity is installed between the tracks and cross-bonded to each rail about three times in each 1000 ft. This makes a total of 7,000,000 circ. mil equivalent of copper in each double-track line. In the vicinity of stations it was found that a large amount of additional return cable was necessary.

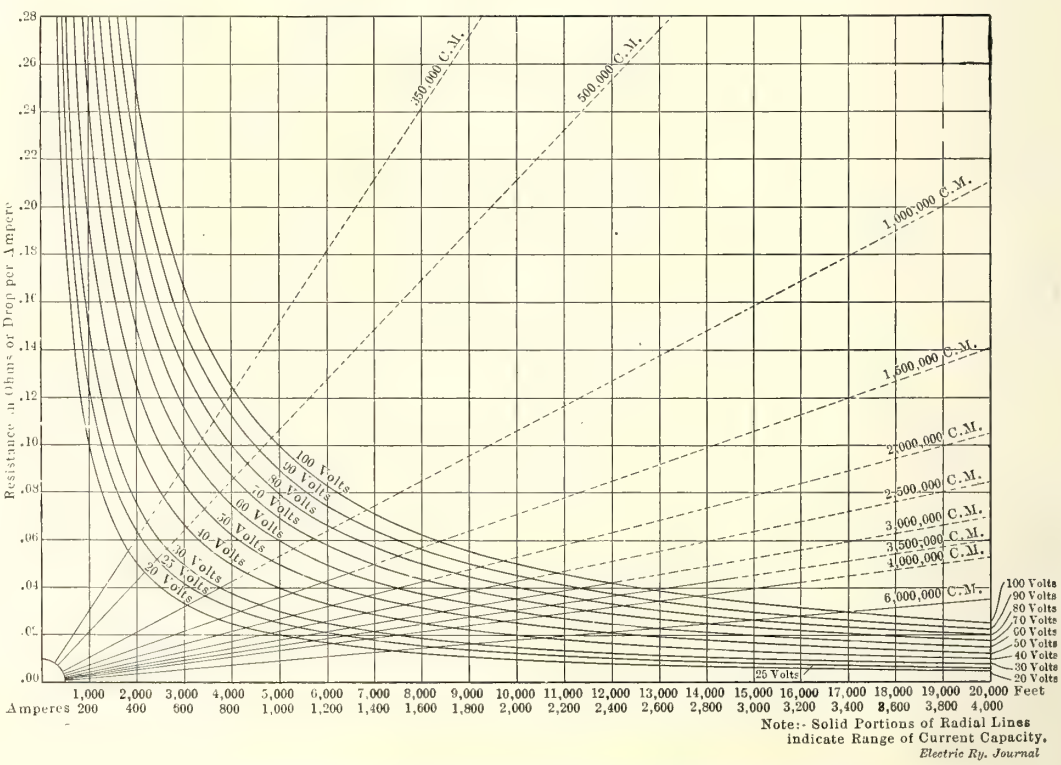


Fig. 2—Curves for Calculating Drop and Capacity of Feeders

Through the special work this full conductivity is assured by the following methods:

(1) The installation of special work cables electrically welded to the stockrails at each end.

(2) The installation of joint bonds at each joint in the special work.

(3) The carrying capacity of heavy 12-bolt joint plates at each joint.

The calculation of the return system was much more complex than for the positive feeders, because the return system consists of a network with a multiplicity of return paths.

Briefly, a typical calculation was made as follows:

From a "spot map" a diagram was made up and the load in amperes determined for each side of any figure in the network. The elements given or assumed were then as follows:

(A) Load in amperes assumed to return to the station from which the corresponding positive feeders are taken.

(B) All tracks to be ultimately rebuilt in accordance with standards laid down by the board.

(C) Drop in volts per unit of distance or a maximum drop from any point on the return to the nearest station.

A preliminary estimate was first made of the probable amount of conductor required, keeping in mind the desirability of reduced potential gradients on all lines.

The resistance of each side of each mesh in the network was then determined and the distribution of the current in returning to the station calculated.

The drop in each section was then computed, or was read directly from curves, and the resultant drop around each mesh was determined, from which the preliminary estimates of amount of conductor required were corrected.

If from a careful study of these results it was found that there were any locations where further economy in copper could be secured additional calculations and corrections were made for these locations.

ELECTRIC RAILWAYS IN CONSTANTINOPLE

A group of German capitalists has recently purchased the Constantinople street railways from a Belgian syndicate and is now engaged in rehabilitating and electrifying the system. The railway company, known as the Société des Tramways, has had since 1906 the right to electrify the lines. One of the conditions imposed was that power must be purchased from the government. The company has made the following agreement with regard to profits from future operation:

From the net profits the shareholders will receive interest at the rate of 6 per cent. The surplus will be divided between the municipality and the company as follows: From 6 per cent to 9 per cent, one-tenth to the municipality, nine-tenths to the company; from 9 per cent to 12 per cent, two-tenths to the municipality, eight-tenths to the company; from 12 per cent to 15 per cent, three-tenths to the municipality, seven-tenths to the company; from 15 per cent to 18 per cent, four-tenths to the municipality, six-tenths to the company; surplus above 18 per cent will be divided equally. The company will complete the system by constructing various lines in and about the city. It will also proceed with other work necessary for the electrification of the lines.

FORMAL OPENING OF THE McKINLEY BRIDGE OVER THE MISSISSIPPI RIVER

The McKinley Bridge, which spans the Mississippi River at St. Louis, named after Congressman W. B. McKinley, Champaign, Ill., president of the Illinois Traction System, was opened formally on Nov. 10, 1910, with appropriate ceremonies in which Gov. C. S. Deneen, of Illinois, and Gov. H. S. Hadley, of Missouri, participated. The massive structure was blessed by Archbishop John J. Glennon, of St. Louis. Miss Julia Mattis, Champaign, Ill., a niece of Mr. McKinley, was escorted to the center of the bridge by the two Governors, and while the band rendered "The Star Spangled Banner," she drew the Stars and Stripes to the highest pinnacle of the bridge. The ceremonies on the bridge terminated with pronouncement of the benediction by Dean Caroll M. Davis, of Christ Church Cathedral.



McKinley Bridge Opening—Decorations





McKinley Bridge Opening—The First View Shows Gov. Hadley (Under the Flag), Gov. Deneen and Mr. McKinley; the Second View Shows the Parade on the Bridge

A banquet was tendered to about 700 guests of the Illinois Traction System at the Planters' Hotel, St. Louis, in the evening. David R. Francis was toastmaster. All the speeches were tributes to Mr. McKinley, his associates and the Illinois Traction System. Toasts were given by the Rev. Dr. Leon Harrison, of Temple Israel, St. Louis; Judge O'Neill Ryan, of St. Louis; Governor Deneen, of Illinois; Governor Hadley, of Missouri; Mayor F. H. Kreismann, of St. Louis, and L. Y. Sherman, former Lieutenant-Governor of Illinois. W. B. McKinley, of Champaign, Ill., president of the Illinois Traction System; T. B. Macaulay, of Montreal, Can., head of the Sun Life Assurance Company and one of the principal stockholders in the railway, and H. E. Chubbuck, vice-president of the system, responded. While the banquet was in progress a fireworks display was given on the bridge for the entertainment of many thousands of people.

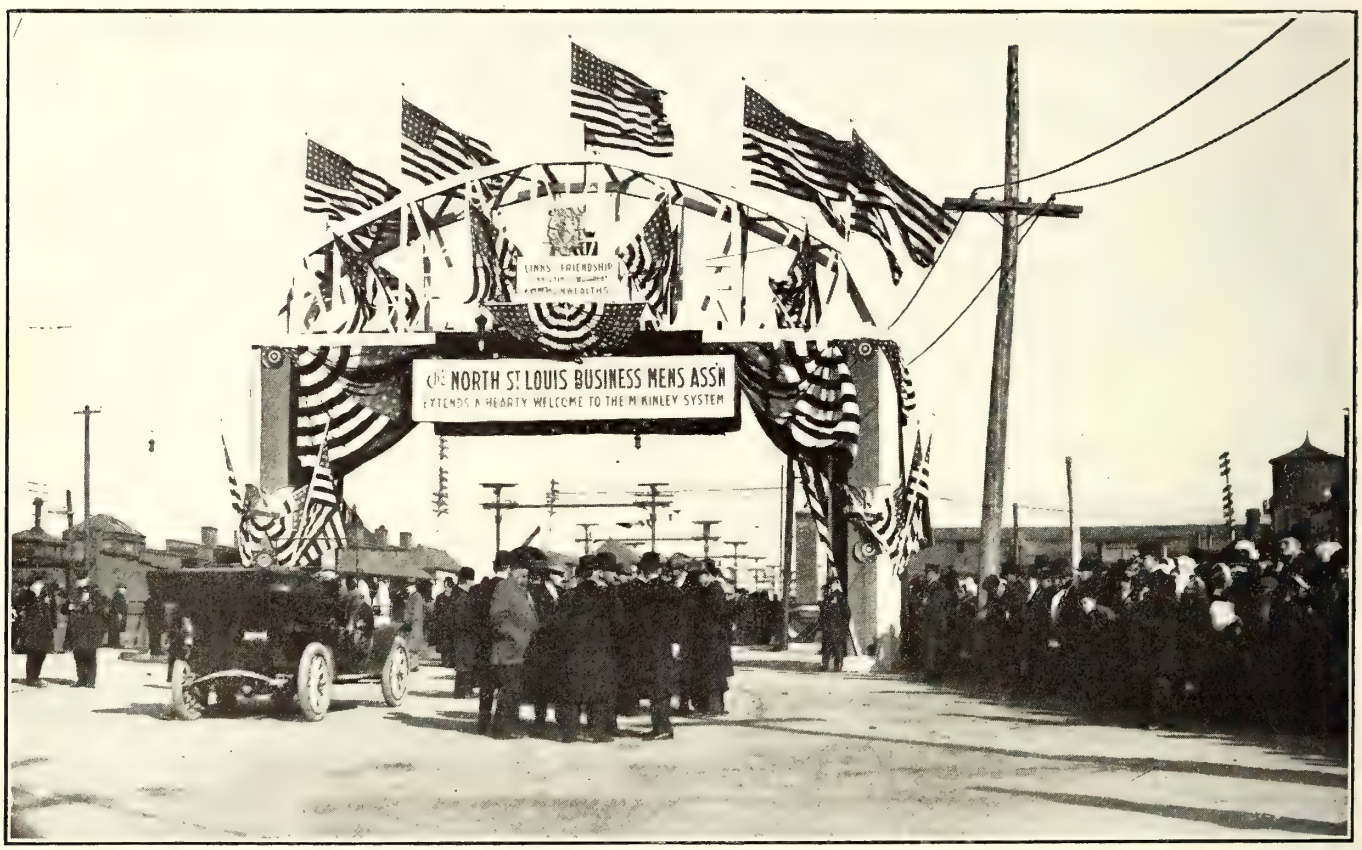
The construction of the McKinley Bridge was begun in November, 1907. It was built at a cost of $4,500,000, is the largest bridge ever attempted by an electric railway and has a greater carrying capacity per lineal foot than any other bridge across the Mississippi. Its carrying capacity will be 12,000 lb. per lineal foot on the tracks as against 10,000 lb. for any other bridge. It will carry 3000 lb. per lineal foot on the driveways, of which there are two.

The steel structure includes three immense spans across the river, 521 ft., 523 ft. and 521 ft. in length, respectively; two shorter river spans, each 250 ft. in length, and three shorter shore spans of 150 ft. each. Structural steel elevated approaches form a connecting grade of 1.75 per cent at each end of the bridge. The approach on the Missouri side passes over 24 acres of freight yards owned by the Illinois Traction System. This approach is 2700 ft. in length and connects with the street grade. The length of the bridge and approaches is over 8000 ft.

The three main river spans are of the modified type of Pratt truss design, while the five spans over the shallow part of the river are of the deck truss construction. The main bridge carries two railroad tracks through a center space of 26½ ft.; two roadways, 14 ft. wide each, are carried on cantilever brackets. The total width of the bridge over all is 65 ft., and the clearance above high water is 50 ft.; clearance above low water is 85 ft.

The four large river piers which support the structure are built of red granite and Bedford limestone, backed with concrete. The piers supporting the approach structure on either side are of concrete resting in reinforced concrete piles. The main piers are 150 ft. from bedrock to capstone, 26 ft. thick and 76 ft. wide at the bottom. The timber in the floors of the bridge and the roadway is creosoted. The design for the bridge was prepared by Ralph Modjeski, under whose supervision it was built. F. E. Washburn was resident engineer on the ground during the entire time the bridge was under way.

Under the west approach to the bridge there is a power plant which will have an ultimate capacity of 28,000 hp and will cost when completed about $1,000,000. From the St. Louis side of the bridge the double tracks of the Illinois Traction System reach into the business heart of St. Louis, terminating at Twelfth Street and Lucas Street, half a block north of Washington Avenue. Immense terminal buildings are being constructed at this point, where the company owns over a block of land. A large passenger station and train sheds will be erected and the freight and express terminal is now nearing completion.



McKinley Bridge Opening—Arch at Entrance

There will be no arbitrary charges over this bridge, and only the regular 2 cents a mile will be collected. The local street cars will run from the corner of Twelfth Street and Lucas Street to Granite City and Venice, a distance of 9 miles, for a 5-cent fare. At present every passenger entering St. Louis on a railroad over the old bridges must pay a toll of 25 cents; 5 cents extra is charged on the city cars. An arbitrary charge of 20 cents a ton is made for coal, with other freight in proportion.

W. Kelsey Schoepf, president of the Ohio Electric Railway, has announced that the old power house at Lindenwald will shortly be transformed into a club house for the use of the Ohio Electric Beneficial Association, which held its annual meeting at that place recently. The building will be overhauled and a gymnasium, baths, reading and pool rooms will be installed.

BOSTON ELECTRIFICATION PROBLEM

On Nov. 15 the special commission authorized at the last session of the Massachusetts Legislature to deal with the electrification of all of the steam railroads within the Metropolitan district of Boston made public the reports received from the New York, New Haven & Hartford Railroad and the New York Central & Hudson River Railroad as lessee of the Boston & Albany Railroad. The report of the New York, New Haven & Hartford Railroad consisted of a letter addressed by E. H. McHenry, vice-president of the company, to C. S. Mellen, president of the company. An abstract follows:

"The following report and estimates are submitted, which have been prepared in compliance with the terms of Chapter 134 of the Resolves of the Legislature of the State of Massachusetts, which provides that the railroad corporations operating within the Metropolitan District * * * be directed to prosecute studies with reference to the electrification of their passenger service in said districts, and to present the results of such studies on or before Nov. 1 to the Joint Board on Metropolitan Improvements.

"It was quite impossible to devote the proper degree of study and investigation to this subject within the very brief time set by the Legislature which the magnitude and complexity of the problem demand, but a special effort has been made to present at least the salient features of the proposed electrification of railroads within the Metropolitan District, together with an approximate estimate of the cost, in order to comply as fully as possible with the terms of the resolves of the last Legislature.

"The investigation of the traffic conditions of the New York, New Haven & Hartford and the Boston & Maine Railroads has been completed by A. B. Corthell, consulting engineer, to whom the task was assigned, which included a study of the train service upon some 20 through lines and branch lines, together with analyses of the number and direction of trains operated, train schedules, tonnage, speed and terminal conditions.

"To W. S. Murray, electrical engineer, was assigned the task of analyzing the traffic data and the preparation of estimates of the cost of the necessary power houses, overload equipment, tracks and of the electric engines and multiple-unit equipment required to replace the present steam engines and passenger cars.

"The results of these investigations are substantially comprised in various maps, diagrams and charts appended to this report, as follows:

"A map showing in heavy lines the portions of the railroads included within the proposed electric zone, also the number of tracks and the number of trains operated over same within 24 hours as compiled from the summer timetable for 1910.

"Diagram No. 1 shows the number of trains in and out of the North and South stations each half hour, and illustrates the relative amount of traffic in each direction at different hours of the day. As a matter of interest, the number of passengers in and out of the two stations, together with similar data for the Grand Central Station at New York for the past 10 years, is added. The curve of future growth may be approximated by extending the curves on this diagram.

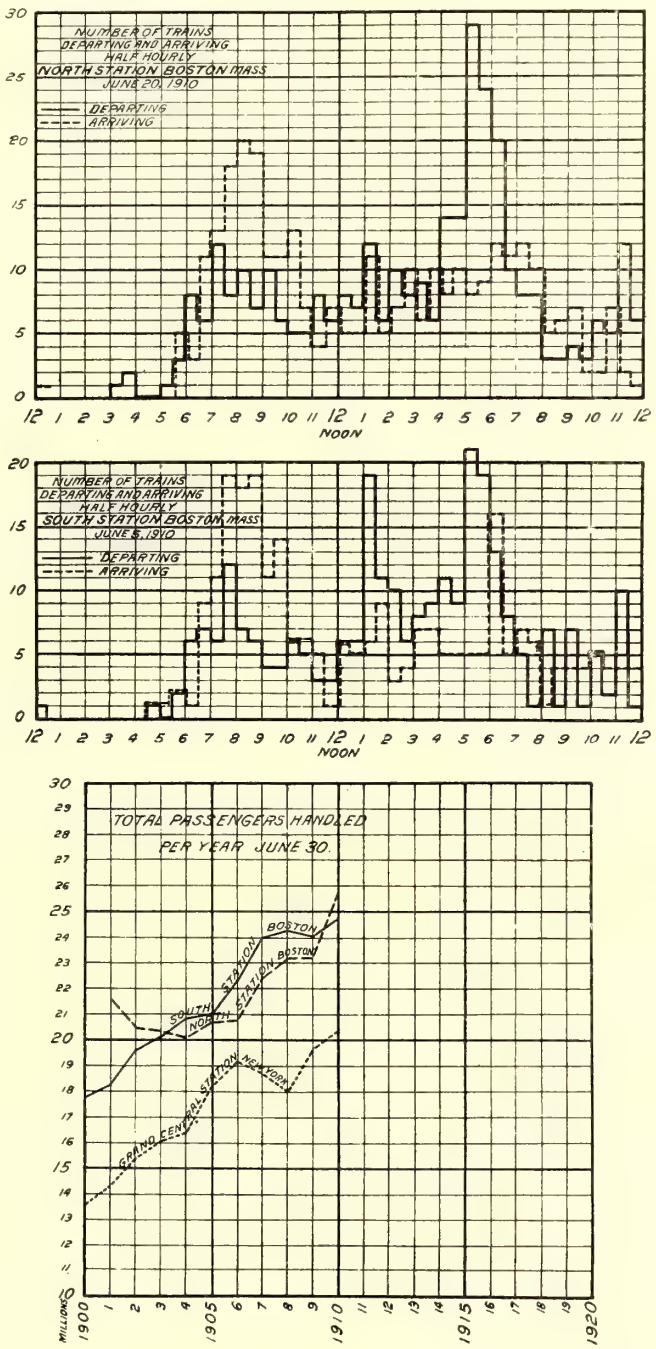
"Diagram No. 2 shows curves of train weights, including motors, moving each period of 10 minutes throughout the day of 24 hours on the N. Y., N. H. & H. R. R. for each district and a curve of totals for all districts within the electric zone.

"Diagram No. 3 shows similar data for the B. & M. railroad for each division and totals for all divisions within the electric zone.

"Diagram No. 4 shows the combined totals for both the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad, also the train weights upon which the estimated power house requirements are based.

"Equipment estimates showing the amount of electrical equipment necessary to cover the service between Boston and the suburban terminals. These estimates show both the number of electric engines required to perform all service, or, as an alternative, the number of electric engines required for the operation of through trains only, and the number of motor and trailer cars operating in multiple-unit service required to replace the present trains terminating within the electric zone.

"A statement showing the number of steam and electric engines or equivalent multiple-unit cars at all suburban termini, for which it is necessary to provide electric or steam engine facilities, also the capacity of the facilities now in existence at each point, together with estimates of cost.



Boston Electrification—Number of Trains Departing and Arriving Daily at North Station and South Station and Total Number of Passengers per Year at These Two Stations

"A supplementary diagram showing the average daily runs and energy in kw-hours required for the motors in local and express service for both the New Haven and the Boston & Maine trains. This diagram is accompanied by a blueprint showing the proposed Boston electric zone, upon which are marked the general routes and track systems of both the New Haven and Boston & Maine Railroads; also showing location and distances of main line and yard tracks.

"Condensed estimates of construction cost within the Metropolitan District of Boston.

"It is not believed that the maps, charts and statements as above require an extended commentary, as they are practically self-explanatory. The estimates of construction cost are based upon the single-phase system of electric operation as adopted in service between Woodlawn and Stamford on the New York division of the New York, New Haven & Hartford Railroad. This system employs a generating voltage of 11,000 volts with a frequency of 25 cycles. An installation of this kind, as proposed for the lines in the vicinity of Boston, will differ, however, in some very important particulars, as the complications and increased cost due to the dual operation of both the single-phase system of the New Haven Company and of the direct current system of the New York Central Company will be avoided. No substations will be required within the zone of electrification, and as all current will be taken from an overhead contact no third rail for conducting current to engine shoes will be required. The elimination of the third rail is particularly desirable in this instance, as its introduction would create grave difficulties in working out plans for the equipment of the many and complicated track systems in terminal yards and at crossovers.

"The estimates for main lines, sidings and yards have been considered upon passenger basis only, and do not cover freight and switching service.

"The power requirements have been ascertained by applying

"The necessity of changing from steam to electricity and vice versa at the limits of the electric zone makes it necessary to provide proper transfer facilities, for which due provision has been made in the estimate. It will be noted that this is a very burdensome requirement in its effect both upon construction cost and operating expenses.

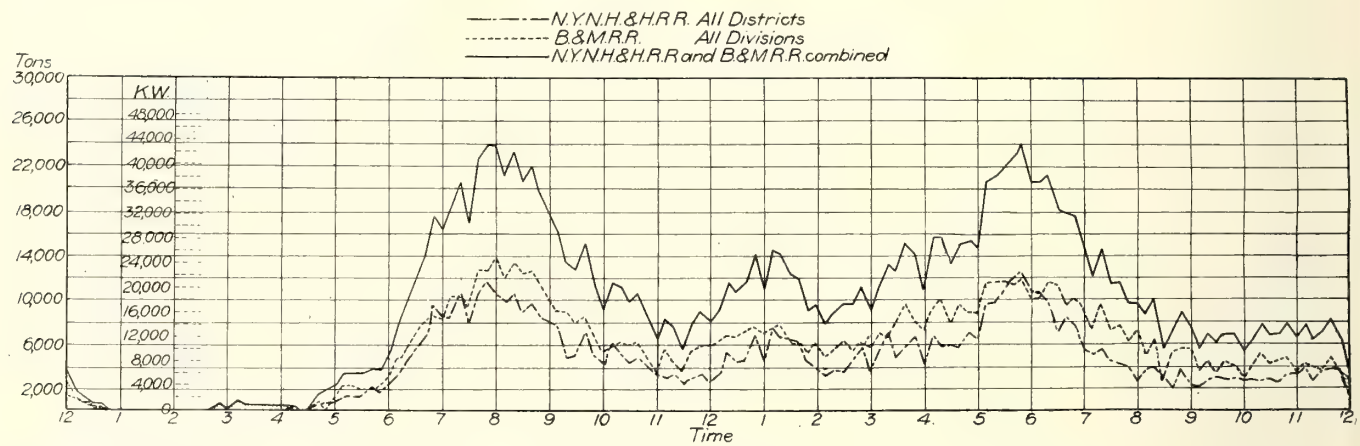
"The equipment estimates attached to this report indicate that equipment must be provided for the operation of 14,630 daily train miles, based upon the summer schedule of 1910. This is the theoretical or timetable mileage, as compared with the total actual mileage, including deadheading and helping, of 17,286 miles.

"The electric locomotives and multiple unit equipment required to replace the present equipment in this service as given in the estimate include additions of 15 per cent for shopping reserve and 50 per cent for holiday service and contingencies.

"The estimates for heavy repair shops and spare parts require no explanation.

"The estimates for the complete equipment of the New Haven and Boston & Maine Railroads as shown in greater detail in the attached summaries amount to $13,862,750 and $18,889,192 respectively, or $32,751,942 total for both companies.

"It will be understood that these estimates are based upon a plan for electrification within the Metropolitan District of Boston in literal compliance with the request of the Legislature, which in nowise represents the scope and method of development which would naturally be favored by the railroad



Boston Electrification—Diagram Showing Curves of Moving Train Weights Each Ten Minutes and Amount of Power Required for Suburban Service of New Haven Railroad and Boston & Maine Railroad

to the computed ton mileage an average coefficient derived from the experience of the New Haven Company on its New York division from operation within its electric zone, which affords an estimate of the amount of energy required, expressed in terms of kw-hours. This result has been equated by adding 50 per cent for holiday conditions, 15 per cent to include heating and lighting of local trains by electricity and 25 per cent to cover transmission losses and power used for general auxiliaries, station and yard lighting, signaling, shop and other power requirements. The estimate so obtained has been reduced by applying the two-hour overload capacity of generators with the final result that a normal generating capacity of 60,000 kw is indicated as required.

"The estimates for transmission lines and the overhead contact system cover the equipment of single and multiple main track mileage and trackage in terminals, yards and sidings, as follows: 15.46 miles of four-track routes; 128.07 miles of double-track routes; 32.44 miles of single-track routes; 111.2 miles of yard tracks and sidings. The total mileage included in the above estimates is equivalent to 461.62 miles of single track.

"The construction types of the overhead structures and suspended system will be quite similar to those installed on the New York division of the New Haven Company, subject to certain modifications indicated by our experience.

companies in interest. The proposed restriction of the operation to the Metropolitan District establishes limits which are purely artificial and arbitrary, having but little relation to the flow and volume of traffic, and makes necessary the establishment of costly intermediate terminals at some 13 points on the district boundaries for accommodating both steam and electric motors.

"All trains passing through these transfer points will be subject to delays of three or four minutes in both directions, and, accordingly, the improved service within the Metropolitan zone will be gained only by sacrificing the commercial interests of many important secondary centers and outlying points, such as Marblehead, Salem, Lawrence, Lowell, South Framingham, Walpole, Brockton, Whitman and Greenbush, which communities will be less well served than at the present time.

"Similar conditions forced the extension of electric service on the New York division of the New Haven Company to Stamford, and on the New York Central lines to White Plains and Yonkers, although not required by the act of the Legislature, as such further extensions were necessary in order to avoid the cost and delays incident to engine transfers within suburban limits. These conditions lead to the conclusion that the subject requires a more complete and comprehensive study before fixing limits for the proposed electric service.

"The problem in its general nature is altogether different from the conditions at New York, as in the latter case the entire traffic of the New York, New Haven & Hartford Railroad and the New York Central Railroad companies within the city limits is concentrated upon a single four-track route between the Grand Central Terminal and Woodlawn, while, on the contrary, at Boston the suburban business is diffused over a great area, requiring the equipment for electric operation of not less than 20 through routes and branches, with a corresponding effect upon first cost and operating charges.

"Notwithstanding the more favorable conditions at New York incident to the greater density of traffic and the simpler track system in the region served by the New Haven and New York Central Railroads, the records of the New Haven Company demonstrate that under present conditions the electric train service not only fails to earn any interest upon the very large amount of capital invested, but that it has also increased the cost of operation, and with the less favorable conditions in the vicinity of Boston it is impossible to escape the conclusion that the deficit in fixed charges and operating expenses will be still greater.

"In explanation of this disappointing result, it may be stated that the experience of the New Haven Company in operating a mixed steam and electric service has proven very unsatisfactory. The annoyances and losses due to smoke, cinders, steam and noise are at best only alleviated without being eliminated, while at the same time so large a proportion of the expense of both methods of operation is retained as to prevent the realization of the fullest degree of economy of either system. This becomes more apparent when it is considered that the power stations, if provided for passenger requirements only, will have a large unused capacity between the hours of peak load, which otherwise could be utilized to very good advantage for the transportation of freight, and more particularly as the occupation of tracks by passenger trains during the hours of peak load acts automatically to limit the simultaneous operation of freight trains at such times. Thus little or no additional investment in power houses is required for freight operation, and similarly the overhead track equipment serves equally well for both passenger and freight traffic, which makes it practicable to extend electric operation to include all classes of service at the cost of only the additional engines and the equipment of yard trackage required for freight service.

"It therefore seems quite safe to conclude that no general substitution of electric for steam traction should be made unless the substitution is complete, including passenger and freight operation and yard switching in addition, and also that in making such substitution the operation should be extended to include the full length of run or engine district, in order to avoid the uneconomical subdivision of the present "trains run," together with the added expense and delays incident to intermediate engine transfer stations. The extension of the estimates to include the much larger expenditures required to cover the inclusion of freight service and yard switching, together with the probable enlargement of the limits of the electric zone, is not possible at this time, as the data for such estimates are not at present available, but it is certain that the revised and completed totals will be of the most imposing magnitude.

"The electrification of the Boston suburban district would release a large number of steam engines and passenger coaches, which should properly be credited to the construction estimate, but as there is no apparent opportunity for the utilization of so large an amount of equipment of this special type, and as its value for resale would be so doubtful, it is not practicable to assign values to this item.

"It should also be noted that no account has been taken of the profound changes affecting terminal conditions and methods of operation which would be introduced if the proposed connection between the North and South Stations at Boston is constructed, and if there is any reasonable probability of such construction being undertaken in the near future the installation of an elaborate and costly electric system at the present terminals could not be reasonably considered.

"In general it would seem altogether more practicable at first to restrict the substitution of electricity for steam to a few of the more important routes, subsequently extending the system as rapidly as consistent with the financial conditions and the public needs."

The figures given in the appendix follow:

SUMMATED COSTS OF BOSTON METROPOLITAN ELECTRIFICATION DISTRICT

(1)	Power house	$6,000,000
(2)	Transmission lines and overhead contact system	3,850,240
(3)	Suburban terminal shops and inspection facilities	1,417,000
(4)	Heavy repair shops	400,000
(5)	Electric locomotives	6,725,000
(6)	Spare parts for electric locomotives	336,250
(7)	Multiple unit motor cars	6,960,000
(8)	Multiple unit trail cars	5,014,100
(9)	Spare parts for multiple unit cars	299,352
(10)	Signaling	1,750,000
		$32,751,942

SUMMATED COSTS OF BOSTON METROPOLITAN ELECTRIFICATION DISTRICT, N. Y., N. H. & H. R. R.

(1)	Power house (27,500 kw, based on average peak)		$2,750,000
(2)	Transmission lines and overhead contact system—		
	13.43 miles 4-track, at $40,000 per mile	$536,000	
	52.58 miles 2-track, at 20,000 per mile	1,051,600	
	17.71 miles 1-track, at 7,000 per mile	123,970	
	61.14 miles yd. tr'k, at 4,000 per mile	244,560	
			1,956,130
(3)	Suburban terminal shops and inspection facilities		435,000
(4)	Heavy repair shops, based on percentage of equipment		172,000
(5)	Electric locomotives—		
	Light passenger type; 48 at $40,000 each	$1,920,000	
	Heavy passenger type; 21 at 45,000 each	945,000	
			2,865,000
(6)	Spare parts for electric locomotives, based on 5 per cent of item 5		143,250
(7)	Multiple unit motor cars, 100 at $30,000 each		3,000,000
(8)	Multiple unit trail cars, 116 at $13,300 each		1,542,800
(9)	Spare parts for M. U. cars, based on 2½ per cent items 7 and 8		113,570
(10)	Signaling (automatic block)		885,000
			$13,862,750

SUMMATED COSTS OF BOSTON METROPOLITAN ELECTRIFICATION DISTRICT, B. & M. R. R.

(1)	Power house (32,500 kw, based on average peak)		$3,250,000
(2)	Transmission lines and overhead contact system—		
	2.03 miles 4-track, at $40,000 per mile	$81,200	
	75.49 miles 2-track, at 20,000 per mile	1,509,800	
	14.73 miles 1-track, at 7,000 per mile	103,110	
	50.06 miles yd. tr'k, at 4,000 per mile	200,000	
			1,894,110
(3)	Suburban terminal shops and inspection facilities		982,000
(4)	Heavy repair shops (based on percentage of equipment)		228,000
(5)	Electric locomotives—		
	Light passenger type; 65 at $40,000 each	$2,600,000	
	Heavy passenger type; 28 at 45,000 each	1,260,000	
			3,860,000
(6)	Spare parts for electric locomotives (based on 5 per cent of item 5)		193,000
(7)	Multiple unit motor cars, 132 at $30,000 each		3,960,000
(8)	Multiple unit trail cars, 261 at $13,300 each		3,471,300
(9)	Spare parts for M. U. cars (based on 2½ per cent items 7 and 8		185,782
(10)	Signaling (automatic block)		865,000
			$18,889,192

BOSTON & MAINE RAILROAD EQUIPMENT ESTIMATE

Statement showing the amount of electric equipment necessary to cover the service between Boston, Swampscott, Wakefield Junction, Wilmington, Lexington, Wayland and Waltham, and the number of steam locomotives which can be released; also the number of coaches by the use of multiple unit equipment.

Passenger Service.	
Number of locomotives required	98
Number of steam locomotives which can be released by substitution of electric locomotives	35
Number of electric locomotives required for switching service at passenger terminal	17
Switching engines released at passenger terminal by reason of electrification	17
Timetable engine mileage	7,853
Total engine mileage, including deadheading and helping	9,854
Multiple Unit Equipment.	
Number of electric engines required to run trains coming from and going to points beyond electric zone	54
Timetable engine mileage	4,792
Total mileage, including deadheading	5,370
Multiple unit equipment required to perform the service entirely within electric zone	227
Number of motors and trailers, assuming that one motor car will handle three trailers, seating capacity seventy-five each.	
Timetable mileage	2,715
Car miles made by motor cars	2,715
Car miles made by trailers	8,145
Number of steam engines which can be released under M. U. system	31
Number of coaches which can be released under M. U. system	227

N. Y., N. H. & H. R. R. EQUIPMENT ESTIMATE.

Statement showing the amount of electric equipment necessary to cover the service between Boston, Campello, Cohasset, South Braintree, Readville, Dedham, Mattepan and Needham Junction, and the number of steam locomotives which can be released; also the number of coaches, by the use of multiple unit equipment.

Number of electric engines required to perform all service	64
Timetable miles	6,777.63
Total mileage, including deadheading and helping	7,431.88

Number of electric engines required to run trains coming from and going to points beyond electric zone	40
Timetable miles	3,956.56
Total mileage, including deadheading	4,737.76
Multiple unit equipment required to perform balance of service—	
Motors	58
Trailers	67
Timetable miles	2,821.07
Car miles made by motors	3,978.00
Car miles made by trailers	6,430.00
Number of steam engines which can be released	53
Number of coaches released under this proposition	164

BOSTON & ALBANY RAILROAD

The report of the Boston & Albany Railroad was submitted by the New York Central & Hudson River Railroad, as lessee, and consisted of a letter dated Oct. 31 to the Joint Board on Metropolitan Improvements from A. H. Smith, vice-president and general manager of the company. It included a map of the district under consideration, a train and power station load diagram, and a diagram of the proposed electric schedule, with electric locomotives for the through and Worcester trains and multiple-unit cars for the Circuit and for the South Framingham trains. It also included a diagram showing the train and power station loads calculated for the present through and suburban service. The latter diagram is reproduced herewith.

The letter states that while the resolve did not impose any duty to make studies beyond the Metropolitan line, which crosses the railroad about 16.2 miles from the Boston Terminal, operating and financial conditions made it necessary to continue the studies to South Framingham. The track mileage involved in the above electrification is substantially as follows:

Boston to South Framingham, four tracks	83.60 miles
Highland circuit, two tracks	19.78 "
Yards and sidings	25.00 "
Total	128.38 "

The company also made no studies for the electrification of the South Terminal. In its calculations the company estimated on a power station located on the Charles River between Allston and Cambridge and containing three 7500-kw, 11,000-volt turbo-generators and three substations, one to be in Boston, one in Newton Lower Falls and one at Natick. Two of these would contain three 1500-kw rotary converters and the other three 750-kw rotary converters.

The company estimated on a third rail, using 1200-volt direct current, and electric locomotives and motor cars similar to those used by the New York Central & Hudson River Railroad in New York City. The present service would require 16 electric locomotives, 62 motor cars and 31 trail cars, and would retire 29 steam locomotives and 113 passenger coaches. A new alternating-current signal system would have to be installed to replace the present direct-current signal system at a cost of approximately $700,000. In addition, improved drainage, at a cost of $60,000, will have to be installed. The company estimates the initial cost of the entire installation and the annual expense resulting therefrom as follows:

	Cost	Annual Expense
Cost of construction	$7,520,300	$1,172,604
Credit	1,107,000	633,413
Increase, net	$6,413,300	$539,191

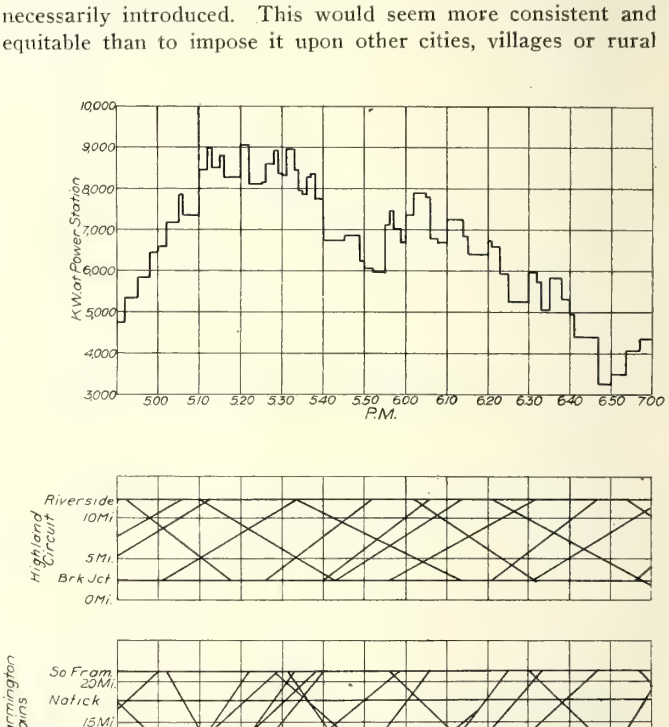
The report then says: "The gross revenue derived by the Boston & Albany Railroad in the district under consideration for electrification, including return tickets, single trip tickets, mileage proportion for traffic entering and leaving Boston for points west of South Framingham, is approximately $1,300,000.

"The visible operating expense of affording this service under steam operation at the present time, without any interest whatever upon the large investment for right-of-way, tracks and structures, is slightly in excess of the gross receipts.

"If to this present deficit there be added the above additional annual expense as result of electrification, namely, $539,191, the net revenue above operating expenses which accrues to the Boston & Albany Railroad as a whole from the business handled in and out of the City of Boston between all points on the road will be practically absorbed, thus leaving no net revenue from such service to meet existing obligations or those which would be created by this new investment.

"The solvency of a transportation company is of paramount importance to the public as well as to the railroad. Insolvency necessarily means inefficient service, and inefficient service means inconvenience and commercial and industrial calamity to the public.

"It would, therefore, seem imperative that any act providing for the electrification of steam railroads under such circumstances, empowering the proper board or boards to determine the manner in which such work should be prosecuted, should also empower the board or other properly constituted authorities to permit the railroad companies to assess all passengers and traffic using the facilities with a terminal charge sufficient to bear the financial burdens imposed, with some additional profit to the operating company for performing the service and assuming the additional responsibilities and liabilities necessarily introduced. This would seem more consistent and equitable than to impose it upon other cities, villages or rural



Boston Electrification—Load Diagram for the Present Through and Suburban Service on the Boston & Albany Railroad

communities in local fares or other forms of transportation which receive no real estate or other benefits from the new form of transportation employed.

"The Boston & Albany Railroad has no material source of income except the receipts from transportation afforded the public. If the public elects through legislative mandate to have that service provided through the use of more costly appliances and methods than formerly, the conclusion is inevitable that the public must ultimately pay the cost and should therefore have full information on the subject in advance. The case is analogous to the elimination of grade crossings, where the public participates in the immediate costs and assumes in transportation expenses the carrying charges on the remainder."

Prof. Dugald C. Jackson, of the Massachusetts Institute of Technology, contributed an article on the report of the Chamber of Commerce of Boston in regard to rapid transit in that city to the Boston *American* of Oct. 30, 1910.

MEETING OF THE EXECUTIVE COMMITTEE OF THE ENGINEERING ASSOCIATION

The executive committee of the American Electric Railway Engineering Association held a meeting at the offices of the American Association in New York on Nov. 15. The following members of the committee were in attendance: W. J. Harvie, Utica & Mohawk Valley Railway, president; Norman Litchfield, Interborough Rapid Transit Company, secretary; Martin Schreiber, Public Service Railway; E. O. Ackerman, Columbus (Ohio) Railway & Light Company; G. H. Kelsay, Indiana Union Traction Company; C. B. Voynow, Philadelphia Rapid Transit Company; E. J. Burdick, Detroit United Railway; H. H. Adams, Metropolitan Street Railway, New York.

The secretary read the minutes of the meeting of the executive committee, held at Atlantic City, Oct. 10, 1910. The minutes were approved as read.

METHOD OF PREPARING COMMITTEE REPORTS

The first general subject considered was the method of preparing committee reports for the coming year. The secretary read the standing instructions to the chairmen of the committees, outlining the method of treatment of the subjects assigned to the standing committees by the executive committee. Mr. Voynow asked that the secretary be instructed to furnish a copy of these instructions to every member of the standing committees to be appointed this year.

Mr. Schreiber moved that the membership of all standing committees, except the committee on standards, be increased from six members to nine members. In support of this motion he stated that the American Railway Engineering & Maintenance of Way Association has about 400 members, of whom over 300 are members of one or more standing committees of the association. Some of the standing committees of this association had as many as 17 members and at least one committee of the American Society for Testing Materials had as many as 40 members. He believed that increasing the membership of the committees would result in the presentation of more representative opinions in the committee reports, and that no better way could be found to increase the interest in association affairs among the members than to have a larger proportion of the members engaged in committee work. In his opinion the time would come when the standing committees would be composed of not less than 20 members. After a brief discussion the motion of Mr. Schreiber to increase the committees to nine members was carried.

Mr. Schreiber then moved that in addition to the appointment of a chairman for each standing committee the president should also appoint a vice-chairman of each committee. The vice-chairman would be in a position to carry on the committee work without delay in the event that the chairman was unable to serve. The motion was carried. Mr. Kelsay suggested that each committee appoint a secretary to have general charge of the correspondence among the members and to prepare the reports of the meetings. It was agreed that this suggestion would be made to the standing committees.

Mr. Litchfield called attention to the fact that it was very difficult for the secretary of the association at the present time to keep in touch with the work to be done by the association committees, and he suggested that the standing instructions to the committees be amended so as to make it mandatory upon the committees to keep the secretary of the association informed at all times of the progress of their work.

After some discussion Mr. Adams moved that, in order to keep the executive committee in touch with the work of the standing committees, the chairman of each standing committee should be instructed to submit reports of progress to the executive committee on Feb. 1, April 1, June 1, July 1, July 15 and Aug. 1, and that the chairman of each committee should also transmit to the secretary of the association copies of all important letters relating to committee work. The secretary is also to be advised in advance as to the date and place of all committee meetings, and after any committee meeting is held the chairman is to transmit to the secretary of the association a brief outline of the work done at the meeting. The secretary is to forward copies of these progress reports to each member of the executive committee. This motion was carried.

Mr. Voynow raised the question of the best method of keeping the associate members acquainted with the progress and scope of the committee work. On motion it was decided to send to all associate members copies of all data sheets and other circular matter relating to committee work, the same as is now being done in the case of member companies.

In order to facilitate the printing of the reports of the committees prior to the convention the secretary was instructed to communicate with the chairman of each standing committee and make suggestions for improving the quality of the engravings included in the reports and reducing the labor and expense of preparing the copy for the printer.

Mr. Ackerman moved that the secretary be instructed to prepare a circular letter to be sent to all associate members advising them of the membership of the standing committees and the subjects selected for consideration this year, and inviting all associate members to co-operate with the committees in contributing information on the subjects under discussion. The motion was carried.

Mr. Adams moved that the date on which committee reports should be in the hands of the secretary of the association be advanced from Aug. 1 to July 15. The motion was carried, as was also a motion to the effect that advance copies of all committee reports should be issued to members 30 days prior to the convention.

In order to bring about a closer knowledge of the work which is being done by the Master Car Builders' Association the secretary was instructed to apply for membership in that association, the expense to be borne by the Engineering Association.

The secretary then read a letter from W. H. Evans, Indiana Union Traction Company, suggesting closer co-operation between the standardization committee of the Central Electric Railway Association and the committees of the Engineering Association. A motion was made that the secretary of the Engineering Association send a copy of the circular letter which is to be prepared for the information of the associate members to the secretaries of all the local electric railway associations, with an invitation to each of these associations to offer any suggestions concerning the scope of the work of the Engineering Association. The motion was carried.

The committee then took up seriatim the different standing and special committees and drew up a series of topics for these committees to discuss during the coming year. Under the rules of the association these topics are suggested only and the committees have authority to omit the discussion of any of them if, for any reason, they should find that it could not properly or fully be considered during the year.

COMMITTEE ON BUILDINGS AND STRUCTURES

The following topics were selected for the consideration of the committee on buildings and structures. The first was recommended for treatment this year in the report of the committee last year; the second was assigned last year and not treated in the report, and the third is a new topic:

Proper facilities for employees, especially in car terminals.

Economical maintenance of car houses and other structures, including their painting, inspection, etc.

Fire protection of car houses and terminals, including open yards. This assignment will include a discussion of the proper method of installing fire protection systems and the best way of maintaining them.

COMMITTEE ON EQUIPMENT

Four topics were selected for the committee on equipment. The first was taken up at the suggestion of a member company in New England. The second was proposed by Mr. Adams. The third was suggested by Secretary Donecker in accordance with a request from Secretary Neereamer, of the Central Electric Railway Association, and the fourth by Mr. Kelsay, who said that the interurban railway companies of the Central West were very anxious to have that matter settled, in connection

with the subject of standard couplers considered in the third topic. The assignments follow:

Methods of heating cars.

Design of car body and trucks with a view of reducing their weight without sacrificing their strength, the reduction in weight of motors and equipment by changes in design, and a unit basis for the comparison of weights of rolling stock.

The report of the Central Electric Railway Association on standard car couplers recently adopted. (See Electric Railway Journal for Sept. 10, 1910, page 403.)

Standard air, signal and control connections for interurban cars.

COMMITTEE ON POWER GENERATION

Four subjects were assigned for consideration this year by the committee on power generation as follows:

Purchase of bituminous and anthracite coal on the b.t.u. basis. The secretary was asked to instruct the chairman of the committee to secure the co-operation of purchasing agents affiliated with the Engineering Association in the discussion of this subject.

Investigation of the economical increase of boiler capacity for service and peak conditions.

Boiler settings.

Direct-current turbo-generators of greater capacity than 500 kw.

COMMITTEE ON POWER DISTRIBUTION

Four subjects were referred to the committee on power distribution, as follows:

Specifications for high-tension, three-conductor cables and for low-tension, single-conductor cables. This subject was considered by the committee last year and a set of specifications was presented in its report, but the specifications were not recommended for adoption as standard. At the request of the committee this subject was referred back to it.

Other sizes of grooved trolley wire than No. 0000. In previous reports the committee on power distribution has considered grooved trolley wire of the No. 0000 size.

The protection of crossings of overhead electric transmission lines with other classes of aerial conductors and of crossings of overhead electric transmission lines with steam railroads.

Concrete poles.

COMMITTEE ON WAY MATTERS

Four subjects were referred to the committee on way matters, as follows:

Further investigation of girder-rail sections, with a view to recommending standards.

Rail joints. This subject was continued from last year.

Economical maintenance, in connection with (1) proper shop facilities for the way department and (2) standard rules for the government of employees in the way department.

Clearances between street surface and the rolling equipment.

COMMITTEE ON STANDARDS

The work of the committee on standards was next considered. The secretary was instructed to prepare a memorandum of the subjects referred to the committee on standards by the standing committees reporting at the last convention. Mr. Litchfield called attention to the indiscriminate use of the terms standards and standard practice in the recommendations of several of the committees. He also called special attention to the apparent conflict in the recommendations contained in the report of the committee on standards this year regarding the adoption of the T-rail and girder-rail sections as standard or recommended practice. Mr. Ackerman called attention to the fact that the committee on way matters had recommended that the T-rail sections be adopted as standard, and that the girder-rail sections proposed two years ago be adopted as recommended practice. The committee on standards had recommended that the sections for both T-rail and girder-rail be adopted as recommended practice. He raised the question as to the authority of the committee on standards to change the recommendations of the standing committees in such a manner. He also explained that the committee on way matters this year decided to withdraw its recommendations regarding the adoption of girder-rail sections as recommended practice. On motion, the secretary was instructed to incorporate in the letter ballot the recommendations for the adoption of the T-rail sections as recommended practice and to omit from the letter ballot all reference to the girder-rail sections.

A long discussion then took place as to the powers which should be conferred on the committee on standards, and the methods which should be employed by the association in the adoption of any standards or recommended practices. As the executive committee was unable to agree on some of the plans proposed the president was authorized to appoint a committee of three members to formulate rules for the guidance of the standardization committee similar to the instructions which have have been formulated for the guidance of the standing committees.

COMMITTEE ON HEAVY ELECTRIC TRACTION

It was decided to retain the committee on heavy electric traction to consist of five members, but the committee will be advanced this year from a special committee to a standing committee of the association. The committee will be instructed to consider the subject of general maintenance of heavy electric equipment which was assigned to it last year, but not reported on, and it was left to the discretion of the committee to take up any other subjects which it considered would be of value and interest.

JOINT COMMITTEE ON ACCOUNTING

The secretary read a letter from W. H. Forse, Jr., president of the Accountants' Association, recommending the continuance of the joint committee on shop accounting. Mr. Forse also recommended that each association increase its committee membership from three to five, and that P. S. Young be retained as chairman. The suggestion of Mr. Forse that the committee membership be increased to five members from each association, and that Mr. Young be continued as chairman, was approved. The selection of the subjects for consideration during the coming year was left to the discretion of the committee, with a recommendation that the committee give special attention to the points brought out in the discussion of this year's report, and that the subject of subdivision of operating and expense accounts of the "way and structures department" also be considered. On motion it was decided to suggest to the Accountants' Association that the name of this committee be changed to "Joint Committee on Subdivision of Operating Expense Accounts," so as to include all branches of engineering work. The president was instructed to keep in mind in appointing the members of this committee that it was desirable to have the membership represent all branches of the engineering department.

MISCELLANEOUS BUSINESS

The secretary read a letter from Edgar Marburg, secretary of the American Society for Testing Materials, extending a cordial invitation to the Engineering Association to appoint a conference committee which would take up with the executive committee of the Society for Testing Materials any questions of common interest. There was some discussion on the representation which the Engineering Association should have on the committees of the American Society for Testing Materials, and the president was instructed to appoint a conference committee of five members, including the president and secretary of the Engineering Association. This committee will canvass the entire situation with the executive committee of the American Society for Testing Materials and make recommendations for representation in that society at a later meeting.

It was moved and seconded that the American Association be requested to appropriate the sum of $2,700 for the expense of the committees and salary of the secretary of the Engineering Association for 1911. The motion was carried.

The advisability of continuing the "Question Box" was raised, and the secretary was instructed to send out a circular letter to all associate members requesting their opinions as to the value of the "Question Box," and making it clear that if at any time a member desires information on any engineering subject the

secretary of the Engineering Association will be glad to institute a search for the information desired and if necessary send out a data sheet to all members of the association.

The secretary read a letter from W. H. Evans, Indiana Union Traction Company, referring to the resolution proposed by him, and adopted at the Denver convention, authorizing the appointment of a committee to consider the subject of electric railway apprenticeship instruction. The president was authorized to appoint a special committee of three members to consider this subject during the coming year.

The secretary then read a letter from the electrical committee of the National Fire Underwriters' Association stating that a meeting of this committee would be held in New York some time during March, at which time the present code of rules for electrical wiring would be brought up for revision. The secretary was instructed to make an announcement of this meeting to all associate members through a circular letter requesting them to co-operate by sending in any suggestions with regard to advisable changes in the electrical code. The president was authorized to appoint a committee of three members to represent the Engineering Association at the meeting in March.

President Harvie explained at length the proposed plan of reorganization of the committee on associate membership. He was empowered to appoint a committee to represent the Engineering Association which will work in connection with the main committee of the American Association. The meeting then adjourned.

HEARING ON BROOKLYN RAPID TRANSIT TRANSFER SYSTEM

The New York Public Service Commission for the First District resumed on Nov. 3 the hearing of the complaint against the amended transfer regulations adopted by the Brooklyn Rapid Transit System. Commissioner McCarroll presided.

Various residents of Brooklyn were introduced to testify as to the increased fares for certain rides affected by the new regulations. John J. A. Rogers, the complainant, asked the witnesses questions regarding the character and apparent occupation of passengers affected. Commissioner McCarroll held that the millionaire and the workingman were not unequally concerned, and that the rules of the company ought to give a square deal to everybody. He also held that the judgment of passengers in a certain locality that a transfer system was unjust, without a statement of the grounds upon which they formed that opinion, added nothing to the information of the commission. The commission, in order to determine the question presented, sought information as to the unreasonableness, the inconvenience and the unlawfulness of the arrangement.

C. D. Meneely, secretary and treasurer of the companies in the system, was recalled for further examination. He testified that some changes were to be made in tickets, mostly in the correction of errors. The two principles embodied in the new transfer system are: (1) The restriction of the transfer between lines of separately operated companies to a transfer only for a cash fare at existing transfer points, and (2) between the lines of the same company (excluding the 10-cent routes to Flushing and North Beach), the retention of the previous plan of three rides for a single fare, including additional privileges to and from feeder lines, except that the route taken shall be in the same general direction. In the adoption of these principles there were necessarily a few errors and some omissions. In addition the arbitrary application of these principles had caused greater hardships in some localities than in others. Without surrendering principles the company had stood ready from the start to do everything it could to make the system as convenient as possible for the public.

Reciprocal arrangements had been made between various companies of the system under which the first company retained the fare in cases where transfers were exchanged between the two properties.

The transfer system was based upon the construction of the words "general direction" and "reverse direction" in the Kelly case. A reference to this case was published in the ELECTRIC RAILWAY JOURNAL of Sept. 24, 1910, page 483.

In answer to an inquiry Mr. Meneely said that the adoption of a general system of transfers had the effect of increasing largely the traffic on paper. He did not know what the receipts would have been if no transfer system had existed. The transfer system was of large benefit to the people in the suburbs and throughout the city at the expense of the companies.

The hearing was adjourned to Nov. 10, when a further adjournment was taken until Nov. 15.

VIEWS OF NEWLY ELECTED GOVERNORS ON PUBLIC SERVICE COMMISSIONS

A report was published immediately after the election in New York State on Nov. 8, 1910, that the Democrats would take advantage of their victory at the polls to amend the public service commissions law so as to take away from the Governor his jurisdiction over the work of the Public Service Commission of the First District, which includes all of Greater New York, and vest the power to make appointments to the commission in the Mayor of New York. On Nov. 12, 1910, Governor-elect Dix, in an interview published in the *New York Times,* discredited the report regarding the plan to change the law. He is quoted as follows:

"I do not see that any good can be attained, but, on the other hand, I do believe that harm might be worked by any such step. Supervision and regulation of public-service corporations has been adopted as a State policy, and the regulation should remain with the State. If New York City had a commission appointed by the Mayor Buffalo might come forward with a similar request and so on ad infinitum. The Public Service Commission Law is a fixture. I think the commissioners have performed a useful service as between the people and the public-service corporations. I believe they have a definite and distinct mission to perform. If nothing else, they have acted as a safety valve. I do not believe even the heads of the public-service corporations would like to see them abolished. What I have objected to, what I do object to still, is the appointment of inexperienced men on these important commissions. Just think of one having no practical experience on railroads telling men who have been trained from early manhood in the transportation business how to run a railroad. It is ridiculous, and I do not believe that regulation should be carried to the extent of telling companies what colors to paint their cars."

Mayor Gaynor, of New York, subsequently announced that he would not favor a bill proposing to change the appointing power of the Public Service Commissioners for the First District from the Governor to the Mayor of New York City. Mayor Gaynor said:

"My attitude as to the proposed new charter has not been affected by the Democratic victory, and I will not take advantage of victory. I do not intend to revise the charter for partisan purposes or along partisan lines."

John K. Tener, who was elected Governor of Pennsylvania on the Republican ticket at the election in that State on Nov. 8, 1910, expressed himself as follows at Norristown on Nov. 4, 1910, in regard to enlarging the powers of the Railroad Commission of Pennsylvania:

"I believe in a reorganization of our Railroad Commission, not so much in the reorganization of the commission as in the passage of legislation that would enlarge the powers of that commission, whether it be called a railway commission or a public-service commission, so that that commission might be clothed with enlarged powers for the purpose of taking over the control and direction of some of our public-service companies, that the public might enjoy to the full all the conveniences which those public-service companies should provide and which it was intended they should provide when their charters were granted."

TOLEDO TRACTION SITUATION

Brand Whitlock, Mayor of Toledo, Ohio, notified the Toledo Railways & Light Company on Nov. 9, 1910, that 18 franchises on streets reaching the business section of the city had expired on that date. In this letter the Mayor said:

"I have to notify you that the rights heretofore vested in or acquired by your company under ordinances of this city to use the streets hereinafter named for the operation thereon of street cars expire to-day, and that from and after this date the use of the streets by your company for the operation of street cars will be a trespass."

The Mayor said that the letter was addressed to the company to protect the rights of the city if the matter ever came before the courts. The operation of cars on the streets could not be suspended. The public right is paramount to all other rights, and the administration will permit the company to operate until a tentative arrangement has been made for the use of the streets.

Albion E. Lang, president of the Toledo Railways & Light Company, made the following statement on Nov. 11, 1910, regarding the letter from Mr. Whitlock:

"I do not consider the letter of the Mayor as an act of hostility at all. Mayor Whitlock, as well as the city solicitor and Chairman Merrell, of the committee on railroads and telegraph, are dealing with the franchise matter with tact and wisdom and on the broad plane of sound business policy.

"I well remember the conditions in this city 25 years ago last Wednesday when the City Council passed the ordinance covered by the streets mentioned in the Mayor's letter. By that act the city conferred a great benefit upon all of the patrons of the street cars as well as promoting the welfare of Toledo, for the subject of transportation is one in which every citizen is vitally interested.

"By that franchise ordinance passed 25 years ago the length of the ride on the street cars for a 5-cent fare was increased from 3 miles to approximately 10 miles by transfer. While the patrons of the street cars were thus enabled to ride over three times as far as formerly, they were not compelled to pay any increased fare.

"By extensions since made to the original lines passengers are now enabled to enjoy by transfer a 12-mile ride at the same rate of fare as formerly charged. Since the days 25 years ago passengers are enabled to ride in cars which in comparison with the old-style street cars are models for comfort and are equipped to carry the passengers much more comfortably and much more quickly than 25 years ago.

"Has not all this contributed very materially to the city's welfare, for whatever assists the individual in his enjoyment of privileges certainly enhances the prosperity of the community as a whole?

"During all the period of the franchise passed a quarter of a century ago the company has sold tickets at a rate of fare less than that which it had a right to charge under the terms of the ordinance. Can it be said, therefore, that corporations have no souls?"

John B. Merrill, chairman of the railways committee of the Council, has stated that nothing had been done to fix the value of the physical properties of the company, but that it would not be a difficult matter to fix a fair value on the whole plant.

In the Electric Railway Journal of Nov. 12, 1910, page 990, the letter was published which Ford, Bacon & Davis addressed to Albion E. Lang, president of the company, with their inventory of the property of the company. The inventory includes the following general particulars regarding the property:

Single, double and non-revenue producing track owned and operated by the company within the city limits aggregates 598,816 ft., or about 113.41 miles. Of this, 8402 ft. is devoted to loop and storage or non-revenue producing purposes. In the car houses and yards at Central Avenue, Dorr Street, Starr Avenue, Superior Street and the interurban station are 21,122 ft. of track. A new interurban station is shown on the maps of the engineers, indicating that the company is not satisfied with the one now in use.

In order to reproduce existing tracks in the paved streets the report shows that 291,046 ft., or 127,792 sq. yd., of pavement would have to be torn out and replaced.

Four plants produce current and heat. The Water Street plant is 350 ft. x 243 ft. ground dimensions, has a boiler capacity of 14,720 hp and a generator capacity of 18,840 kw. The Detroit Avenue plant is 200 ft. x 425 ft. in dimensions and has a capacity of 5000 kw. Two smaller plants are located on Floyd Street and Twenty-second Street.

The underground conduit system occupies 56,538 ft. of streets and carries 625,662 duct-ft. There are 266 manholes leading to the system.

The company has 176 cars in use on the system, of which 140 are of the double-truck, single-end type and the remainder double-truck, double-end cars. The schedule includes 40 vehicles and 33 horses. About 30 pieces of real estate are owned by the company, some of it being accumulations from the days when horse cars were operated. Some of the old horse barns have been rebuilt as flat buildings.

STRIKING PUBLICITY IN CHICAGO

On Nov. 16 the Chicago City Railway published as an advertisement in the Chicago papers a page announcement entitled "The Three-Legged Stool of Local Transportation: A Study in Street Railway Operation." The company took as its text the happy simile used by the Pennsylvania State Railroad Commission in a recent report when it likened electric railway congestion problems to a three-legged stool. In this problem three factors are necessary for success—the company, the public and the municipality. Each must do its duty or any attempt at reform will fail.

The company states in its announcement that it has as a business partner the City of Chicago, and therefore the Chicago public, so that it solicits the co-operation of both without apology, that it proposes to discuss partnership business and addresses business partners.

The announcement continues that Leg No. 1 of the three-legged stool in Chicago is the company, whose duty it is to co-ordinate the various lines under its control, and to regulate the traffic so as to accommodate the greatest number of people without violating contractual obligations running to communities in sparsely settled territory. A sketch is then given of some of the situations which the company must meet, especially in regard to the evening rush-hour business. In this connection the notice says: "Adequate street car service in Chicago cannot be obtained and maintained without the aid of a highly organized system. This system, moreover, must be constructed along scientific lines and must be controlled by general as against local needs of the city considered as a whole. Traction troubles in the past have been due to lack of system and co-ordination rather than to the failure of it. The more delicate the machinery of transportation becomes and the more highly organized the system of car distribution the more serious become obstructions to traffic. A pebble will soon do as much damage as was done by a boulder a few years ago." A sketch is also given of the improvements made in the rolling stock of the company, and some of the duties which the company has to fulfil to the public and municipality.

The public is referred to as Leg. No. 2 of the triangular support. Some of the duties of the public are given as follows: "Prompt compliance with the reasonable rules of the railway company and with city ordinances as they relate to personal conduct and the regulation of traffic is an indispensable requisite to efficient railroading. Patrons who assist the company in enforcing the anti-spitting ordinance perform a valuable public service. Overcrowding of cars results not only in traffic delays, but in increased liability to accidents. Overcrowding is made a misdemeanor in some cities and is particularly unwarranted when done by persons who can conveniently take the next car. In the interest of good service, the public can greatly facilitate the movement of traffic by not attempting to board overcrowded cars.

"It is the duty of drivers of all vehicles to give street cars the right of way at all times. Vehicle obstruction is one of the chief causes of irregular service and broken schedules. These obstructions are cumulative in their effect and a momentary delay caused by each of 50 vehicles results in a large aggregate loss of time and makes regular service impossible."

The third leg is the municipality, which in its legislative and executive capacity exerts a powerful influence upon street railway transportation. The announcement says that: "As representatives of all the people it becomes the duty of city officials to consider street railway problems as affecting, first, the entire city, and, second, particular territories whence come demands for changes in transportation which may involve the whole system. Manifestly it is the duty of the constituted municipal authorities to consider all special interests in connection with the general welfare and to enact such legislation as may be necessary to simplify routes and to expedite the operation of cars.

"In the regulation of street traffic the municipality is rendering invaluable aid to street railway service through the activities of the mounted police squad and crossing officers in the downtown district. The police are in constant communication with trainmen, and their influence upon traffic is incalculable.

"Through its various departments and bureaus the municipality's dealings with the street railway company cover every phase of its activity. Without its co-operation progressive railroading would be either extremely difficult or impossible."

In conclusion the company expresses its acknowledgment of the assistance of the public and the municipality in the past and bespeaks even greater awards as the result of still greater intelligent co-operation in the future.

ADDITIONAL SIGNALS ON ILLINOIS TRACTION SYSTEM

The Illinois Traction System at present is receiving bids for 100 track-circuit control, automatic block signals similar to those used by steam trunk lines, and also has just closed a contract with the Baird Electric Company, Chicago, for dispatchers' signals to cover 100 miles of track. The devices of the Baird Electric Company have been described in these columns. The Illinois Traction System installation of these dispatchers' signals will include 51 sidings on single-track lines connecting Peoria, Mackinaw Junction and Bloomington, and Mackinaw Junction, Lincoln and Springfield. The dispatchers' signal indications will be given by semaphore blades in the day time and lamps at night. The system provides an answer-back and record in the dispatcher's office for the movement of each signal.

With the Baird system the dispatcher can at one time set or clear one or as many of the semaphores as he desires. The control for the dispatchers' signals will be superimposed on one of the telephone circuits, and the operation of the signals will not interfere with the use of the telephone. No additional line wires will be required. Duplicate control boards will be provided in the dispatcher's office at Mackinaw Junction. Special care has been taken in the design of this layout to provide against false indications either from mechanical reasons or from stray currents. It is interesting to note that with the addition of selectors for setting dispatchers' signals over the telephone wire the telephone service itself is said to be improved, and also the operation of the signals and the attachment of the selectors will not interfere in any way with the use of the telephone between those parts of the road which are equipped with signals and other parts not so equipped.

The Pacific Electric Railway, the Indianapolis, Columbus & Southern Traction Company and the Louisville Railway also are said to be considering the purchase of block signals.

H. C. Eddy, secretary of the District Electric Railway Commission, Washington, D. C., has reported to the commission the result of the study which he made of the exhibits at the recent convention of the American Street & Interurban Railway Association at Atlantic City.

RIGHT OF CITY COUNCIL TO ORDER EXTENSIONS

A decision has been rendered by the Railroad Commission of Wisconsin on a case in which an order was sought to require the Merrill Railway & Light Company to extend a street railway line. The commission held that it was without jurisdiction and it dismissed the petition.

It was shown in the hearing that the Common Council had requested by ordinance that the company extend its lines as desired. The decision of the commission says in part:

"The relation existing between the company and the municipality is contractual, and while the terms and the conditions of the franchise may not be beyond the power of amendment or repeal vested in the Legislature, they are, nevertheless, binding upon the parties until altered by express legislative provision. It is incontrovertible that the authority granted to the company to extend its lines or to construct additional lines is permissive merely, if its duty in the premises is to be determined by the language of the ordinances mentioned. The only imperative obligation resting on the company, by virtue of the franchise, as to lines upon which service shall be rendered, seems to be that of maintaining and operating the existing lines and any extension thereof or additions thereto that may hereafter be voluntarily constructed by the company. Nor is there anything in the act under which the company was organized, or in its articles of incorporation, requiring it to extend its line to subserve the public convenience. In this respect it stands in the same position as steam railroads chartered under the general railroad act.

"It seems to be established by the weight of authority that in the absence of any statutory or charter provision requiring a railroad company to construct and operate its line or any portion thereof, such a duty cannot be implied from the common-law obligations resting upon the company in respect to its public service. It is only when the property has been brought into being and operations commenced that the right of the public in the use of the property attaches and may be enforced, and as long as the property is devoted to a public service such right continues, and in certain instances its withdrawal from the service without the consent of the public is denied by statute.

"Unless there is some provision in the Railroad Commission act altering the situation, a railroad company cannot be compelled to extend its lines in order to serve a new territory in the absence of any contractual obligation to make such extension. The material inquiry then relates to the purposes and scope of such act. The contention is urged by counsel for petitioner that section 1797—3, which provides that every railroad shall 'furnish reasonably adequate service and facilities,' in effect imposes upon the railroad the duty of extending its lines whenever public convenience and necessity require it. Railroad facilities are the means by which the road renders its service. However, the duty of furnishing reasonably adequate facilities has not been left by the statute in every instance to the general terms employed in section 1797—3, which is merely declaratory of the common law.

"Furthermore, the act was designed to regulate railroads operating within the State in the same general manner that the Interstate Commerce Act regulates interstate carriers and traffic, and much of the phraseology of the former was taken from the latter. The general purpose of the two acts, as far as they are identical in subject matter, is the same. They were both enacted to remedy certain evils which were common in both interstate and intrastate transportation. It is very clear from the authorities that the Federal act created no such obligation as is here asserted.

"It may be that the authority contended for by the petitioner should exist in case of street railways, which in cities of the size of Merrill have a natural monopoly. More than one street railway system in such a city is impossible. Therefore the necessities of such a community as a whole should be taken into consideration in developing the street railway system. If public convenience and necessity demand the extension of a line or lines of street railway to serve a section

of the city whose population is sufficient to warrant the required investment, the company should meet the exigencies. The Public Utilities Law has vested in common councils the power to compel extensions and additions to public utility plants when necessary to serve the public requirements. The common council is the proper body to which such authority should be given, if possible, over all public utilities, including street railways. It has control of the streets and is best situated, in the first instance, to determine what extensions and additions are required and where they should be made. Such authority, however, has not yet been conferred by the Legislature upon common councils or this commission in respect to street railways, and hence we are without jurisdiction of the subject matter of the petition."

REORGANIZATION OF THE THIRD AVENUE ROAD

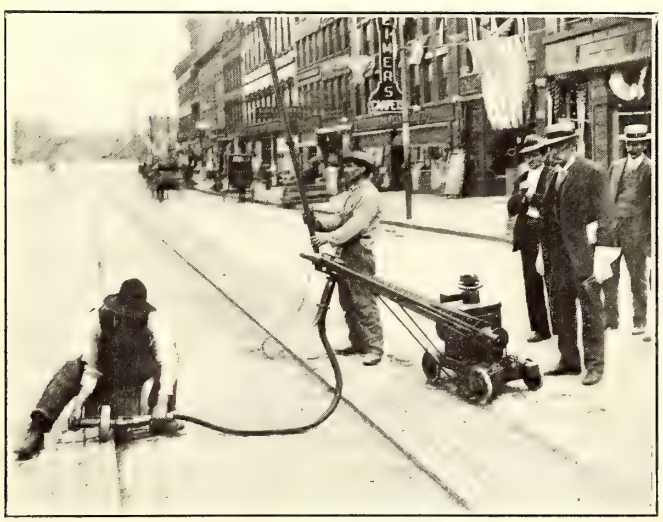
The rehearing on the reorganization plan of the Third Avenue Railroad System, New York, has been closed formally by the New York Public Service Commission, First District. Several hearings have been held and various points have been raised, presumably with the idea that the entire case will be taken into the courts.

Herbert J. Bickford, of counsel, made a formal request for a reconsideration by the commission of all the facts and conclusions and that the commission abrogate, modify or change the order so as to grant the relief requested by the petition of the committee of bondholders and the Third Avenue Railway.

No announcement has been made as to the date when the commission will render its final decision.

JOINT AND SPECIAL WORK GRINDING IN SYRACUSE

The accompanying illustration shows a grinding outfit which is being used with good results by the Syracuse Rapid Transit Company to smooth down joints and manganese special work. The machine itself is the standard electric grinder of the Stow Manufacturing Company, Binghamton, N. Y., but the arrangement of the flexible shaft is novel. According to E. P. Roundey, engineer maintenance of way for the Syracuse company, the original installation had a 1¼-in. shaft coming straight out from a universal joint at the grinder. The men had to carry a wooden trough to lay the shaft in while grinding to keep it from getting kinked; also the arrangement of the original shaft at the grinding wheel was so rigid that the wheel



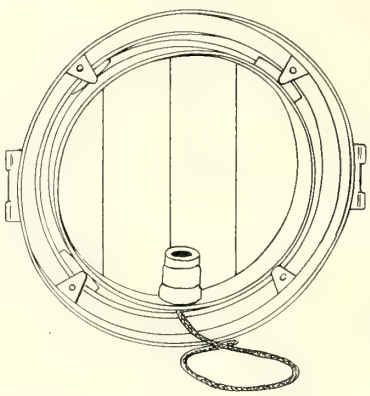
Grinding Machine in Service

when grinding chattered to such an extent that a man could only grind for a short time without resting.

The present shaft is ⅞ in. instead of 1¼ in. and as can be seen from the illustration falls in an easy curve from an arm attached to the motor. The troublesome universal joint at the motor is eliminated, and the connection of the shaft to the grinding wheel is made flexible. Hence, as there is no more trouble from wheel chattering, a man can grind a long time without resting. The present ⅞-in. shaft costs about one-half as much as the original 1¼-in. shaft. The grinding wheel is of Carborundum Aloxite, 8 in. in diameter, 1½ in. thick and with a 1-in. arbor hole. The wheel is driven at 1700 r.p.m.

ASSEMBLING GLASS IN HEADLIGHT DOORS

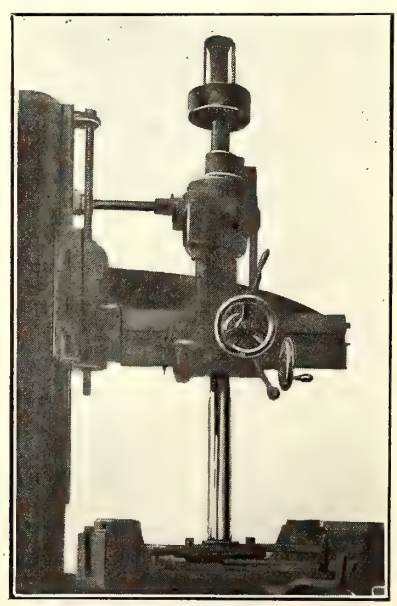
When the door of the headlight is bent or out of shape, it is quite difficult to adjust the several pieces of glass into place. The glass is sent from the factory cut circular in four pieces. It is a long and tedious job to put the gasket around the glass and place it into the frame straight. To avoid this, cut a pasteboard templet the exact shape of the frame which is to receive the glass. Lay the pasteboard templet under the glass and cut around it with a glass cutter. Tap the glass where the marks have been made with the end of the glass cutter. Break the glass away to leave a piece the same shape as the templet. Divide the glass into four equal parts and cut straight parallel lines, by the aid of a straight-edge. When this has been done, take a rubber gasket and place it around the edge of the glass, first having put a little shellac on the ends of the gasket, to hold it together. Put the glass into the frame of the headlight door and fasten securely with the four little clamps, as shown in the cut. Tap the glass where the four parallel lines have been cut, so the glass will break at these places, thus allowing room for expansion when the glass becomes hot.



Assembling Headlight Door Glass

USING A DRILL FOR A BORING MILL

There are many small electric railway shops which find it necessary to adapt one tool for several uses as there is not work enough to warrant the purchase of special devices. An interesting example of this kind is afforded by the accompanying illustration showing a W. E. Gang radial drill which is used by the Charleston (S. C.) Consolidated Railway, Gas & Electric Company, and is frequently employed as a boring mill. The regular drill slot suffices for holding the 1½-in. borer used for this company's ferryboat repair work, but the full length of the spindle is required for the wheel borer. No change is required in the bed of the machine in either case. The wheel borer was made out of an old car axle and the tool set in with a wedge. From 15 to 20 minutes is required to bore a wheel to remove ¼ in. of metal. The illustration and particulars were furnished by F. H. Harris, master mechanic, Charleston (S. C.) Consolidated Railway & Lighting Company.



Radial Drill Used as Borer

News of Electric Railways

Program of Central Electric Railway Association

The following program has been announced for the meeting of the Central Electric Railway Association which is to be held at the Phillips House, Dayton, Ohio, on Dec. 1, 1910:

MORNING SESSION, 9:30 A. M.

Business session and reports of special committees.

Last reading of and final action on "Revised Constitution and By-laws."

Paper, "Recent Developments in Car Heating," by H. S. Williams, of the Peter Smith Heater Company, Detroit, Mich.

Discussion.

Paper, "Traffic," by W. O. Woodard, traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.

Discussion.

Adjournment for lunch.

AFTERNOON SESSION

Paper, "Gears and Pinions," by T. W. Williams, of the General Electric Company, Schenectady, N. Y.

Discussion.

Paper, "Wood Preservation," by A. L. Kuehn, general superintendent of the American Creosoting Company, Chicago, Ill.

Discussion.

The executive committee of the association will meet at 7:30 p. m. on Nov. 30, 1910.

Quarterly Meeting of New York State Association

The twelfth quarterly meeting of the Street Railway Association of the State of New York will be held at the Hotel Onondaga at Syracuse, N. Y., on the evening of Dec. 6 and on Dec. 7, 1910. The session on the evening of Dec. 6, 1910, will be opened with an informal dinner at 8 o'clock at the Hotel Onondaga, after which the remainder of the evening will be given to a general discussion of one of the subjects on the program. There will be morning and afternoon sessions on Dec. 7, 1910, at the Hotel Onondaga, at which the following program will be carried out:

PROGRAM OF MEETING

Committee appointed to confer with the Public Service Commission relative to the meaning of the word "center-bearing" as it appears in the Railroad Law—W. H. Collins, chairman; M. J. French, B. E. Tilton.

Committee on Traffic and Tariff—J. M. Campbell, chairman; H. C. Allen, C. H. Armatage, R. M. Colt, C. R. Gowen, John W. Nugent, B. E. Wilson.

Committee on Standard Franchises—C. Loomis Allen, chairman; Edgar S. Fassett, E. F. Peck.

Committee on New Schedule of Annual Dues—H. M. Beardsley.

The next order of business will be a discussion of the results secured at the annual meeting of the American Electric Railway Association, held at Atlantic City last October, as follows:

"Shop Accounting and a System for Handling Scrap Materials." Discussion to be opened by J. C. Collins, secretary and auditor of the New York State Railways, followed by J. M. Joel, auditor of the Utica & Mohawk Valley Railroad, and F. E. Belleville, auditor of the Schenectady Railway.

Paper, "Training of Transportation Employees," by W. H. Collins, general manager of the Fonda, Johnstown & Gloversville Railroad. Discussion led by J. E. Duffy, superintendent of transportation of the Syracuse Rapid Transit Railway, and R. H. Smith, general manager of the Albany & Southern Railroad.

Paper, "Maintenance of Way and Equipment," by H. A. Benedict, mechanical engineer of the United Traction Company. Discussion led by Martin Schreiber, engineer of maintenance of way of the Public Service Railway, Newark, N. J.; M. J. French, engineer of maintenance of way of the Utica & Mohawk Valley Railway, and W. J. Harvie, chief engineer of the Utica & Mohawk Valley Railway.

Arrangements have been made with the Hotel Onondaga for accommodations for those who apply directly to the hotel management prior to the date of the meeting.

A cordial invitation is extended to all to attend and participate in the open discussions on the papers and questions presented.

Subway Grants in Cleveland

At the election in Cleveland on Nov. 8, 1910, franchises were approved which grant to the Cleveland Underground Rapid Transit Railroad permission to proceed with the construction of high and low-level subways in Cleveland. The franchises were originally passed under the Johnson administration. They were opposed by many because they contained few of the safeguards which are contained in the grant made to the Cleveland Railway.

Ordinance No. 1647a, known as the high-level grant, provides for subways from the Public Square to the city limits under Superior, Euclid and Woodland Avenues on the East Side and under Detroit and Lorain Avenues and West Twenty-fifth Street on the West Side, with certain cross-town lines and connections. Another short line is provided for in the grant to reach the flats along the Cuyahoga Valley.

The low-level subways are intended to care for the interurban and suburban business of the steam railroads and the electric railways. One line will extend from the Public Square under Superior Avenue to East Ninth Street and under the latter to the private right-of-way of the Nickel Plate Railroad at the Broadway depot. Another line will leave Euclid Avenue at Fourth Street, pass under the Central Market grounds and continue in a southerly direction to a connection with the tracks on the right-of-way of the New York, Chicago & St. Louis Railroad, near Twenty-second Street. Another line will begin at the south side of Canal Road, opposite East Ninth Street, as an elevated structure and extend to a subway on East Ninth Street, and continue northerly to the railroad right-of-way north of Summit Avenue N. E. Still another line will begin at East Ninth Street and Summit Avenue and continue under Summit Avenue to East Third Street and south under East Third Street to Superior Avenue N. E., also from East Ninth Street under Rockwell Avenue to the Public Square.

In asking for these grants it was urged that the low-level subways would take care of the interurban and suburban traffic by providing an entrance for the interurban cars to the city over the Nickel Plate tracks and the subway to the Public Square, while the high-level routes would care for traffic within the city.

The franchises for the low-level routes require that the company must begin construction before December, 1912, and must have at least one line, or lines, from the Cuyahoga Valley to the Public Square in operation before December, 1914. All low-level lines must be completed before December, 1917. The franchise for the high-level routes provides that the company must begin construction before June, 1912, and that one line must be in operation from the Public Square to the city limits before December, 1914. At least 5 miles more of double track must be completed before December, 1917, and five additional miles must be completed every two years until all the lines are in operation.

The grant is for 75 years, with the privilege of purchase sooner by the city at a price fixed by the franchise. At the end of 75 years the upper subways will pass to the city without cost.

The first grant made to the company was submitted to the voters a year ago, but the result is still in doubt, as the election board was restrained from counting the blank ballots, which the representatives of the company insisted were votes. New franchises were passed by the Council and signed by Vice-Mayor Lapp. After the grants had been advertised once the city was restrained from proceeding further. W. R. Hopkins, for the company, claimed that in the case of a special ordinance advertisements were not necessary and that the contract between the company and

the city had been closed, as the company had accepted the ordinances. Under the new administration the City Council passed a repealing ordinance, but it was claimed the repeal was not legal. The referendum petitions were then circulated. David Evans then brought suit to restrain the board of elections from placing the question of approving the ordinances on the ballot. This case was carried to the Supreme Court, but was not decided. The board therefore had the right to submit the grants to a vote.

Transit Affairs in New York

On Nov. 14, 1910, the Public Service Commission received from Alfred Craven, its chief engineer, the report on the examination of the bids on the Broadway-Lexington Avenue, the Canal Street crosstown, and the Broadway-Lafayette Avenue (Williamsburg) subway, which Mr. Craven made to detect any unbalancing of the bids. Chairman Willcox of the commission would not say when the commission would send the bids to the Board of Estimate. The members of the Board of Estimate are said to be divided in regard to the tri-borough plan. Unless the members who have made public their preferences change their attitude it is possible that Borough President McAneny, whose attitude is unknown, will cast the deciding vote. Mr. McAneny is quoted as saying: "I have taken no position in the subway situation either for or against the tri-borough route. Until the Board of Estimate has given its hearings and heard the argument and until time has been taken for careful consideration of every question involved, financial as well as tactical, I prefer to reserve my own judgment."

The agreement between the Interborough Rapid Transit Company and the Public Service Commission regarding the operation of the Steinway Tunnel was placed before the Board of Estimate and Apportionment of New York on Nov. 11, 1910, but owing to the fact that the commission had not submitted a complete proposition or terms regarding the third tracking of the elevated system, which is a part of the plan of the Interborough Rapid Transit Company, the matter was referred to the transit committee of the board.

The Public Service Commission has adopted a final order directing the Coney Island & Brooklyn Railroad to relay or repair within two years its tracks in Franklin Avenue, Wythe Avenue, Malbone Street, Parkside Avenue and Ocean Avenue, from Park Circle to the termini at South Eighth Street and at the Broadway ferries. The company has 30 days in which to file with the commission a statement of what portions of its tracks it will rebuild within two years.

The Public Service Commission has ordered a hearing to be held Nov. 21, 1910, to determine whether the Brooklyn Union Elevated Railroad, the Nassau Electric Railroad, the Sea Beach Railway and the South Brooklyn Railway shall be ordered to change the ventilating arrangements on some of their cars. The cars used on the Culver, Fifth Avenue, Bay Ridge, Sea Beach and West End lines have "Empire" roofs with small ventilators in the top of the car instead of a monitor with side ventilators.

Expiration of Trial Period in Cleveland

The trial period for the operation of the Cleveland (Ohio) Railway provided in the Tayler franchise ends on Dec. 1, 1910. So far the present fare of 3 cents and 1 cent for a transfer has taken care of the interest on the investment and provided some money for the extension of the service. The idea seems to prevail that no material extensions should be asked by the Council and that re-routing should be left for future consideration. Under this plan the company will be limited to a certain and almost definite sum per year in making repairs and rebuilding track. The company is operating with about the same number of cars that it had when the settlement was reached. Some of these have been rebuilt, however, and provided with pay-within or pay-as-you-enter equipment. On the other hand, J. J. Stanley, president of the Cleveland Railway, states that the coming winter will bring a crisis in the 3-cent fare proposition. He does not believe that the people will remain satisfied with the service which they are getting under the present fare. G. M. Dahl, street railway commissioner, would not confirm the report that the City Council had settled the question of fare as outlined above.

The allowance for repairs and maintenance goes from 6 cents to 4 cents per car mile during the winter months, but the increased cost of operation will probably more than offset this. The cost of heating the cars is about $150 a day.

It is said that the system has been operated on the most limited margin since the settlement was reached. No extensions are being made and no improvements are contemplated. Since March 1, 1910, $850,000 has been borrowed and stock amounting to $376,000 has been sold. This money has gone to care for necessities. No permanent improvements can be made unless a better demand for the stock develops.

The people of Collinwood complain that the cars which reach that section are filled with passengers who do not ride beyond the fare limits and that the people who pay a 5-cent fare are compelled to stand up after waiting sometimes half an hour for a car. It has been suggested that signs should be placed on the Collinwood cars stating that the fare is 5 cents and asking people who ride only within the 3-cent fare limits to take other cars. The trouble occurs mostly during the rush hours in the evening.

Both Mr. Stanley and Mr. Dahl object to the plan to build a line through the flats along the Cuyahoga River. They say that the company has no funds for construction and that the line would not pay. Mr. Stanley has suggested that the connection of the Harvard and Dennison Avenue lines over the new Harvard-Dennison bridge would pay and that such an improvement is needed. The cost of the three miles of track required would be about $150,000, but even this extension cannot be undertaken now on account of lack of funds.

The city health authorites believe that the prepayment cars, which are closed by doors at both ends, are not sufficiently ventilated. Mr. Stanley states that a new ventilating apparatus is being tested and may be adopted.

Meeting of Alabama Light & Traction Association.—The meeting of the Alabama Light & Traction Association, which was originally arranged to be held at Anniston, Ala., on Nov. 21, 22 and 23, 1910, has been postponed until Nov. 28, 29 and 30, 1910, at Anniston. The program for the meeting is now being arranged.

Special Committee to Consider Municipal Ownership in Worcester.—The Aldermen of Worcester, Mass., have passed a resolution to appoint a special committee to consider the advisability of conducting negotiations with the Worcester Consolidated Street Railway for the purchase of the property of the company.

Mill Tax Taken to Supreme Court.—An appeal has been granted in the United States Circuit Court at St. Louis by Judge David P. Dyer on motion of the attorneys for the United Railways, St. Louis, Mo., and the St. Louis Transit Company, which will take the mill tax of the electric railways to the Supreme Court for a second time. An ordinance passed in 1903 levied a tax of one mill on every 5-cent cash fare received by the company. The amount now due the City of St. Louis under the provisions of this tax is said to be nearly $1,500,000.

Meeting of Massachusetts Street Railway Association.—The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, Mass., on the evening of Nov. 9, 1910. President R. S. Goff presided. The dinner was attended by a large number of street railway officials from various properties in Eastern Massachusetts. After the dinner Commodore J. W. Miller, vice-president of the Cape Cod Construction Company, described the construction of the Cape Cod Canal, illustrating his remarks with the stereopticon.

Public Conference to Consider Legislation in Indiana.—The officers of the interurban railways in Indiana are to be asked to confer with Governor Marshall of Indiana and the members of the Railroad Commission of Indiana to consider suggestions regarding recommendations about electric railways which it is proposed to incorporate in the Governor's message to the Legislature. The conference will be public. The special report made by the commission to the Governor on the recent fatal interurban wrecks at Kingsland and Tipton will be considered at the conference.

Financial and Corporate

New York Stock and Money Market

Nov. 16, 1910.

The Wall Street market has practically recovered from the selling epidemic which succeeded the election. Many of those who bought stocks about the first of the month at low figures sold while the high prices prevailed before the election. Others tried to gather their profits the day after the election. As a result there was a sharp break in prices. This flurry over, the market has settled down strong in tone but dull in trading.

The bond market has improved very little, but the money market continues to be sufficiently easy to continue trading. Quotations to-day were: Call, 3@3½ per cent; 90 days, 4½@4¾ per cent.

Other Markets

While transactions in Rapid Transit and Union Traction have been quite liberal—especially in the former—on the Philadelphia Exchange during the past week there have been no material changes in the prices.

In the Chicago market there is less interest in tractions. Small lots of Railways certificates series 2 have been traded in, but the price has remained stationary in the neighborhood of 20. Other tractions have been neglected.

Massachusetts Electric shares are again quite active in the Boston market, stimulated by the excellent earnings reports that have recently been made public. Prices are strong, but have not advanced materially. Boston Elevated is less prominent in the market.

In Baltimore there has been no trading in traction stocks during the past week. The bonds of the United Railways continue to sell actively at unchanged prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 7.	Nov. 15.
American Railways Company	a43	43
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a90	a89½
Boston Elevated Railway	a128	a128½
Boston & Suburban Electric Companies	*14¼	16½
Boston & Suburban Electric Companies (preferred)	*72	72
Boston & Worcester Electric Companies (common)	*10½	*10½
Boston & Worcester Electric Companies (preferred)	*43	*43
Brooklyn Rapid Transit Company	77¾	77¼
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83¼	83¼
Capital Traction Company, Washington	a128½	a128½
Chicago City Railway	*170	*170
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a77	a76
Chicago Railways, ptcptg., ctf. 2	a21	a20½
Chicago Railways, ptcptg., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a5½	a5½
Consolidated Traction of New Jersey	a73½	a74
Cleveland Railway	*91½	*91½
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	a58	a57
General Electric Company	154½	153
Georgia Railway & Electric Company (common)	a121¾	a120
Georgia Railway & Electric Company (preferred)	*89	a89
Interborough-Metropolitan Company (common)	22¼	21
Interborough-Metropolitan Company (preferred)	58¾	57½
Interborough-Metropolitan Company (4½s)	81⅛	80⅜
Kansas City Railway & Light Company (common)	a23½	a23
Kansas City Railway & Light Company (preferred)	a75	a75
Manhattan Railway	a142½	a142
Massachusetts Electric Company (common)	a21	a20½
Massachusetts Electric Companies (preferred)	a86	a87¾
Metropolitan West Side, Chicago (common)	*21	*21
Metropolitan West Side, Chicago (preferred)	*64	*64
Metropolitan Street Railway	*22	*22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*67½	65½
Northwestern Elevated Railroad (common)	a23	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a45¼	a45½
Philadelphia Company, Pittsburg (preferred)	a42	a41½
Philadelphia Rapid Transit Company	a15¾	a16½
Philadelphia Traction Company	*82	*82
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	*109	a107½
Seattle Electric Company (preferred)	*98½	a102½
South Side Elevated Railroad (Chicago)	65	*65
Third Avenue Railroad, New York	13½	12¾
Toledo Railways & Light Company	a8	a10
Twin City Rapid Transit, Minneapolis (common)	a111	a110½
Union Traction Company, Philadelphia	a39½	a39¾
United Rys. & Electric Company, Baltimore	*15⅝	*15⅝
United Rys. Inv. Co. (common)	14¾	*14¾
United Rys. Inv. Co. (preferred)	*60	*60
Washington Ry. & Electric Company (common)	35¾	a36½
Washington Ry. & Electric Company (preferred)	a89⅜	a90
West End Street Railway, Boston (common)	a87	87½
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	73¾	71
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	124

a Asked. * Last sale.

Railway Assessments in Wisconsin

A preliminary assessed valuation of $42,788,000 has been placed on the street railway, light, heat and power utility companies of Wisconsin by the State Tax Commission. This is an increase of $2,318,000 over the preliminary valuations of the past year. The largest increase was made with the Milwaukee Electric Railway & Light Company, from $23,500,000 in 1910 to $24,400,000, an increase of $900,000. The assessments of the various electric railway companies follow:

Milwaukee Electric Railway & Light Company	$24,400,000
Milwaukee Light, Heat & Traction Company	6,950,000
Milwaukee Northern Railway	1,650,000
Wisconsin Traction, Light, Heat & Power Company	1,150,000
Chippewa Valley Railway, Light & Power Company	1,000,000
Duluth Street Railway	875,000
Sheboygan Light, Heat & Traction Company	865,000
Southern Wisconsin Railway	850,000
Eastern Wisconsin Railway & Light Company	775,000
Green Bay Traction	705,000
Wisconsin Electric Railway	650,000
Wausau Street Railroad	500,000
La Crosse City Railway	460,000
Rockford & Interurban Railway	310,000
Kenosha Street Railway	275,000
Menominee & Marinette Light & Traction Company	240,000
Ashland Light, Power & Street Railway Company	285,000
Chicago & Milwaukee Electric	180,000
Merrill Railway & Lighting Company	120,000
Manitowoc & Northern Traction Company	120,000
Grand Rapids Railway	110,000
Beloit Traction Company	110,000
Waupaca Electric Light & Railway	86,000
Janesville Street Railway	37,000
Bay Shore Street Railway	20,000
La Crosse & Onalaska Street Railway	20,000

These preliminary valuations are subject to review and correction after hearing, which will be held before the State Tax Commission.

Annual Report of the New Orleans Railway & Light Company

Earnings of the New Orleans Railway & Light Company for the year ended Dec. 31, 1909, compare with the previous year as follows:

YEAR ENDED DEC. 31		
Operating revenue:	1909	1908
Railroad department	$4,101,545	$4,033,780
Electric department	1,027,898	1,046,776
Gas department	904,881	887,933
Total	$6,034,324	$5,968,498
Operating expenses:		
Railroad department	$2,403,076	$2,468,366
Electric department	525,806	487,517
Gas department	400,019	409,101
Total	$3,328,901	$3,364,984
Net operating revenue	$2,705,423	$2,603,514
Deduct: Operating taxes	481,750	476,727
Operating income	$2,223,673	$2,126,787
Miscellaneous income	8,569	10,497
Gross income	$2,232,242	$2,137,284
Total deductions	$1,571,760	$1,566,790
Interest on funded debt	$1,498,888	$1,451,272
Other interest charges	13,966	68,188
Dividends on New Orleans City R. R. stock, proportion payable to minority holders	4,745	4,746
Amortization of commission on loans	47,222	26,389
Uncollectible accounts and unadjusted claims charged to income	5,448	14,695
Other deductions	1,500	1,500
Total deductions	$1,571,760	$1,566,790
Net income	$660,473	$570,494

Hugh McCloskey, the president, says in part in his statement to shareholders:

"The percentage of passengers using transfers during the year 1909 was 22.6 per cent, and our average fare per passenger was 4.10 cents against 4.19 cents in 1908.

"During the past year the various companies expended in construction, improvements and betterments and for acquisition of new property the sum of $681,382.

"On Nov. 1 the company sold to Bertron, Griscom & Jenks $2,581,000 par value of its 5 per cent 40-year refunding and general lien gold mortgage bonds, the proceeds to be used for improvements and betterments to the properties of the company at 75 per cent of the cost thereof. This discount on these bonds and on the 4½ per cent bonds sold during the year as shown in the balance sheet will be

written off in the customary manner during the period covered by the life of the securities.

"It is gratifying to be able to assure you that the physical property and equipment of the company in every department and branch have been maintained in a good state of repair and efficiency, the generally satisfactory showing for the year not having been made at the expense of the property."

The certificate of Marwick, Mitchell & Co., who examined the accounts, certifies that "subject to proper provision for depreciation of properties and plant" the balance sheet is correctly prepared from the books of the company, and its subsidiaries, and is in their opinion "properly drawn up so as to show the true financial condition of the company as at Dec. 31, 1909."

Traffic statistics in the report compare as follows:

	1909	1908
Revenue passengers carried	78,643,680	77,459,499
Transfers redeemed	17,816,746	15,492,363
Revenue mileage	18,718,605	18,671,256
Eighteen-hour cars	117,072	115,605

Chicago (Ill.) Consolidated Traction Company.—The Harris Trust & Savings Bank, Chicago, Ill., is receiving deposits of the underlying bonds of the Chicago Consolidated Traction Company. The time for the deposit of these securities expires on Nov. 19, 1910, and the properties are to be sold under the decree of the Federal Court on Nov. 30, 1910.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—The Wisconsin Railroad Commission has approved a further issue of $100,000 of first mortgage 5 per cent bonds of 1907 by the Chippewa Valley Railway, Light & Power Company. The proceeds are to be used to complete a concrete dam and power house at Cedar Falls; to acquire additional riparian rights; to pay for additions, including the transmission line from Eau Claire to Chippewa Falls, and to pay the floating debt incurred for additions.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been further postponed by Judge Lacombe of the United States Circuit Court to Jan. 17, 1910, on motion of the Union Trust Company, New York.

Interstate Railways, Philadelphia, Pa.—The directors of the Interstate Railways have decided to call a special meeting of stockholders of the company at Camden, N. J., for Nov. 25, 1910, to vote on a plan to issue $1,000,000 of preferred stock at par. The proceeds of the sale of the stock will be used to liquidate the company's floating indebtedness and to pay overdue interest and the coupons due on the bonds in February.

Los Angeles (Cal.) Railway Corporation.—The Los Angeles Railway Corporation, which succeeded the Los Angeles Railway, and, as noted in the Electric Railway Journal of Nov. 12, 1910, page 1007, has taken over local lines of the Pacific Electric Railway in Los Angeles and will operate them as a part of its system, has secured title to the lines of the Los Angeles Traction Company, including the West Adams, West Jefferson, Boyle Heights and Santa Fe depot lines, which operate downtown via Third Street, the Temple Street line in the northwestern part of the city, the Belt Line, which is made up of the Angeleno Heights and the Crown Hill lines, the Arcade depot and the Brooklyn Heights line on the East Side and the West Sixth Street line beyond Figuera.

Manhattan Elevated Railway, New York, N. Y.—Paul Morton has been elected a director of the Manhattan Elevated Railway to succeed the late Dumont Clark.

Metropolitan Street Railway, New York, N. Y.—The sale of the property of the Metropolitan Street Railway under foreclosure has been postponed until Jan. 5, 1910, on which date the property pledged under the $12,500,000 first mortgage will be sold at noon and the property pledged under the $16,604,000 refunding mortgage will be sold at 2:30 p. m.

Philadelphia (Pa.) Rapid Transit Company.—The committee of directors of the Union Traction Company, consisting of Robert A. Balfour and George W. Elkins, which has been considering the plan for financing the Philadelphia Rapid Transit Company proposed by E. T. Stotesbury, reported to the directors of the Union Traction Company on Nov. 14, 1910, and was instructed to continue its investigation. No official statement was issued in regard to what transpired at the meeting, but the Philadelphia *Public Ledger* quoted J. J. Sullivan, an ex-officio member of the committee, as follows: "The committee's report was accepted. That is all I am at liberty to say at this time." The same paper also quoted J. H. Chestnut, a director of the Union Traction Company, as follows: "The committee is getting along nicely, although it has been delayed somewhat by Mr. Elkins' unavoidable absence from the city of two weeks. The plan as being worked out will undoubtedly find favor when the committee's work is completed." T. E. Mitten, president of the Chicago (Ill.) City Railway, it is reported will shortly be elected a director of the Philadelphia Rapid Transit Company. It is understood that Mr. Mitten will accept this duty in addition to his present work and that he will be elected a director of the Philadelphia Rapid Transit Company so that his services may be used in an advisory capacity during rehabilitation work. City Councils have postponed action on the resolution which provides for the election of a successor to George H. Earle, Jr., as one of the three representatives of the city on the board of directors of the company, George McCurdy, president of Common Council, having declared that he could not accept the appointment on account of other business.

Portland Railway, Light & Power Company, Portland, Ore.—A special meeting of the stockholders of the Portland Railway, Light & Power Company has been called for Nov. 28, 1910, at Portland, Ore., to act on a plan to redeem $5,000,000 of the preferred stock of the company now outstanding at 105, by increasing the capital stock of the company to $25,000,000 by issuing an additional $10,000,000 in common stock. For each share of the present full-paid common stock, accompanied by $62.50 in cash, 2½ shares of new stock will be issued, 65 per cent paid, the remaining 35 per cent being subject to call, the calls to be limited to not more than 5 per cent in any calendar year. The circular to stockholders says that the result of this plan will be that instead of having $15,000,000 of capital stock, divided into $5,000,000 of preferred and $10,000,000 of common, the capital stock will be $25,000,000, of which 65 per cent, or $16,250,000, will have been paid in. As a further result the company will receive $1,000,000 in cash.

Trenton (N. J.) Street Railway.—The Trenton Street Railway has asked the Board of Public Utility Commissioners for the State of New Jersey to ratify the lease of the property of the company to the Trenton & Mercer County Traction Corporation.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—Plans which are said to have been prepared by the committee representing the bondholders of the Washington, Baltimore & Annapolis Electric Railway provide for the organization of a new company to take over the property of the Washington, Baltimore & Annapolis Electric Railway after foreclosure, the new company to have total authorized capital liabilities of $13,000,000, of which $7,500,000 is to be first mortgage bonds, $2,500,000 6 per cent non-cumulative preferred stock and $3,000,000 common stock. At present $5,000,000 of bonds would be issued, $1,460,000 of preferred stock and the entire amount of common stock. Of the bonds to be issued, $217,000 are to be placed in the treasury and the remainder to be delivered only for additions, extensions, etc.

West Penn Traction Company, Pittsburgh, Pa.—The directors of the West Penn Traction Company have authorized an initial semi-annual dividend of 1 per cent on the common stock of the company, payable on Dec. 15, 1910, to holders of record of Dec. 7, 1910.

Dividends Declared

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1¼ per cent, common.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., 1 per cent, common.

Traffic and Transportation

Boston Elevated Continues Educational Campaign

Reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 15, 1910, page 856, to the rapid transit educational campaign which the Boston Elevated Railway is conducting in the daily press of Boston to convey to the public comprehensively the improvements effected in recent years and planned for the immediate future. Nine advertisements have been printed in this campaign up to Oct. 26, 1910, each accompanied with a large map of the entire system and showing the effect of each new elevated or subway line upon the transit facilities of the metropolitan district. In the ELECTRIC RAILWAY JOURNAL of Oct. 15, 1910, the features of the first two maps were mentioned. In the third insertion the East Boston tunnel was shown. This is the first structure ever built under tidewater for street car service. The tunnel serves a district inhabited by 80,000 persons which is peculiarly located.

The fourth advertisement discussed the benefits to the community of the Washington Street tunnel, which permitted the restoration of the Tremont Street subway to its original surface car use. The new tunnel made it possible to use six, seven or eight-car trains, and the capacity of the entire elevated system was thereby increased 70 per cent. These advantages were obtained only at the enormous cost of $10,000,000, or about $2,000 per running foot.

The fifth insertion showed the Forest Hills elevated extension. The company emphasized the fact that eight years ago the residents of West Roxbury paid two fares to reach the downtown district. In 1903 the Boston Elevated Railway leased the West Roxbury lines and reduced the fare to 5 cents, at once expending $400,000 in double tracking and similar improvements. The elevated extension cost $3,000,000 more and was opened for business in November, 1909.

The sixth advertisement took up the East Cambridge elevated extension, which will provide a fast route over the Charles River dam from Lechmere Square, East Cambridge, to the North Station and Tremont Street subway entrance and reduce the running time by two-thirds.

In the seventh instalment the company discussed the Cambridge subway and Beacon Hill tunnel which are under construction. The entire taxable value of Cambridge, with its population of 105,000, is only $108,000,000, or nine times the cost of this subway.

The eighth publication discussed the improvement to be effected by the Riverbank subway, which will provide additional terminal facilities at Park Street, relieve the congestion on Boylston Street, and save 10 minutes in running time to nearly all residents of Brighton, Allston and Brookline, and to a part of the population of Newton, Waltham and Watertown. This subway will be 1.75 miles long and its estimated cost without equipment is $3,000,000.

In the ninth advertisement the company describes the elevated extension to Malden from Sullivan Square, which will mean the completion of 11 continuous miles of double track elevated road from north to south through Boston. This extension will be about three miles in length and its estimated cost is $3,500,000, without equipment. The running time from Malden Square to Sullivan Square will be reduced from 16 minutes to 6 minutes by this improvement. The extension will also serve the people of Everett.

On Oct. 31 the company published a map showing the additions which it has made to the surface lines of its system in the past 12 years and pointed out that in 16 States of the Union and numerous important cities, such as Louisville, Indianapolis, Omaha, Rochester and Columbus, there are fewer miles of street railway than the Boston Elevated Railway has added to its surface lines since 1898.

Accidents on Interstate Electric Railways

The Interstate Commerce Commission has issued Accident Bulletin No. 36, which contains a summary of railroad accidents in the United States during April, May and June, 1910, and the year ended June 30, 1910. The report deals only with employees on duty and passengers. It contains the accompanying tables, which show the accidents on electric railways on which interstate commerce is carried and which are subject to the federal accident law.

ACCIDENTS ON ELECTRIC RAILWAYS—CASUALTIES TO PERSONS—APRIL, MAY AND JUNE, 1910.

	Passengers (*a* and *b*), killed.	Passengers (*a* and *b*), injured.	Persons carried under agreement or contract (*bb*), killed.	Persons carried under agreement or contract (*bb*), injured.	Total (*a*, *b* and *bb*), killed.	Total (*a*, *b* and *bb*), injured.	Trainmen, killed.	Trainmen, injured.	Trainmen in yards, killed.	Trainmen in yards, injured.	Yard trainmen (switching crews), killed.	Yard trainmen (switching crews), injured.	Other employees, killed.	Other employees, injured.	Total employees, killed.	Total employees, injured.	Total persons reported killed.	Total persons reported injured.
Collisions	2	259	1	..	3	259	5	13	..	1	..	..	..	1	5	15	8	274
Derailments	..	50	..	1	..	51	..	6	..	..	..	..	..	2	..	8	..	59
Miscellaneous train accidents	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	2
Total train accidents	2	311	1	1	3	312	5	19	..	1	..	..	..	3	5	23	8	335
Causes.																		
Coupling or uncoupling	..	..	..	..	..	..	..	2	..	1	..	4	..	1	..	8	..	8
While doing other work about trains or while attending switches	..	..	..	..	..	..	..	14	..	..	..	2	1	6	1	22	1	22
Coming in contact with overhead bridges, structures at side of track, etc	..	9	..	..	..	9	1	3	..	..	..	2	..	1	1	6	1	15
Falling from vehicles or while getting on or off	4	275	..	1	4	276	1	11	..	..	..	3	..	3	1	17	5	293
Other causes	..	52	..	..	..	52	2	2	..	..	..	..	2	28	4	30	4	82
Total (other than train accidents)	4	336	..	1	4	337	4	32	..	1	..	11	3	39	7	83	11	420
Total, all classes	6	347	1	2	7	649	9	51	..	2	..	11	3	42	12	106	19	755

(*a*) Ordinary passengers; (*b*) passengers traveling on freight trains; (*bb*) postal clerks, express messengers, newsboys and others carried under special arrangements.

ACCIDENTS ON ELECTRIC RAILWAYS—COLLISIONS AND DERAILMENTS—APRIL, MAY AND JUNE, 1910

	Number	Loss	Killed	Injured
Collisions, rear	15	$5,839	1	62
Collisions, butting	11	47,502	7	202
Collisions, train separating	..	.....	..	..
Collisions, miscellaneous	7	846	..	10
Total	33	$54,187	8	274
Derailments due to defects of roadway, etc.	2	.....	..	5
Derailments due to defects of equipment	..	.....	..	..
Derailments due to negligence of trainmen, signalmen, etc.	2	.....	..	15
Derailments due to unforeseen obstruction of track, etc.	1	1,500	..	1
Derailments due to malicious obstruction of track, etc.	..	.....	..	..
Derailments due to miscellaneous causes	11	3,860	..	38
Total	16	$5,360	..	59
Total collisions and derailments	49	59,547	8	333

Operation of Hudson & Manhattan Railroad Extended to Thirty-third Street, New York

The new station of the Hudson & Manhattan Railroad, which operates under the Hudson River between New York and New Jersey, at Thirty-third Street and Sixth Avenue, was opened at 3 a. m. on Nov. 10, 1910. The work on the extension to Grand Central Station by way of Sixth Avenue and Forty-second Street has not yet been begun. A special train was run on Nov. 9, 1910, from the Cortlandt

Street terminal by way of the Pennsylvania Railroad and the Erie Railroad Stations in Jersey City back to Manhattan and up Sixth Avenue to Thirty-third Street. The train carried a party of railroad officials and business men, who were entertained at luncheon at the Hotel Martinique. Among those who were present at the luncheon were William G. McAdoo, Wilbur Fisk, O. T. Bird, J. B. Davies, E. P. Munger, William Everdell and K. B. Conger, of the Hudson & Manhattan Railroad; Isidor Saks, B. J. Greenhut, Isaac Stern, Percy Straus, A. J. Hemphill, W. H. Browning, Chairman Willcox and Commissioner Eustis, of the Public Service Commission; W. G. Oakman, president of the Hudson Companies; Pliny Fisk, William M. Barnum, Waldo H. Marshall, president of the American Locomotive Company, and Frederick D. Underwood, president of the Erie Railroad.

In anticipation of the opening of the station the Hudson & Manhattan Railroad carried in the daily newspapers in New York an advertisement 11 in. by 13 in. containing a drawing of a train pulling into the station at Thirty-third Street and Broadway, under which appeared in bold type the following:

"At 3:00 a. m. on Thursday, Nov. 10, 1910, the magnificent concourse station at Broadway and Thirty-third Street and the station at Twenty-eighth Street and Sixth Avenue will be opened for traffic.

"Tube trains will run to and from Thirty-third Street and the Pennsylvania, Lehigh Valley, Erie and Lackawanna Railroad stations in Jersey City and Hoboken, saving passengers from 20 to 45 minutes in each direction.

"At the Thirty-third Street station will be ticket offices of the Lehigh Valley, Erie and Susquehanna Railroads; a parcel check room, public telephones and telegraph offices, taxicabs and baggage delivery facilities.

"This wonderful station at Broadway, Sixth Avenue, Thirty-second and Thirty-third Streets enables passengers to get to or from the very heart of the shopping, theatre, hotel and up-town business district quickly, conveniently and comfortably by the Hudson & Manhattan Railroad."

It was announced on Nov. 13, 1910, that the joint service of the Hudson & Manhattan Railroad and the Pennsylvania Railroad between Newark and the new station at Thirty-third Street, New York, will begin next summer. Trains will be operated over the Hudson & Manhattan Railroad as far as Bergen Hill, N. J., and thence over the Pennsylvania Railroad to Newark at frequent intervals. The rates charged will be the same as the Pennsylvania Railroad now charges passengers to its station in Jersey City or at its ferry stations at Cortlandt Street and Twenty-third Street, New York. If Newark passengers wish to travel by the Pennsylvania tunnels to the Seventh Avenue and Thirty-third Street station, they will be required to pay the 10 cents extra which the Pennsylvania Railroad has placed on fares to its new station. It also has been arranged to transfer passengers of the Pennsylvania Railroad who wish to land downtown to the trains of the Hudson & Manhattan Railroad at Harrison, N. J., in the near future, instead of bringing them into the Jersey City terminal of the Pennsylvania Railroad as at present.

Decision Regarding Fares in Lenox, Mass.

The Railroad Commission of Massachusetts has rendered the following decision in regard to the petition of the Selectmen of Lenox to require the Berkshire Street Railway to establish a 5-cent fare between all points in the municipality and to institute a half-hourly service over its lines:

"The primary inquiry in this case is directed to the reasonableness of rates on the Berkshire Street Railway within the township of Lenox. A careful study of the finances of the company warrants no recommendation by the board that would result in a reduction of the fare for a through ride originating in the village of Lenox to points outside the township. The receipts and expenses on the Lenox branch, so called, are conclusive upon this issue. We believe, however, that residents of the township should be afforded communication between its villages for a 5-cent fare, and recommend the establishment of a 5-cent fare from Lenox proper to a point substantially in the center of the village in the northern part of the town. This fare in operation will secure the same rate between Lenox and New Lenox as is now enjoyed between Lenox and Lenoxdale.

"The remaining question is with respect to service. The board suggests that prior to the opening of the next summer season attention be given to a schedule that will provide more frequent trips from Lenox to the station, and in the event of the failure of the Selectmen and the management of the company to agree, the board will, upon the application of either party, reopen this branch of the case."

A summary of the testimony presented before the commission in this case was published in the Electric Railway Journal of Sept. 24, 1910, page 484.

Accidents in Indiana During Quarter Ended Sept. 30, 1910

The Railroad Commission of Indiana has issued Accident Bulletin No. 13, which contains a summary of the accidents on the steam railroads and the electric railways operated in Indiana for the three months ended September, 1910. On the electric railways during this period 71 persons were killed and 89 were injured, whereas for the same period of 1909 20 persons were killed and 63 injured. The comparative record of casualties on the interurban electric railways for the quarter ended Sept. 30, 1910, and the same period of 1909, as contained in the bulletin of the commission, follows:

	1909.	1910.
PASSENGERS.		
WHERE—		
On passenger trains	42	100
On station grounds	1	9
CAUSES—		
Collisions	21	96
Derailments	8	0
Getting on and off moving trains	7	4
Getting on and off trains after stops are made	2	0
Miscellaneous	7	9
RESULTS—		
Deaths	3	50
Fractures or dislocations	4	4
Sprains	10	6
Cuts and bruises	22	47
Miscellaneous	6	2
TRAVELERS ON HIGHWAYS.		
WHERE—		
Travelers on highways in vehicles	11	14
On foot	2	2
CAUSES—		
Struck on crossings	13	16
Teams frightened	0	0
Miscellaneous	0	0
RESULTS—		
Deaths	6	5
Sprains	1	1
Cuts and bruises	6	9
Miscellaneous	0	0
Loss of limb	0	1
EMPLOYEES.		
EMPLOYMENT—		
Conductors	6	4
Motormen	4	9
Laborers	2	3
CAUSES—		
Collisions	2	13
Miscellaneous	10	5
RESULTS—		
Deaths	2	4
Fractures or dislocations	0	0
Sprains	4	5
Cuts and bruises	5	9
Miscellaneous	1	0
TRESPASSERS.		
WHERE—		
Trespassers on tracks	10	17
Miscellaneous	3	0
RESULTS—		
Deaths	9	12
Fractures or dislocations and cuts and bruises	4	5

Collisions, 2. Damage, $750.00.

In commenting on the figures contained in the report the commissioners say:

"This quarter was the most disastrous to passengers in the history of interurban railroads in this State. This quarter 1909, 42 passengers were injured on these lines; this quarter 1910, 100, an increase of 100 per cent. In 1909, this quarter, three passengers were killed; this quarter 1910, 50 were killed, the per cent of increase being too great for comparison. Nearly all of these fatalities resulted from head-on collisions; and collisions are preventable accidents and will occur most rarely, and not in groups, where fit, careful men are employed, and where the railroad is equipped with safety devices. The comparatively small revenues of the interurbans, their freight business being very little compared with the steam railroads, make a most difficult problem as to how these railroads may be able to do what is necessary to secure the proper factor of safety. This commission has had this subject under consideration and has made a report to the Governor and recommendations to the companies on this subject."

Report on Pay-Within Cars in Washington, D. C.

H. C. Eddy, executive officer and secretary of the District Electric Railway Commission, has recently submitted to the commission an interesting report on the new pay-within cars of the Capital Traction Company, Washington, D. C., which are equipped with folding doors and steps, as described in the ELECTRIC RAILWAY JOURNAL of Nov. 12, 1910, page 1002. Mr. Eddy in his report says, in part:

"I have the honor to report that on Oct. 31, 1910, the Capital Traction Company placed in operation on its Fourteenth Street line a number of new cars, these being a part of the first delivery of an order for 150 cars recently placed by the Capital Traction Company with the Jewett Car Company, Newark, Ohio. This first delivery is to consist of 20 cars which are practically of the same type as car No. 131, which has been in operation on the Fourteenth Street line since June 28, 1910.

"The new cars are of the pay-within type. The doors are of the folding type, but are slightly different from and an improvement on the doors on experimental car No. 131, above referred to. The doors are manually operated, the front or exit doors folding inwardly and at the same time forming a protection for the passengers from danger of being injured by the brake handle, and the rear or entrance door folding outward and in such a manner as to form a barrier which will tend to prevent a person from being thrown off the platform if by any chance the car should start before the door is closed. The door-operating mechanism is so designed that it can be operated very quickly and with very little effort. The steps are provided with a safety tread designed to prevent persons from slipping thereon.

"This type of car has several advantages over the strictly open car, chief among which may be mentioned the element of safety and the possibility of quickly and effectually closing the car in the case of a sudden storm. The car also answers every purpose for winter service and can be readily and effectually heated, as has been demonstrated in the case of the Chevy Chase cars."

After referring to the seating arrangement, which utilizes all the seating space, and to other details of the equipment, Mr. Eddy concludes his report as follows:

"The cars are provided with the latest approved mechanical and electrical devices and apparatus, including some improved and more efficient fender and wheel guard trips. The writer has made a thorough inspection of these cars at the company's shops and finds that the cars comply in all respects with the rules and regulations of the Interstate Commerce Commission.

"It will be remembered that Mr. Hamilton, president of the Capital Traction Company, in his letter of July 15, 1910, to the Interstate Commerce Commission stated that if these 20 cars proved satisfactory the remaining 130 would be ordered to be the same type. It will also be observed that these cars have been placed in operation one month earlier than was promised by Mr. Hamilton, thereby making it possible for the company to continue the one-minute schedule ordered by the commission on the Fourteenth Street line last spring, the season for open motor cars now being closed and the company not having previously had a sufficient number of cars to operate this schedule."

Near Crossing Stops in Indianapolis.—The Board of Public Safety of Indianapolis has requested the Indianapolis Traction & Terminal Company to stop its cars on the near side of the street in downtown Indianapolis.

Increase in Age Limit of School Tickets Requested.—The companies operating street railways in Los Angeles, Cal., have been petitioned to increase from 18 to 21 years the age limit at which half-fare school tickets are sold.

Accident in Michigan.—Several persons were killed and more than a score were injured on Nov. 12, 1910, in a collision in Kalamazoo, Mich., between a car of the Michigan United Railway and a train of the Michigan Central Railroad.

To Use New Fenders.—In an ordinance signed by Mayor Simon, of Portland, Ore., the Portland Railway, Light & Power Company will be required to place Nelson fenders on all its cars by July 1, 1911, to take the place of those that are now in use, and felt to be inadequate.

More Pay-as-You-Enter Cars in Los Angeles.—Pay-as-you-enter cars have been placed in operation on the West Eleventh Street line of the Los Angeles (Cal.) Railway Corporation, making three lines on which cars of this type are now in use in Los Angeles.

Smoking on Cars Prohibited in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., has issued an order, signed by John M. Egan, president of the company, to prohibit smoking on its cars. Placards placed in the cars read: "Smoking positively prohibited on this car. Conductors are required to enforce this rule. Please observe."

Traffic Over the McKinley Electric Bridge.—The local service which the Illinois Traction System recently started between St. Louis, Mo., and Alton, Venice and Grant City, Ill., using the new terminal tracks and the McKinley Bridge, handled 152,000 passengers during the first 10 days of operation, exclusive of passengers carried on interurban cars.

Decision in Tacoma Fare Case.—The Supreme Court of Washington has decided that the residents of Fern Hill, which is now part of Tacoma, are entitled to be transported by the Tacoma Railway & Power Company to and from all parts of Tacoma for a 5-cent fare. The city limits of Tacoma were some time ago extended to include Fern Hill, and the company contended that the settlement ordinance which was passed in 1901 should not be interpreted as providing for a 5-cent fare to territory not included within the city limits as prescribed when the franchise ordinance was originally passed. The company has announced that it will apply for a rehearing of the case.

Rehearing Denied in West Chester Fare Case.—The application of the West Chester Improvement Association for a rehearing of the complaint which it brought against the Philadelphia & West Chester Traction Company, Philadelphia, Pa., for establishing six 5-cent fare zones between Sixty-third Street and Market Street, Philadelphia, and West Chester, instead of five, has been denied by the Railroad Commission of Pennsylvania. The hearing before the commission on the original complaint was held on April 24, 1910, and was reported in the ELECTRIC RAILWAY JOURNAL of April 30, 1910, page 787. On June 24, 1910, the commission dismissed the complaint. A summary of the decision of the commission dismissing the complaint was published in the ELECTRIC RAILWAY JOURNAL of July 2, 1910, page 55.

Inquiry Into Trolley Guards in Indiana.—The Railroad Commission of Indiana has addressed the following circular to all the interurban electric railways operated in Indiana: "The Railroad Commission is conducting an inquiry with respect to the installation of trolley guards at crossings of electric and steam lines. To assist it in its investigation it solicits your answers to the following questions: 1. Give number of crossings upon your line now protected by trolley guards, and give brief description of guard or guards so used, with name of manufacturer. 2. Give approximate number of crossings upon your line not so protected. 3. What is your opinion concerning the practical efficiency of trolley guards? 4. What kind of guard do you consider the best? 5. What is the approximate cost of installing a serviceable trolley guard? 6. Do you propose installing guards upon your line in the near future? If so, to what extent? Prompt replies to the above are requested."

Deportment in Oklahoma.—J. E. Love, chairman of the Corporation Commission of Oklahoma, has addressed a communication to the steam railroads and the electric railways in Oklahoma regarding the deportment of their employees, in part as follows: "You are hereby notified that on Nov. 16, 1910, the commission will hear any objections which may be urged against the following proposed order, rule, regulation and requirement: 'All employees of steam and electric railways or railroads, the Pullman Company and all persons, firms or associations regularly engaged in the transportation of persons or property for hire employed in the operation of any car, train or other vehicle of conveyance in the State of Oklahoma, as conductor, train auditor, brakeman, motorman, porter, or otherwise, shall at all times extend to the public and to each individual passenger or patron every possible courtesy and perform every duty devolved upon him by his position, to provide comfort and convenience to the public and to all passengers and patrons.'"

Personal Mention

Mr. R. C. Taylor, master mechanic of the Illinois Traction System in charge of the shops of that company at Granite City, Ill., has been appointed engineer of maintenance of equipment of the company attached to the office of the general superintendent at Springfield, Ill.

Mr. W. T. Durfee, Decatur, Ill., has been appointed traveling auditor of the local properties of the Illinois Traction System, Champaign, Ill., to succeed Mr. L. L. Campbell, who has been appointed auditor of disbursement to succeed the late Mr. A. A. Price.

Mr. G. H. Dodge has resigned as acting superintendent of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y., which is controlled by the Beebe interests. No successor to Mr. Dodge will be appointed, as it is proposed to have the operating force of the Syracuse, Lake Shore & Northern Railroad, which is also controlled by the Beebe syndicate, conduct the Syracuse & South Bay Electric Railroad.

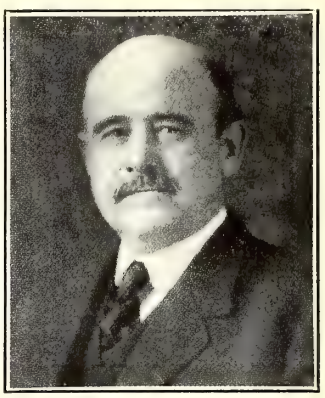
Mr. E. W. Olds, superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is now on the trip to the Pacific Coast for the benefit of his health which he was noted in the Electric Railway Journal of Aug. 13, 1910, as contemplating taking. Mr. Howard A. Mullet, who has been assistant superintendent of the Kinnikinnic shops of the company for several years, will act as superintendent of rolling stock during Mr. Olds' absence.

Mr. L. E. Fischer, formerly general manager of the Illinois Traction System, Peoria, Ill., has been elected vice-president and general manager of the Choctaw Railway & Lighting Company, McAlester, Okla. Mr. Fischer was born in O'Fallon, Ill., in 1876, and was graduated from the Manual Training School at St. Louis in 1893. In 1898 he was graduated from the School of Municipal and Sanitary Engineering of the University of Illinois and was immediately appointed assistant city engineer at Kendallville, Ill. In 1899 and 1900 he acted as assistant city engineer at Paris, Ill. Mr. Fischer's connection with the Illinois Traction System began in 1901, when he was made superintendent of the power house of the company at Danville, Ill. In 1902 he was appointed manager of the property of the company at Danville, and in 1905 was appointed general manager of the entire system. He retired from the company in 1908.

Mr. D. H. Brown has been appointed engineer of maintenance of way of the Salt Lake & Ogden Railway, Salt Lake City, Utah. Mr. Brown began his railway work with the New York Central & Hudson River Railroad and served in the engineering department of that company and the Central Railroad of New Jersey from 1899 to 1902. From July, 1902, to April, 1903, he acted as transitman for Ford, Bacon & Davis, New York, N. Y., on work which they were then doing for the Metropolitan Street Railway, Kansas City, Mo. Mr. Brown then became connected with the Gulf & Ship Island Railroad, Gulfport, Miss., as a construction engineer. In October, 1905, he accepted the position of assistant engineer of the Public Service Railway, Newark, N. J., but resigned from that company in June, 1907, to become engineer of maintenance of way of the Lehigh Valley Transit Company, Allentown, Pa. Since September, 1909, Mr. Brown has been chief engineer of the Diamond Water Company, Hazleton, Pa.

Mr. F. A. Belden, whose appointment as superintendent of the Dover, Somersworth & Rochester, or northern division of the New Hampshire Electric Railways, with an office at Dover, N. H., was announced recently in the Electric Railway Journal, entered electric railway work in June, 1900, in the car house of the Aurora (Ill.) Street Railway when he was 19 years old. In the fall of 1901 Mr. Belden resigned from the Aurora Street Railway to attend the University of Wisconsin. In August, 1902, he entered the shops of the Georgia Railway & Electric Company, Atlanta, Ga. Later he served in the track department of this company and as inspector of car service. In 1905 he was appointed engineer of work being done by the Aurora, De Kalb & Rockford Electric Traction Company, Aurora, Ill. In 1906 Mr. Belden entered the woolen business, but in 1909 he accepted an appointment as superintendent of construction of the Haverhill, Merrimac & Amesbury Street Railway for the New Hampshire Electric Railways. When this work was completed Mr. Belden became general foreman of the Chicago (Ill.) Railways and continued with the company during the period of rehabilitation of the property and until his recent appointment to the New Hampshire Electric Railways.

Mr. W. B. McKinley, president of the Illinois Traction System, Peoria, Ill., who conceived and caused to be built the bridge across the Mississippi River which was formally opened on Nov. 10, 1910, was born in Petersburg, Ill., on Sept. 5, 1856, and was educated in the common schools of Champaign and the University of Illinois. After he left school Mr. McKinley became associated with his uncle, Mr. J. B. McKinley, in the farm loan business in Champaign. In 1884 he began to interest himself in public utility enterprises. He had formed financial relations with capitalists in the East, and in 1884 he built the water works at Champaign. Shortly after this Mr. McKinley constructed an electric lighting plant in Champaign. He then bought the horse railway between Champaign and Urbana and equipped it with electricity. In 1890 Mr. McKinley bought the gas and electric plants in Defiance, Ohio, and built a street railway in that city. In 1892 he bought the horse railway in Springfield, Ohio, and electrified it and did the same thing at Bay City, Mich. At the time of the panic of 1893 Mr. McKinley had considerable money invested in farm mortgages in Kansas and disposed of most of the utilities which he had bought. In 1896 he re-entered the public utility field by building an 11-mile electric railway at Joliet. Mr. McKinley intended to continue this line to Chicago, but he afterward disposed of the property. In 1898 he bought and modernized the street railway lines to Quincy. He did the same with the lines at Galesburg and constructed an interurban railway to Knoxville. With the purchase of the car lines at Danville in 1900 the foundation was laid for the present Illinois Traction System. Mr. McKinley interested a group of capitalists in Montreal, Can., in his plans and bought up rights and franchises for lines in various places which the original promoters were unable to finance and build. In nine years the line at Danville has grown until it has become the Illinois Traction System, operating 500 miles of track, the bridge across the Mississippi at St. Louis and the terminal which enables the cars of the Illinois Traction System to run into the heart of St. Louis. The public utilities operated by the McKinley syndicate are embraced in two holding companies, of which Mr. McKinley is the president. These are the Illinois Traction System and the Western Railways & Light Company. The first comprises the interurban lines connecting St. Louis, Springfield, Lincoln, Peoria, Bloomington, Decatur, Champaign, Urbana and Danville; the street car lines at Danville, Urbana, Champaign, Decatur, Bloomington, Peoria, Normal, Jacksonville, Granite City, Venice and Madison; the electric light, gas and heat systems at Urbana, Champaign, Danville and Decatur; the light and heat plants at Bloomington and Normal, and the light and gas at Jacksonville. It also includes the electric lighting plant at Edwardsville, Madison, Venice and Granite City. The latest additions to the holding of the Illinois Traction System were the electric lighting plant at Des Moines, Ia., and the street railways at Topeka and Atchison, Kan. The Western Railways & Light Company controls the interurban lines in the northern part of the State between Princeton, La Salle and Seneca and the local lines in Quincy, Ill., and Wichita, Kan.; the street car, electric and gas concerns at Cairo, La Salle and Peru, and the gas, electric light, street car system and heat plants at Galesburg.



W. B. McKinley

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mesaba Electric Railway, Duluth, Minn.**—Application for a charter has been made in Minnesota by this company to build electric railways in St. Louis, Itasca and adjoining counties. Capital stock, $50,000. Officers: Oscar Mitchell, president; W. D. Bailey, vice-president, and F. M. Emanuelson, secretary and treasurer.

St. Louis, St. Charles & Northern Traction Company, Mexico, Mo.—Chartered in Missouri to build a 77-mile electric railway to extend through St. Charles, Lincoln, Pike, Montgomery and Audrain counties. Capital stock, $900,000. Headquarters, Mexico, Mo. Incorporators: R. E. Race, Mexico; R. M. Hendershott and C. Pearson, Middletown. [E. R. J., Aug. 27, '10.]

***Defiance (Ohio) Interurban Railway.**—Incorporated in Ohio to build an electric railway to connect Defiance, Fort Wayne, Ashwood, Emmett, Cecil, Paulding, Antwerp and New Haven. Capital stock, $50,000. Officers: K. V. Haymaker, Defiance, president; Charles E. Bennett, Wausen, vice-president; T. C. Jacks, Defiance, secretary and general manager, and Robert C. Holgate, Defiance, treasurer.

***Glassport & Elizabeth Railway, Elizabeth, Pa.**—Incorporated in Pennsylvania to build a 3-mile electric railway to connect Glassport and Elizabeth. Capital stock, $18,000. Incorporators: Jacob Ulrich, McKeesport; W. T. Fuether, D. J. Altman, H. G. Altman and C. A. McGrew, Glassport.

***Pennsylvania Southern Railway, Harrisburg, Pa.**—Incorporated in Pennsylvania to build a one-mile railway in Clarion County. Capital stock, $20,000.

FRANCHISES

New Britain, Conn.—The Connecticut Company, New Haven, has received a franchise from the Council to build an extension to its north end line, from Allen Street to Francis Street, New Britain.

Waterbury, Conn.—The Connecticut Company has applied to the Council for a franchise to build several extensions to its line in Waterbury.

Collinsville, Ill.—The St. Louis & Eastern Traction Company has received a franchise from the City Council to build its tracks on Clay street, Collinsville. This proposed railway will connect Granite City and Greenville via Collinsville, Troy, St. Jacob, Highland, Pierson and Pocahontas. A. W. Crawford, Hillsboro, is interested. [E. R. J., Oct. 22, '10.]

Waukegan, Ill.—The Waukegan, Rockford & Elgin Traction Company has applied to the Council for a franchise to build its tracks over certain streets in Waukegan.

Waterloo, Ia.—The Waterloo, Cedar Falls & Northern Railway will ask the City Council for a franchise to build extensions to its tracks in Waterloo.

Hagerstown, Md.—It is reported that L. N. Downs, New York; H. L. Kirby, Virginia, and associates have received a franchise to build a railway in Hagerstown. This is part of a plan to build a 27-mile electric railway to connect Hagerstown, Clear Springs, Md., and Mercersburg, Pa. [E. R. J., Nov. 5, '10.]

***Duluth, Minn.**—The Mesaba Electric Railway has received a franchise from the County Commissioners to build a 36-mile electric railway from Hibbing to Gilbert, via Chisholn, Buhl, Virginia and Ebelethe. Oscar Mitchell, president.

Fulton, Mo.—The Mexico, Santa Fe & Perry Traction Company has received a one-year extension to its franchise in which to begin construction of its railway connecting Perry, Mexico City, Santa Fe, Hereford, Columbia, Fulton and Mokane.

Mexico, Mo.—The Mexico, Santa Fé & Perry Traction Company has received an extension to its franchise of one year's time in which to begin the construction of its line through Boone, Andrain and Collaway Counties.

St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company will apply to the City Council for a franchise to build an extension to its track on Third Street, from Francis Street to Edmond Street, in St. Joseph.

South Amboy, N. J.—The Public Service Railway, Newark, has applied to the Council for a franchise to extend its tracks to connect with those of the Jersey Central Traction Company at Main Street and Broadway, South Amboy.

Binghamton, N. Y.—The Binghamton Railway has received an extension of time to build its line between Union and Vestal. The franchise is extended for two years until Nov. 1, 1912.

Lebanon, Ore.—The Albany Interurban Railway, Albany, has applied to the City Council for a franchise to build an electric railway through Lebanon. This proposed railway will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. P. A. Young is interested. [E. R. J., Sept. 10, '10.]

Port Arthur, Tex.—The Beaumont-Port Arthur Interurban Electric Railway has asked the Council for a franchise to build a proposed electric railway in Port Arthur. I. D. Polk is interested. [E. R. J., May 7, '10.]

TRACK AND ROADWAY

***Penticton, B. C.**—J. M. Robinson, Summerland, is said to be interested in a plan to build an electric railway to connect the towns which are located on the east shore of Okanagan Lake between Naramata and Vernon, B. C.

Fresno, Cal.—S. N. Griffith, Fresno, has awarded the contract to the Colorado Fuel & Iron Company, Pueblo, for material for building the proposed 10-mile electric railway to connect Fresno and Clovis. [E. R. J., Nov. 5, '10.]

Los Angeles (Cal.) Railway.—This company has begun the construction of an extension on its suburban system from Hollywood to Lankershine via Cahuenga Pass.

Los Angeles-Western Railway, Los Angeles, Cal.—This company is making preliminary arrangements for the building of its proposed electric railway to connect Hermosa Beach and Culler. A. W. Taylor is interested. [E. R. J., Nov. 5, '10.]

Gough Street Railroad, San Francisco, Cal.—This company has begun the construction of its proposed one-mile street railway to extend south along Gough Street connecting Valencia Street and Fillmore Street via McAllister Street to Haight Street, there to connect with existing lines in San Francisco. Albert J. Pon is interested. [E. R. J., Oct. 22, '10.]

San Joaquin Valley Electric Railway, Stockton, Cal.—This company has completed the grading of its roadbed to Ripon and is now advertising for bids for the construction of a reinforced concrete bridge over the Stanislaus River south of Ripon. The structure will be 200 ft. in length and the two main spans will be 80 ft. each. Morris L. Brackett is interested. [E. R. J., April 30, '10.]

***Brooklyn, Conn.**—Plans are being considered for building an electric railway to connect Brooklyn, Danielson, Willimantic, Attawaugan and Ballouville. William Clewley, Brooklyn, is interested.

Shore Line Electric Railway, New Haven, Conn.—This company, it is reported, expects to extend its railway next year into New Haven.

Fox & Illinois Railway, Aurora, Ill.—This company, recently incorporated to build an electric railway to connect Yorkville and Morris with connecting lines at Dwight and Sandwich, has organized by electing the following officers: Henry H. Evans, president; John Meredith, vice-president; Ralph C. Putnam, secretary, and Frank M. Zimmerman, treasurer. [E. R. J., Nov. 12, '10.]

***Gary, Ind.**—C. H. Geist is said to be interested in a plan to build an interurban railway to connect Gary, Chesterton and Whiting.

Kalamazoo, Elkhart & South Bend Traction Company, South Bend, Ind.—This company is said to have amended its charter so as to provide for the construction of its line from South Bend to Kalamazoo, Mich., via Mishawaka, Elkhart, Bristol, Constantine, Nottville, Three Rivers, Parksville, Vicksburg and Austin. A. D. Harris, South Bend, president. [E. R. J., Nov. 7, '09.]

Tri-City Railway, Davenport, Ia.—This company has begun work on the extension of its Twenty-seventh Street line in Davenport. The grading is being done by the McCarthy Improvement Company.

Louisville (Ky.) Railway.—This company has placed a contract with the Carnegie Steel Company, Pittsburgh, Pa., for 500 tons of rails.

Northampton Street Railway Company, Northampton, Mass.—This company advises that it will relay three miles of track with 70-lb rails, which will be ordered before Jan. 1.

Butte (Mont.) Electric Railway.—This company expects to build an extension and double-track a portion of its line in Meadville.

***Halfmoon, N. Y.**—It is stated that plans are being considered to build a 15-mile electric railway to connect Waterford, Halfmoon, Crescent, Vischers Ferry and Rexford flats. This proposed line would follow practically the course of the Mohawk River along its northern shore. Surveys have been made. Among those who are interested are: D. B. Hawley, W. F. Hickey, Halfmoon; C. V. Gould, Dunsbach Ferry; Frederick W. Kavanaugh and W. K. Mansfield, Waterford.

Hudson River & Eastern Traction, Ossining, N. Y.—This company has applied to the New York Public Service Commission, Second District, for permission to issue bonds for an amount sufficient to extend its railway from the present terminus in Ossining southeast through Briarcliff Manor, Pleasantville and Sherman Park to White Plains, a distance of about 18 miles.

Asheville & Carolina Railway, Asheville, N. C.—This company is reported to be making plans to build a 2-mile extension of its West Asheville line. It is expected to have this extension ready about the time the new bridge across the French Broad River is completed. The rails for the line are to be laid in the center of the bridge.

Isothermal Traction Company, Rutherfordton, N. C.—It is said that this company is now making surveys between Rutherfordton and Asheville through the Hickory Nut Gap. This proposed railway will connect Rutherfordton and Gastonia via Carolien, Shelby, Cherryville, Waco, Stubbs, Shelby, Cliffside, Henrietta, Caroleen and Boiling Springs. J. F. Flack, Rutherfordton, secretary. [E. R. J., June 25, '10.]

Wheeling, Cadiz & Tuscarawas Traction Company, Cadiz, Ohio.—This company advises that it has let contracts and construction will begin this month on its proposed 60-mile electric railway to connect Wheeling, Bridgeport, Martin's Ferry, Florence, Colerain, Harrisville, New Athens, Cadiz, Franklin, Philadelphia Roads, Dennison, Adena, Uhrichsville and Georgetown. Capital stock, issued, to be increased from $10,000 to $1,200,000. Bonds, issued, to be increased to $1,200,000. The company will operate nine cars. Its power station and repair shops will be located at a point half way between terminals. It will also furnish power for lighting purposes. A. Evans Townsend, Doylestown, general manager. [E. R. J., Oct. 15, '10.]

Toledo, Columbus, Springfield & Cincinnati Railway, Toledo, Ohio.—This company reports that preliminary arrangements have not yet been completed for building its proposed 28-mile electric railway to connect Toledo, Napoleon, Lima, Bellefontaine, Columbus and Cincinnati. Capital stock, $100,000. Bonds authorized, $100,000. Officers: M. Seyfang, Toledo, Ohio, president; Dr. S. S. Thorn, Toledo, vice-president, and William P. Heston, 2901 Collingwood Avenue, Toledo, secretary and treasurer. [E. R. J., Sept. 18, '09.]

Muskogee (Okla.) Electric Traction Company.—This company has begun work on two new extensions of its lines, one to the north end of Muskogee to the city limits in Reeves addition and the other an extension to the Midland shops.

Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.—This company announces that it will begin work at once on its proposed 60-mile electric railway to connect Ottawa and Brockville. Andrew Haydon, president. [E. R. J., Oct. 1, '10.]

Portland Railway, Light & Power Company, Portland, Ore.—This company has awarded the contract to Watson, Flagg & Strandifer for the construction of the 3½-mile extension of its Cazadero line to the new power house on the headwaters of the Clackamas River in Portland.

***Hazleton, Pa.**—It is said that plans are being considered to build an electric railway to connect Berwick, Nescopeck, Wapwollopen, Beech Haven and Hobbie. At Hobbie it will connect with the Wilkes-Barre & Hazleton Railway, Hazleton.

Lewisburg, Milton & Watsonville Passenger Railway, Milton, Pa.—This company will soon extend its line to Mifflinburg. The Simplex Surface Contact Company has the contract for electrifying the Lewisburg & Tyrone Railroad between Montandon and Mifflinburg, a distance of 10 miles. Work will soon begin. Power will be furnished by the new power plant at Milton.

West Penn Railways, Pittsburg, Pa.—This company has awarded the contract for grading and has begun work on the extension of its line from Juniata to Bitner.

***Woodlawn (Pa.) Southern Railway.**—This company is being organized by the Jones & Laughlin Company to build a seven-mile electric railway passing along Franklin Avenue, Woodlawn, to the borough line in the direction of New Sheffield, over the Woodlawn-Aliquippa Road to Woodlawn and above the Pittsburgh & Lake Erie Railroad from the present station to the south end of the borough. It is proposed eventually to extend the line to South Heights and New Sheffield.

***York, Pa.**—It is said that New York and Pittsburgh capitalists are planning the construction of a proposed electric railway to connect York, New Freedom, Paradise, Logansville and Glen Rock.

Quebec Railway, Light & Power Company, Quebec, Ltd., Quebec, Que.—This company will apply to the Dominion Parliament for a bill amending its charter. It is understood that the company plans to extend its line from St. Joachim down the north shore of the St. Lawrence to Murray Bay.

Chicago, Burlington & Quincy Railway, Deadwood, S. D.—This company has placed in operation its double-track line between Galesburg and Bushnell.

Trinity Valley Traction Company, Dallas, Tex.—This company expects to finish the surveys of its 100-mile railway to connect Dallas and Palistinevia Waxahachie, Ennis, Corsicana by Dec. 1. [E. R. J., June 11, '10.]

***Bonita Valley Rapid Transit Railway, Jourdanton, Tex.**—C. S. Young, San Antonio, is reported to be promoting an electric railway to be known as the Bonita Valley Rapid Transit Railway to connect Jourdanton and Pleasanton.

***Taylor, Tex.**—L. E. Walker is said to be interested in a plan to build an electric belt railway to connect the different industrial plants and steam railroads of Taylor.

Elkins (W. Va.) Electric Railway.—This company is laying 8 miles of new track in Elkins and expects to have it completed by the first of the year. All material has been purchased.

***Burlington, Wis.**—H. B. Kamschulte, Milwaukee, is said to have obtained a certificate of necessity from the Railroad Commission to build a proposed electric railway from Lake Geneva to Burlington via Lyons.

POWER HOUSES AND SUBSTATIONS

Connecticut Company, New Haven, Conn.—This company has purchased the following apparatus from the General Electric Company: One 400-kw, 600-volt, 60-cycle rotary converter with transformer and switchboard for station A at New Haven; one 1000-kw, 600-volt, 25-cycle rotary converter with transformers and switchboard for the Hartford station; two 300-kw, 600-volt, 25-cycle rotary converters with transformers and switchboard for the Buckland station; two 400-kw, 600-volt, 25-cycle rotary converters with transformers and switchboard for Rockville station.

Shore Line Electric Railway, New Haven, Conn.—This company, it is said, will install a new rotary with a capacity of 300-kw at its power house at Waterford. The New London & East Lyme Street Railway expects to purchase its power from this company.

Capital Traction Company, Washington, D. C.—This company will build a power house on Thirty-sixth Street and M

Street in Washington. The building will be a 1-story structure of brick and concrete construction.

Beech Grove Traction Company, Indianapolis, Ind.—It is reported that this company will build a substation on Twenty-fifth Street and Churchman Avenue in Beech Grove. The structure will be 26 ft. x 34 ft. The motor generators will be furnished by Fairbanks, Morse & Company. This company has made arrangements to obtain power from the Indianapolis Light & Heat Company.

Lexington & Interurban Railways, Lexington, Ky.—This company will spend $300,000 installing new equipment at its power house in Lexington. Exact details have not yet been given out.

New York Central & Hudson River Railroad, New York, N. Y.—This company has placed an order with the General Electric Company for four 2000-kw, 600-volt, 25-cycle, direct-current rotary converters, with four air-blast transformers. Three of these rotary converters will be placed in the substation at Irvington and one at Glenwood. Delivery will be made next summer.

Cincinnati (Ohio) Traction Company.—Press reports state that this company will build an addition to its Pendleton power house in the East End of Cincinnati. The structure will be 40 ft. x 60 ft. of steel and concrete construction. It will be equipped with two additional boilers of 525 hp each. When completed this plant will have a capacity of 7250 hp. The estimated cost of improvements is about $50,000.

Cleveland, Ohio.—The Cleveland, Barberton, Cashocton & Zanesville Railway has applied to the County Commissioners for a franchise to build its tracks over certain streets in Cleveland. The proposed railway will connect Cleveland and Zanesville via Elyria, Barberton, Oresville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., Oct. 29, '10.]

Rhode Island Company, Providence, R. I.—This company has ordered the following apparatus from the General Electric Company: One 15,000-kw, 25-cycle, 11,000-volt, three-phase Curtis turbine; three 2000-kw, 600-volt, 25-cycle rotary converters; also three 2250 three-phase air blast transformers and switchboard.

Elkins (W. Va.) Electric Railway.—This company states that it will soon build a new power house at Elkins. It will not let any contracts for the work. P. B. Bloomfield, general manager.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company is building a substation on Clinton Street in Milwaukee. The structure will be 47 ft. x 145 ft. and 34 ft. high, of brick and steel construction. The cost is estimated to be about $25,000.

SHOPS AND BUILDINGS

Central California Traction Company, San Francisco, Cal.—This company has taken possession of its new offices on Weber Avenue and El Dorado Street in Stockton.

Chicago (Ill.) City Railway.—It is reported that this company has purchased property on West Seventy-ninth Street in Chicago on which it will build new car houses.

Iowa City (Ia.) Electric Railway.—This company will erect a car house containing an office and a repair shop at College Street and Gilbert Street in Iowa City.

Tri-City Railway & Light Company, Davenport, Ia.—It is said that this company will remodel the Smith Building in Davenport to be used as a station and office building. The structure is 43 ft. x 150 ft. and four stories high.

Boston & Worcester Street Railway, Boston, Mass.—This company has just built a new station on Bacon Street, Boston.

Missoula (Mo.) Street Railway.—This company is reported to be building a new car house and machine house in Missoula.

Janesville Traction Company, Madison, Wis.—This company has let the contract to Shearer, Ford & Boos for the construction of its car house to be located on Eastern Avenue in Janesville. The structure will be a 1-story brick building, with an ordinary roof construction divided by a firewall into two bays. One bay will contain two tracks for storage of cars. The other bay, which will contain one track with a pit for the inspection of cars, will be floored with concrete.

Manufactures & Supplies

ROLLING STOCK

Kankakee (Ill.) Electric Railway is considering the purchase of three new cars.

East Shore & Suburban Railway, Richmond, Cal., contemplates the purchase of three motor cars.

Dayton, Covington & Piqua Traction Company, West Milton, Ohio, expects to purchase six dump cars for hauling crushed stone.

Greenville Railway & Light Company, Greenville, Tex., which has under construction a 7-mile street railway in Greenville, will purchase seven cars.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 15, 1910, as asking for bids for 100 new cars, has ordered 50 semi-convertible cars from the Laconia Car Company.

Metropolitan Street Railway, Kansas City, Mo., has nearly completed the first double-truck car of a lot of 88 cars which are to be built by splicing together two single-truck car bodies.

Woodstock & Sycamore Traction Company, Sycamore, Ill., has ordered a gasoline motor car from the McKeen Motor Car Company for use on its extension between Genoa and Woodstock, which is nearing completion. This is the second car of this type ordered by this road.

Atlanta-Northern Railway, Atlanta, Ga., has received from The J. G. Brill Company two closed 44-passenger trail cars. The car bodies are 30 ft. 8 in. long and the length over vestibules is 38 ft. 8 in. The equipment includes Brill 27 trucks, Van Dorn couplers, Brill gongs, Ohmer registers and Brill Winner seats.

Alton, Jacksonville & Peoria Railway, Jacksonville, Ill., noted in the ELECTRIC RAILWAY JOURNAL of April 9, 1910, as considering the purchase of four cars, is asking bids for six 55-ft., 42-passenger, double-truck cars. Plans and specifications were prepared by H. A. Straw, vice-president and chief engineer, Falkenau Electrical Construction Company, Chicago. The new cars will be equipped with four Westinghouse 306 interpole motors, double-end electro-pneumatic control and automatic air brakes.

Chicago & Joliet Electric Railway, Joliet, Ill., has received two combination passenger and smoking cars from The J. G. Brill Company. Mention of the placing of this order was made in the ELECTRIC RAILWAY JOURNAL of April 23, 1910. The specifications for these cars include the following details:

Seating capacity	50	Curtain fixtures	National
Length of body	36 ft.	Curtain material	Pantasote
Over vestibule	46 ft.	Gongs	Brill Dedenda
Width over sills	8 ft. 9¼ in.	Heaters	Consolidated
Over posts at belt,	8 ft. 9¼ in.	Roofs	plain arch
		Sanders	Brill Dumpit
Body	wood	Seats, style	Wheeler
Interior trim	cherry	Seating material	rattan
Underframe	steel	Step treads	Mason
Bumpers	Brill	Trolley retrievers	Wilson
Couplers	Tomlinson	Trucks	Brill 27 MCB-I

TRADE NOTES

Ackley Brake Company, New York, N. Y., has been awarded the silver medal for brakes at the International Exposition in Brussels.

Buffalo Brake Beam Company, New York, N. Y., has removed its St. Louis offices from the Lincoln Trust Building to suite 1443, Syndicate Trust Building.

Burton W. Mudge & Company, Chicago, Ill., manufacturers of the Garland car ventilation devices, have appointed J. L. Phillips manager of their electric railway department.

Rossiter, MacGovern & Company, New York, N. Y., have moved their offices from the West Street Building, New York, to Claremont and Mallory Avenues, Jersey City, N. J.

Couch & Seeley Company, Boston, Mass., announces that on Nov. 15, or shortly after, it will be established in its new factory and office building at 162-172 Columbus Avenue, Boston.

Charles K. Mohler, Chicago, Ill., consulting engineer, announces that he has opened a new office at 1839 McCor-

mick Building. Mr. Mohler has made a specialty of reports on traffic and transportation and valuations of steam and electric railways.

Cooper Hewitt Electric Company, New York, N. Y., has removed its general offices from 220 West Twenty-ninth Street, New York, to Eighth Street and Grand Street, Hoboken, N. J. The company also announces that the equipment of its new works is completed.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Denver, Laramie & Northwestern Railroad for two of its 70-ft. gasoline motor cars, which are to be delivered in January, 1911. These cars will be operated between Denver and Greeley, Col.

F. B. McCurdy Company, Halifax, N. S., are proposing to organize a company with this name under the Nova Scotia Companies Act, its authorized capital stock to be $2,625,000, in shares of $100 each, to take over the property and business of the Silliker Car Company, of Halifax, and assume its indebtedness, including the debt to the city of Halifax.

Nickelized Casting Company, Pittsburgh, Pa., reports the use of its Nickelized chilled car wheels on four railroads. They have now been in use for 18 months, making a mileage of 45,000, and are still running under 100,000-lb. coal cars on heavy grades. They show the same endurance as steel wheels in freight train service at less than one-half the cost per 1000 miles run.

Union Switch & Signal Company, Pittsburgh, Pa., will have a meeting of shareholders on Dec. 14, at which a vote will be taken on increasing the capital stock from $2,500,000 to $5,000,000, or to an amount not exceeding $5,000,000. The additional stock may be issued from time to time in payment of dividends or for subscription upon such terms as the directors shall deem proper.

American Rolling Mill Company, Middletown, Ohio, has just completed a splendidly equipped research laboratory costing approximately $40,000. The company has made arrangements whereby it has secured the services of Dr. Allerton S. Cushman, late of the office of good roads, Department of Agriculture, Washington, D. C., who will give the work of the research laboratory personal supervision and direction.

Pawling & Harnischfeger Company, Milwaukee, Wis., owing to the increase in its business on the Pacific Coast, has opened a branch office in the Washington Building, Portland, Ore., in charge of R. K. Morse, who for some years past has been a member of the company's engineering staff at the home office in Milwaukee. Mr. Morse will also be sales representative and will handle a complete line of cranes, hoists and lumber-handling apparatus, etc.

Wonham, Sanger & Bates, New York, N. Y., sales agents of the American Automatic Switch Company, report the recent sale to the Brooklyn Rapid Transit Company of 26 electric track switches, as well as an interlocking outfit consisting of three curb controls and nine switch-throwing machines with indicators. Wonham, Sanger & Bates have also received an order from the Sao Paulo Tramway, Light & Power Company, Brazil, for 125 sets of H-B Universal wheel guards.

American Brake Shoe & Foundry Company, New York, N. Y., announces that J. S. Coffin, vice-president, will on Dec. 31 next retire from active service with the company in order to devote himself more closely to the affairs of the Franklin Railway Supply Company, of which he is president, and the American Arch Company, of which he is chairman, as well as the Locomotive Superheater Company and other allied interests. Mr. Coffin will, however, retain his financial interest in the American Brake Shoe & Foundry Company and also his membership on the board of directors.

Canton Culvert Company, Canton, Ohio, has recently sold a large order of Acme corrugated metal culverts in Brazil. Although the shipment, consisting of several carloads of 4-ft., 5-ft. and 6-ft. diameter culverts, left New York by boat Oct. 15, it is not expected that it will reach its destination until some time next spring. The representative of the railway project in connection with which these culverts are to be used said that the Canton culverts were decided upon because it is a serious proposition to transport bridge work or anything that cannot be shipped in small and light sections. By using Acme culverts they can be hauled to their destination section by section, if necessary.

Western Electric Company, New York, N. Y., reports that its gross earnings for October, 1910, were 40 per cent larger than last October, and the 12 months ending with this month will show gross sales of more than $61,000,000. The Western Electric Company has now disposed of the greater part of its Chicago surplus real estate, which consisted of its Polk Street and Clinton Street property. Nearly $4,000,000 which was received for the property will be added to its already large working capital and will render financing unnecessary in 1911. Recently the company appropriated $1,000,000 for new buildings at Hawthorne, and doubtless before the present lease expires on the 500,000 sq. ft. of the Clinton Street property which the company still occupies it will be necessary to erect further new buildings at Hawthorne to carry ont the policy of concentration which is now in effect.

United States Electric Signal Company, West Newton, Mass., is building a large reinforced concrete two-story addition to its plant. The first floor will be used for testing purposes and shipping, and the second floor will be devoted to assembling and stock room. The main plant will be equipped with new machines and tools for the further extension of the manufacturing facilities of the company. The working force has been doubled. Among recent orders for signals received by the company are 120 blocks for Public Service Railway, Newark, N. J., and 30 blocks for the Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil. The company has secured the services of J. Warren Putnam as sales engineer. Mr. Putnam was formerly electrical engineer of the signal department of the Boston & Albany Railroad. He has had several years of experience in high-tension transmission work and was connected for nine years with the Metropolitan Street Railway, New York, as superintendent of the feeder line department.

ADVERTISING LITERATURE

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 4025, which briefly describes Allis-Chalmers motor-driven air compressors and calls attention to a few of the many applications to which this type of apparatus is adapted.

Recording Register & Fare Box Company, New Haven, Conn., has printed a booklet describing and illustrating several types of its fare boxes and fare registers. It also contains illustrations of register fittings accompanied by a complete price list.

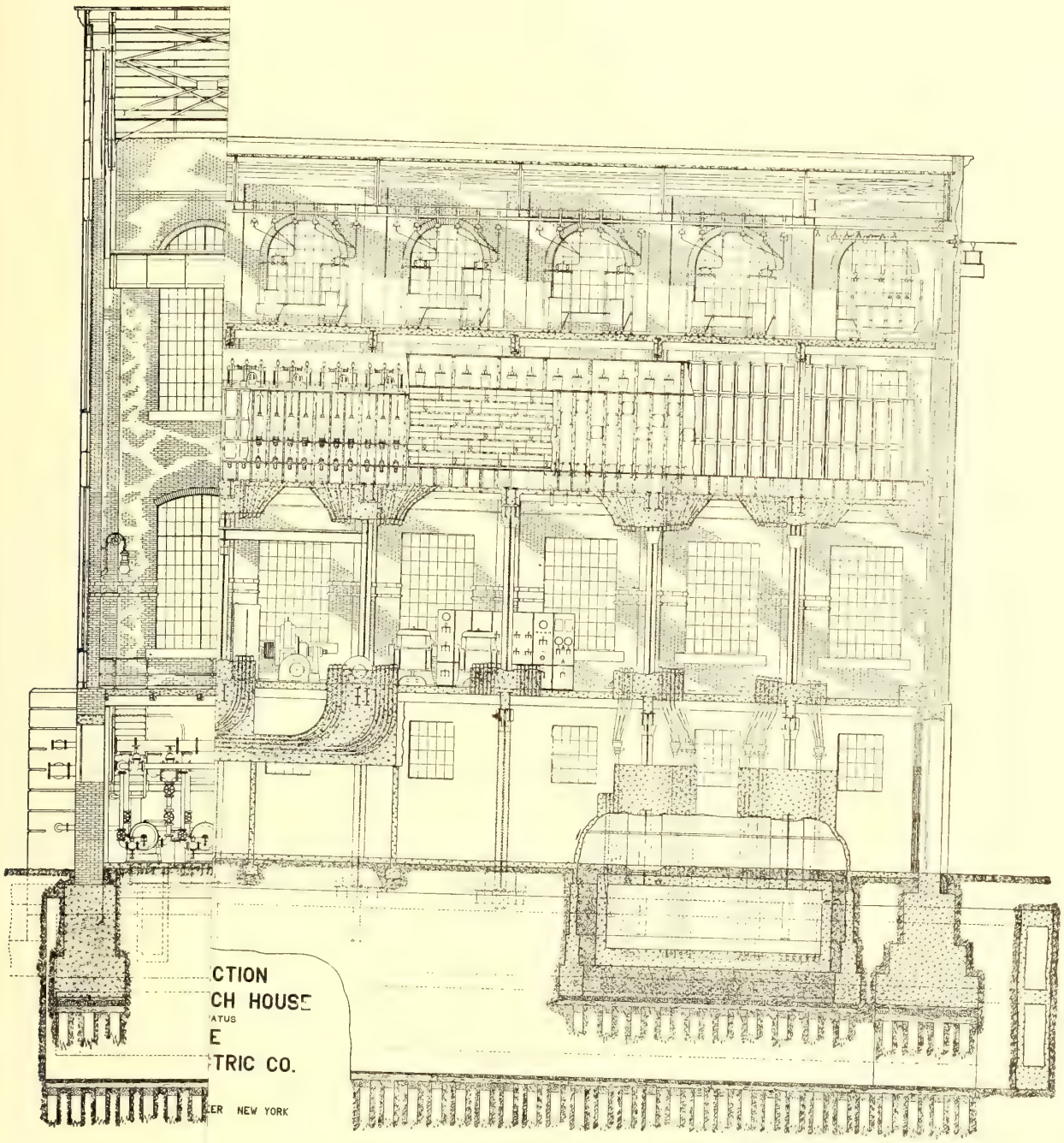
Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued several catalog sheets on ball bearings and their correct use. Sheet No. 18 A is devoted to mounting directions, sheet No. 60 to positive lock nuts for ball bearings and sheet No. 61 to bearing mountings without shoulders on shaft.

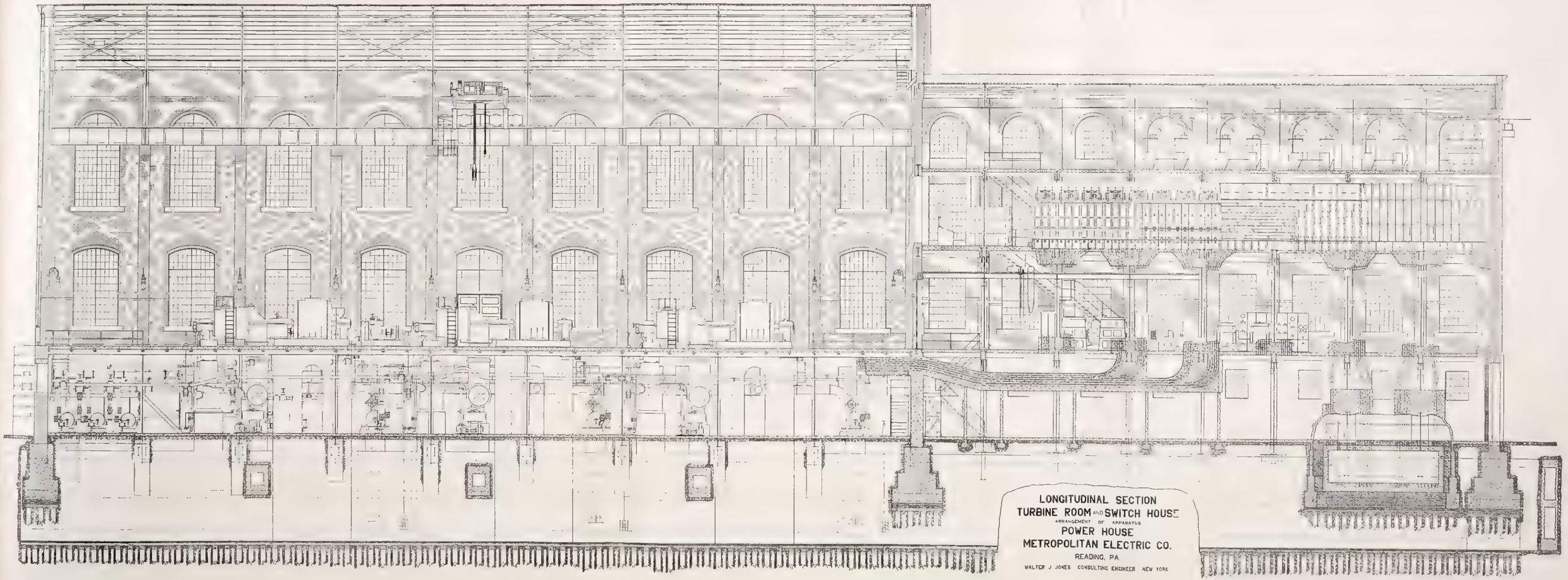
National Metal Molding Company, Pittsburgh, Pa., has issued a 32-page booklet listing and illustrating its various forms of metal molding and molding fittings. Particular attention is directed to several new National molding fittings, Nos. 350, 370, 375 and 376, with particular reference to the last two named.

NEW PUBLICATIONS

Report of the Twenty-eighth Annual Meeting of the Street Railway Association of the State of New York. Published by the secretary at Kingston; 158 pages.

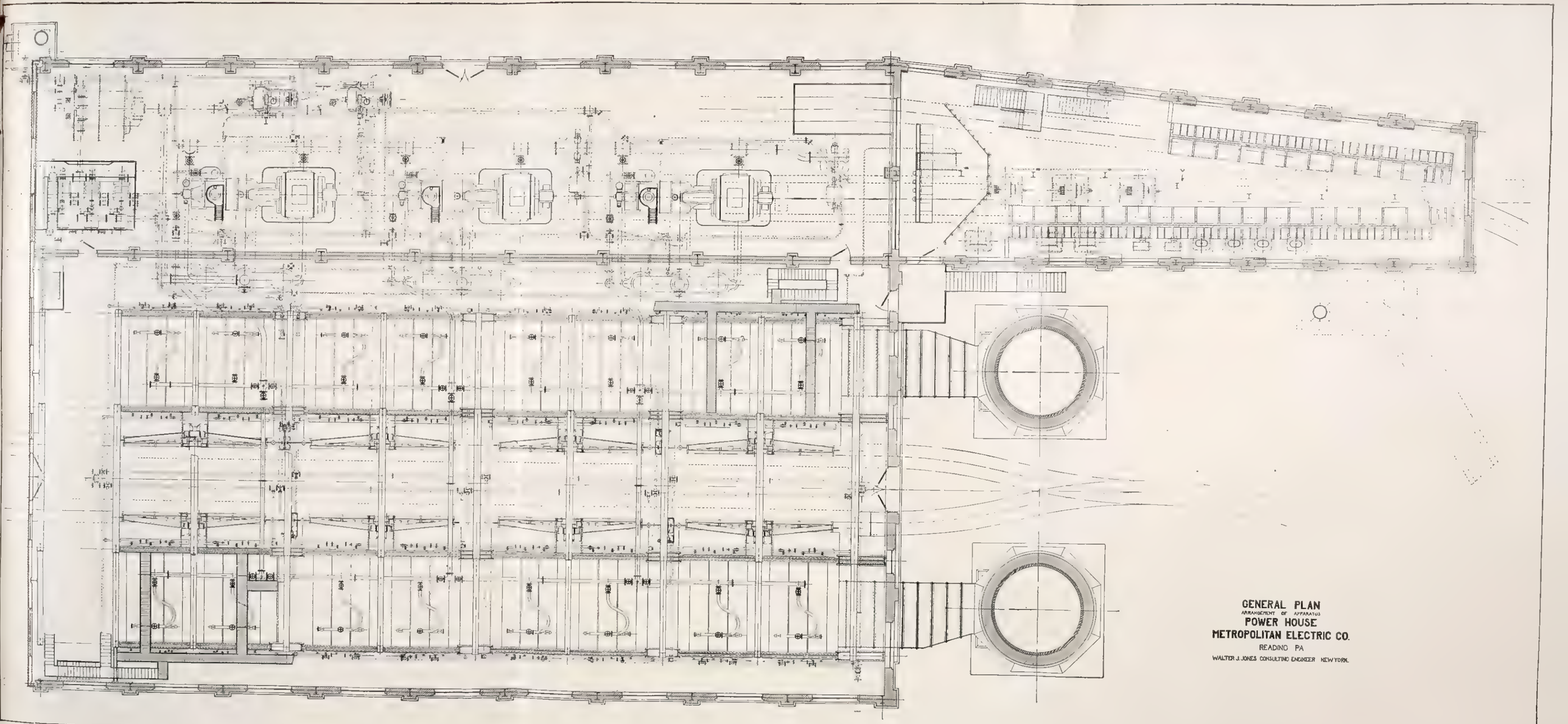
The Cooperstown convention of the Street Railway Association of the State of New York, held June 28 and 29, has been reported in these columns, but the official proceedings give the complete discussion and papers, as well as the banquet speeches. The Cooperstown convention, like all of the meetings of the Street Railway Association of the State of New York, was an excellent one and the proceedings will well repay a careful perusal, whether the reader was in attendance at the meeting or not.


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METROPOLITAN ELECTRIC CO.
READING PA
WALTER J. JONES CONSULTING ENGINEER NEW YORK.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, NOVEMBER 26, 1910 No. 22

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 26, 1910.

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Starting the Association Year Promptly

Active work has already been begun on preparing for the 1911 convention. As chronicled in our issue of last week, the new officers and executive committee of the American Electric Railway Engineering Association held a meeting Nov. 15 to decide upon the number of committees which would be required to carry on its work during the year and to select the topics which they are to consider in their reports. The new officers and executive committee of the Transportation & Traffic Association held a similar meeting on Nov. 22. Another radical departure made by the American Electric Railway Engineering Association this year is to require all committees to have their reports in the hands of the secretary by July 15, instead of Aug. 1, as previously. This is a good start and promises well for the future.

The Subway Deadlock Is Broken

The proposal of President McAdoo of the Hudson & Manhattan Railroad to operate an amended tri-borough subway system projects a new element into the acute New York City subway situation. It has had the wholesome effect of breaking the deadlock which had developed between the Interborough Rapid Transit Company and the New York Public Service Commission for the First District and of arousing public interest in the enormous outlays of capital required for transit development. The Interborough company will prepare new terms on which it will extend its system, and until the commission analyzes the McAdoo offer no further steps will be taken regarding the original tri-borough subway plans. Although the New York newspapers are not unanimous, public opinion generally appears to like the tone of the proposal made by Mr. McAdoo. A statement of the terms offered, published in another part of this issue, makes it plain that protection of the private capital is an essential provision of the arrangement. Taxes and interest on $50,000,000 or whatever sum is required for the construction of the Grand Central extension and for the equipment of the system are to be first charges on the net earnings from operation. Interest on the money expended by the city for construction is to be a second charge. It is evident from all the signs, including the attitude of Mayor Gaynor, that careful consideration of the entire situation will precede any formal action on contracts by the city's Board of Estimate and Apportionment.

Discussion of the Interurban Rules

One of the most important subjects before any of the associations this year is the revision of the standard code of interurban rules by the Transportation & Traffic Association. The present standard code, that adopted at Denver in 1909, is not considered perfect even by its warmest advocates, and has

been seriously criticised by a certain number of electric railway managers who think that a code more nearly corresponding with that of the American Railway Association would be far preferable. It was the general expectation that those who believed in the radical revision of the code would present arguments in favor of their position at the recent Atlantic City convention, but the code was referred back to the committee with practically no instructions as to the direction in which the association wished the code changed. As a result the committee is in the dark as to the general policy which should govern the proposed revision of the rules, and the interurban railways throughout the country are uncertain whether sentiment as a whole prefers minor or radical changes in the code. To assist the committee in its problem J. W. Brown, one of its members, urges a discussion of the subject, and we shall be glad to give space to any letters which may be sent to us on the subject which will assist in reaching a decision. Mr. Brown emphasizes a point which is often forgotten in a discussion of this kind. This is that it is not the purpose of the committee to formulate a code which will meet all of the varying conditions which obtain on widely dissimilar properties. Indeed, such a result could hardly be effected. Rather it is the duty of the committee to furnish a basis upon which local rule books may be founded and to which exceptions and additions can be made by individual companies. We trust that the discussion will be along these lines.

A Substantial Development

The completion of 50 years of operation of the Montreal Street Railway occurred coincidently with the surrender of control of the company to new interests. It was therefore opportune and appropriate that the last annual report should have contained a brief history of the development of the property under the administration of the interests which controlled its affairs for so many years. An abstract of the history, published in the issue of the Electric Railway Journal for Nov. 12, 1910, emphasized particularly the remarkable progress of the system since the adoption of electricity as a motive power in 1892. The increase in earnings has far outstripped the increase in the number of people in the city of Montreal and its suburbs and represents a decentralization of population which was certainly made possible only by the introduction of rapid transit and the extension of railway lines into outlying districts. In 1891 the city of Montreal and its suburbs had a population of 261,302. After 31 years of existence with horse power the company, according to the historical statement, had in operation in 1892, the year when the work of electrification was started, a total of 12½ miles of track. Gross earnings in the 1892 fiscal year were $564,407. By 1901 the population of the city and suburbs had increased to 376,402, a gain of 44 per cent. In the fiscal year 1901 the company earned gross $1,900,680, a gain of 237 per cent over 1892. It operated in 1901, according to American Street Railway Investments, about 100 miles of track. The population of the city and suburbs of Montreal in 1910 is estimated at 600,000, an increase of 59 per cent in nine years. During the same period the gross earnings of the company increased 129 per cent, amounting in the 1910 fiscal year to $4,352,551. The company operated 144 miles of track at the end of last year, exclusive of subsidiary companies. A calculation of the gross earnings per capita is rendered inexact for the earliest year given because of the absence of figures for like years. If we use the population of 1891 and the earnings of 1892 the average gross revenue per capita was $2.16. In 1901 the average was $5.05 and in 1910, with the population estimated, it was $7.25. This is a substantial development.

THE CONDITIONS OF ELECTRIFICATION IN BOSTON

We published last week an abstract of the reports made upon proposed electrification around Boston, together with a brief editorial summary. It is worth while perhaps to look at somewhat greater length into the special conditions which there exist in order to form some adequate idea of the real situation at present. As is well known to our readers, the railroad corporations operating within the Metropolitan District of Boston were required by the Legislature to prosecute studies with reference to the electrification of their passenger services within this district and to present reports upon such work. Now, it quite goes without saying that any reports presented under duress of this kind were morally certain to be adverse, as they have proved to be, since not even the most amiable railway company can be expected to minimize its difficulties when a large possible expenditure confronts it. It is well, however, to look into the circumstances which would attend electrification around Boston with the view of pointing out some of the difficulties and some of the favoring factors to which perhaps too little weight has been given in the present report.

Boston is served by three railway systems, one of which, the Boston & Maine, now leased by the New Haven Railroad, enters on the north; another, the old Boston & Albany line, now leased by the New York Central & Hudson River Railroad, on the west, and the New Haven Railroad proper, which serves the south and west. Each conducts a large and important suburban service in addition to through service. The entrance to the city on the north is fairly free; that on the south and west is at one point well within the city very much cramped, inasmuch as the Boston & Albany system and that part of the New Haven lines which passes through the Back Bay Station have far too little track room for the heavy traffic conducted. These systems are the ones upon which the necessity for electrification is the most acute since the South Station and its approaches come well within the densely populated part of the city and lie along lines which make the smoke nuisance reach its maximum. The Boston & Maine system, on the other hand, comes in over the waterways from the north without great crowding of the tracks and without running for any considerable distance through densely populated and thickly built territory. On the north, therefore, the operation of the system by steam is much less of a nuisance than on the south and the terminal conditions are upon the whole much easier.

The total number of passengers handled at the North and South stations respectively is about the same, about 25,000,000 a year in each, representing both local and through traffic. The lines from the two stations after getting out of the immediate city spread like the ribs of a fan, taking up the suburban districts, and the total mileage involved becomes rather large. The New Haven lines aggregate about 238 miles, the Boston & Maine about 224 miles and the Boston & Albany lines about 128 miles, when the electrification is carried out somewhat beyond the Metropolitan District to South Framingham, which seems to be the logical terminus for an electrical service. Altogether about 590 miles of single track are involved in the electrification

district, an amount relatively very large considering the traffic, which one may roughly estimate at about 100,000 per annum per mile of track to be electrified. This ratio is upon its face somewhat unfavorable when one considers that under the estimates given the cost of electrification amounts to about $66,000 per mile. Particularly is this the case when one remembers that the bulk of the area considered lies within a 10-cent fare limit on the electric lines now serving parts of the same territory.

On the other hand, considering the nature of the service over a large part of this territory, an average of $66,000 per mile for changing to electricity, including equipment, is a figure which strikes one familiar with the operation of suburban and interurban electric lines as enormously high, and universal experience in the operation of such lines near large cities indicates that the passenger traffic on an existing steam line is far less than that which would be obtained if the line were electrically equipped. This, of course, has not been taken into consideration in the necessarily somewhat cursory investigation made by the railroads concerned. As a general rule figures made from the steam railroad standpoint upon electrification would differ radically from those presented by expert electric railway operators confronted with the same traffic problem. In the one case provision is made for maintenance of steam railroad conditions in the electrified system, while in the other case estimates are based on intimate knowledge of normal railway conditions given the advantage of splendid roadbed and private right of way. From this viewpoint the electrification of lines in the district which we are considering would present two quite distinct problems: First, the terminal electrification for handling through traffic by electric locomotives within the area affected. Second, the conversion of the suburban lines into first-class electric roads for the class of service undertaken.

Until the proposed electrification is taken up from the electric railway manager's point of view it is perhaps premature to pass judgment on its financial outlook or to indorse the intimations conveyed by the railroad systems concerned, that electrification would of necessity imply considerably increased passenger charges.

We would like, for example, to see worked out by the experience of the Boston Elevated Railway Company a scheme for the inclusion of the Albany circuit, which carries suburban traffic to the westward, from the standpoint of an efficient auxiliary to its own lines. The Boston & Albany Railroad figures out that it is actually losing money on its total service within the zone to be electrified under the present conditions of steam operation, but we have strong inclination to the belief that if this service could be turned over to a skilfully managed electric railway organization familiar with the problems involved it could be electrified and be made to show a good profit. Similar conditions hold in other parts of the Boston suburban system. One can readily pick out from this system lines which evidently are now run at a loss which as electric lines could in all probability be made traffic winners to an extent which would set the balance sheet right. In some of these instances, as in the Albany circuit, it might not be a bad idea for the roads now losing money on them to see if some equitable leasing arrangement could not be made by which lines could be operated electrically with returns to the present owners at least on the right side of the ledger.

We have consistently maintained through the whole period of discussion about electrification that successful electrification involved much more than the substitution of motive power in an existing steam service. In includes both the handling of trains by electric locomotives and the conversion of subsidiary suburban lines into well equipped and operated electric roads, such as almost universally offer opportunity for profitable operation. There is at present almost universal complaint on the part of steam roads that their suburban services do not pay On the other hand, it is well established that electric suburban lines with termini in large cities tapping a populous suburban district pay and pay handsomely. It would seem wise therefore not to consider the subject of the Boston electrification as a closed issue, but to have it more thoroughly worked out, especially with reference to individual suburban lines, as indeed Mr. McHenry suggests, with a view of seeing whether the actual conditions may not prove to be more favorable than appears in the report on the entire system.

REWARDING MOTORMEN FOR SAVING POWER

The saving of power through devices for checking the operating characteristics of motormen is as yet a new subject in this country, but it may not be premature to consider how the motormen themselves may be induced to co-operate with their employers for this purpose. Whatever may be the comparative merits of wattmeters, ampere-hour meters, current clocks and coasting clocks, the maximum benefits from their use cannot be obtained unless the men are educated to regard them as something else than automatic spies. Such a favorable mental attitude can be secured only when it is made clear to the men that the device helps to distinguish the careful from the wasteful motorman, and to bring merit prominently before the management. Since a number of American electric railways are beginning to install current-checking instruments it may be interesting to summarize the treatment accorded to their employees by the numerous Continental street railways which have had several years' experience with this problem. From a recent report to the International Street & Interurban Railway Association it appears that some of the companies rely for good results merely on disciplining the men by obliging them to take further instructions, by posting comparisons in the car houses, or even by threats of dismissal. Others advance the period when a man's pension privileges go into effect. But apparently the most satisfactory method is to present bonuses or to promote the leaders to the position of motorman instructor. One company divides into three grades all men who have worked at least 22 days in the preceding month. These divisions are based on the percentage of power saved within certain limits. The men in the first class receive almost an hour's pay for each day of service in addition to their regular wages; those in the second class receive 20 per cent less, and those in the third class receive 40 per cent less than the first-class men. There is no question that some such plan of rewarding the motormen is desirable, because the chances for promotion from the ranks are comparatively few, and even if they were not, the best motorman would not necessarily prove an equally reliable instructor or inspector.

It is impracticable to increase the wage rate indefinitely merely on the basis of seniority, but a monthly bonus for good service is an incentive which helps the best motormen to earn more money whether they have or have not reached the wage limit for length of service.

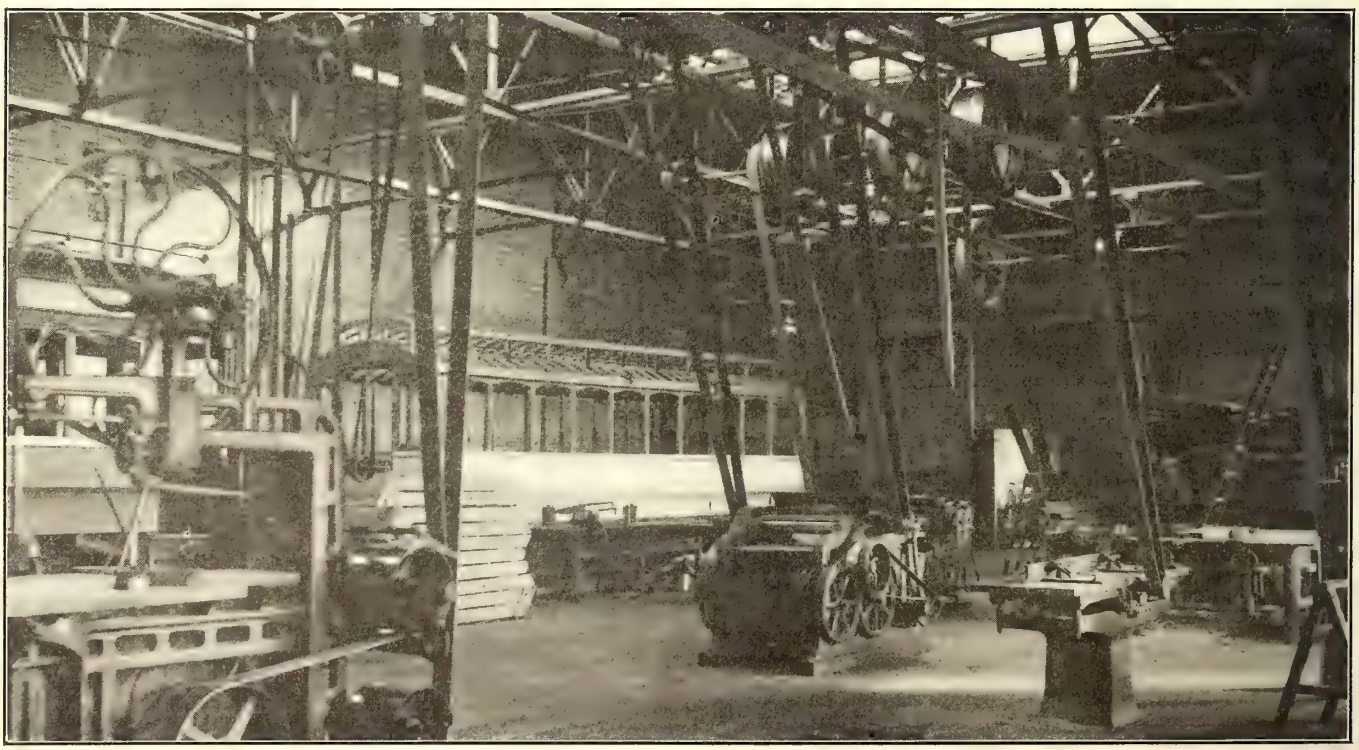
REPAIR SHOP PRACTICE OF THE PORTLAND RAILROAD COMPANY

One of the most extensive electric railway repair shops in New England is the installation of the Portland Railroad Company, at Portland, Maine. Although the shops were erected several years ago their design and equipment have proved to be so well adapted to the maintenance requirements of the system that substantially no rearrangement of departments has been necessary, and the initial equipment has largely sufficed. New storage and stockroom facilities have lately been added, and the shops illustrate in a marked degree the advantages of concentrating repair work on a medium-sized system, leaving only emergency adjustments and replacements of a lighter character to scattered car houses. Routine inspection and cleaning are performed at all the company's car houses and division headquarters, but practically all important repairs are executed at the main shops.



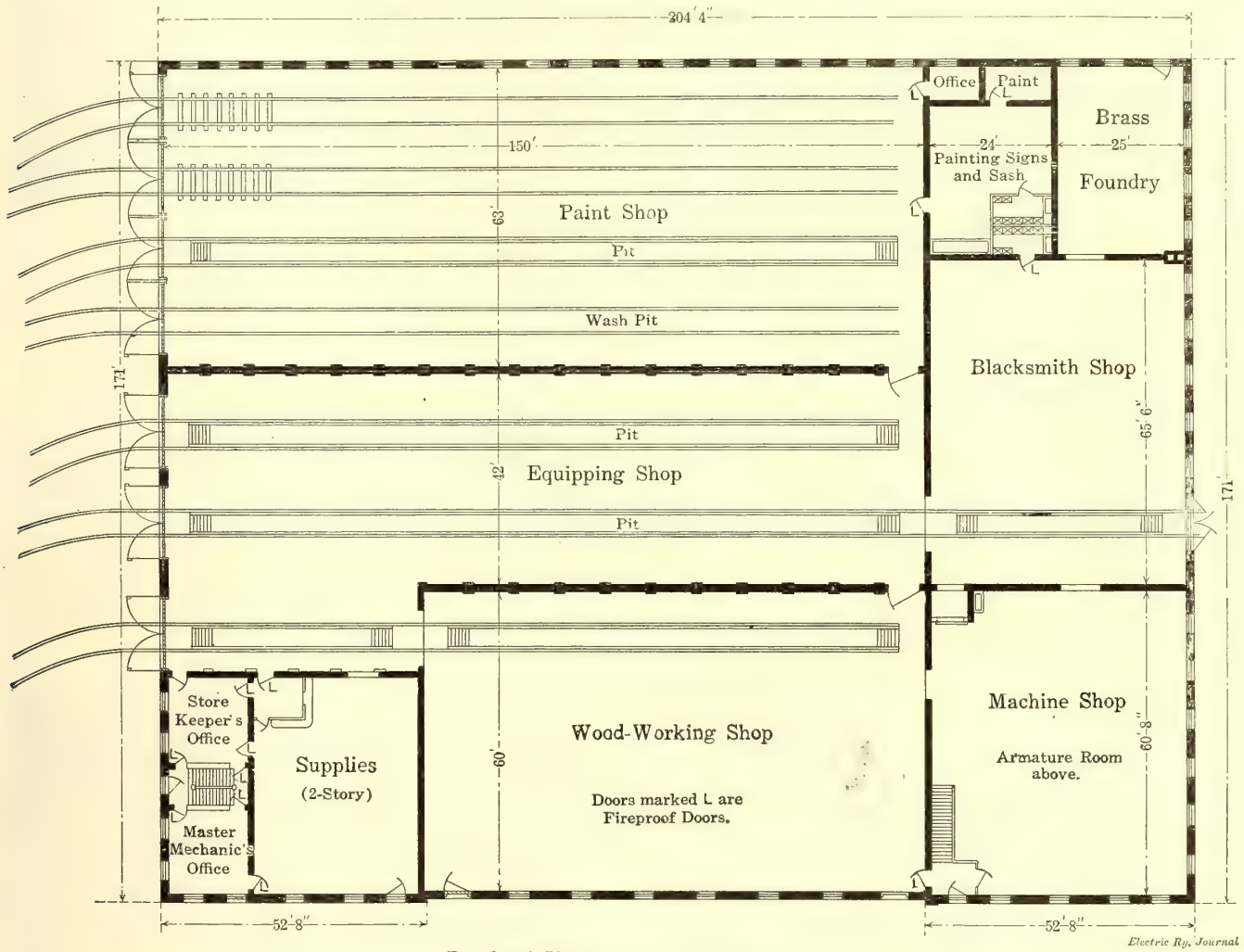
Portland Shops—Exterior of Repair Shops

The shops are situated at the base of the Western Promenade, on St. John Street, Portland, adjoining the main line of the Boston & Maine Railroad and approximately 2 miles from the business center of the city. The plant was designed by the engineering firm of Sheaff & Jaastad, Boston, during the administration of the late E. A. Newman, who preceded W. F. Berry as general manager of the company. In general, the buildings are of brick and steel construction, with concrete foundations and steel roof trusses for all departments. Adjoining the shops are the principal storage car houses of the system in the city, the latter being of the same general design as the former. Special attention was given to fire protection in the construction of the plant. All departments are equipped with a sprinkler system installed by the General Fire Extinguisher Company, of Providence, R. I., the water supply being taken from a 10,000-gal. wooden tank carried on a steel tower in the yard between the car house and the shops. The property is well equipped with hydrants, hose and chemical extinguishers, city water service, telephone and fire-alarm facilities, a special alarm box being located in the yard. All departments are provided with interior telephone connections with a special button for making calls on the local Bell system. In departments where the work is so noisy as to interfere with telephoning sound-proof booths have been built by the company, a favorite method of construction being the use of discarded end doors of closed cars. In one instance a locker booth is employed. Brick fire walls 16 in. thick separate the various divisions of the shop, the partition walls being carried 2 ft. above the roof level in the majority of cases. Self-closing, metal-lined doors are used throughout. The floor construction consists of granolithic material on one-story sections and slow-burning wooden flooring in the portions of the shop where two stories are built. At each end of the shop building is a two-story section, containing offices for the master mechanic, stockroom, an upholstery room and armature-winding department, with machine shop below the latter.



Portland Shops—Carpenter Shop Showing Closed Car Under Construction by Company.

The shop property is about 205 ft. x 171 ft. in dimensions and has repair facilities for about 250 cars. The general arrangement consists of a narrow yard connected with the street tracks by a short curve, from which branch tracks are carried into the building in seven parallel lines. At the front of the shops are the paint shop, washing facilities for cars, equipping shop and office section, with a stockroom behind the latter 50 ft. long, 43 ft. wide and 16 ft. high. The interior tracks are carried in each case about 140 ft. into the shop building and terminate in front of a fire wall separating the sections where larger work is performed from the machine shop, blacksmith shop, minor painting and fitting quarters. Behind the stockroom and office is a carpenter shop served by one of the interior tracks, and at the rear of the latter is a general machine shop. The blacksmith shop is located at the rear of the paint and equipping departments and is served by an extended track which has proved of great convenience in the handling of trucks. The tracks inside the shops are from 15 ft. to 18 ft. apart on centers, and the provision of this space has greatly facilitated rapid painting and general maintenance work. Pits are installed beneath the tracks in the carpenter and equipping shops, and one paint shop track is provided with a pit. The pits are carried throughout practically the entire length of the track, and a pit is built under the track which is carried into the forge shop. At fire doors the trolley is discontinued on each side of the wall. The general shop arrangement is characterized by very short runs between departments, and the operating convenience of the shops is unusually noticeable. Large doors are provided in the carpenter and blacksmith shops to facilitate the entrance and egress of supplies.



Portland Shops—Plan of Shops

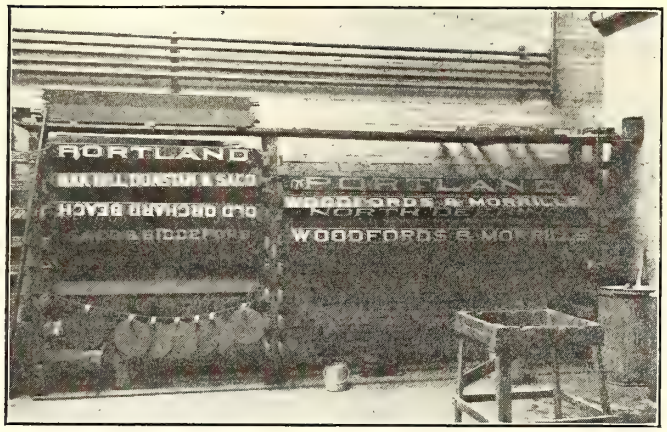
LIGHTING AND VENTILATION

The natural lighting facilities of the shops are excellent, a liberal apportionment of both side and skylight equipment being provided. The paint shop is provided with five monitors. The company coats the glass in each every spring with a thin glazing of oil paint. This keeps the sun out in the hot season, and at the same time washes out by fall, leaving a clear glass in the winter, when the warmth and the light of the sun are most needed. Three ventilators are installed in each of the paint shop skylights, the latter being of ribbed glass construction. The natural illumination of the carpenter and equipping shops is gained chiefly through similar skylights. Both arc and incandescent lights run off the railway circuit are utilized in the shops. General illumination in the paint shop is secured by arc lamps of the inclosed type with diffusing reflectors, and the woodworking division is similarly equipped. In the machine and armature shops incandescent lamps, wired either singly or in clusters, are employed more generally. The use of a concrete floor in the paint shop aids materially in the distribution of light. Four inclosed arc lamps are in service in the carpenter shop for night use, and incandescents are used at benches and for localized illumination. The walls are painted a light yellow with a dark green border extending 5 ft. above the floor, and the working space between the track and the division wall is lighted by a row of 16-cp incandescents hung one from each truss and 9 ft. apart. Two inclosed arc lamps are provided in the general machine division. The blacksmith shop is lighted by three inclosed arc lamps and numerous incandescents for local service. In the equipping division and in pits lighting circuits are installed with plug connections so that portable lamps may be cut in wherever desired. At the end of the paint shop is a sign and sash room, 24 ft. x 32 ft., provided with an inclosed arc lamp and large skylight.

HEATING

The shops are supplied with steam heat from a central boiler plant serving the entire property. This contains three hori-

zontal return tubular boilers rated at about 50 hp each, the steam usually being supplied at from 1 lb. to 5 lb. pressure. The service for the repair shops is brought over by an insulated 10-in. main carried in a riveted steel framework which spans the entire distance between the shops and the car house section, the boilers being located in the latter portion of the property. Direct radiators are used for the heating of the office section, but in general the various departments are heated

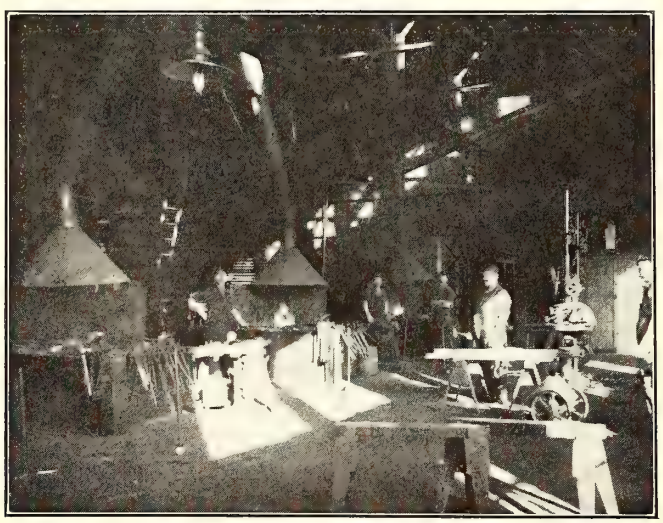


Portland Shops—Storage Racks for Car Signs in the Paint Shops

from sets of horizontal pipe coils carried along the walls at a height of about 10 ft. from the floor.

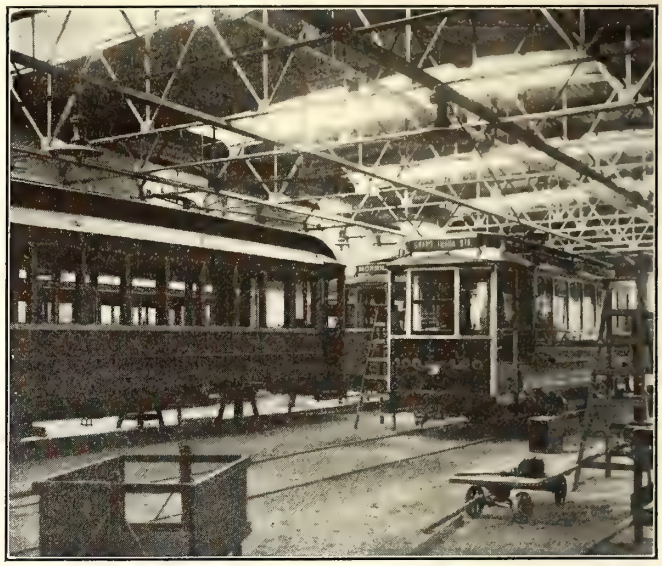
LOCAL TRANSPORTATION

Unusual care was taken to provide adequate transportation arrangements between different departments, so that heavy work need not be delayed in progress through the shop. The equipping shop is provided with four hand hoists of 4 tons capacity each installed on runways so that they sweep the entire division longitudinally. The hoists are carried on travelers suspended from wheels which run on longitudinal girders without interfering with the movement of trolleys. By means of this equipment the use of jacks is unnecessary in handling car bodies when the latter are freed from their trucks, and assembling or dismantling is much facilitated. The benefits of overhead hoists on runways have been recognized in other departments as well, a 2-ton outfit being installed to operate



Portland Shops—Blacksmith Shop

between the blacksmith and the machine shops, connecting the extreme ends of each department and serving floor space not reached by the longitudinal tracks. The fire doors between the two shops are cut away for the runway girder, but the clearance is made close to avoid drafts in case of fire. A Morse-Williams electric elevator is installed to connect the machine shop and the armature department on the floor above. The elevator platform is about 7 ft. x 5 ft. in dimensions, and the drive is by a 10-hp, 550-volt motor. The blacksmith shop is also served by this elevator, and tinned doors are installed for fire protection. The machine tools in the general repair section

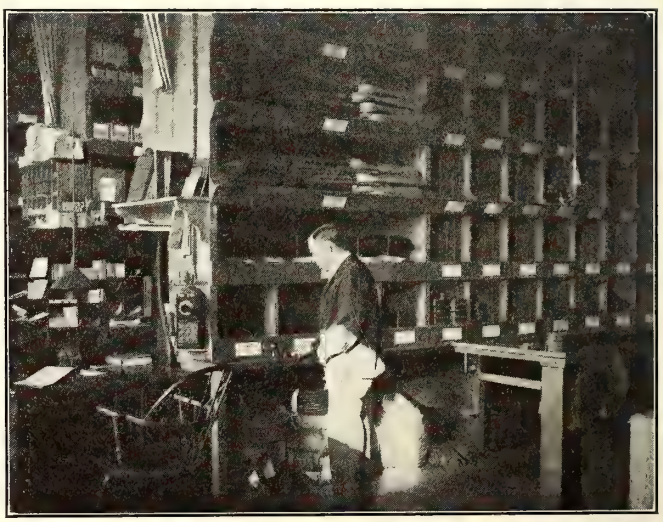


Portland Shops—Paint Shop; Window-Glass Truck in Foreground

are served by the same hoist that is used to convey material between the blacksmith and machine shops. Local transportation within departments is further facilitated by the use of hand trucks, notably in the paint and armature shops. In the former a truck is fitted up in the form of a cabinet, containing various drawers and compartments so that enough painting equipment for the needs of an entire car can be readily moved about the shop without the necessity of frequent trips to and from the stockroom. Another portable truck is provided with grooved slides on its upper portion, so that all the window panes required by a car can be kept conveniently at hand. The armature trucks consist of wooden frames supported on a pair of wheels, with wooden handles and wrought-iron braces, the framing being notched conveniently to receive the shaft.

WOOD-WORKING SHOP

The wood-working shop contains a circular and split saw



Portland Shops—Stock Room

bench, band saw, jointer, cutting-off saw, grindstone, mortising and basing machine, shaper and irregular molding machine, planers and lathes, all group-driven by a 30-hp, 550-volt direct-current shunt motor. The motor is controlled from a starting panel mounted near the floor level, the motor itself being on timber framing near the machine-shop doorway. The starting panel contains an ammeter, knife switches, Chase-Shawmut fuses and automatic release circuit-breaker and start-

ing switch. In case the current supply is cut off from the shops the automatic switch opens the motor circuit, stopping the machinery until the line becomes alive again, when the switch throws the motor into service by gradually cutting out resistance until full speed is attained. The various machines in the carpenter shop are belted to short countershafting and pulleys carried on the under sides of the roof trusses, the belting for the most part being away from the skylights. One of the minor conveniences of the carpenter shop is an octagonal set of drawers assembled in a single case for housing different sizes of screws. In general the drawers are triangular in shape, each being labeled with the size contained, and the cabinet is accessible from all sides, so that two or three men can work at it simultaneously without interference.

PORTLAND RAILROAD COMPANY

DEPT. No. ..... DATE 191

STOREKEEPER: DELIVER TO BEARER THE FOLLOWING MATERIAL:

DEBIT ORDER NO.	DR. CHECK	CREDIT ORDER NO.	CR. CHECK

QUANTITY		ARTICLES	PRICE		AMOUNT	

O. K. ENTERED

FOREMAN STOREKEEPER

Portland Shops—Requisition on Stock Room by Department Foreman

PORTLAND RAILROAD COMPANY

DEPT. ..... DATE 191

MATERIAL

DEBIT ORDER NO { PASSENGER CAR NO. / SERVICE CAR NO. / SNOW PLOW NO } DR CHECK | CREDIT ORDER NO | CR. CHECK

QUANTITY		ARTICLES	PRICE		AMOUNT	

O. K. ENTERED

FOREMAN STOREKEEPER

Portland Shops—Storeroom Record Showing to What Cars Stock Is to Be Charged

MACHINE SHOP

The machine shop is about 61 ft. x 52 ft. in dimensions, and contains a 125-ton hydraulic wheel press, engine lathes, milling machine, boring machine, drills and planer with a 9-ft. bed. A 15-hp, 550-volt direct-current motor drives these machines in group, the motor being also mounted upon the floor and located near the carpenter shop wall to secure convenience in driving and economy in wiring. The motor is provided with an automatic release and starter of the same type that is used in the carpenter shop. The blacksmith shop, 65 ft. x 52 ft., is equipped with three forges provided with forced draft, and a screw machine, 28-in. drill press and power hammer, all driven by a 10-hp, 550-volt motor installed on an overhead platform at one side of the room. The air supply for the forges is furnished by a fan blower direct-driven by a 2½-hp motor, the air being delivered to the forges by an underground duct. The forges are ventilated by galvanized iron hoods and discharge pipes leading to the roof. Storage racks for bar iron are provided on the walls. A wooden floor is used on account of its ability to withstand scoring by heavy pieces of metal. Any piece undergoing repair can be readily transferred to any point in the shop by the traveling hoist mentioned above. In general the bottoms of the pits are of concrete construction and the sides are of brick.

PAINT SHOP

The paint shop is provided with a fireproof oil storage-room with high concrete threshold and air-tight metal-covered door. The walls are carried to a point 4 ft. above the roof level, and are capped by a skylight. The window-glass truck is equipped with an extension rack to fit all sizes of panes used by the company and carries a paint press in addition to paints and brush equipment. The sign section of the paint shop is equipped with a rack capable of holding both end and side signs near

PORTLAND RAILROAD CO.

Number | TIME TICKET. | Rate

Date, ... 19....

Name, ...

ORDER NO.	DESCRIPTION OF WORK	HOURS	AMOUNT

Correct,

Foreman.

PORTLAND RAILROAD CO.

DEPARTMENT	DATE	ORDER NO

DESCRIPTION

DRAWING OR PATTERN NO	SPECIFICATION NO	DATE WANTED

RETURN THIS SLIP PROMPTLY WHEN WORK IS DONE.

PORTLAND RAILROAD CO.

STANDING ORDER No.

DRAWING NO	SPECIFICATION NO	DATE

For ..... Dept.

REQUISITION NO	DATE WANTED

Description

CARPENTER SHOP	BUILDINGS AND FIXTURES
TRUCK AND MOTOR DEPT	POWER PLANT
WINDING DEPT	CAR SERVICE
BLACKSMITH SHOP	CARTING
MACHINE SHOP	DEPT.
UPHOLSTERING DEPT	REPAIR SHOP
PAINT SHOP	
TRACK AND ROADWAY DEPT	
ELECTRIC LINE DEPT	

APPROVED .....

Portland Shops—Standard Form of Time Ticket, Requisition by Storekeeper for Job Work, and Order for Departmental Manufacturing

the wall. Sixty-four signs can be stored in a space 16 ft. long, 32 in. wide and 7 ft. high. Adjustable racks are also provided in this room for window-sash storage, and on one side a sink, with steam and hot-water connections, is in use, the sink being of a size capable of holding car doors. The window-sash car has a capacity of 2000 lb. of glass and fittings. Car steps of the open type are painted by dipping them into troughs of black varnish, extra troughs being provided for dripping service. The company has given up the practice of using brushes fitted with kerosene oil reservoirs to allay dust, on account of its inconvenience.

ARMATURE ROOM

The armature winding department is equipped with banding and field coil winders and an engine lathe, group-driven by a 5-hp motor mounted on the floor. A 1-ton hand hoist is provided for local transportation, and the department has recently been equipped with a drying oven 6 ft. square and 4 ft. high, made of sheet iron ⅛ in thick, and set on an insulating plate of sheet iron and asbestos ½ in. wide. Four electric car heaters are used in the oven, and these are wired to switches so that three heats can be applied. The maximum current consumption is 10 amp at 550 volts. In this department a simple method of testing is practised by the use of incandescent lamps arranged in a group of five in series. Taps are taken off the terminals of one lamp, all the lamps being on a single portable baseboard. When the five lamps are in series the full line potential of 550 volts can be obtained at the terminal of the one with the taps, if the bulb is unscrewed, while screwing in the bulb gives a potential of 110 volts over the lamp terminals.

STOCKROOM

The stockroom is provided with an installation of 1000 storage bins arranged in tiers along the walls and in the center of the room. Each bin is numbered progressively, beginning with 1200 on the first tier, 2000 on the second and so on up to 10,000. The number of the tier and the row is indicated by the bin number. Portable drop lights of 16 cp each are installed between the tiers, and three portable wooden ladders attached to overhead runways are in service so that all parts of the stockroom can be reached with minimum trouble. The stockroom is in charge of a clerk who is on duty from 7:30 a. m. to 5:30 p. m. week days. Each of the bins is provided with a card label on the front, set in a tin frame costing $3 per hundred. The card gives the number of the bin, the article, its size and any further data necessary. All stock is delivered on the basis of car numbers, accounts of the work being kept for each piece of rolling stock. The forms used are of a simple character, consisting of a department foreman's requisition on the stockroom, an order blank to a department foreman for the manufacture of special parts and spare equipment, car house slip showing to what operating point material goes, and a record of the progress in spare part manufacture.

COMPANY MANUFACTURES

The company makes brush springs, motor bolts, cash register springs, deck sash openers, release spring hooks, door handles and other minor car fittings, the patterns being made in the carpenter shop and cast outside. Castings are brought into the machine shop for final tool work and assembling. The company manufactures a motorman's seat in its own shop, consisting of a turned wooden stool top attached by a U-spring to a ¾-in. steel rod bent in the shape of a letter "C" at the top and carried downward in a straight line to a floor socket 3 in. deep, the rod being recessed into the socket. The seat spring is 1 in. wide and ⅛ in. thick. Two clamps are provided so that the seat can be adjusted horizontally and vertically, and the simplicity of the device, as well as its comfort, has decided the company to manufacture a considerable number. The motorman simply lifts the seat out of the socket on arriving at the end of a route, and no space is occupied by a permanent end seat which is normally in use only half the time.

The company manufactures passenger and express cars in its own shops when the pressure of routine work relaxes. The standard passenger car is built with a 28-ft. body, has longitudinal seats and double trucks. Of the 210 cars now in service on the system about half are of the single-truck type. In the summer season the company takes off two of the four motors used in winter service on each closed car. It is now using a leatherboard headlining in place of veneered wood, and finds the moisture-proof qualities much improved.

The standard wheel used on the system is 33 in. in diameter, of cast iron. A few steel wheels are being tried in service at present, the company turning its own steel wheels when necessary, although the facilities for this work are not as yet satisfactory for rapid production. The wheels are taped to within 1/32 in. in circumferential measurement in the effort to produce similar dimensions. The standard axle is 4½ in. in diameter and the axle-bearing journals are 3¼ in. in diameter and 7 in. long.

Three Ridlon babbitting devices are in service in the shop, and the company turns its bearings before assembling them on the cars. All brass and iron castings are made outside.

About 45 men are employed in the repair shops. Time is kept on cards, showing the number of each man, his rate, the date, name, car number for which the work is planned, character of the work, hours spent upon it and the total amount due. These cards are signed by the department foreman after being passed through a recording clock supplied by the International Time Recording Company. C. P. Garland is the master mechanic of the company.

HEARINGS ON COMMUTATION RATES

Hearings in regard to the increase in commutation rates put into effect recently by the Pennsylvania Railroad, the New York, New Haven & Hartford Railroad, the Erie Railroad and other railroads operating into New York were held in the Waldorf-Astoria on Nov. 16, 17 and 18, 1910, before John M. Harlan, of the Interstate Commerce Commission.

On Nov. 16 the hearing was confined to the presentation of testimony by officials of the Pennsylvania Railroad. J. G. Rodgers, assistant general manager of the company, offered figures showing increase in wages for the decade which ends this year and the increase in the cost of fuel and equipment and the rise in taxes. The commuter to New York is hauled on the average 14 miles. Previous to July 20, 1910, the company received 11 cents for this service. It now receives 13 cents. The cost for each commuter in train expenses, according to Mr. Rodgers, was 9.13 cents, the cost to pass him through the Jersey terminal was 6.86 cents and the cost to ferry him to New York was 2.28, making the loss to the company 5 cents. In short, the railroad contributed to each commuter a portion of each fare received from a through passenger, the commuter paying barely more than the cost of passing him through the Jersey City Terminal and over the Hudson River.

R. H. Wallace, general passenger agent of the Erie Railroad and the New York, Susquehanna & Western Railroad, was the principal witness on Nov. 17. He did not know the financial condition of the road before the changes in the commutation rates were made in July, 1910, but the expense of conducting the commutation business was greater than the returns. He thought that in the case of sections where the cost of the road was higher than in others the rates should be proportionately higher. This was not possible, however, as a compensatory rate would make the commutation rate prohibitive. The making of improvements was one of the considerations which influenced the increase of rates. Commuters should bear the same proportion of terminal charges as other passenger business. It was necessary for the road to increase its revenue in order to better its facilities.

L. F. Vosburgh, general passenger agent of the New York Central & Hudson River Railroad, testified on Nov. 18, 1910, in regard to the business of that company in transporting commuters over the West Shore Railroad. At this hearing considerable testimony was presented on behalf of the commuters regarding the effect which the increases in rates on the various roads has had on the development of the towns which the roads serve. Briefs will be submitted to the commission in January.

MEETING OF RAILWAY COMMISSIONERS

The twenty-second annual convention of the National Association of Railway Commissioners was held at the headquarters of the Interstate Commerce Commission, Washington, D. C., on Nov. 15 to 17. Representatives of the Interstate Commerce Commission and of nearly all of the State railroad commissions were present.

Officers were elected for the ensuing year as follows: President, R. Hudson Burr, Florida Railroad Commission; first vice-president, Charles F. Staples, Minnesota Railroad & Warehouse Commission; second vice-president, O. P. Gothlin, Railroad Commission of Ohio; secretary, W. H. Connolly, Interstate Commerce Commission; assistant secretary, William Kilpatrick, Illinois Railroad & Warehouse Commission.

The next meeting will be held in Washington, D. C., on Oct. 10, 1911.

The committee on accounts and statistics of electric railways had no report to make at this session.

SAFETY APPLIANCES AND INTERURBAN ACCIDENTS

William Kilpatrick, secretary Illinois Railroad & Warehouse Commission, presented the report of the committee on safety appliances. An abstract follows:

"At the last session of the Congress important action was taken looking to an increase in safety of railway operation. This action is represented by two measures, one providing for the standardization of railway safety appliance equipment, and another act providing for the investigation of railroad accidents by the Interstate Commerce Commission.

"Serious collisions, accompanied by great loss of life, have recently occurred upon interurban electric lines. The rapid development of these lines during the past few years has emphasized the unsafe methods under which they are operated. The interurban lines now carry a considerable percentage of the passenger traffic of the country, and it has become necessary in the interest of public safety that they be placed under regulations with respect to train operation fully as strict as are the regulations applying to steam railroads. Moreover, as these lines are largely intrastate in character, their regulation can only be properly effected by the States. Up to the present time no proper methods of inspection nor adequate systems of rules looking to the safety of train operation have been applied to these roads. The personnel of these lines is very much less efficient than the personnel of steam roads, and both motormen and conductors are employed who are without railroad experience and have no proper sense of the responsibility connected with their employment or the importance of the duties they are called on to perform.

"The rules and regulations governing the movement of trains on these lines are in many cases also crude and ill constructed. It would seem the part of wisdom for this convention to go on record as favoring a uniform system of standard rules and regulations for interurban lines and recommending that the block system be absolutely required. The arguments for the use of the block system on steam roads apply with much greater force to electric lines, where discipline is more lax and deficiencies in personnel are greater than upon steam roads. On steam railroads before a man can be placed in charge of a train he must have had several years' experience in train service. He must also pass a thorough physical examination, both with respect to his hearing and eyesight, and to his general physical soundness, before being employed in any capacity in train operation. The same system should apply to electric roads.

"In considering matters that will tend to lessen dangers incident to train operation the committee does not wish to confine itself purely to mechanical safety appliances.

"For many years the American Railway Association, a body of men composed of the highest officials of the principal railways of the United States, has been endeavoring to standardize the rules and regulations governing the movement of trains, but with only partial success. It is true the work which that association has accomplished has been of incalculable value, and the standard code of train rules is recognized in a greater or less degree by all lines, but only on a very limited mileage are these rules in force in their complete form.

"These rules have been adopted by a large majority of the railroads of the United States, at least in part, but it will be found that on almost every railroad, and, in some instances on separate divisions of the same road, a few or many of the rules differ from the standard.

"Now, it would certainly seem that no more beneficial safeguard to trainmen and the traveling public could be devised than the adoption and enforcement of a uniform set of standard rules, so that on all railroads in the United States each signal would mean exactly the same thing.

"The safe operation of trains largely depends upon the training of the men to perform automatically certain duties in certain specific emergencies. Trainmen are more or less possessed with wanderlust, the nature of their work and easy means of transportation encouraging such desire for change. Comparatively few can be found who have worked for one system only. Some few rules are almost universally the same on all roads, but many of the rules and regulations which every road must have are not; consequently men changing from one system to another are constantly met with deviations in varying degrees from the standard; and there is always this additional unnecessary risk, that, in the confusion of an emergency, a man may do something that would be perfectly proper under the circumstances on some other line, but would result in loss of life and property on the road by which he is then employed. This is so plain to the practical railroad man that the necessity for absolute uniformity of rules governing train movement really needs no explanation. The difference between two railroad systems may be only slight, yet sufficient at some time to cause disaster. As long as trains move along on time, without obstruction, the dissimilarity of rules makes little difference, but when emergencies arise and men are working under pressure and excitement, at the very time when most important that all understand their instructions alike, they are liable to confuse or forget the proper thing to do unless their training has been along uniform lines.

"The Interstate Commerce Commission and many of the State commissions have men whose duty it is to see that the laws requiring uniformity of appliances for cars, such as automatic couplers, grab irons, ladders and other devices for the protection of the employees are enforced, so that now practically all cars are uniformly equipped. This, however, is only the mechanical part, and, if omitted entirely, would result in individual loss of life or limb, while a lapse of memory on the part of an employee accustomed to working under a different set of signals might mean a disaster involving the lives of hundreds and the destruction of thousands of dollars' worth of property.

"A road can be fined for having a drawbar lower or higher than a certain number of inches from the top of the rail, but there is no penalty for the failure of a brakeman properly to protect the rear end of a train occupied by hundreds of passengers; if his superior discovers his delinquency he may receive a few 'brownies' on his record, or, in extreme cases (generally after an accident), he may be discharged. And yet the obstacles to be overcome in enforcing uniformity of rules would be as nothing compared to the standardizing of equipment and there would be no large sums of money to be spent in the change. No additional burdens are placed on the carrier, the rules for the small line apply as well to the large systems, double-track lines are provided for, and an efficient employee of any line is immediately available for a similar position on any other line.

"The American Railway Association, while recognizing all of the above facts, has been unable to standardize for the very reason that it is without power to enforce, but can only recommend, even to roads members of the association.

"If this association would also go on record as favoring the enactment of such a law by Congress, it would be very helpful in securing this much-needed legislation.

"The state of development that devices for automatic control of trains have reached is nothing short of marvelous when we take into consideration the fact that this development has been reached not only without the co-operation of the railroads, but in the face of their active hostility. This development has undoubtedly reached its limit without extended use on railroads, but given that service which is the only means by which they can be developed beyond their present state there can be no doubt that they will rapidly develop to meet all possible contingencies of exacting railway conditions.

"Neither the public nor the railroads will get the benefits of automatic control of trains until its use is made mandatory by Congressional enactment, without which the Block Signal and Train Control Board can go on testing and reporting on various systems for an indefinite period and the state of the art will remain right where it is now and the railroads will have killed and crippled an army of our people. It is time for Congress to act. There are ample data upon which to base such action, and delay means a fearful cost in lives and money.

"This association should pass resolutions at this meeting calling upon Congress to take prompt action for the compulsory use of automatic control of trains. Such an act would, in reality, become an enabling act for the railroads, as it would and should of necessity grant a period of years in which to complete the equipment, the same as was done with the automatic couplers and air brakes, fixing a certain percentage annually. This is due the railroads to insure against excessive damages for accidents happening on portions of their road not equipped during the period of installation, provided they install in accordance with the prescribed period which Congress may designate."

The report was discussed by representatives of several commissions. J. C. Sullivan, Ohio Railroad Commission, said that he was a member of the committee and that he did not sign the report for the reason that there was criticism of the interurban lines which to a certain extent, so far as his State was concerned, he did not think was justifiable. A standard code of rules had been formulated in Ohio and since that time the roads had been going along fairly well.

J. C. Lawrence, Washington Railroad Commission, said that the Washington Water Power Company had installed, in connection with an electric automatic signal system, an automatic train control with an automatic stopping device and put it into practical effect at considerable expense.

John F. McClure, Indiana Railroad Commission, said that he thought the report should not be adopted in the form in which it was read. Recently there occurred two very disastrous accidents on interurban railroads in Indiana. In each instance the cause of the accident was the inefficiency of the men in charge of the cars, or at least one of the cars, that were in collision, due to the fact that they overlooked their orders or disobeyed rules. In the investigation, the commission ascertained that the length of time required for an applicant in train service, either for a motorman or conductor, was only about three weeks. His application was taken, he was examined physically, he was put in the shops to learn something about the construction of the car and its management, and he was given about two weeks after that, or three weeks as the case might be, in the nature of studentship upon the car, and then, when he was certified as being competent by one or three, as the rule happened to be upon different roads, as to his fitness to take charge of the car, he was employed.

It was found that the men in that branch of the service, Mr. McClure said, were paid from 18 cents to 25 cents an hour. In the aggregate the men would make from $68 to $70 a month, probably as high as $75. The commission came to the conclusion that the length of time in train service to enable these men to be put in charge of interurban cars was not sufficient, and recommended that they should have at least one year's train service, either upon side lines, upon work trains or in some service before they were given charge of a car.

It required a longer time than one year, under the rules, to obtain a position of similar character on steam lines, and Mr. McClure was inclined to think that the same standard ought not to be applied to the employment of interurban operatives as on steam railroads. Their service was not of such a complex nature, the trains were not so heavy and the mechanism of the cars was not so complex as the steam cars.

Another thing the commission ascertained was that the manner of blocking interurban roads was yet in embryo, so to speak. There was no automatic block, so far as the Indiana commission was aware, that was approved and in an acceptable condition for successful operation on interurban lines. It was true that steam roads have automatic block systems that are satisfactory, but the same kind could not be applied to electric interurban service and steam lines.

Mr. McClure added that there ought to be a little more flexibility in the wording as to the recommendation for block systems and as to the period of train service that shall be the standard of employment by the companies or the men operating the interurban cars.

George W. Dickinson, Michigan Railroad Commission, said he realized that in Michigan there was a great necessity for some power by the commission or some Federal authority to compel both steam and electric lines to put in use the block-signal system. He did not think the same rule would apply to the operation of electric roads as to the steam roads. It had been stated that in a good many cases the trainmen of electric roads were insufficiently trained and to his personal knowledge they had been put in charge of a car within 15 days after they left their previous occupation. He believed there should be some restrictions and that the report should require the electric railroads as well as the steam railroad companies to supply some block-signal system. In Michigan the electric lines had been asked to block their curves, especially when the view was obstructed, and they were working on that plan to-day.

Mr. McClure moved that the recommendation with reference to block signals on interurban roads, and the standard of previous employment before the employee is given charge of trains either as motorman or conductor, be amended by substitution of the following: "By recommending the enactment of a law requiring interurban electric roads to be adequately blocked and that greater train service be required as the standard of employment thereon than now exists." He also added, in accordance with a suggestion by Mr. Lawrence: "And that power be given to the Interstate Commerce Commission to require the use of a uniform code of signals on all interstate railroads throughout the United States."

With these amendments the report was adopted.

RAILROAD TAXES AND VALUATION

J. C. Lawrence, Railroad Commission of Washington, presented the report of the committee on railroad taxes and plans for ascertaining the fair value of railroad property. An abstract of the report follows:

"In 29 States the railways are taxed on a property valuation only; in five States on property value and specific taxes; in four States on gross receipts; in three States on property value and gross receipts; in two States on capital stock and gross receipts. In the remaining States various other methods are used. It will be seen at a glance that the question of property value is of the greatest importance. There is some difference of opinion as to whether the valuation of railroad property for assessment purposes and for rate-making purposes is the same. Without entering into a discussion, we will assume that a valuation of railway property for rate-making affords a basis of valuation for taxation purposes.

"In any fair method of determining the value of railroad property, such determination should be made with notice to the company whose property is to be valued. Whether such valuation is made under the provisions of a statute directing the course of procedure or not, common fairness and the value of the results to be obtained demand that the valuation be made with notice to the company and that it be given an opportunity to be heard and a full and impartial consideration be given to the testimony submitted by it.

"Conversely it is true that a railroad company whose property

is to be valued by a railroad commission should give such commission and authorized representatives full access to its records for the purpose of securing information and verifying all statements made.

"The most important facts on which to base a determination of the value of a railroad property are: First, the actual cost of construction; second, cost of reproduction, new; third, the depreciated value; fourth, the amount and market value of stock and bonds issued, with a full financial history of the road; fifth, the density of population and traffic; sixth, the nature and permanence of population and traffic; seventh, facilities for doing business; eighth, physical characteristics; ninth, the amount of earnings and operating expenses.

"All of the facts named are pertinent to the inquiry as to the market value of the property, but none is controlling. A given railroad property may be actually worth only half as much as it originally cost, the cost of reproduction or depreciated value, or it may be worth double the amount in either case. The amount and value of stocks and bonds may have only a remote bearing on the question of real value, according to the reflection of true value in such market value. The density of population and traffic are only indications of probable amount of business to be transacted, not necessarily the earning capacity of the road, except when done at a remunerative rate. The nature and permanence of population and traffic are factors affecting the earning capacity of the road in the future. A road may have ample facilities for doing business without business offering commensurate with such facilities. The physical characteristics are of more vital importance when in the presence of a competing carrier which is operating under more favorable conditions. It is, therefore, apparent that the elements named and other elements which may appear during the progress of the inquiry are only important steps leading to a conclusion which may be summed up in answer to the question: 'What is the ability of the company now and in the future to earn money as a going concern at a charge of reasonable rates?' The considerations which would govern a prudent business man in the purchase of the property, or the owners in fixing a selling price, are the same considerations that should govern a railroad commission in determining the market value of a railroad property.

"The construction records are the best source of information as to construction quantities on which to base a determination of cost of reproduction. While surveys in the field might give information on which to approximate such quantities, such surveys, for this purpose, are open to two principal objections. The first is the cost of doing the work, and the second is inaccuracy of results. In a field survey it is difficult to determine the original ground line, hence impossible to determine grading quantities with any degree of accuracy. It is difficult to determine the amount of work encountered in the construction of bridge piers and abutments and other classes of difficult and expensive construction of which nothing remains visible. Without the actual records of construction accurate quantities can never be ascertained. The term 'original cost of construction' should be applied to the complete cost of the company up to the date of valuation. The term 'actual cost,' as we use it, is synonymous with original cost, but we think it less likely to be misleading.

"The cost of reproduction, new, means determining all construction cost as of a given, recent date. It is found by multiplying the construction quantities, as secured in construction records, by the prevailing unit prices of material and labor. To this amount should be added engineering, superintendence, legal and general expenses, interest during construction, discounts and contingencies, with an allowance for sufficient stores and capital on hand for operation. The cost of reproduction of right-of-way and terminals should be determined in exactly the same way that careful and prudent business men would estimate the cost of producing such right-of-way and terminals in the construction of a new line. The cost of reproduction of right-of-way and terminals cannot be worked out by rule, but will vary according to the conditions met in each locality. It is the most uncertain and variable element in estimating the cost of reproduction. It is dependent not so much on the price of adjacent property as on the conditions encountered. The market value of adjacent property can be determined within reasonable bounds of accuracy, but the multiple to be used is a question of the judgment of men familiar with the work of obtaining right-of-way and terminals for railroad purposes and the correctness of the result depends on the accuracy of judgment used. The increased value should be allowed in determining the cost of reproduction, new, if the elements entering into the cost of production have increased over original construction to exactly the same extent as would be done in lowering values could the property be reproduced new at less than the original cost. Not only is the railroad company entitled to the unearned increment to the same extent as other property owners, but a failure to allow for such increment would be an injustice to a new, competing line and would discourage competitive building. This is illustrated where a new company, in a given locality, say, in a large city, would have to pay for necessary terminals several million dollars more than an older line with a similar amount of property, it being generally true to-day that the cost of securing right-of-way and terminals has greatly increased over former years.

"The depreciated value of the property can be ascertained by the application of what might be termed mortality tables. First determine the average life of each element, then multiply the cost of each by the per cent of years in use to the average life. The time in use can be ascertained by the records of the company. Where elements of the same class are of different values, such as structures, it is a simple matter to calculate the average age of the money invested, which is what is needed to secure a true measure of the amount of depreciation. For instance, if the average life of a wooden structure is 25 years, and one structure costing $1,000 has been in existence 10 years and another costing $5,000 has been in existence 20 years, the average age of the two is not 15 years, but is found as follows: $1,000 × 10 years = $10,000 one year; $5,000 × 20 years = $100,000 one year; $110,000 ÷ $6,000 (total value of structures) gives 18 1/3 average years in use, or 73 per cent the depreciation on the total cost, or $4,400 depreciation. In some instances there is a scrap value after the full life in use, such as rails and steel structures. In such cases compensation should be made by allowing a life somewhat in excess of what it actually has in practical use or modifying the annual depreciation.

"The depreciation of the physical property of a railroad affects the determination of the market value according to conditions encountered, the age of the railroad valued and the efficiency for operations found. During the first few years of the life of a railroad there is little demand for renewals due to wearing out of the ties, rails, bridges, structures and equipment. There is a depreciation, it is true, but not to the extent requiring renewals. At the same time there is an appreciation in the value of the roadbed, due to what is termed 'seasoning,' the settling of embankments requiring a filling in to bring up to required grade and width, clearing out and widening cuts, etc., which require an unusual expenditure during the first few years, all of which adds to the value of the roadbed and must be taken into consideration in the valuation.

"At the end of the average life of a tie there will be a large percentage of renewals. At the end of the second period of such life a large percentage of such renewals will be again renewed. Some ties will be replaced before the average of period and some will last much longer. It is evident that in course of time the number of tie renewals from year to year on the same standard of efficiency will vary but little. This is equally true of rails, bridges, structures and equipment, with a different average life of each. To meet the extraordinary demand for renewals at the expiration of the average life of the elements referred to in the early history of a road good business prudence requires the setting aside of a depreciation fund. This fund is needed to equalize the cost of maintenance during the period extending from the beginning of

operation until the lapse of that period of time which will bring about an average of renewals from year to year when maintenance will take care of the renewals. When such time is reached the requirement of a depreciation fund will cease.

"Prior to this time the existence of a depreciation fund becomes a consideration in finding the value of the property. Take, for instance, two roads of short mileage, with a number of miles of pile trestle and some expensive wooden bridges, all of which have reached a period where renewals are necessary. One road has made no provisions for the cost of such renewals, while the other has set aside a depreciation fund from year to year. Such depreciation fund amounts to the cost of renewals and is equal in value to a road with such renewals made and is clearly of more value than the road which has set aside no depreciation fund and must meet the requirements of such renewals by an increase in rates. Such increased rates put a burden on future traffic that should have been borne in part by the traffic of the past.

"Having a physical valuation of the property, the next step is to determine the market value. While the physical value is a basis for such determination, it by no means fixes the market value. A road originally costing $5,000,000 may have been built principally for the transportation of forest products. Suppose the forests tributary to it have been exhausted, no other traffic has developed and the road has ceased to pay operating expenses, would the original cost determine its value? Would the cost of reproduction, new, or the depreciated value govern in such cases? Clearly not. No rule for determination of market value can be laid down. Fixed charges must be met, so a knowledge of outstanding issue of bonds and other obligations is necessary. A careful study should be made of the financial history of a road, its stock issue and all sources from which funds were secured for construction purposes.

"The density of population and traffic is one of the greatest importance, coupled with permanency of population and traffic Other things being equal, the facilities for doing business become an important factor. A road which has a long-established transportation business, with industries located on its tracks, warehouses, both public and private, to facilitate the movement of business, is of greater value than a new road lacking such facilities.

"The physical conditions under which a road is operated largely govern the cost of conducting transportation and directly affect the earning power of a road.

"Having the factors going to show the ability of the carrier to conduct business, with the amount and kind of business offering, a study of the earnings and operating expenses will show the ability of the company to earn money as a going concern. No better evidence can be secured in this regard than the actual earnings and operating expenses.

"From a consideration of all of these and other facts appealing to a commission, the market value of the railroad property will be determined. The determination of *market* value as a basis for rate making solves impossible problems presented in the mere *physical* value as measured in the cost of reproduction."

On motion, the report was received and printed.

POWERS, DUTIES AND WORK OF STATE COMMISSIONS

The report of the committee on powers, duties and work of State railway commissions, prepared by B. H. Meyer, of Wisconsin, who was unable to be present, was read by Clyde B. Aitchison. It was in part as follows:

"We can do nothing more profitable than to enunciate a few generalities relating to the inner organization of State commissions. While we are not advised with respect to the organization of all of the State commissions, sufficient information is before us to suggest that in many instances the character and dignity of the work of State commissions could be greatly enhanced through a change in their respective organizations.

"It should be too late in the day to advocate the proposition that every commission should be organized on the basis of merit. Unless we have been misinformed regarding types of organization still extant, there is much need for placing emphasis upon this simple elementary proposition. Whatever public money State commissions expend cannot be economically and efficiently spent unless every dollar thus expended is made to secure the very best service available at the time under the prevailing circumstances. Economy and efficiency in the administration of the office are obviously impossible under any system of political patronage. We recall an instance where a member of a State commission had recommended to him for employment an expert to do the particular work in which his commission was interested, but whom he was not permitted to employ, on the ground that the expert did not belong to the dominant political party. This commissioner complained that in his office everybody from the janitor up was obliged to be a member of the party in control and that no appointment could be made from outside the ranks.

"Entirely aside from other considerations, the assertion may be ventured that no political party embraces within its membership a monopoly of talent in any one particular line of endeavor, and proper selection of employees in any department of railway commissions cannot be made if party or any other similar arbitrary lines have to be adhered to. The Constitution has long forbidden the imposition of a religious test for public office, and for the efficient work of State commissions the imposition of political tests is as obnoxious as the imposition of a religious test. More than this, not only should commissions not be limited to special party affiliations in the selection of their staff, but they should be permitted freely to go outside of the borders of their respective States in order to get the kind of help they need if they cannot secure sufficient satisfactory assistance in their respective States. A commission should feel free to go wherever it pleases to employ its help, with the sole aim of getting the most competent force for the money which it can expend.

"The work of State commissions, irrespective of technical differences in the wording of statutes, should develop more and more along investigative lines. Every problem before a commission should be regarded as a problem for investigation and analysis. Every conclusion of a State commission should rest upon an analysis of the actual facts, and an analysis as thorough as it is possible to make. Conclusions which rest upon such an analysis of facts must prevail in the long run, irrespective of the particular direction in which they act. It should be beneath the dignity of every State commission to balance its decisions in such a manner as to maintain an equilibrium between adverse and favorable decisions in the same manner that boys agree upon their bargains with marbles. A commission must travel fearlessly with truth, and not with votes. We have heard it said that years ago a certain commission traveled with truth as long as truth and votes traveled in the same direction, but that when the two parted company the commission traveled with votes. In the long run votes will doubtless go with truth, and every action of a commission which caters to political feeeling, prejudice or expediency taints the path of truth. If commissions will take care of their work the ballot will protect this work."

The report was adopted.

ADDRESS OF MARTIN A. KNAPP

Martin A. Knapp, chairman of the Interstate Commerce Commission, made an address of welcome in which he said:

"It is easy to see that great progress has been made in the task which has been committed to our hands, and I have this encouragement, that when I contrast the methods and practices which were characteristic, if not universal, a score of years ago with the methods and practices which generally obtain to-day I can see an immense advance toward upright conduct and impartial treatment of the public. Quite as significant as this, to my mind, is the altered attitude of railroad managers toward the whole subject of public regulation; that, whereas it was then opposed, belittled, obstructed, it is to-day, if I may not say welcomed, at least conceded to be a public necessity.

"But I am not altogether persuaded that the scheme of public regulation has passed the experimental stage. I do not forget

that older countries than this, whose experience we may well consider, have, with only one notable exception, adopted the other theory and made their transportation lines a government service, and I am more and more impressed with the belief that upon the wisdom of our Legislature, the prudence and intelligence of its administration, depends in great measure, if not altogether, whether that experiment is to be permanently successful or whether the other and more undesirable result will be reached at no remote date.

"I realize in some degree the difficult and delicate questions which have arisen and must arise between State and federal authorities, and I can see in that direction the possibility of such disappointing and unsatisfactory results as, instead of promoting popular confidence in railway regulation, will furnish an impetus toward a movement in favor of the nationalization of our railway systems. That to me is a constant admonition that we should seek that substantial harmony of legislative measures and that substantial co-operation in our administrative policies that will result not only in the wise and useful regulation of our railway systems, but strengthen and confirm that policy as against government ownership."

ADDRESS OF PRESIDENT DECKER

Martin S. Decker, of the New York Public Service Commission for the Second District, read his address as president. He said in part:

"I think many of us have come to realize that through this association much of the necessary planning or groundwork of regulation may be successfully accomplished. We have about reached the time, I think, when investigations of related railway rates may properly include conferences between regulating commissions before determination. State commissions deal with a State commerce that in many important aspects is related to interstate commerce, and in another sense is related to the internal commerce of adjacent States. What is said of rates applies as well to rules or regulations affecting rates.

"We know that under the Constitution of the United States, as it has been definitely interpreted by the Supreme Court of the United States, each State has exclusive jurisdiction of transportation conducted wholly within its borders, and the United States has exclusive jurisdiction of transportation which passes across State lines, and each of these jurisdictions applies in full to the agencies engaged in such transportation. As to all matters where the jurisdictions are severable the fundamental law is well settled. We need not waste our time, therefore, in consideration of practical difficulties arising from the exercise of authority in these separate jurisdictions. It is for us rather to deal with the work of avoiding practical difficulties through an effort to apply regulation by national and State authority along harmonious lines, accepting and enduring situations which temporarily may not be cured, but trying through conferences and co-operation to bring about rates and rate rules based upon right and justice to all concerned.

"It is plain that the association through its committees may work actively toward securing harmonious action in large territories, and possibly the whole country, as to matters of general concern—harmony in those respects between the States as well as between the State and the United States. Much has been done along that line, now and then under separate State or federal action something may be undone, but differences of view may be reconciled and many things that remain to be accomplished may be constantly progressed under the larger comprehension and broader outlook resulting either from special conferences between particular commissions or as the result of the work of committees acting under the authority of this association.

"I recommend this association to take a far more active part than it has done in the past in securing greater uniformity of regulating laws in the various States. Perhaps the committee on legislation might be instructed to co-operate to that end with the commissions on uniform State laws and otherwise so far as may be practicable.

"The work of the regulating commissions is in nature and scope distinctly opposed to legislative prescription of rates. Wherever a commission has been established to pass upon the reasonableness and justice of the rates of any public-service corporation the passage of acts by the Legislature prescribing schedules of maximum charges constitutes to that extent a substituted regulation and thereby diminishes not only the authority, but the general usefulness of that commission. The delegation of powers by the law-making body to a railway commission is justified and has been judicially upheld, because rate regulations and other specific matters of transportation can be rightly determined only upon thorough investigation, such as cannot be made by the legislative branch of the State or Federal Government. We are now fully committed to the scheme of regulating public-service corporations by commissions because only that method of regulation has been found to operate successfully.

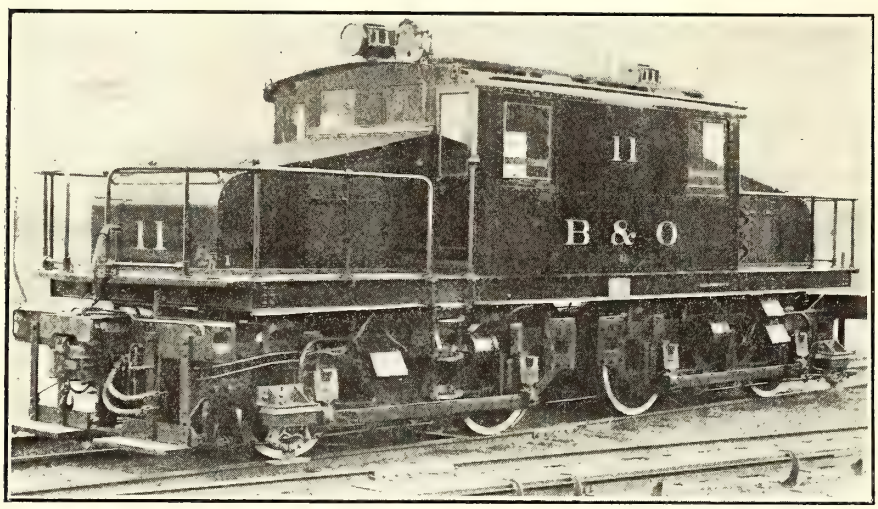
"The great and broad powers which have been conferred upon the Interstate Commerce Commission and upon many State commissions, the almost yearly additions to the number of these strong commissions, the general recognition that public-service corporations are best guided in their relations with the public by a competent administrative body in each State and for the nation demonstrate the final determination of the people that these great public-service companies shall be intelligently regulated under patient investigation and impartial action by independent tribunals of this character. It is of course a matter of high public concern that these various regulating commissions and those who constitute their membership shall be free from the trammels of political influences in the same way and to the same extent as our courts and judges are under the force of tradition and general public demand. The great insistent people, who have finally succeeded in establishing efficient systems of regulations for public-service corporations based upon protection of the right of citizenship and industry and fairness to the owners and managers of such corporations, plainly are vitally concerned that these regulating systems shall be continuously administered solely in the public interest.

"Commissions established to regulate carriers and other public utilities take valid action only when they predicate their determinations upon standards necessarily fixed by the legislative body and under procedure by which all material facts and conditions shall be developed. So that end may be fully attained the commissions are left usually to fix the character of their proceedings and investigations. They work without the trammels of court practice or of court rules as to admission of evidence, but they may not on the other hand undertake new legislation. Their functions are quasi-legislative, quasi-judicial, and in some sense executive. These the courts have held to be neither purely legislative, judicial nor executive, and have summed them up in one word as administrative. As such administrative tribunals the important work of these commissions affects directly and indirectly all phases of industry and transportation. Not merely the instrumentalities of commerce but commerce itself is regulated by the commissions. Indeed it may be said that the great purpose of regulating carriers is to liberate our vast and increasing commerce from the burdens, prejudices and disadvantages, the preferences, discriminations and oppressions which in myriad forms and countless definitions have been and are continually presented under the changing conditions of trade, industry, and communication, the growth and distribution of our population, and the ever-increasing needs of civilization.

"Yesterday, so to speak, the rebate and free pass became as rare as counterfeiting or train robbery. To-day, while the carriers assert the need of higher rates to meet increased cost of operation, the putting of high rates in force is cheerfully withheld by the carriers pending authoritative inquiry into the propriety of such rate advances. Who can say that to-morrow we shall not put in practice through governmental supervision and co-operation, sought by the carriers themselves and fully sanctioned by the force of public sentiment, methods of rate construction under which many of the great problems that now perplex us will almost magically disappear?"

NEW ELECTRIC LOCOMOTIVES FOR THE BALTIMORE & OHIO RAILROAD

During the present year the service on the Baltimore belt line of the Baltimore & Ohio Railroad has required the addition of the two electric locomotives which are illustrated and described in this article. The locomotives were designed and equipped by the General Electric Company, the mechanical portion being furnished by the American Locomotive Company. The complete locomotive as shown in Fig. 1 is similar to that



Baltimore & Ohio Locomotive—Fig. 1, Front and Side View of the Latest Design for Baltimore Belt Line Service

built for the Detroit River Tunnel Company, but differs from it in details and is the first of this type to be used on the Baltimore & Ohio. The cab resembles the type which has been widely used for switching locomotives on interurban electric railways, while the trucks and running gear are suitable for the severe duty demanded in trunk line service.

The running gear is articulated and consists of two four-wheeled trucks connected through a massive hinge which allows the two trucks to support and guide one another without interfering with the lateral flexibility required in curving with a long wheel base. The framing is massive and the sections are heavier than actually required for mechanical strength on account of the necessity of obtaining ample weight for tractive effort. The side frames are steel castings 5 in. thick, bolted together through steel end frames and bolster castings of a box girder pattern. Draft gear and buffers are carried on the outer end frames. The wheels are steel tired, 50 in. in diameter, with the motor gears mounted directly on extensions of the wheel hubs. The journal boxes are of cast steel and are carried in pedestal jaws between shoes 9 in. wide and have journal bearings 7½ in. x 14 in. The weight of the locomotive is carried on the boxes through semi-elliptic journal box springs equalized together to obtain the most uniform possible distribution of weight over groups of springs. This construction concentrates the principal hauling and buffing strains in the trucks themselves and relieves the platform and cab of all stresses except those due to its own weight and that of the control and operating apparatus mounted on it.

The cab platform is 38 ft. 6 in. in overall length. It is carried upon side bearings on the two tracks, and upon two center pins, one of which has a slight longitudinal sliding motion in order to accommodate the variation in center pin distance due to curving.

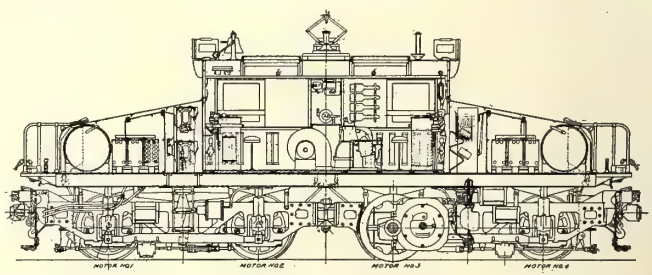
The platform is built up of 10-in. longitudinal sills 34 ft. 1 in. in length and riveted to 10-in. end sills. The body bolsters are built up of 1-in. x 12-in. plates to which are riveted the center pin castings referred to above. A cover plate below the two center sills forms, with the floor above, an enclosed air space which serves for distributing air from the blower located in the center of the main cab for forced ventilation of the motors. The whole platform is braced and squared by heavy floor plates extending the whole width of the platform and riveted to side sills and end sills.

The cab consists of a main operating cab located in the center of the platform and sloping auxiliary end cabs extending toward the ends of the locomotive. A series of interior illustrations are presented to show the study that has been expended on the location and arrangement of apparatus and wiring.

Fig. 2 shows the arrangement of the principal pieces of apparatus as arranged for the Detroit locomotive and followed for the Baltimore machines. The auxiliary cabs are 6 ft. in width and contain parts of the apparatus which are not subject to inspection and repairs. In the outer end of this cab are located the main air reservoir and sand boxes for sanding the leading wheels. The rheostats come next on the floor of the cab. Perforated side sheets allow a circulation of air through and around these rheostats for ventilation. The upper part of these side sheets is hinged and held with spring locked buttons to permit the convenient inspection of rheostats and wiring. The end cab is held to the platform and main cab by means of bolts, but for major repairs these can be removed and the end cab completely removed from the locomotive to give access to all the apparatus contained in it.

The contactors are located in the auxiliary cab, but stand in a bank facing the main cab. Fig. 3 is a view of this bank of contactors taken from the floor of the main cab. During operation these contactors are inclosed by asbestos-lined folding doors which shut them off from the main operating cab, as shown in several of the succeeding views. The space on either side of the auxiliary cab is devoted to a platform running from the main cab to the ends of the locomotive, permitting, on one side, access from the main cab to the coupler, and, upon the other side, affording an uninterrupted view for the operating engineer.

Turning now to the main operating cab, it will be noted from the views of the interior that all wiring is in conduit. Even the bell and whistle ropes are drawn through pipes, both for protection and for conformity in appearance with the rest of the piping and wiring. The central piece of apparatus in the cab is the air compressor. This is a CP-26 compound compressor, motor-driven, with a capacity of 100 cu. ft. piston displacement per minute when pumping against 130 lb. reservoir pressure. The center of the main cab is the most feasible point for locating the compressor as it permits the various items which may require attention, such as valves, piston rings, brushes, etc., to be accessible from every side. Figs. 4 and 5 show the com-

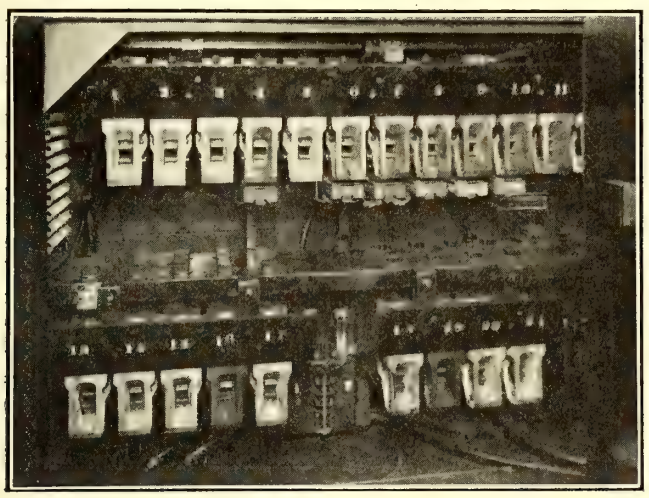


Baltimore & Ohio Locomotive—Fig. 2, Layout of Apparatus on Detroit River and Baltimore Tunnel Locomotives

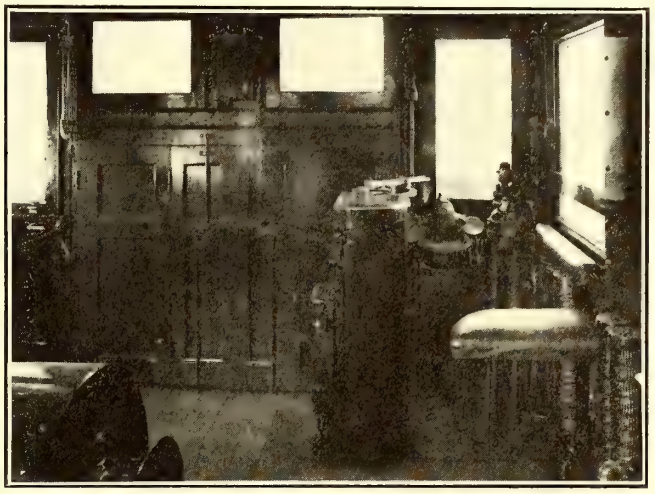
pressor and piping leading to it. In passing from the low pressure to the high pressure cylinder, the air is carried by a 2-in. pipe to the roof of the cab and through about 35 ft. of pipe lying on the roof in order to provide the radiating surface necessary to reduce the temperature of the air before entering the high pressure cylinders. A similar length of radiating pipe is inserted between the high pressure cylinder and the main reservoir for the same purpose. The compressor is controlled by an

electro-pneumatic governor mounted on the A side of the cab, shown in Fig. 4, and arranged for maintaining the reservoir pressure between the limits of 120 lb. and 130 lb.

A fan for forced ventilation of motors is placed beside the compressor. This fan delivers air into the enclosed space or distributing chambers previously described. The air from this distributing chamber is carried through branch pipes to the motor. Against the side walls of the cab as shown in Figs. 4 and 5 are mounted racks for paddles and flags, and electric coil heaters for heating in the cab. Sand boxes for sanding the track in front of the rear truck are also placed in the middle of the side walls. They are operated from the engineer's position simultaneously with the forward sand boxes in the auxiliary cabs.



Baltimore & Ohio Locomotive—Fig. 3, Bank of Contactors Opening on Main Cab

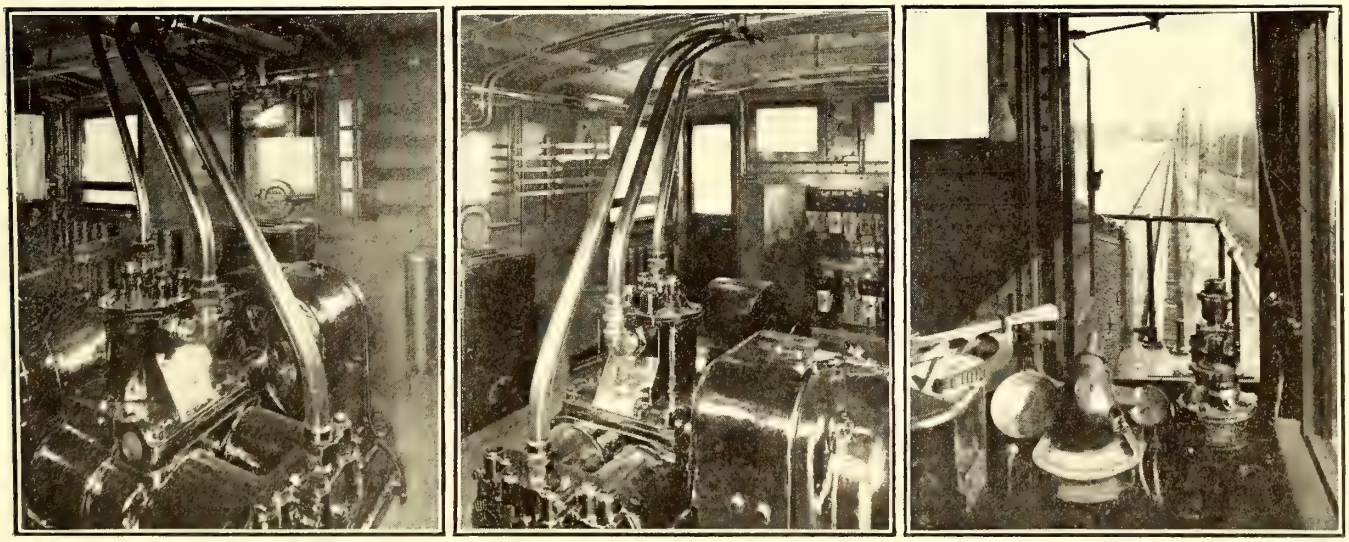


Baltimore & Ohio Locomotive—Fig. 7, Motorman's Corner Alongside Contactor Cabinet

Figs. 6 and 7 show the apparatus for direct control of the locomotive, located at the engineer's window. This is in duplicate at the two opposite ends of the cab, and consists of the master controller, air brake valves, air gages and ammeters. The handles for bell and whistle ropes, the switches for headlights and valves for sanders are also within convenient reach.

The motor equipment consists of four GE-209 motors. Each motor is furnished with twin gearing, a pinion being mounted on each end of the armature shaft and a corresponding gear on each driving wheel. With absolute alignment of the armature shaft and axle insured, the strains on the gear teeth are reduced to a minimum. The motor is a 600-volt commutating type. The equipment of four motors can exert a tractive effort of 46,000 lb. at 14 m.p.h., which is the theoretical slipping point of the wheels, assuming a co-efficient of adhesion of 25 per cent.

To obtain some idea of the power of these locomotives, they may be compared with the heaviest types of steam passenger locomotives. The Baltimore & Ohio electric locomotives weigh 90 tons on drivers. The weight on the drivers of the Pacific type of steam locomotives, which is the type used for heavy passenger service, very rarely exceeds 75 tons. A weight of 90 tons to 100 tons on drivers is obtained only on freight locomotives of the Consolidation and Mikado types. The weight on drivers, which determines the maximum pulling power of the electric locomotives, is therefore comparable with the heaviest types of steam locomotives for freight service.



Baltimore & Ohio Locomotive—Figs. 4, 5 and 6, Main Cab Arrangement

Fig. 6 shows the arrangement of this apparatus in detail and also illustrates the uninterrupted view of track and right-of-way which is obtainable from the operator's seat.

One of the great advantages of this sloping cab and open side platform design is that the engineer's window is about 12 ft. back from the front end of the locomotive. This arrangement affords protection in case of collision and buffing accidents, while giving the engineer a view which is practically as comprehensive as if he were at the extreme front end of the locomotive.

In the steam locomotive, however, on account of boiler limitations, it is impossible to carry the maximum tractive effort at speeds higher than 8 m.p.h. or 10 m.p.h., while the electric locomotive will develop its maximum tractive effort at 14 m.p.h. This tractive effort of 46,000 lb. at 14 m.p.h. corresponds to an output of 1700 hp. The electric locomotive, however, is more

flexible and has a greater power than indicated by these figures. By means of the multiple unit control, which is a feature of these locomotives, two of these 90-ton units can be coupled together and operated by one engineer in the forward cab. All the motors are controlled simultaneously by one operating handle, and one engineer thus has under his control a maximum capacity of 3400 hp or a maximum tractive effort of 90,000 lb. developed from one 180-ton locomotive.

It might be noted that 180 tons represent approximately the weight of a single large steam locomotive and its tender, and that in the steam locomotive only half this weight is on drivers, while in the electric type the whole 180 tons is on drivers and is capable of being applied for developing tractive effort. With a light passenger train, a single 90-ton electric locomotive will develop speeds of 25 m.p.h. to 35 m.p.h. on the level. The new locomotive is therefore an engine capable of handling the heaviest freight trains over the tunnel grades or the highest speed passenger trains at the greatest speed consistent with its tunnel service.

The following table gives the principal dimensions of the new locomotive:

Number of motors	4
Gear ratio	3.25
Number of driving wheels	8
Diameter of driving wheels	50 in.
Total wheelbase	27 ft. 6 in.
Rigid wheelbase	9 ft. 6 in.
Length inside knuckle	39 ft. 6 in.
Length of main cab	15 ft. 6 in.
Length of cab overall	33 ft. 6 in.
Total weight	184,000 lb.
Tractive effort at 25 per cent coefficient	46,000 lb.
Speed at maximum tractive effort	14 m.p.h.

HEARING ON INTERCHANGE OF CARS IN MASSACHUSETTS

The Massachusetts Railroad Commission gave a hearing on Nov. 4 upon Resolve 138, Acts of 1910, requiring the board to investigate and report to the Legislature of 1911 upon the advisability of requiring street railways to interchange cars.

Joseph B. Eastman, for the Public Franchise League of Boston, appeared in favor of the measure, and urged that the board report a bill conferring upon itself the power to order or recommend the interchange of cars in its discretion. W. M. Butler, president of the Boston & Worcester Street Railway, notified the board that he is opposed to the measure. George C. Travis, counsel for the Boston Elevated Railway, offered to file a brief with the commission within 10 days stating objections to the proposition.

At a legislative hearing held on this subject during the past session C. S. Sergeant, vice-president of the Boston Elevated Railway, opposed the plan of compulsory interchange, stating that there are many physical obstacles to safe operation on such a basis, that the differences in line voltage and equipment design on various roads might be serious to a comprehensive working out of such a plan, and that the clearances of large cars would be prohibitive in many cases, while different standards of wheel width and tread were also objectionable points.

The hearing was continued so as to permit further arguments to be filed.

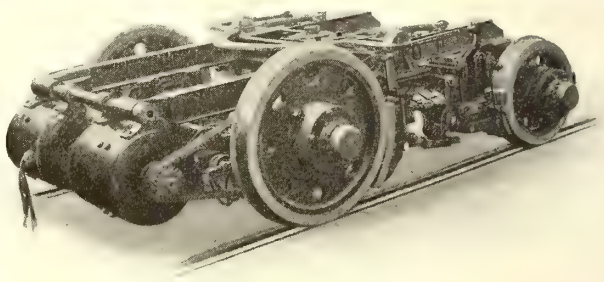
MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The regular monthly meeting of the Central Electric Traffic Association was held in the office of the chairman of the association at Indianapolis, Ind., on Nov. 14, 15, 16 and 17, 1910. The sessions were devoted largely to checking and revising Joint Passenger Tariff No. 3 and the proposed uniform exception sheet. Owing to the numerous changes in the rates and routes in the passenger tariff, it was decided to continue the work at the meeting which will be held in the office of the chairman on Dec. 12, 13 and 14. Four additional companies signified their intention to adopt the revised tariff.

DOUBLE-TRUCK STORAGE BATTERY CAR

The Federal Storage Battery Car Company, New York, has recently completed a double-truck accumulator car, with which a number of demonstration runs have already been made on the Watchung branch of the Erie Railroad in New Jersey. Further demonstrations are to be made with this car on the Lackawanna Railroad, and afterward the same car will be operated in New York over the Queensboro Bridge by the South Shore Traction Company.

As shown in the illustrations on page 1069, this car is of the vestibule type, with maximum traction trucks. The storage battery equipment consists of 190 A-8 Edison cells. The car body is 28 ft. long inside of the corner posts and 7 ft. 6 in. wide over the drip rail. It is furnished with longitudinal rattan seats for 40 passengers. Both the longitudinal and end risers of the seats consist of perforated metal screens. There are two platforms, each 6 ft. 1½ in. long. The usual body end doors are omitted, but each vestibule is provided on the right with a sliding door and on the left with two double-leaf folding doors. The arrangement of these doors is such that the sliding door is always the exit on the motorman's platform and the double folding door the entrance on the conductor's platform. The folding doors are controlled by the conductor through the Remelius lever system, as used on many cars of the Public Service Railway of New Jersey. These platform and door arrangements permit the use of either the prepayment or ordinary methods of fare collection.



Two-Motor Chain Drive on Truck for Storage Battery Car

The window posts are provided with electric bell connections to enable the passengers to signal the conductor. The motorman's curtain is carried from the ceiling of each vestibule.

Instead of straps there are provided eight 1¼-in. vertical and two longitudinal tubular steel stanchions. These tubes act as grab rails, as supports for the lighting fixtures, as conduits for the lighting cables, as interior supports for the roof and as longitudinal supports for the body. The vertical tubes are finished in black and the longitudinal tubes in white porcelain. Each vertical tube has a fixture carrying two 10-cp tungsten lamps. There are 16 lamps for interior lighting, besides two ceiling lamps and a headlight per vestibule. Inasmuch as the wiring is in multiple, any number of lights may be used as desired.

The construction of the car is very novel since the special objects of the designer, Ralph Beach, were to reduce dead weight and to eliminate friction losses as far as possible. The underframing is composed of open-hearth steel shapes with channel side and end sills and I-beam center and cross beams. The bolsters are of cast steel and are so formed as to receive the center sill to which they are welded. The side sills are welded to the ends of the bolsters and the end sills and all cross beams also are welded to the center and side sills. All of this welding was done by the oxy-acetylene process.

The sides are formed of angles and channels, making a lattice to which the outer sheathing of steel plate is electrically welded. This outer sheathing is also carried to the lower edge of the side sills, to which it is electrically welded. Two angles are electrically welded on the outside and one on the inside longitudinally to give the required stiffness to the entire structure. On the inner side of the side structure there is placed a

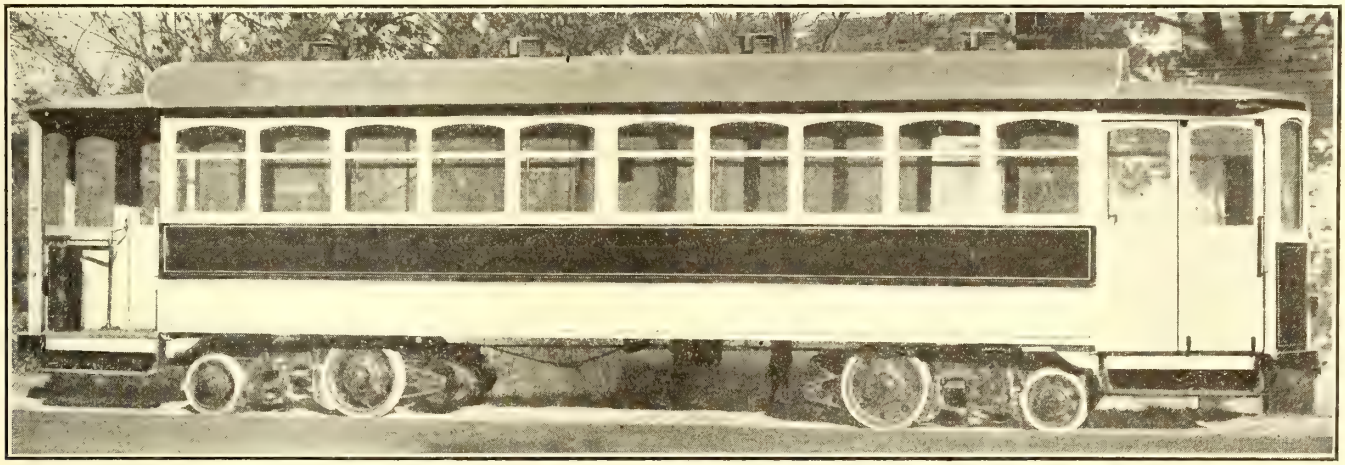
lattice steel girder extending the full length. This girder is also electrically welded. At each window channel an angle is placed at 45 deg. and is welded to the lattice steel girder and to the side, the longitudinal steel girder and the cross sill, thus binding the structure very firmly. The center window post is formed of a channel bent to conform to the shape of the cross section of the body; it is welded to the side sills, the lattice girder and the 45-deg. angle and is carried in one piece all the way over the body. Each end bulkhead is made up of the channels which form the corner posts and of properly shaped steel plates. The bulkhead is oxy-acetylene welded to the end sill, the side framing, the side plating and the lattice steel girders. Thus the entire framework is a unit structure without a bolt or rivet.

The body trim is of ash. The design is of the usual appearance, except that the roof is formed of two eccentric arches, the outer arch being of strips of basswood and the inner of composite board. A novel feature of the body is a steel belt just below the line of the roof which is welded to the bulkhead at the four corners and the center steel arch. On each side of the middle of the body inner lugs are welded to this belt to support the window posts. The structure therefore has a one-piece steel underframe, a belt of steel up to the windows, steel ends and a steel belt above the window held at six points. The platform and vestibule are of the usual design of construction.

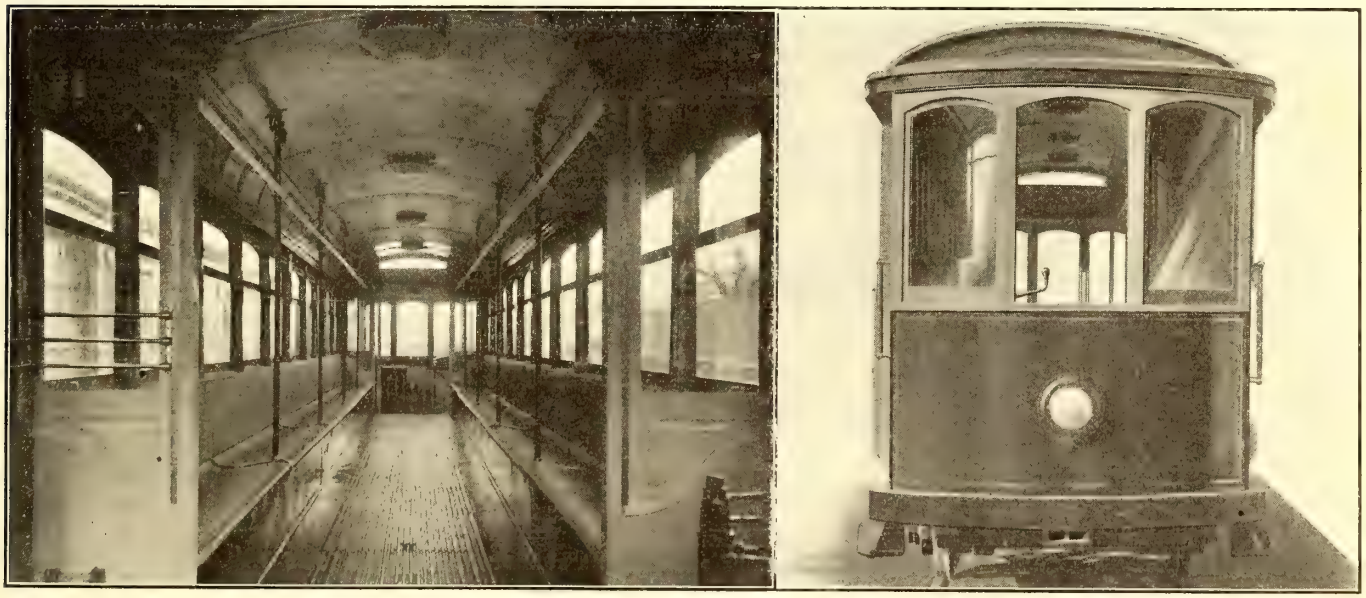
An entirely new method of design has been followed in the trucks. The axles are of chrome steel I-beams, each forged with 3¾-in. ends inserted into the bearings. The latter are of the Railway Roller Bearing Company's roller type and are set in the wheel hubs. The axles do not rotate. The load, as is usual in maximum traction trucks, is carried principally on the driving wheels. The latter are 30 in. diameter and the ponies of 22 in. diameter. The wheels have steel centers and rolled rims. Each driving wheel is driven through a Morse silent chain by an 85-volt, 30-amp No. 1022 G. E. automobile type motor, equipped with Hess-Bright armature ball bearings. The motor speed at the operating potential of 100 volts is 850 r.p.m. The speed reduction is about 3½:1. Suitable distance rods are provided to take up the chain wear. The members of the truck frame are standard I-beams welded throughout. The wheel base is 4 ft. 10 in. The center bearing of each truck has Symington ball bearings, while the side bearings are of the roller type.

The weight of this double-truck car is 29,000 lb. completely equipped, which gives the low weight of 725 lb. per seated passenger. The maximum speed is given at 30 to 35 m.p.h.; the average power consumption at 650 watt-hours per car mile; and the acceleration on level track at 1 m.p.h. per second.

One of the novel equipment features of the car is the use of a Klaxon electrically operated horn, used so extensively in automobile work. It effects a considerable saving in power over the usual air whistle, while giving out the same volume of sound as the latter.



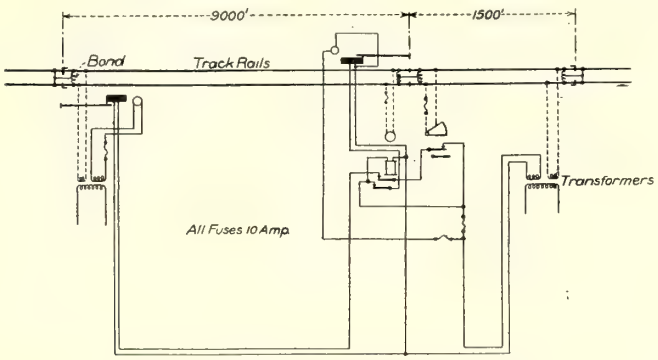
Double-Truck Storage Battery Car with Maximum Traction Trucks



Interior and End Views of Double-Truck Storage Battery Car

AUTOMATIC BLOCK SIGNALS ON THE ILLINOIS TRACTION SYSTEM

The Illinois Traction System has closed a contract with the Union Switch & Signal Company to install automatic block signals on 100 miles of track. This is said to be the beginning of a program for the protection with automatic block signals of the entire 550 miles of interurban track included in the Illinois Traction System. The first installation will include: Peoria to Mackinaw Junction, together with the approaches to that junction from all three directions; 20 miles of track near Staunton and Carlinville and five miles of track leading west from Danville toward Champaign. Signals will be placed at all the more hazardous locations, such as at curves, subways and approaches to double-track sections in addition to the signals at sidings.



Circuit Diagram for Curve Protection

The signal apparatus is to be installed immediately, the preliminary work having been completed pending the closing of the contract. Standard steam railway type signals of exactly the same design as are now in use on more than 6000 miles of track of the Southern and Union Pacific Railroads will be used. This is thought to be the first extensive application of full automatic block signal protection to a long-distance single-track interurban road and will no doubt attract considerable attention from operating men. The signals will be controlled and actuated by alternating current taken from the railway transmission system.

The principal circuit diagrams and the arrangement of signals at sidings are shown by the accompanying engravings. The smaller engraving shows the arrangement of signals and circuits for curve protection. In general four signals will be installed at or near each stub end siding. At the siding will be a home signal for each direction and from 1500 ft. to 1800 ft. away, according to running conditions, will be distant signals to control the approach. The signals will be controlled by track circuits so designed that any derangement of the running rails, bonds, signal wires, relays or other control apparatus automatically will cause the semaphore blades to assume the horizontal position by gravity. Similarly, the control of the signals from siding to siding will so be arranged that every train will be protected by a signal set at danger both ahead of and behind the train. By the use of the home signals placed at the sidings and distant signals to govern the approach of trains which are to meet at the sidings, the capacity of the track for handling trains will be increased.

The distant signals will be fully automatic. That is to say, if two trains are to meet at a siding and one train should arrive in advance of the other, the second train on approaching the siding will find a distant signal set to indicate caution and the motorman will approach the switch prepared to stop. All switches will be protected with switch circuit controllers so that the misplacement of any switch or the failure to close the switchpoint tightly against the stock rail will set the home and distant signals on both sides to "danger."

Energy for operating the signal system is to be taken from the secondary side of the rotary converter transformers in the substations. This energy will be distributed along the line by a pair of hard-drawn copper wires carrying current at 2300 volts pressure. At the signal locations, transformers will be installed to step down the 2300-volt current to supply 110-volt current for the operation of the signal mechanisms and the semaphore lamps. These transformers also will supply energy at about 12 volts for the track circuits. The low-voltage terminals of the transformers will be connected one to each rail and at each signal location the track rails will be sectionalized with insulated joints. This sectionalization will not interfere with the passage of the propulsion current. The two sections of track on either side of the insulated joints at a signal location will be connected by a pair of reactance bonds. These provide full carrying capacity for the return propulsion current, but offer sufficient reactance to choke the passage of the alternating current used for actuating the track circuit signal relays.

Each track section will be supplied at one end with low-potential alternating current and at the opposite end this current will pass through a track relay. The passage of the current through the track rails is continuous and must be so in order to hold the relay in such a position that the signal which it controls will remain at "clear" provided the track circuit is not interfered with. When a train passes onto a track section, the wheels and axles offer a low resistance path from one track rail to the other and thus short-circuit the secondary of the track transformer. This cuts off the supply of current from the track relay. Then the relay will operate and in turn will release the signal mechanism, allowing the blade to assume the stop position by gravity. After the train has left the section the flow of current in the track circuit again becomes normal and the relay closes, causing the actuating current to pass into the motor which drives the single blade to the clear position.

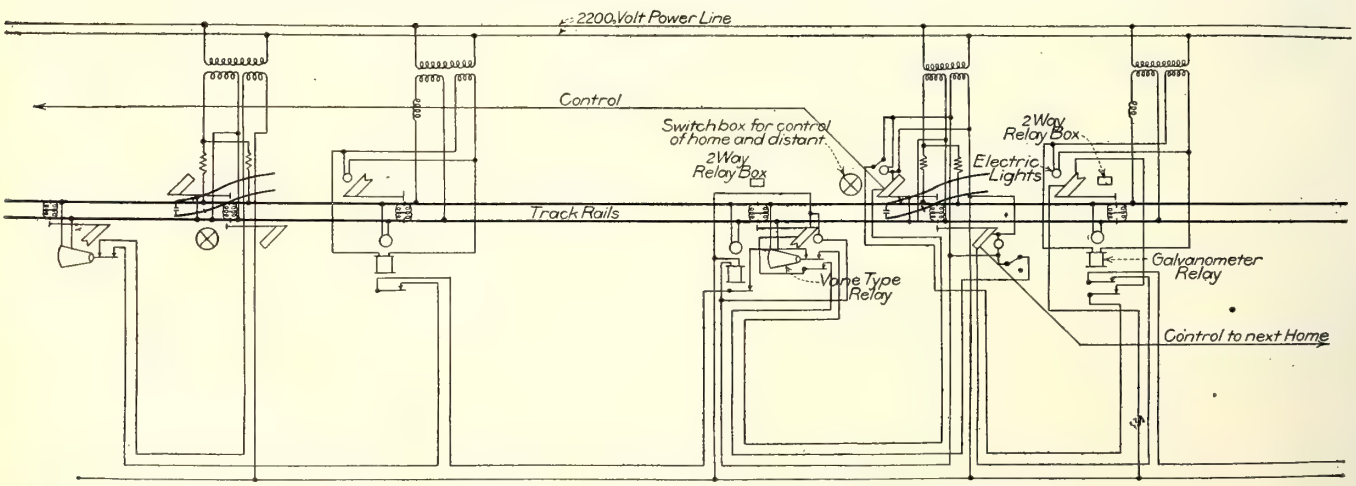


Diagram of Signal Locations and Circuits at Stub-End Sidings

The new installation of automatic block signal protection on the Illinois Traction System will be supplemented by dispatchers' signals. As announced in last week's issue, a contract has been made with the Baird Electric Company, of Chicago, to

supply selectors which will make it possible to operate the dispatchers' signals at every siding on 100 miles of track. Similarly, about 200 miles of track are being equipped with Blake dispatchers' signals. The automatic block signal apparatus and the dispatchers' signals will not be connected in any way mechanically or electrically and thus two-fold safety of train operation will be obtained.

PROPOSAL FROM HUDSON & MANHATTAN RAILROAD REGARDING OPERATION OF TRI-BOROUGH SUBWAY

William G. McAdoo, president of the Hudson & Manhattan Railroad, New York City, made a formal offer to the Public Service Commission of the First District of New York on Nov. 18, 1910, on behalf of that company to operate the triborough subway system, with certain modifications of the Brooklyn connections. As has previously been noted in the ELECTRIC RAILWAY JOURNAL, bids have been received by the commission for the construction of the Broadway-Lexington Avenue, Canal Street and Broadway-Lafayette Avenue lines which are included as part of the triborough system. The estimated cost of the construction of the new lines to the city, according to Mr. McAdoo, would be $100,000,000, while the cost of tracks, signals, power houses, rolling stock, etc., would be $50,000,000. Mr. McAdoo proposes that the city provide the money for construction and the Hudson & Manhattan Railroad provide the money for the equipment. His proposition regarding the modification and construction of the system follows:

"(1) That the city proceed forthwith to construct the Broadway-Lexington Avenue line as planned, extending from River Avenue, in the Bronx, to the Battery;

"(2) That the commission immediately lay out the following routes as additions to and extensions of the said Broadway-Lexington Avenue line:

"(a) Beginning at the intersection of Broadway and Thirty-third Street, Borough of Manhattan (there connecting with the extension which this company is to build under Sixth Avenue and Forty-second Street to the Grand Central Station), and continuing southwardly along Broadway to Tenth Street, there connecting with the local tracks of the Broadway-Lexington Avenue line.

"(b) Beginning at a point on the Broadway-Lexington Avenue line in Church Street, between Liberty and Rector streets, and thence under the Trinity churchyard to Wall Street, and thence under Wall Street and the East River, Montague Street, Borough Hall Park, Willoughby Street to Flatbush Avenue extension, there connecting with the new Fourth Avenue subway now under construction, and using the tracks of said subway, including the DeKalb Avenue station, to Fulton Street; thence under Fulton Street to Lafayette Avenue, and under said avenue on the plan already adopted to its intersection with Broadway, in the Borough of Brooklyn.

"(3) That there be constructed under Broadway, between Thirty-third and Tenth Streets, and between Church Street and the intersection of Lafayette Avenue and Broadway, in the Borough of Brooklyn, a double-track subway of the dimensions of the Broadway-Lexington Avenue line, with stations at convenient points. We will build our Grand Central extension of sufficient dimensions so that with a physical connection at Forty-second Street and Lexington Avenue it may be operated as an integral part of the system herein proposed."

If the commission will modify and construct the system as Mr. McAdoo proposed, the Hudson & Manhattan Railroad will agree to furnish the $50,000,000 necessary to equip the line and will operate the system under a lease for a period of years to be agreed upon on substantially the following terms:

"The net earnings resulting from the operation of said system shall be applied:

"1. To the payment of interest and taxes on said $50,000,000 or whatever sum is required for the construction of the Grand Central extension and for the equipment of said system, as aforesaid, the money therefor to be provided by this company and expended under the supervision of the Public Service Commission.

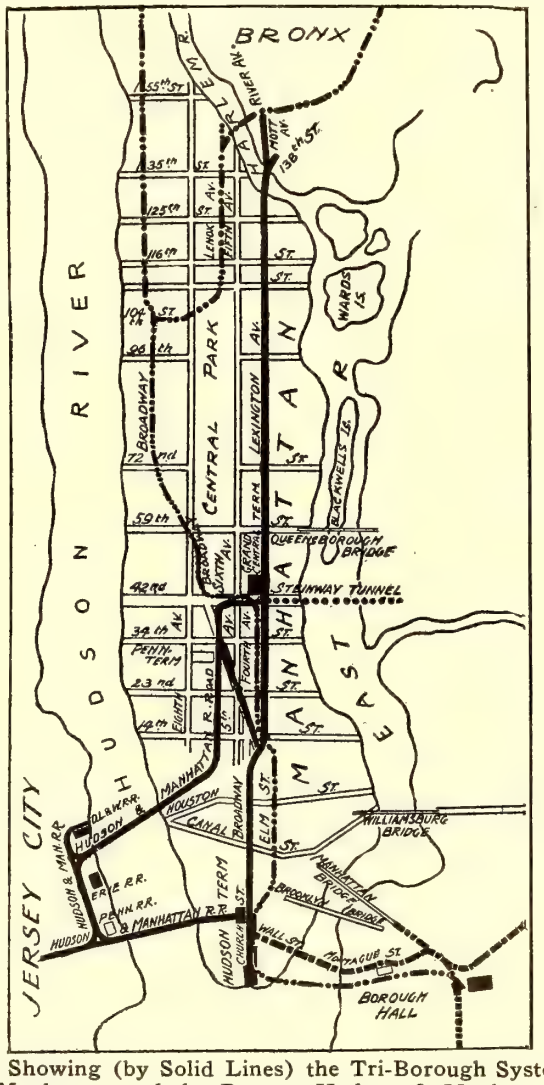
"2. To the payment of interest on the money expended by the city for the construction of said system.

"3. Should the net earnings be insufficient to pay said interest and taxes in full, a special account shall be kept of such deficiency and all surplus earnings thereafter shall be applied to the liquidation of said account until the same shall be paid in full.

"4. Thereafter all surplus earnings remaining after full payment of fixed charges of every kind shall be divided equally between the city and this company.

"5. An amortization fund of 1 per cent per annum shall be established and commence at some time after the beginning of operation of any part of said system, to be agreed upon.

"6. A uniform 5-cent fare shall be charged over said system,



Map Showing (by Solid Lines) the Tri-Borough System in Manhattan and the Present Hudson & Manhattan System. Other Existing or Proposed Lines Are Shown by Dots or Dashes

but not to include carriage over our present Hudson River tunnel system, for which a separate fare will continue to be charged."

Mr. McAdoo says that the conditions which have just been outlined are the fundamentals of the company's proposition and that the details can be arrived at by conference and agreement. In concluding his communication to the commission Mr. McAdoo said that the company is prepared to furnish a bond for $1,000,000 to insure the faithful performance of any contract that may be entered into between the company and the city, but that "in view of the large financial undertaking which the company would assume in carrying out this plan, it is obvious that we cannot allow the proposition to remain open indefinitely and that promptness is essential."

An interview with Theodore P. Shonts, president of the Interborough Rapid Transit Company, published in the newspapers of Nov. 17, 1910, developed the fact that a difference of opinion exists between Mr. Shonts and Chairman Willcox, of the commission, as to whether the letter of the Interborough Rapid Transit Company to the commission, dated July 5, 1910, contained a definite proposal from the company on the subject of extensions to the subway.

On Nov. 16, 1910, Mr. Willcox replied to the criticisms of the triborough subway route which have been made recently by the Chamber of Commerce, the Merchants' Association and others. He said that years ago the question of a comprehensive system of rapid transit was decided by the Rapid Transit Commission and the Board of Estimate and Apportionment and that this system had been adhered to in the main by successive boards and by the Public Service Commission. In the statement which he issued Mr. Willcox said:

"Cost of construction of the triborough system, including station finish, of the entire system is $147,500,000. The Centre Street loop, costing $9,800,000, is nearly finished. The six sections of the Fourth Avenue subway, costing $15,000,000, will be finished within 18 months. The Manhattan Bridge portion, costing not less than $25,000,000, is nearly finished. The Williamsburg Bridge, costing almost as much, is already finished. The cost of these bridges does not come within total cost of the triborough system, for the policy has been not to include cost of bridges as part of rapid transit and not to expect any revenue from bridges. The city is committed to these links of the system. The fundamental question is not whether the city shall now begin the triborough system, but whether, having spent $25,000,000, it shall spend a further amount to complete it. The opposition is now so hostile to construction of the trunk line of the triborough because it will be profitable; and when connected with the loop and Fourth Avenue subway will make profitable what may not be as profitable without articulation."

At the annual dinner of the Chamber of Commerce on Nov. 17, 1910, Mayor Gaynor in discussing the subway situation said:

"The city is now about to come to a decision in respect to one of the largest matters that ever confronted a government anywhere. I have not come to a decision yet, and shall not until I hear the case, as is my official duty. The case that confronts us is this: The city has only a limited amount of credit or money to put into subways. The question, therefore, is into what routes it should be put, so as to give the people of the city the largest result. Let me add that there is an immediate and pressing need of $50,000,000 or more to do certain necessary public works other than subways. This enters into the question of how much we have available for subways. It is the intelligent public sentiment which is expressed by such men as compose the Chamber of Commerce which is to instruct the city officials and determine what they shall do. We do not intend to pay the slightest heed to clamor, however or wherever expressed."

As a member of the Chamber of Commerce John B. McDonald, the contractor who built the subway in New York now operated by the Interborough Rapid Transit Company, has written a letter to the chamber in which he upholds the objections of that body to the proposed triborough route, and favors the suggested extensions of the Interborough Rapid Transit company's system south from Times Square under Seventh Avenue and north from Forty-second Street under Lexington Avenue. Mr. McDonald does not believe that the construction of the triborough route would be for the best interests of the city on account of its great cost and the indefinite provisions for its equipment and operation.

Frank J. Sprague has written a letter to the Public Service Commission suggesting: First, a compromise plan of subway extensions on a basis of city participation in all net profits after certain deductions; second, or failing this, an alternative plan for an independent line on which he is willing to guarantee a bid for operation, with the city sharing in both management and profits.

STATISTICS ON TRANSFERS IN NEW YORK STATE

Curran & Mead, of New York City, have recently compiled for the Street Railway Association of the State of New York some interesting statistics on the transportation furnished free by transfer tickets to the population of the State during recent years by the electric railway companies of the State. Allowing half a mile for each transfer ride the riding on transfers in New York State during 1907 would be sufficient to carry every man, woman and child in the City of Elmira or in Genesee County to California and back. The tickets would completely carpet an area four times as large as Niagara Falls Park, and if laid end to end would girdle the globe once and then reach from New York City to Calcutta.

FAST TRACK LAYING ON THE SYRACUSE, LAKE SHORE & NORTHERN RAILROAD

The remarkable feat of removing three-quarters of a mile of 56-lb. rail and replacing it with 70-lb. rail in 21 minutes and 2 seconds was performed March 25, 1910, on a section of the Syracuse (N. Y.), Lake Shore & Northern Railroad between



Preparing to Install New Rails on the Syracuse, Lake Shore & Northern Railroad

Liberty Street, in Syracuse, and the Syracuse Railroad junction bridge. The exact length of track changed over was 3720 ft. Before starting on the work the new bonded rails were laid beside the old ones and the spikes were also distributed at con-



Spiking the New Rails to the Ties on the Syracuse, Lake Shore & Northern Railroad

venient distances. The job was done in such quick time that there was not the slightest delay in the operating schedule. The track gang which made this fine record was directed by Roadmaster W. A. Steckel.

MEETING OF THE EXECUTIVE COMMITTEE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

A meeting of the executive committee of the American Electric Railway Transportation & Traffic Association was held at the association offices in New York Nov. 22. Those present were H. C. Page, Worcester, Mass., president; J. N. Shannahan, Baltimore, Md., first vice-president; H. C. Donecker, secretary; C. D. Emmons, Fort Wayne, Ind.; A. Gaboury, Montreal, Que.; C. E. Learned, Boston, Mass.; J. V. Sullivan, Chicago, Ill.

The question of subjects for papers and committee reports for the coming year was first considered. Mr. Shannahan moved that the draft of a proposed uniform transfer law or ordinance contained in the paper by L. S. Hoffman, read at the Atlantic City convention, be referred to the American Association for such action as it saw fit to take. The motion was carried.

Mr. Sullivan suggested a number of general subjects for consideration. These were referred to the committee on subjects.

A. W. Brady, president of the American Association, suggested as a subject for committee work the consideration of signals and signaling for interurban railways. This subject was considered tentatively by the executive committee of the Engineering Association last week, and Mr. Emmons moved that a joint committee consisting of three members of the Transportation & Traffic Association and three members of the Engineering Association should be appointed to take up the question. The motion was carried and Mr. Page was instructed to confer with Mr. Harvie, president of the Engineering Association, in making the appointments and outlining the scope of the committee's investigation.

CITY RULES

The committee on city rules was instructed to consider rules for prepayment cars and to confer with the committee on interurban rules regarding conflicting rules.

INTERURBAN RULES

The committee on interurban rules was instructed to ascertain what action had been taken or was contemplated by the State and national commissions which would affect the use of a standard code of interurban rules.

TRAINING OF TRANSPORTATION EMPLOYEES

This committee was instructed to make a similar investigation of legislation or commission orders affecting the employment of trainmen. It was also instructed to consider the following phases of employment methods: Time required to break in for motormen and conductors in city and interurban service. Uniform blanks for recording records of breaking in. Methods of keeping permanent records of employees.

PASSENGER TRAFFIC

The committee was instructed to consider the promotion of steady traffic throughout the year, inasmuch as this committee in the past has devoted its efforts principally to describing methods of promotion for special excursion and summer business and the operation of parks.

EXPRESS AND FREIGHT TRAFFIC

The Accountants' Association having suggested the appointment of a joint committee to consider the classification of express and freight accounts recommended by the committee on express and freight traffic at the Atlantic City convention, the president was instructed to appoint three members of such a joint committee. The standing committee will devote its attention to the development of express and freight traffic. The committee was also instructed to investigate State laws and municipal franchises relating to the operation of freight and express service and, if possible, to recommend reasonable and uniform restrictions and regulations.

TRANSFERS AND TRANSFER INFORMATION

This committee was instructed to follow up any new transfer laws and ordinances which may result from the suggestion of Mr. Hoffman, made at the Atlantic City convention, and to report on new transfer methods. The committee will also consider methods of issuing and collecting transfers on prepayment cars.

CONSTRUCTION OF SCHEDULES AND TIMETABLES

Among the subjects referred to this committee for further consideration at the Atlantic City convention were the following: Define "tripper" and "extra," and other terms. Basis of calculating schedule speed. Assignment of work as called for by schedules. The committee this year will devote special attention to the problems of constructing schedules and timetables for interurban roads.

ASSOCIATE MEMBERSHIP

The secretary explained the proposed method of increasing the associate membership affiliated with the Transportation & Traffic Association. The president was authorized to appoint a committee on associate membership in accordance with the plan suggested by President Brady of the American Association.

JANUARY MEETING

It was voted that a meeting of the executive committee should be held in January at the time of the mid-winter meeting of the American Association. At this meeting the chairmen of the standing committees will be expected to report what progress has been made in the work assigned to them. The chairmen of the standing committees will report to the secretary after each committee meeting so as to keep him in touch with the work of the committees. The secretary was instructed to follow the work of the sectional associations and take such steps as may be necessary to have the Transportation & Traffic Association represented at these meetings.

CONVENTION OF NATIONAL SOCIETY FOR PROMOTION OF INDUSTRIAL EDUCATION

The fourth annual convention of the National Society for the Promotion of Industrial Education was held at Boston from Nov. 17 to 19, inclusive. It was largely attended by educators, publicists, industrial executives and others interested in the better training of juvenile and youthful workers. Several papers were read bearing upon mercantile, trade school, apprentice course, factory and special evening instruction facilities. Prominent among these were a paper by Tracy Lyon which described the apprentice course of the Westinghouse Electric & Manufacturing Company; a paper by F. W. Thomas upon the apprentice course of the Atchison, Topeka & Santa Fé Railroad; a description by George C. Cotton of the mechanics' educational course of the Solvay Process Company, and a discussion by G. M. Basford of the system for preparing recruits in the service of the American Locomotive Company. All the speakers voiced the need of first-class skilled mechanics rather than the dearth of mechanical draftsmen and technical graduates. The Westinghouse courses aim to produce all-around mechanics, with encouragement of latent efficiency in handling specialized tools. The Atchison, Topeka & Santa Fé Railroad spends about $40,000 per year in training boys for future needs, but the result is that the recipients of the training accomplish enough more work to pay the cost of their instruction. The importance of paying a living wage to industrial apprentices was generally conceded. Part time and evening schools also received much attention at the convention, and an able address was delivered by Dr. Georg Kerschensteiner, of Munich, Bavaria, on "Continuation Schools." The final session was devoted to the broader economic aspects of industrial education, the principal speakers being Prof. T. N. Carver, of Harvard University; Miss E. B. Butler, of the Bureau of Research, New York, and C. H. Winslow, of the American Federation of Labor. A feature of the convention was a banquet tendered the society by the Boston Chamber of Commerce, ex-Governor Guild, of Massachusetts, presiding. Among the speakers were F. A. Delano, president of the Wabash Railroad, and F. P. Fish, chairman of the Massachusetts Board of Education and former president of the American Telephone & Telegraph Company. An elaborate exhibit of industrial educational courses, problems and apparatus was held at the Boston Public Library during the convention.

COMMUNICATION

THE STANDARD CODE OF INTERURBAN RULES

THE AURORA, ELGIN & CHICAGO RAILROAD COMPANY
WHEATON, ILL., NOV. 17, 1910.

TO THE EDITORS:

The code of interurban rules submitted by the 1910 interurban rules committee to the Atlantic City convention of necessity received only brief discussion and was referred back to the committee for further consideration.

The discussion, brief as it was, will be of benefit to the committee in its further considerations, but the subject of interurban rules is of too grave importance to receive anything but the most careful and painstaking attention and the interurban rules committee should receive the benefit of the best thought on the subject from the operating officials of interurban properties in all parts of the country. It would seem as if free expression of opinion by various operating men through the medium of the technical press would be of great value and no doubt the press would consent to give place to a number of views on the subject.

The report submitted did not attempt in any way to close the subject, but rather to furnish material for constructive discussion. From the views obtained so far it appears that the adherents to a straight American Railway Association code are few in number but strong in their belief that it is the only permissible code. Other operating men believe that the Denver code points the only way to salvation, while a third faction places its trust in a modified code combining many of the good features of both the American Railway Association and Denver codes. The code submitted to the Atlantic City convention was constructed along the latter lines and aimed to harmonize as far as possible the two sets of rules.

To construct a code of operating rules that will fit all interurban lines and meet widely divergent local conditions is manifestly impossible. Nevertheless, if the writer is not mistaken, discussion of the submitted codes from year to year has generally included reference to the inadaptability of various rules to the speaker's own particular road. The fact is forgotten apparently that the committee does not attempt to formulate a code that will meet all the varying conditions that obtain on the widely dissimilar roads of the country, but rather to furnish a basis upon which the local rule book may be founded, with such exceptions and additions as may be necessary. A full and free discussion of this important matter will be both interesting and helpful.

The rules committee is neither thin-skinned nor hidebound and will appreciate frank expressions from operating officials on the subject, be they for or against the submitted report. Let us have a goodly bunch of them before the snow plows start out.

J. W. BROWN,
Superintendent of Transportation.

PROPOSED BUENOS AYRES UNDERGROUND LINES

Permission has been given for the construction of two underground lines in Buenos Ayres to relieve the congested condition of the narrow streets of that city. One of the concessions is to the Anglo-Argentine Tramway Company, whose general plan is the construction of a double line uniting the Plaza de Mayo with the Plaza Once de Setiembre. The railway is to be 22 ft. below the level of the street. The tunnel will be formed of walls of cement and brick. The cars will seat a maximum of 60 passengers, and will be operated on the multiple unit system.

The other concession is granted to the Western Railway Company, which is authorized to extend its present lines from near the Calle Sadi-Carnot to a junction with the port lines of the capital, part of the route being on the surface. This company is also to construct a tunnel under the Plaza Once de Setiembre, as an extension of its lines, to provide for the quick transfer of passengers from its trains to the underground line of the Anglo-Argentine Tramway Company.

COMMITTEE ON ELECTRICAL WORKING OF AMERICAN RAILWAY ASSOCIATION

At the meeting of the American Railway Association at St. Louis, Mo., on Nov. 16 the committee on electrical working reported that, owing to the pressure of other work that had engaged the attention of the members of the committee, it had held no session during the last six months. The committee stated that at the spring session of the association to be held in New York City on May 17, 1911, it "hopes to present a general report upon the subjects intrusted to its care. For the present it can only report progress."

The members of the committee on electrical working are as follows: George Gibbs, (chairman), chief engineer of electric traction, Long Island Railroad; J. F. Deems, general superintendent motive power, rolling stock and machinery, New York Central lines; J. D. Isaacs, consulting engineer, Union and Southern Pacific systems; W. J. Harahan, assistant to president, Erie Railroad; C. S. Sims, second vice-president and general manager, Delaware & Hudson Company; L. C. Fritch, chief engineer, Chicago Great Western Railroad; E. H. McHenry, vice-president, New York, New Haven & Hartford Railroad.

CHANGE IN NAME OF THE MANUFACTURERS' ASSOCIATION

Secretary Keegan, of the American Street & Interurban Manufacturers' Association, has issued a notice to the members asking for a letter ballot on the amendment to the constitution by which the name of the association will be changed to American Electric Railway Manufacturers' Association. This change can be made by a vote of two-thirds of the members and is, of course, with the object of making the name accord with that of the American Electric Railway Association and its affiliated associations.

LIFE OF PAINT ON STEEL CARS

In the discussion of the paper by William Marshall on "Protection of Metal Equipment," which was read at the October meeting of the New York Railroad Club (see ELECTRIC RAILWAY JOURNAL, Oct. 29, 1910, page 913), John Gearhart, foreman painter of the Pennsylvania Railroad, gave some interesting figures on the life of paint and varnish on steel passenger cars. There have been built at the Altoona shops of the Pennsylvania Railroad since 1903 a total of 119 steel passenger cars. Of these 42 were dining cars, 9 were coaches and the rest were postal cars. In addition the Pennsylvania Railroad has had built in contract shops 455 steel passenger cars, making a total of 574 steel cars in service at the present time. The first 200 cars have been in service for more than three years, and while some rust has been found, on the whole the paint on the cars was in better condition to-day than it would have been on wooden cars in service for the same length of time. The first steel passenger car built at the Altoona shop was an experimental subway car for the Interborough Rapid Transit Company, which was completed in November, 1903. This car has been in service since that time in the New York subway and the following is the record of painting:

Dec. 10, 1903, received new.

Oct. 4, 1904, cut in and one coat of varnish.

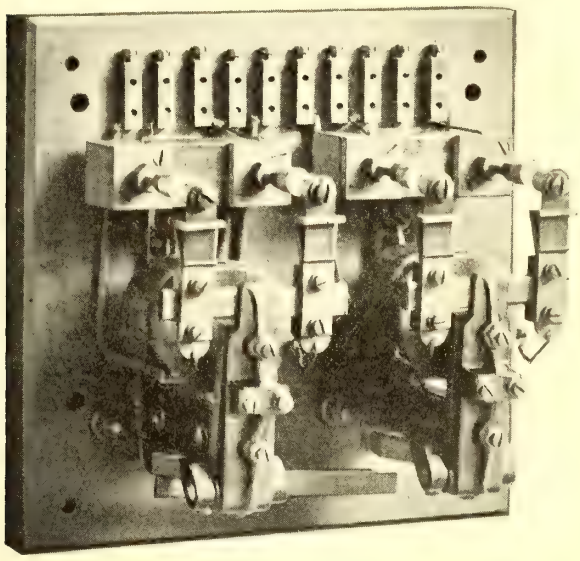
Jan. 30, 1907, two coats of Tuscan red and two coats of varnish.

July 3, 1909, two coats of enamel.

A recent examination of this car and about 30 others of a lot of 300 cars built about seven months after the first car showed that the paint was in first-class condition with no indications of rust. The first steel car built for the Pennsylvania Railroad was completed in June, 1906. In March, 1907, it was cut in and given two coats of varnish, and in March, 1909, it was given two coats of Tuscan red and two coats of varnish. The paint was examined early in October, 1910, and found to be in excellent condition.

A DRY TYPE RELAY

The Westinghouse Electric & Manufacturing Company has just brought out a new secondary or auxiliary relay for its induction regulators. The new relay is of the dry type, while the former was oil-immersed. The non-inductive resistance used in the old-style relay is employed with the new style, but



Auxiliary Relay for Induction Regulators

it is now built as a primary part of the relay instead. This resistance, permanently connected across the contacts, absorbs the inductive discharge of the coils at the moment of the breaking of contact and assists in eliminating sparking. The wearing parts are case-hardened for durability. The use of nickel for the relay contacts is a marked advancement, as it gives all the advantages of platinum at a negligible cost for renewals. The results obtained from the operation of motor-operated regulators by means of this relay are said to have been very satisfactory. The wear on the contacts is very slight, but in any event adjustments or renewals can be very easily effected.

A NEW INSULATING MATERIAL

An important addition to the field of insulating materials, called "Bakelite," has recently been placed on the market by the General Bakelite Company, New York. This substance is a synthetic product invented by Dr. L. H. Baekeland, who is well known among chemists for his work in the development of "Velox" and other photographic papers. Numerous experiments for the past two years have shown that "Bakelite" is very suitable for coil impregnation and all forms of molded insulation, but it is not recommended for flexible insulation as in taping. It is extensively used by large electrical manufacturers for third-rail and line insulators, transformer tubes, etc. This material is not only an insulator, but it is also made to replace Japanese lacquer, celluloid, hard rubber and even some forms of jewelry.

In its formation two strong-smelling liquid substances (carbolic acid and formaldehyde) react chemically upon each other and solidify to a transparent amber-like substance entirely devoid of odor and taste. The various uses of "Bakelite" will be better understood from the following description of some of its properties.

The final product, Bakelite C, is infusible and can resist temperatures of 572 deg. Fahr. (300 deg. C.) or over. It is insoluble in all solvents and can withstand strong chemicals, oil, hot water, steam, etc. These qualities, in conjunction with its dielectric properties, make it an excellent electrical insulator. It can be compounded with various filling materials and shaped or molded to articles of unusual strength. It can be sawed, turned and polished. It can be used to impregnate wood and other porous bodies, rendering them harder and more resisting to chemical and physical influences. It can be obtained as transparent as glass or colored to suit special requirements.

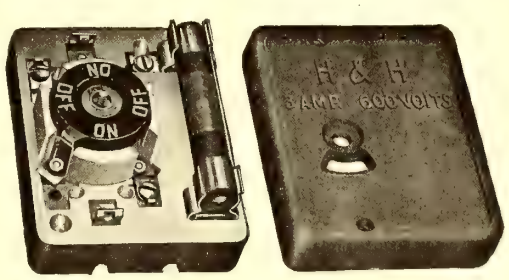
It does not emanate sulphur like hard rubber, nor nitrous products like celluloid, which have a very disturbing influence in some electrical applications. If heated in a flame it does not suddenly catch fire like celluloid nor melt like rubber; it simply chars, then burns with difficulty. Its specific gravity is about 1.25.

The manufacturing process involves the utilization of three distinct and well-defined varieties, designated Bakelite A, Bakelite B and Bakelite C. "C" is the final product, whereas "A" and "B" are the transition products, which enable the manufacturer to mold or otherwise apply the material before its final condition. The initial raw material "A" exists in liquid, pasty or solid condition. Every variety of "A," if heated at a sufficiently high temperature, changes into "B," then into "C." All varieties of "A," whether they be liquid, pasty or solid, are still soluble in alcohol, acetone or in caustic soda and behave as true resins. The intermediate solid product "B" is neither so hard nor strong as "C," and may be easily mistaken for "A," but it is different from the latter on account of its insolubility. "B" is specially characterized by the fact that although it is infusible it will soften under the action of heat and then will mold and weld together if pressed in a hot hydraulic press. The latter fact differentiates it clearly from "C."

The final product "C," resulting from the application of heat to "A" or "B," may be considered as a chemical polymer of "B" resulting from a multiple molecular grouping. It is no longer a resin, although physically it may resemble amber. It has the maximum strength and maximum resistance to chemical influences as previously noted.

BARRIER TYPE CAR LIGHTING SWITCH

The Hart & Hegeman Manufacturing Company, Hartford, Conn., has recently brought out the H. & H. barrier 600-volt car lighting switch, which represents a new application of the barrier principle in electric snap switches. The plates of this switch are swiftly rotated through the narrow inclosed slot in the porcelain barrier and effect a mechanical blow-out that permits the switch to break the circuit under very heavy overloads. The cartridge fuse is in circuit between the line and the switch and protects the incandescent lamps on the circuit from burn-outs. Special pains have been taken to make the switch mechanically strong, so that it will not break down under rough usage and will withstand the effects of the dust,



Car Lighting Switch

snow and moisture to which it is exposed by its position under the hood. The indicator showing whether the circuit is "on" or "off" is extra large and very legible. The steel spindle rotates in two steel bearings and all wearing parts are of hardened steel. The contacts are made of a special alloy to withstand the fusing effect of the arc. The porcelain parts are of glazed chocolate color and are strongly reinforced. The cover is tightly clamped on to prevent rattling. These railway car switches are made in single-pole, three-way and two-circuit types.

News of Electric Railways

Earnings of Cleveland Railway for October

The report of the Cleveland (Ohio) Railway for October, 1910, shows a surplus of $11,111. This is the first surplus since May, and it is said to have been due to the business which the company did during the week of the Cuyahoga County centennial celebration. The passenger earnings were $538,105, the greatest since the Tayler ordinance became effective. Including transfers, 21,517,678 passengers were carried, or 4500 more than during October, 1909. The report for October follows:

Gross receipts	$550,805
Operating expenses	398,588
Net earnings	$152,217
Income from other sources	2,801
Total income	$155,018
Interest, taxes, etc	143,907
Surplus	$11,111

The car mileage for October was 2,277,649. This gives an operating allowance of $261,929 and a maintenance allowance of $136,658. Figuring actual expenditures, there was a surplus of $15,652 in the maintenance account, while in the operating allowance there was a deficit of $7,165.

On Nov. 19, 1910, the directors of the company authorized a loan of $200,000 to pay accrued debts. Of this $110,000 has been appropriated to pay taxes under the receivership, including $65,000 to be used to cover the excise tax from May, 1909, to about March 15, 1910.

Residents of the South End, headed by Councilman C. W. Shimmon, urge that a belt line route should be established when the new Denison-Harvard County bridge is completed. The East 105th Street cars should be routed over the new bridge to West Sixty-fifth Street, according to Mr. Shimmon. This would give a route between points on the lake front on the East and West Sides, passing through the outer portions of the city the entire distance. It would cost not less than $150,000 to establish this line. J. J. Stanley, president of the company, states that a line across the bridge would accommodate people of Newburg and other near-by portions of the city, but that there is no money for such improvements now. As only $400,000 of the new issue of $1,500,000 of stock has been sold, the prospects for betterments and extensions are not particularly bright, especially as about $2,000,000 would be required to carry out work which should be done.

First mortgage and collateral gold bonds to the amount of $750,000 have been sold by the Shaker Heights Land Company. Of this, it is stated, about $250,000 will be devoted to the extension of the Shaker Heights car line south and east of Coventry Road. This is the first time that any company in Cleveland has been called upon to build its own car lines to take care of new developments. Under the conditions imposed upon the Cleveland Railway, however, the company is unable to play any part in the development of the city.

Railway Affairs in Detroit

The case against the Detroit (Mich.) United Railway on the charge of violating a city ordinance by collecting an extra fare on the Jefferson Avenue line in Fairview since that village has been annexed to Detroit was argued before Judge Phelan of the Recorder's Court at Detroit, on Nov. 10, 1910. Assistant Corporation Counsel Weadock appeared for the city and Fred A. Baker for the company. Mr. Baker argued that the contract of the company with the city provides merely for carrying passengers within the city limits and that any litigation which involves this question should be brought in the civil court. Mr. Weadock insisted that as violations of the airbrake, vestibule and other ordinances were brought before the criminal courts the question of fares should also be brought in the same court. He also stated that separate cases, involving the fare question, would be brought for each day from the time of the annexation of the village to the date of the decision of the Supreme Court. About 60 such cases have already been filed. Judge Phelan will be called upon to decide whether the Recorder's Court has jurisdiction in such cases and whether the Common Council has authority to enact an ordinance to enforce a contract. Mr. Baker insisted that the contracts made with Fairview and Gross Point relating to fare are valid as long as they run, notwithstanding the fact that these villages have been annexed by the city. Such matters should be brought before the city courts and not before the criminal court, as no crime has been committed, even if it should be decided that the terms of the contract have not been observed. Since the second decision of the Michigan Supreme Court in favor of the city on this question, the company has collected only one fare, and it will continue to collect only one fare until a decision has been rendered by the United States Supreme Court.

William B. Thompson, who was elected Mayor of Detroit at the recent election, is having a spirited contest with Proctor K. Owens, his opponent, in a recount before the city canvassing board. Many mistakes have been found in the original count, but it is not expected that they will change the result. During the campaign Mr. Thompson frequently referred to the street railway situation in Detroit, but he has so far made no definite statement in regard to the conditions which he believes should govern the new grant to the Detroit United Railway.

Fender Specified for Use in Portland, Ore.

The Nelson ordinance specifying the type of fender that shall be used on street cars operated in Portland, Ore., after July 1, 1911, to which reference was made in the Electric Railway Journal of Nov. 19, 1910, page 1047, describes the device necessary to meet the requirements of the ordinance as follows:

"A fender located and attached to forward end of the car projecting therefrom at least 24 in., consisting of an apron composed of steel wire mesh, and a lifeguard or vertical fender of similar construction projecting at least 3 in. vertically in front of bumper or platform of car, the rear end of said apron or guard to be not less than 4 in. near or more than 12 in. above the top of rail, and said apron or guard to be not less than 24 in. long from its rear end to its front or forward edges, and to be of sufficient width to extend at least 6 in. outside of each rail of the track, the front edge of said apron to be formed of standard piping not more than 2 in. in diameter; said apron to be formed of steel wire mesh, the openings not more than 3 in. wide through or between the same; said apron to be attached to pistons working within cylinders, so that by an emergency application of the air through the motorman's air valve said apron will be thereby lowered and held on the rails by said air pressure within said cylinders; the said apron of said fender may have a projecting bar parallel with and in front of said apron, whereby when said bar comes in contact with any pedestrian on the track air will be thereby admitted into said cylinders controlling said fender and into cylinder controlling brake mechanism simultaneously. The motive power for actuating or compressing said apron or fender to the rails shall be straight or automatic air under instant control of the motorman or drive of said car by use of controlling valve which incorporates both fender and brakes; provided, however, that the apron may be in addition provided with means for operating said fender automatically as hereinbefore described."

Opening of American Museum of Safety

The formal exercises in connection with the opening of the permanent exhibition of the American Museum of Safety were held on the evening of Nov. 21, 1910, in the auditorium of the Engineering Association Building, New York. Philip T. Dodge presided. There are 12 museums of safety in Europe and one in Canada. The New York museum is the fourteenth of its kind. The object of the museum is to conserve human life, by providing a permanent exhibit of the best and most practicable de-

vices for making safe the dangerous parts of machines and processes. President Taft expressed his interest in the work and stated that he did not know of any better method to bring about the use of such devices than to exhibit them. Greetings from Justice Charles E. Hughes, of the United States Supreme Court, Dr. Kaufman, president of the German Imperial Insurance Office, and directors of the European Museums of Safety were then read. Justice Hughes said that he had been deeply interested in the work of the museum from the outset and expressed the hope that the permanent exhibit would increase the interest in the protection of life and limb.

The gold medal offered by the Travelers' Insurance Company to the individual industrialist or corporation that had done the most to protect the lives and limbs of workmen was presented to the United States Steel Corporation and was accepted by W. B. Dickson, vice-president of the company. Prof. F. R. Hutton, chairman of the jury of award, announced that the trustees had awarded a gold medal, offered by the *Scientific American* for the best safety device exhibited at the museum, to the Safety Scaffolding Company, New York, for its design and construction of suspended platforms.

Dr. W. H. Tolman described the systems to insure the safety of employees which are used abroad, and T. C. Martin outlined the history of the American Museum. Other speakers were Edson S. Lot, president of the United States Casualty Company, and Dr. N. E. Ditman.

Arbitrators Selected at Winnipeg.—W. J. Christie was selected on Nov. 10, 1910, as the third member of the board of arbitration which is to consider the differences between the Winnipeg Electric Railway and its employees, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 29, 1910, page 923. Captain Robinson has been selected to represent the company and Mayor Peletier, Fort William, has been selected to represent the employees.

Complaint Against Walkill Transit Company.—The Public Service Commission of the Second District of New York has received a complaint from the chairman of the street committee of the Common Council of Middletown against the Wallkill Transit Company, Middletown, N. Y., alleging that the tracks and rails of the company on certain streets are out of repair, dangerous and unsightly. The commission is asked to order the company to put its tracks in shape for safe and comfortable operation.

Incidents in the Columbus Strike.—George W. Brady, alias Gerald O'Leary, has been brought to trial at Columbus, Ohio, on the charge of shooting two women in the riots which occurred during the strike of the employees of the Columbus Railway & Light Company. After the shooting Brady disappeared. He was captured in Cleveland and an indictment was found against him. The proprietor of a moving picture show at Kenton has been forbidden by the police to produce scenes of the riots in Columbus during the strike.

New Washington Street Tunnel Under Chicago River.—The reconstructed Washington Street tunnel under the Chicago River will shortly be opened for the passage of cars of the Chicago (Ill.) Railways. As originally built, this masonry tunnel was only 16 ft. below the mean level of water in the river, limiting the draft of vessels in the Chicago River at that point. The reconstructed tunnel is 26 ft. below the river surface. Parts of the original masonry walls of the structure were retained, the roof was taken off and rebuilt on steel girders supported on the walls and the floor lowered sufficiently to allow cars to pass. The tunnel is 1200 ft. long, of which 200 ft. is subaqueous. The west approach extends beneath the new terminal station of the Chicago & Northwestern Railroad. The track grade is 46 ft. below the river level, and the bore section measures 16 ft. x 25 ft. The reconstruction work was done by George W. Jackson, Inc., Chicago, Ill.

Amendments Suggested to Cleveland Subway Grants.—George W. Kinney, president of the Cleveland Chamber of Commerce, has suggested to the City Council certain amondments to the subway ordinances granted recently to the Cleveland Underground Rapid Transit Railroad and has asked for a hearing before the committee on railroads of the Council. One of the amendments suggested is that the upper subway in the free territory of the city be of sufficient width and depth to admit the operation of surface cars; another would provide power to inspect the books and accounts of the company, with special reference to the cost of construction, to the end that the investment may be accurately ascertained, and a third would provide for the validity of the purchase and licensee provisions of the ordinance. The City Council, it is stated, will not pass these proposed amendments unless the case now in the Supreme Court is decided against the city. The City Council repealed the subway ordinances, but the company declared they were still valid because they had been accepted before the repealing ordinanc was passed. To adopt amendments, it is asserted, would be to acknowledge that the ordinances are valid.

Transit Improvements Considered in Indianapolis.—On Nov. 10, 1910, the directors of the Commercial Club of Indianapolis and the members of the Board of Works of that city considered the report of a special committee of the club regarding street railway improvements in Indianapolis. The directors of the club urged the Board of Works to require the Indianapolis Traction & Terminal Company to hasten the work of paving between tracks and to build a cross-town line. Members of the Board of Works claimed that a cross-town line was not needed at present, and that the company was paving between the tracks as rapidly as possible. There were many things to be done in the way of paving, building cross-town lines and making extensions. The company was only able to do part of the work at once. The committee states that when the Indianapolis company accepted its franchise in 1902 it agreed to build two cross-town lines in Indianapolis by 1905, one on the north side and the other on the south side. Routes named in the franchise have been considered impractical by the succeeding administrations, and no definite action has been taken regarding the selection of new routes.

Decision Regarding Right of Interurban Railway to Parallel Steam Railroad.—The Lake Shore & Michigan Southern Railroad brought suit against the Chicago, Lake Shore & South Bend Railway in the Elkhart Circuit Court recently, alleging that the Chicago, Lake Shore & South Bend Railway paralleled its road from South Bend to Gary, and that the high tension wires of the Chicago, Lake Shore & South Bend Railway interfered with the transmission of messages over its telegraph lines. An injunction was requested to forbid the operation of the electric railway until it had installed devices to correct the inductive effect of its high-tension lines. The court has denied the injunction on the ground that the defendant is making lawful use of the franchise conferred upon it by the statute, and that such an act cannot be considered as a nuisance in itself; that in the exercise of such franchise no negligence has been shown and no wanton or unnecessary disregard of the rights of the complainant; that the damages occasioned are not the direct consequence of the construction of the defendant's road, but are merely incidental resulting from the operation and not recoverable. The plantiff has appealed from this finding.

The Massachusetts Railroad Commission gave a hearing on Nov. 16, 1910, upon the appeal of the Boston (Mass.) Elevated Railway against the action of the Cambridge Water Board by which the latter refused to agree to the relocation of an important water main in Massachusetts Avenue, Boston, according to plans proposed by the Boston Elevated Railway in connection with the building of the Cambridge subway. It developed at the hearing that the chief issue is the agreement of both parties upon a solution of the problem and the case was held open to permit further technical conferences. The company maintained that the water board did not give it the legal determination of the problem to which the statutes entitle it and contended that it had no right to condemn private property for the relocation of water mains. Counsel for the company have also filed a brief declaring against the passage of a law requiring street railways to interchange cars on the grounds that such a statute is not needed; that the Boston Elevated Railway is already receiving the cars of foreign companies and that a general interchange is undesirable on the ground of safe operating.

Financial and Corporate

New York Stock and Money Market

Nov. 21, 1910.

The Wall Street market for the past week has been highly professional. Although prices have not declined during the week until to-day, the feeling in the financial district is not one of strength or confidence. It is generally believed that the market has been oversold and that prices are being artificially maintained on this account. Trading is very dull and outsiders are taking practically no part at all.

The demand for bonds is still very light, but the money market is remarkably easy for the season. Quotations to-day were: Call, 2½@2¾ per cent; 90 days, 4¼@4½ per cent.

Other Markets

Rapid Transit and Union Traction issues have both been active in the Philadelphia market during the past week, stimulated, undoubtedly, by the near approach of an agreement upon a plan of refinancing along the lines suggested by Mr. Stotesbury. Prices for both issues have advanced slightly.

In Boston there continues to be an active market for Boston Elevated and the Massachusetts Electric issues. These stocks are strongly held, but prices are very little higher than the former quotations.

Chicago Railways certificates, Series 1 and 2, have been in the market almost every day during the past week, but there have been only small lots offered. Prices are somewhat stronger, the former showing a net gain of six points on the week and the latter more than two points.

In Baltimore a few lots of Railways certificates have been sold at about 15. The bonds continue active at the former prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 15.	Nov. 22.
American Railways Company	43	43
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a89½	a90
Boston Elevated Railway	a128½	a129½
Boston & Suburban Electric Companies	16½	a16½
Boston & Suburban Electric Companies (preferred)	72	a72
Boston & Worcester Electric Companies (common)	*10½	a10
Boston & Worcester Electric Companies (preferred)	*43	a41
Brooklyn Rapid Transit Company	77¼	78
Brooklyn Rapid Transit Company, 1st pref. conv. 4s	83¼	83⅛
Capital Traction Company, Washington	a128½	a128
Chicago City Railway	*170	*170
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a76	a82¼
Chicago Railways, ptcptg., ctf 2	a20½	a22¾
Chicago Railways, ptcptg., 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a5½	a6
Consolidated Traction of New Jersey	a74	a74
Cleveland Railway	*91½	*91½
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railways	a57	a57
General Electric Company	153	156¼
Georgia Railway & Electric Company (common)	a120	a118
Georgia Railway & Electric Company (preferred)	a89	a88
Interborough-Metropolitan Company (common)	21	20⅞
Interborough-Metropolitan Company (preferred)	57½	56
Interborough-Metropolitan Company (4½s)	80⅜	80⅜
Kansas City Railway & Light Company (common)	a23	a21¼
Kansas City Railway & Light Company (preferred)	a75	a75
Manhattan Railway	a142	141½
Massachusetts Electric Company (common)	a20½	a20½
Massachusetts Electric Companies (preferred)	a87¾	a88¾
Metropolitan West Side, Chicago (common)	*21	a21
Metropolitan West Side, Chicago (preferred)	*64	a68
Metropolitan Street Railway	*22	*22
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	65½	*65½
Northwestern Elevated Railroad (common)	a20	a22
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a45½	45½
Philadelphia Company, Pittsburg (preferred)	a41½	42
Philadelphia Rapid Transit Company	a16½	a18
Philadelphia Traction Company	*82	*82
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs	a101	a101
Seattle Electric Company (common)	a107½	a107½
Seattle Electric Company (preferred)	a102½	a103
South Side Elevated Railroad (Chicago)	*65	a65
Third Avenue Railroad, New York	12¾	a12¾
Toledo Railways & Light Company	a10	*10
Twin City Rapid Transit, Minneapolis (common)	a110½	108½
Union Traction Company, Philadelphia	39¾	a41¾
United Rys. & Electric Company, Baltimore	*15⅝	a15
United Rys. Inv. Co. (common)	*14¾	*14¾
United Rys. Inv. Co. (preferred)	*60	57
Washington Ry. & Electric Company (common)	a36½	a34
Washington Ry. & Electric Company (preferred)	a90	a87½
West End Street Railway, Boston (common)	87½	a90½
West End Street Railway, Boston (preferred)	*100¾	*100¾
Westinghouse Elec. & Mfg. Company	71	71⅜
Westinghouse Elec. & Mfg. Company (1st pref.)	124	*124

a Asked. * Last sale.

Proposed Reorganization of Washington, Baltimore & Annapolis Electric Railway

The committee, consisting of George T. Bishop, J. L. Severance, Hinsdill Parsons, George A. Craig, John Sherwin and J. J. Nelligan, which has recently prepared a plan for the reorganization of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., has issued a circular which gives in detail the terms of the readjustment. As stated in the Electric Railway Journal of Nov. 19, 1910, page 1044, it is proposed to organize a new company with total authorized capital liabilities of $13,000,000, of which $7,500,000 is to be first mortgage bonds, $2,500,000 6 per cent non-cumulative preferred stock and $3,000,000 common stock. At present $5,000,000 of bonds will be issued, $1,460,000 of preferred stock and the entire amount of common stock. This will leave unissued $2,500,000 of first mortgage bonds, and $1,040,000 of 6 per cent non-cumulative preferred stock.

Holders of the second mortgage bonds will have the right to subscribe for $100,000 of preferred stock with a bonus of $500,000 of common stock, and holders of the preferred stock will have the right to subscribe at par for $500,000 of preferred stock with a bonus of $2,500,000 of common stock. The right of stockholders to subscribe for preferred stock, however, is qualified as follows: "Stockholders may subscribe for preferred stock in an amount equal to 10 per cent of their present holdings, but the committee reserves the right to reduce all subscriptions to 8 per cent of their present stock holdings, the same being necessary in case more than 86 per cent in amount of stockholders subscribe."

The circular says further:

"In cases where a subscriber is entitled to a fractional share, and where such fraction exceeds a half share, he will be permitted to underwrite a full share. In cases where the fraction is less than a half share, the right to subscribe will be reduced by such fractional amount. Subscription rights are available only on deposits of second mortgage bonds and stocks.

"Of the indebtedness contracted prior to and under the receivership, approximately $400,000 thereof is of a nature to require the payment of the same in cash upon reorganization, representing payment in full for 10 new cars, cost of Lombard Street freight terminal, reconstruction of tracks of Washington Railway & Electric Company so as to permit operation of the railway company's cars in Washington, and costs of receivership.

"The issue of bonds, par for par, as to principal to the railway company first mortgage bondholders and to the Terminal bondholders, and of preferred stock for interest, liquidates in full the entire amount due on all such bonds, and gives the holders thereof interest and dividend-bearing securities. The issue of $400,000 preferred stock to the second-mortgage bondholders, with the right to subscribe for an amount of underwriting equal to 1-10 of the par value of their bonds, should fully protect the equity of the second-mortgage bondholders, and give them a chance to participate in the anticipated development of the property. The allotment of the remainder of the underwriting to the present stockholders gives to them an opportunity (1) to acquire dividend-bearing securities for the new capital (2) to preserve a stock control."

The circular also comments on the prospects of the reorganized company. References are made to the substitution of the 1200-volt direct-current system for the alternating current system, to the operation of through cars to the downtown district in Washington and to the advance in fares, all of which took place on March 1, 1910. The results of operation since March 1, 1910, it is stated, indicate that for the year which will end with February, 1911, the net earnings should equal the amount which will be required the following year for interest and taxes and leave a surplus of approximately $60,000, or slightly more than 4 per cent on the new preferred stock of the company. Continuing, the circular says:

"The properties are at present encumbered by mortgage indebtedness to the amount of $6,145,000, with an outstanding capital stock of $5,783,000. The new company will have an outstanding bond issue of $5,000,000, preferred stock of

$1,460,000, common stock of $3,000,000, with $217,000 of bonds and ample cash as working capital in the treasury, the reduction in outstanding capitalization exceeding $2,500,000."

After Nov 29, 1910, bonds of the Baltimore Terminal Railway and first and second mortgage bonds of the Washington, Baltimore & Annapolis Electric Railway will be received for deposit by the Cleveland Trust Company, Cleveland, Ohio, and the Safe Deposit & Trust Company, Baltimore, Md., as depositories only on the payment of $10 for each bond deposited, and stock of the Washington, Baltimore & Annapolis Electric Railway will be received for deposit only upon the payment of 25 cents per share.

Southern Pacific Acquires Pacific Electric Railway

The property of the Pacific Electric Railway has been acquired by the Southern Pacific Railroad, while all the holdings of the Los Angeles Railway are now for the first time owned by Henry E. Huntington. An official statement says:

"For several years past the Southern Pacific Railroad has owned 45 per cent of the stock of the Los Angeles Railway and Mr. Huntington the balance. The stock of the Pacific Electric Railway has been owned equally by Mr. Huntington and the Southern Pacific Railroad. Mr. Huntington now acquires from the Southern Pacific Railroad its 45 per cent of the stock of the Los Angeles Railway and thus becomes its sole owner, while the Southern Pacific Railroad in turn buys out Mr. Huntington's half interest in the Pacific Electric Railway and thus becomes its exclusive owner. Furthermore, the Southern Pacific Railroad acquires control of the interurban portion of the Los Angeles & Redondo Railway, lying between Hawthorne and Redondo, while the urban portion between Hawthorne and Los Angeles will hereafter belong to and be operated by the Los Angeles Railway.

"Mr. Huntington's new interests have been reorganized under the corporate name of Los Angeles Railway Corporation, having a capitalization of $20,000,000, with the active management in the hands of his son, Howard E. Huntington.

"The details of the reorganization of the Pacific Electric Railway have not been arranged. The new name may be Pacific Electric Corporation. The Los Angeles-Pacific Company, the old Clark-Sherman system, which was purchased by the Harriman interests several years ago and is now in charge of Robert C. Gillis, will probably lose its identity in consolidation. The electric railways in Ontario, Redlands, San Bernardino and Riverside are now part of the new Southern Pacific electric system in Southern California. The present capitalization of the Pacific Electric Railway is $10,000,000, but it owns assets costing several times that amount.

"Negotiations in the readjustment of electric railway ownership above indicated were carried on for Mr. Huntington by himself and his personal attorney, William E. Dunn, and for the Southern Pacific Railroad by William F. Herrin, vice-president and head of its legal department; J. W. McKinley, its Los Angeles counsel, and Col. Epes Randolph.

"The ownership of the 10-story Pacific Electric Building at Sixth Street and Main Street, Los Angeles—the entrepot of the Pacific Electric system in the metropolis—is also transferred to the Southern Pacific Railroad.

"Mr. Huntington's recent acquisition of the urban lines of the Pacific Electric Railway in Los Angeles and granting to his patrons universal transfer privileges is a part of the new order of things."

Speaking of future plans, Mr. Dunn said:

"It is apparent that the Southern Pacific Railroad's attitude is to extend the Huntington liberal policies in future construction and operation. This will mean much to Southern California. I have heard it stated that, assuming that $25,000,000 or $30,000,000 have been invested in the Pacific Electric Railway up to date, as much more will have to be put in to keep the system moving with the development of the regions it serves."

The new directors of the Pacific Electric Railway are: W. F. Herrin, president; Paul Shoup, vice-president; William Hood, Walter F. X. Parker, J. W. McKinley, Col. Epes Randolph, R. C. Gillis. The retiring directors are H. E. Huntington, Howard Huntington and G. C. Ward. The new directors of the Los Angeles & Redondo Railway are Paul Shoup, Guy V. Shoup, Walter F. X. Parker, J. W. McKinley and W. C. Martin. The retiring directors are H. E. Huntington, Howard Huntington, G. C. Ward, C. A. Henderson and W. E. Dunn. The new directors of the Los Angeles Corporation are H. E. Huntington, president; Howard Huntington, vice-president and general manager; W. E. Dunn, Albert Crutcher, J. E. Brown, C. A. Henderson and G. C. Ward. Those who resigned are W. F. Herrin, I. W. Hellman, Jr., and J. K. Harrington.

Atchison Railway, Light & Power Company, Atchison, Kan.—The Atchison Railway, Light & Power Company has filed for record the mortgage for $1,500,000 covering its property, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 29, 1910. The Federal Trust Company is trustee under the mortgage.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The Augusta-Aiken Railway & Electric Corporation has been incorporated under the laws of Maine with an authorized capital stock of $3,750,000 as successor to the Augusta-Aiken Railway & Electric Company, the purchase of a controlling interest in which by Redmond & Company, New York, N. Y., was noted in the ELECTRIC RAILWAY JOURNAL of July 23, 1910, page 162. All of the 5 per cent collateral trust bonds of the Augusta-Aiken Railway & Electric Company, dated 1903, which are outstanding have been called for payment at 105 and interest on Jan. 1, 1911, at the office of the Baltimore Trust Company, Baltimore, Md.

Gary & Interurban Railway, Gary, Ind.—The unsold portion of the present issue of $1,000,000 of first refunding mortgage 5 per cent gold bonds of the Gary & Interurban Railway, dated July 1, 1910, and due July 1, 1930, but callable at 105 and interest, is being offered at 95 and interest by Lawrence Barnum & Company, New York, N. Y. The Western Trust & Savings Bank, Chicago, Ill., is trustee under the mortgage which secures the bonds.

Georgia Railway & Electric Company, Atlanta, Ga.—J. H. Hilsman & Company, Atlanta, Ga., have purchased $225,000 of the refunding and improvement 5 per cent mortgage bonds of the Georgia Railway & Electric Company, forming part of the $1,250,000 of bonds which the Georgia Railroad Commission in April, 1909, authorized the company to issue. Of these bonds $1,000,000 were previously outstanding.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The property of the Indianapolis & Cincinnati Traction Company was purchased at foreclosure recently by John J. Appel, representing the bondholders, and a company to be known as "The Indianapolis & Cincinnati Traction Company" has been incorporated with an authorized capital stock of $3,000,000 and an authorized bond issue of $1,300,000, to succeed the Indianapolis & Cincinnati Traction Company. Thus the only difference between the name of the old company and the successor company is in the word "The." The following directors have been elected for the successor company: W. T. Durbin, W. J. Alford, Anderson, Ind.; T. F. Rose, George A. Ball, Munsey, Ind.; John J. Appel, J. F. Wild and Charles L. Henry, Indianapolis, Ind.; W. M. Frazee, Rushville, and John R. Beasley, Terre Haute, Ind. The officers of the successor company are: Charles L. Henry, president and general manager; T. F. Rose, vice-president, and John F. Wild, secretary and treasurer.

Interstate Railways, Philadelphia, Pa.—In the ELECTRIC RAILWAY JOURNAL of Nov. 19, 1910, page 1044, mention was made of the special meeting of the stockholders of the Interstate Railways which has been called for Nov. 25, 1910, to vote on a plan to issue $1,000,000 of preferred stock at par, the proceeds to be used to liquidate the company's floating indebtedness and to pay overdue interest and the coupons due on the bonds in February. The new stock is to be divided into 100,000 shares of a par value of $10 each and the dividends are to be at the rate of 6 per cent, cumulative from the date of issue. This stock is to have preference over the common stock, both as to dividends and assets, and is to be redeemed and retired at par before any dividends are paid on the common stock. Subscription agreements which have been addressed to the stockholders

and the bondholders of the company ask the stockholders to subscribe to $500,000 of the proposed issue of preferred stock at par, payable in five installments of 20 per cent each beginning Dec. 15, 1910, and ending April 1, 1910, and ask the bondholders to accept the preferred stock at par for the 1910 and 1911 coupons. If these plans are accepted, the opinion is expressed that the company will be able by Feb. 1, 1912, to resume the payment of coupons at the regularly stated periods.

Louisville & Eastern Railroad, Louisville, Ky.—Judge Walter Evans, of the Federal Court at Louisville, has entered an order which provides for the sale of the Louisville & Eastern Railroad, which has been in the hands of a receiver for more than a year. Thomas Branham has been appointed commissioner to conduct the sale within 30 days. The motion to sell the road was made by Judge Alex P. Humphrey, acting for the bondholders. It is expected that the Louisville Railway, which has bought a majority of the outstanding claims against the company, will purchase the property at the sale.

San Francisco, Vallejo & Napa Valley Railway, Napa, Cal.—A. W. Fox, Harrogate, Eng., has applied for a receiver for the San Francisco, Vallejo & Napa Valley Railway.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—McCuaig Brothers & Company, Boston, Mass., offer for sale at 95 and interest carrying a bonus of $400 par value of stock with every $1,000 of bonds a limited amount of 5 per cent consolidated first mortgage sinking fund bonds of the Sherbrooke Railway & Power Company. The bonds are dated July 1, 1910, and are due July 1, 1940. An annual cumulative sinking fund of 1 per cent of the total outstanding issue of bonds is provided to commence July 1, 1916.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1½ per cent.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

Kansas City Railway & Light Company, Kansas City, Mo., quarterly, 1¼ per cent, preferred.

Norfolk Railway & Light Company, Norfolk, Va., 2½ per cent.

Pensacola (Fla.) Electric Company, 3 per cent preferred.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

St. Joseph Railway, Heat, Light & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred; quarterly, ½ of 1 per cent, common.

About 65 exhibitors have contracted to take space at the electrical show which is to be held at the Coliseum, Chicago, Ill., on Jan. 7 to 21, 1911. The general scheme of interior decoration and lighting will be different from anything heretofore attempted. It will represent a noonday effect, the ceiling of the large building being treated and lighted to represent a bright daylight sky with a few fleecy clouds. Consistent with this conception will be the placing of all exhibits under vine-covered trellises, giving the appearance of arbors. A 500-watt tungsten lamp will be suspended from the arbor over the center of each exhibit space and smaller tungsten lamps will surmount the posts connected with the railing surrounding the exhibits. As in former years, the central-station exhibit of the Commonwealth Edison Company will form a conspicuous feature of the show. The space at the north end of the building heretofore allotted to this company will be used again. The idea of this year's Edison display will be a representation of a section of a street with a 7-ft. sidewalk, street lamps and six stores. The street lamps will consist of six posts, each supporting four or five 60-watt tungsten lamps in round frosted-glass globes. These posts are of the type adopted as standard for the various special street-lighting installations in Chicago. Commonwealth Edison Avenue is the name given to this "street," and each of the stores fronting on it will be of fairly good size, with two show windows and a central entrance. One of them will be a lamp shop. Another store will be a model grocery. A third store will be a shop for the display of domestic electric appliances of all kinds.

Traffic and Transportation

Sale of School Tickets in Portland

Early in 1910 the Portland Railway, Light & Power Company, Portland, Ore., with the approval of the School Board of Portland modified its rules which governed the sale of tickets to children and persons attending school. Subsequently the City Council of Portland adopted a resolution to instruct the City Auditor of Portland to address a communication to the company requesting it to discontinue the regulation then in force restricting the sale of street car tickets to those attending school and to adopt the system which had previously been in use.

Upon his return to Portland from the East B. S. Josselyn, president of the company, under date of Oct. 24, 1910, addressed a letter to the City Auditor, in which he said:

"We have concluded to modify our regulations in regard to the sale of these street car tickets to school children, as set forth in copy of my letter to F. D. Hunt, traffic manager of this company, which follows. Inasmuch as the change from 16 to 20 years in the age of school children entitled to the tickets and the permitting of one or more children in the same family to travel on the same book will remove the main difficulties complained of, I trust there will be no further objection to permitting the rest of the regulations concerning these school tickets to stand as issued."

On the same date Mr. Josselyn addressed a letter to F. D. Hunt, traffic manager of the company, in which he reviewed the conferences which had been held with the School Board in regard to the changes in the fares of school children and called attention to the advertisements carried by the company in the daily papers to acquaint the public with the changes in school fares for 1910-11. This letter Mr. Josselyn concluded as follows:

"The issuance of school tickets at reduced rates by the company is a gratuity on our part, and it seems to me that we should be permitted in granting a gratuity to surround it with such safeguards as we deem proper, in order that improper use may not be made thereof; and notwithstanding the request of the City Council that we return to the old method for selling school tickets, I feel that if we modify our regulations to some extent and overcome the main objections raised the City Council and the public will be satisfied.

"For the purpose of making these concessions, this will be your authority to change from 16 to 20 years the age limit of children to whom school tickets may be issued in order that pupils attending high school may be given the reduced rate. Also arrange to issue tickets hereafter so that any number of children in one family may use the same book of tickets, instead of requiring each child to procure a book for his or her independent use. You can keep a record of these tickets by charging the book first to one child and then to another, and so on, which will keep your record as desired. Of course, it will be necessary for all the children using a single book to board the car at the same time, for the tickets must not be detached except by the conductor.

"I do not think it advisable to sell tickets at more than one point, for we must have a complete record of all transactions at one place in order that no more than the number entitled to be sold to a person or family may go out."

Subsequently the company decided on the following conditions to govern the use and sale of school tickets in Portland and the 5-cent fare limits:

"The special school rate for pupils attending both public and private schools has been extended to include pupils up to and including 20 years of age, subject to the following conditions:

"Pupils attending school who will be entitled to the special school rate of 3 1-3 cents for continuous trip will be divided into two classes and for convenience will be designated as Class A and Class B.

"Class A will include pupils over 14 years but not over 20 years of age.

"Class B will include pupils 14 years of age and under.

"1. Tickets will be sold to pupils in Class A only upon presentation of a certificate of this company's issue, properly filled out. The certificate must bear the pupil's full

name, name of school attending and must be signed by the principal of such school.

"2. The certificates and tickets sold therein are not transferable and are for the individual use of the pupil to whom issued, and the tickets will not be accepted for the transportation of any other person. No two or more pupils will be permitted to use the same book of tickets; each pupil must be provided with an individual book of tickets for his or her individual use.

"3. Not more than three books of tickets will be sold on any certificate within any one month.

"4. Not more than one book of tickets will be sold on any certificate within a period of eight consecutive school days.

"5. Should a book of tickets be lost, another book of tickets will not be sold until the prescribed eight consecutive school days have expired.

"6. Should a certificate be lost it must be reported to the principal of the school by whom issued and by him reported to the traffic manager of the company before another certificate is issued.

"7. Certificates must be filled out and signed in ink.

"8. Certificates must be presented at ticket office each time tickets are purchased. Under no circumstances will tickets be sold for use of pupils more than 14 years to 20 years of age without a certificate properly filled out.

"9. Blank certificates will be furnished to principals on application to the traffic department.

"10. Certificates will not be required for children in Class B and it will not be necessary for each child to have an individual book.

"11. Tickets sold for use of children in Class B will be distinguished by a rubber stamp or printed impression of a 'crescent' on face of each ticket. Tickets stamped or printed in this manner will be good for passage if detached for children in Class B only; they will not be accepted for the transportation of any other person more than 14 years of age.

"The tickets sold at the special school rate named herein to pupils in both Class A and B are good for transportation to and from school only, on school days between the hours of 7:30 a. m. and 6 p. m. They will not be accepted for passage before 7:30 a. m. or after 6 p. m. or on Saturdays, Sundays, holidays, or when schools are not in session.

"All of the above conditions must be complied with under penalty of forfeiture of the reduced rate named herein.

"Certificates expire and tickets will be taken off sale at close of school season, June, 1911. Tickets will not be accepted for passage during closed school period.

"School tickets are sold in books of 33 coupons (single trips) at $1 per book and are on sale at the company's ticket office only."

Commutation Rates Between Los Angeles and Recently Annexed Territory

Citizens of Hollywood and Colegrove, which are now part of Los Angeles, Cal., recently petitioned the Los Angeles-Pacific Company to place a 5-cent fare in effect between those places and Los Angeles, instead of the 10-cent fare. As noted in the ELECTRIC RAILWAY JOURNAL of Sept. 24, 1910, page 485, the company refused this request, but announced that it would establish a special commutation fare between Hollywood, Colegrove and Los Angeles. The company has now announced that on or about Jan. 1, 1911, it will place on sale 60-ride individual commutation tickets for $3, good for 90 days; 30-ride family commutation tickets for $2.10, good for 90 days, and 40-ride school commutation tickets for $1.50, limited to the school term, for use between Los Angeles and Gardena Junction on the Hollywood line and Highland Avenue on the Colegrove line. The commutation tickets will be honored via any route and transfers will be issued to cars of the Los Angeles-Pacific Company in Los Angeles, Hollywood and Colegrove. On the same date the 5-cent fare will be extended from Arlington to Vineyard on the Sixteenth Street line.

In explanation of the change the company, through D. W. Pontius, traffic manager, addressed a letter to the Public Utilities Commission of Los Angeles in which the following statements are made:

"Desiring insofar as we consistently can to promote a good understanding and friendly feeling between the residents of the Hollywood and Colegrove sections and our company, an investigation has been made of the effect upon our revenue of the single trip 5-cent fare that has been requested and we regret that we cannot profitably carry on our business under that rate with conditions as they are, as the bulk of our business would be carried on under a rate yielding us only from ½ to ¾ of a cent per mile. The country between is not yet thickly populated and we have no compensating short hauls, as in the case of city railways, to make up losses on the longer hauls.

"Annexation may become very widespread, consolidation of city and county government being even now contemplated, and obviously the interurban electric railways could not make effective a rate of 5 cents within such possibly enlarged limits and continue in business.

"In the character of our reconstruction work on the line to Hollywood, and in the improvement of our service to follow, we are trying to show the spirit of friendly co-operation with the residents of that section and hope that our side of the question may be considered by our Hollywood friends."

Near Side Stops in Baltimore

The following announcement is contained in *Trolley News*, which is published weekly by the United Railways & Electric Company, Baltimore, Md., regarding the plans of the company for complying with the city ordinance passed recently which requires all street railways which operate in Baltimore to stop their cars on the near side of the street:

"Beginning Friday, Nov. 25, the cars of this company will stop only at the near side of street crossings. On that day the ordinance requiring the street railway companies of Baltimore to make a uniform near side stop to receive and discharge passengers becomes effective.

"The riding public has already become accustomed to the near side stop at rapid transit crossings, as for some months past the cars of the United Railways & Electric Company have been stopping only at the near side of so-called rapid transit crossings.

"In order that there may be no confusion on the part of the public concerning the proposed change, attention is particularly directed to the fact that the requirement of the law is that a near-side stop is to be made at streets where there are no rapid transit crossings only on signal of either the conductor or a patron that a passenger wishes to get on or get off the car.

"Automobilists, teamsters and pedestrians should bear in mind that the motorman is not required to stop his car in crossing a street where railway lines do not intersect, except to allow passengers to board or alight.

"Until the public becomes accustomed to this new order of things, it is necessary that extra precaution should be exercised by drivers and the public generally. The public should be careful when approaching rapid transit lines either for the purpose of crossing or of boarding a car; and patrons are requested to wait for cars only on the near-side corner."

Women First in Boston.—The Boston (Mass.) Elevated Railway has posted on all its elevated stations signs which read: "Women first, please." The company has also posted in its elevated cars signs which read: "The company respectfully requests male passengers to give women precedence at stations."

Motorman Concerned in Wreck Insane.—B. F. Corkwell, a motorman of one of the cars of the Fort Wayne & Wabash Valley Traction Company which collided near Kingsland, Ind., on Sept. 21, 1910, has been adjudged insane and has been committed to the Eastern Hospital for the Insane at Richmond, Ind.

Car License Ordinance Introduced in Paterson.—The ordinance to require street railways which operate in Paterson, N. J., to pay a license of $25 a year for every car operated in Paterson, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 29, 1910, page 927, has been introduced in the Council and referred to the ordinance committee.

Through Service Between Michigan City and Indianapolis.—The Indiana Union Traction Company, Anderson, Ind.; the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., and the Winona Interurban Railway,

Winona Lake, Ind., established through service from the South Shore of Lake Michigan at Michigan City to Indianapolis, a distance of 175 miles, on Nov. 20, 1910.

Hearing on Fares in Niagara Falls Park.—The Provincial Board of the Queen Victoria Niagara Falls Park Commission will hold a hearing in Toronto, Ont., on Nov. 25, 1910, to consider the question of fares charged by the International Railway, which controls the Niagara Falls Park & River Railway, on its lines in Niagara Falls, Ont. It is claimed that the fares in force impose a burden on persons such as tourists who only use the company's lines occasionally.

Hearing on Withdrawal of Tickets in New Jersey.—The Public Utility Commission of New Jersey recently gave a hearing on the petition to require the Public Service Railway to restore the sale of tickets in books of 106 for $5.00. The company reiterated before the commission the statements made in its letter to that body which was published in the Electric Railway Journal of Oct. 15, 1910, page 859. Briefly the company contends that the public demand for tickets at the rate of 21 for a dollar does not warrant the expense involved in printing and handling them; that tickets cannot be used readily with the fare boxes which it is installing; that street railway tickets are not on sale in other large cities, and that the ordinances under which the company operates authorize it to collect 5-cent fares. It was explained that school tickets made of paper are still sold, but that it is proposed to substitute metal disks for the paper tickets in the near future. The commission has not yet announced its decision in regard to the matter.

Calling Attention to Nature's Beauties Near Louisville.—The Louisville & Northern Railway & Lighting Company, Louisville, Ky., is constantly exploiting the advantages of electric transportation through the newspapers and billboards. The following advertisement of the company was published recently in a Louisville paper in a space 4 in. square: "See Nature in its truly wonderful work of tinting the forest leaves on Silver Hills. The great variety of forest trees here makes possible a multi-colored effect that is rarely seen. The cars wind around the hills for over a mile, affording many beautiful views. Be sure to see the view from the New Albany reservoir situated on top of the hill, the finest scenery around the Falls Cities. Take the big red car." In the lower left-hand corner this injunction was printed in type of a different face from the body of the advertisement: "Cars over Big Four and K and I bridges every 15 minutes from the depot—Third Street, near Walnut. Go one way, come back the other. Complete trip, 25 cents. Passengers taken on at any street along the route."

Plans for Improving Service in New Haven.—E. G. Buckland, vice-president of the Connecticut Company, New Haven, Conn., has addressed a letter to the committee on railroads of the City Council of New Haven in which he reviews at considerable length the plans which the company is making to improve service over its lines in New Haven. Effective on Nov. 21, 1910, it was proposed to adopt a schedule for all lines which would increase the frequency of cars 20 per cent. All cars which previous to Nov. 21, 1910, were run on a 12-minute headway and a 6-minute headway are hereafter to be run on a 10-minute headway and a 5-minute headway, respectively. Fifteen electric switches are being installed. Twenty-one new closed cars have been received by the company for use in New Haven and 14 cars are on order for delivery. The letter is concluded in part as follows: "Double-truck cars will be substituted for single-truck cars on the Fourth Street-Edgewood Avenue line as soon as the construction work is completed at the approaches to the new bridge over West River. Forty-six new double-truck, 15-bench open cars have been ordered for next summer. Delivery on these is promised by the builders, beginning in March, 1911, to be completed on or before June 15, 1911. There has been appropriated within the last year the sum of $1,291,235.50 for additions and improvements on the New Haven system. In these improvements are the cars and electric switches heretofore mentioned, the cost of which aggregates $499,618.50. We shall welcome the suggestions of your committee and of any citizen as to further improvements. I personally shall always be glad to receive such suggestions at my office."

Personal Mention

Mr. J. L. Adamson has resigned as general superintendent of the Geneva & Auburn Railway, Seneca Falls, N. Y.

Miss Grace E. Fitz has been appointed assistant treasurer of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.

Mr. Walter G. Parker, formerly electrical engineer of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has been appointed superintendent of motive power and track of the company.

Mr. George W. Bowie, who has been superintendent of transportation of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., for several years, has been appointed general superintendent of the company.

Mr. Kenyon B. Conger, whose election as assistant secretary of the Hudson & Manhattan Railroad, New York, N. Y., was announced in the Electric Railway Journal of Nov. 12, 1910, succeeds Mr. W. J. Martin, resigned.

Mr. Alfred J. Sweeney, who has been superintendent of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has been appointed assistant to Mr. H. B. Ivers, general manager and purchasing agent of the company.

Mr. W. H. Munro has been appointed manager of the Peterborough (Ont.) Radial Railway to succeed Mr. J. H. Larmonth, who has been appointed manager of the Peterborough Light & Power Company, Peterborough, Ont.

Mr. William H. Savery has resigned as superintendent of the Westfield division of the Springfield (Mass.) Street Railway. Mr. Savery entered electric railway work nine years ago with the Woronoco Street Railway. He was formerly connected with the Boston & Albany Railroad.

Mr. Charles W. Ford has resigned as general superintendent of the Oklahoma Railway, Oklahoma City, Okla. Mr. Ford has been connected with the company since 1902. His associates in the company surprised Mr. Ford recently by presenting him with a gold watch as a token of their esteem.

OBITUARY.

James A. Collins, who was secretary of the Cincinnati (Ohio) Street Railway for 20 years, died at the Jewish Hospital, Cincinnati, Ohio, recently, from injuries received on Nov. 7, 1910, when he was struck by an Avondale car in Cincinnati. Mr. Collins was born at Williamstown, Ky., on Feb. 20, 1847, and entered the service of the Cincinnati Street Railway in 1873 as auditor. Later he was made secretary of the company. He also served as claim agent of the company for several years. He was a thirty-third degree Mason and for 27 years had been secretary of all Scottish Rite bodies in Cincinnati. Mr. Collins was also a member of the Cincinnati Business Men's Club, the Dayton Club, Dayton, Ohio, and the Hamilton Club, Hamilton, Ohio. He is survived by a widow and one son, Mr. Alpheus Collins, who is connected with the Cincinnati Traction Company.

The Public Service Commission has adopted a resolution providing for a hearing to be held by Commissioner Bassett, on Nov. 30, 1910, to consider the advisability of laying out a rapid transit route in Nostrand Avenue, Brooklyn, as a subway from Eastern Parkway South to Flatbush Avenue, and from that point south to the vicinity of Sheepshead Bay as an elevated railway. On Sept. 16 the commission approved a report of Commissioner Bassett favoring the building of a rapid transit route in Nostrand Avenue, the cost to be defrayed by assessment on the owners of the property to be benefited. Property owners have petitioned the Public Service Commission to extend the subway from its present terminus at Van Cortlandt Park to the Yonkers city line. It has been announced that the Interborough Rapid Transit Company is preparing a new subway proposal which will be submitted to the commission shortly. Up to noon on Nov. 22, 1910, the commission had not replied to the communication of the Hudson & Manhattan Railroad, referred to on page 1071 of this issue.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS.

***Grandview Street Railway, Birmingham, Ala.**—Application for a charter has been made in Alabama by this company to build a 4-mile street railway in Birmingham. Capital stock, subscribed, $100,000. Incorporators: E. W. Jordan, C. J. Phillips and W. M. Kane.

***Denverside Connecting Railway, East St. Louis, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway in East St. Louis. Capital stock, $100,000. Incorporators: George G. Heller, Robert Gillespie, A. W. Baltz, Robert P. Munger and Harry S. Kramer.

***Pekin & Petersburg Interurban Railway, Pekin, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway to connect Pekin and St. Petersburg. It is expected to extend this line southeast throughout Tazewell County, connecting Hopewell, Minier and other towns. Capital stock, $50,000. Directors: W. A. Elliott, New York; A. C. Sprague, Dubois, Ill.; E. C. Todd, J. A. Shellito and William Ressler, St. Paul, Minn.

***Toledo & Indiana Railroad, Toledo, Ohio.**—Incorporated in Ohio to build an electric railway through Lucas, Fulton, Williams, Henry, Defiance and Paulding Counties. Capital stock, $10,000. Incorporators: George D. Welles, Frank W. Caughlin, Eugene Winkworth, Henry W. Isenberg and Frank E. Miller.

Moose Jaw (Sask.) Electric Railway, Ltd.—Application has been made in Saskatchewan for a charter by this company to build a 7-mile electric railway in Moose Jaw. It is also expected to acquire and to construct suburban lines leading from Moose Jaw. Capital stock, $400,000. Officers: A. A. Dion, 35 Spark Street, Ottawa, president; Newton J. Ker, vice-president; Douglas R. Street, secretary and treasurer. [E. R. J., Sept. 3, '10.]

FRANCHISES

***Birmingham, Ala.**—The Grandview Street Railway has asked the Board of Revenue of Jefferson County for permission to build over county roads in Jefferson County. The company proposes to build a 4-mile electric railway in Birmingham and Jefferson County. E. W. Jordan, C. J. Phillips and W. W. Kane are interested as incorporators, as noted elsewhere in this department.

Fresno, Cal.—S. N. Griffith, Fresno, will apply to the Council for a franchise for a railway over certain streets in Fresno. This proposed railway will connect Fresno and Clovis. [E. R. J., Nov. 19, '10.]

Long Beach, Cal.—The Pacific Electric Railway has received a franchise from the Council to extend its tracks on Riverside Drive near Sixth Street in Long Beach to connect the Union Oil Company's plant with the main line.

Springfield, Mass.—The Springfield Street Railway has asked the Railroad Commission for authority to extend its tracks in West Springfield on North Main Street in Springfield.

Ballston Spa, N. Y.—The Schenectady Railway has received permission from the Trustees to build an extension through Ballston Spa. This will be part of an extension to connect Albany and Ballston Spa via Schenectady. At Ballston Spa it will connect with the Hudson Valley Railroad.

Edgewood, N. Y.—The City & Elm Grove Railroad has asked the Council for an extension of time on its franchise to build an electric railway in Edgewood.

Dalton, Pa.—The Berkshire Street Railway has asked the Railroad Commission for approval of location of its tracks on Hinsdale Road in Dalton and the relocation of tracks on the state highway in Cheshire; also for the extension of time for maintenance of the grade crossing over the Boston & Albany Railroad over Park Street in Adams.

Lewisburg, Pa.—The Lewisburg, Milton & Watsonville Passenger Railway, Milton, has received permission to use the tracks of the Lewisburg & Tyrone Railroad and the Pennsylvania Railroad in the borough. This gives the company the right of way to enter Lewisburg.

Seattle, Wash.—The Seattle Electric Company has applied to the Council for a franchise to build a double-track extension to its line across the proposed Stone Avenue Bridge, extending from Westlake Avenue across Lake Union to Kilbourne Street in Seattle.

Tacoma, Wash.—The Tacoma Railway & Power Company has received a franchise from the Council to build a line on North Thirty-fourth Street, between Madison Street and Stevens Street, in Tacoma.

TRACK AND ROADWAY

Alabama Traction Company, Montgomery, Ala.—This company is surveying its proposed 25-mile railway in Montgomery. It is expected to begin work soon. Charles G. Abercrombie, Montgomery, general manager. [E. R. J., Nov. 12, '10.]

Alabama Railway & Electric Company, Opelika, Ala.—This company will build a 3½-mile extension from Birmingham to Mine No. 13 during the coming year. Roger W. Snyder is interested. [E. R. J., Dec. 19, '08.]

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has filed for record a mortgage in favor of the Carnegie Trust Company, New York, as trustee, to secure an issue of $1,250,000 of 5 per cent bonds, dated Oct. 1, 1910. This company is planning to build a line from Fresno to Kingston and Sanger.

Central California Traction Company, San Francisco, Cal.—This company has completed all the details for the rebuilding of its lines in Stockton. The material has been ordered. The foundation will be changed from the usual rock ballast to concrete and the ties will be set into the solid concrete.

Denver (Col.) Interurban Railroad.—This company expects to extend its electric service from Denver to Boulder, Longmont, Loveland, Fort Collins and Greeley.

Georgia Railway & Electric Company, Atlanta, Ga.—This company is making plans to extend its railway from Decatur to Stone Mountain via Scottdale and Ingleside.

Iowa Traction Company, Oskaloosa, Ia.—This company has completed surveys and secured most of the right of way for its proposed railway. Construction is to begin within the next 60 days. The line will connect Oskaloosa, Barnes City, Montezuma, Malcom and Tama. Capital stock authorized, $2,000,000. Bonds authorized, $3,000,000. Bonds issued, $500,000. The company will operate 10 cars. Its repair shops will be located at Oskaloosa. Officers: George E. Wodehouse, P. O. Box 423, Oskaloosa, president and general manager; C. M. Hiserman, Albia, vice-president; Earnest J. Renz, Albia, secretary, and G. W. Gordon, treasurer. [E. R. J., Nov. 5, '10.]

Illinois Traction System, Champaign, Ill.—This company will build an extension to Joliet.

Decatur, Sullivan & Mattoon Transit Company, Mattoon, Ill.—This company has decided to begin the construction of its proposed 48-mile electric railway early in the spring. [E. R. J., Jan. 22, '10.]

Sterling-Moline Traction Company, Sterling, Ill.—It is said that this company has completed all preliminary arrangement and will begin construction in the Spring on its proposed electric railway to connect Sterling, Morrison, Lynedon, Prophetstown, Erie, Hillsdale and Moline. The Milwaukee Construction & Engineering Company are said to be interested in this proposition. A. Van Petten, Sterling, general manger. [E. R. J., Aug. 27, '10.]

Kalamazoo, Elkhart & South Bend Traction Company, South Bend, Ind.—This company has been voted a $3,500 subsidy by Washington township in aid of the proposed 50-mile electric railway to connect South Bend and Kalamazoo via Mishawaka, Elkhart, Bristol, Constantine, Nottville, Three Rivers, Parksville, Vicksburg and Austin. A. D. Harris, South Bend, president. [E. R. J., Nov. 19, '10.]

Louisville, Lincoln Farm & Mammoth Cave Traction Company, Glasgow, Ky.—Press reports state that this com-

pany has completed preliminary arrangements and will now let contracts for building its proposed 47-mile electric railway to connect Glasgow and Hodgenville, via Canmer, Hardyville and Buffalo, including a bridge over the Green River. J. M. Richardson, Glasgow, president. [E. R. J., July 30, '10.]

***Lafourche Valley & Gulf Railway, Donaldsonville, La.**—This company has been organized to build an electric railway on the west bank of Bayou Lafourche between Lockport and Donaldsonville. Capital stock, $1,500,000. Officers: F. M. Welch, president; J. N. Colomb, vice-president; Monroe Dugas, second vice-president, and Charles Maurin, treasurer. Headquarters, Donaldsonville.

Holyoke (Mass.) Street Railway—This company has completed and will soon place in operation its double-track line on High Street and Appleton Street in Holyoke.

***Detroit, Bay City & Northwestern, Caro, Mich.**—This company is being organized to build an electric railway to connect Detroit, Utica, Romeo, Almont, Imlay City, Burnside, North Branch, Mayville, Caro and Bay City. From Burnside a branch will be built to Marlette, Bad Axe and Harbor Beach.

Granite City Railway, St. Cloud, Minn.—This company expects to build a 1-mile extension of its tracks in Granite City. All material is on hand.

Kansas & Missouri Railway, Kansas City, Mo.—This company will begin work in the spring on its 37-mile electric railway to connect Fort Scott, Arcadia, Coldwater, Grass, Mulberry, Fuller, Nelson, Curranville, Frontenac and Pittsburgh. Officers: Col. L. H. Phillips, 610 Broadway, Kansas City, president: G. H. Dorman, vice-president, and C. E. Cary, Ft. Scott, secretary. [E. R. J., Nov. 12, '10.]

Billings (Mont.) Traction Company.—It is said that this company has secured the capital necessary for the construction of its proposed electric railway in Billings. John A. Connolly is interested. [E. R. J., Nov. 5, '10.]

Auburn & Syracuse Electric Railroad, Syracuse, N. Y.—The Public Service Commission, Second District, has approved the franchise granted by Auburn to this company as to the construction and extension of certain tracks and switches in Auburn. The commission has also approved the franchise granted by Auburn to the Auburn & Northern Railroad for the relocation of its tracks in State Street, Auburn.

Asheville (N. C.) Electric Company.—This company has awarded to B. J. Luther & Company, the contract to build a short extension to West Asheville. The extension has been surveyed and the remaining contracts for the work will soon be let. Work will be begun at once.

Cincinnati (Ohio) Traction Company.—This company, will extend its Glendale line to Hamilton, and an hourly schedule will be maintained between Glendale and Hamilton. The tracks of the Millcreek Valley Traction Company will be used from the end of the city limits.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—This company reports that within the next 60 days it will complete arrangements for building an extension to its tracks, and if the negotiations now pending are successful definite information will soon be made public.

Columbus, Mt. Vernon & Mansfield Railway, Columbus, Ohio.—This company has completed surveys for its proposed electric railway to connect Columbus and Mansfield via Mt. Vernon. L. P. Stevens, general manager. [E. R. J., July 30, '10.]

Defiance (Ohio) Interurban Railway.—This company advises it is a preliminary organization only, and when its reorganization is accomplished will, with larger capital, construct and operate this proposed electric railway to connect Defiance, Ohio, and Ft. Wayne, Ind., via Ashwood, Emmett, Cecil, Paulding, Antwerp and New Haven. Capital stock, $50,000. Officers: K. V. Haymaker, Defiance, president; Chas. E. Bennett, Wauseon, vice-president; T. C. Jacks, Defiance, secretary; Robert G. Holgate, treasurer; T. C. Jacks, Defiance, general manager, and The W. H. Schott Company, 39 Jackson Boulevard, Chicago, Ill., engineers. [E. R. J., Nov. 19, '10.]

Oklahoma Union Traction Company, Tulsa, Okla.—This company has awarded the Interurban Construction Company the contract to build a railway from Tulsa to Sapulpa via West Tulsa and Redford. This work will include the building of a bridge over the Arkansas River at Tulsa. It is expected to begin construction at once.

***Ottawa & Kingston Electric Railway, Ottawa, Ont.**—Preliminary steps are being taken to organize this company to build an electric railway from Ottawa to Kingston and Smith's Falls, via City View, Manotick, Kars, Burritt's Rapids and Merrickville. Application will soon be made for a charter. Among the directors are Robert McElroy, Carp; C. L. Dickenson, Manotick; Thomas Kidd, Burritt's Falls; F. A. Heney, Westboro; Geo. Boyce, J. C. Graham, A. E. Baker, J. E. Caldwell, D'Arcy Clayton and D. Clark.

Allegheny & Northwestern Railroad, Philadelphia, Pa.—This company has completed surveys and is asking bids for the construction of part of its proposed 21-mile electric railway to connect Callery, Mars, Valencia, Bakerstown and Deer Creek, connecting with the Alleghany Valley Railway Company at Harmarville. At Evans City the line will connect with the Pittsburg, Harmony, Butler & New Castle Railway and at Mars with the Pittsburg & Butler Railway and the proposed Rochester & Mars Street Railway. Work will be begun at the Evans City end. The bonds have been taken by a Philadelphia syndicate. All the franchise rights are said to have been obtained. [E. R. J., Dec. 19, '08.]

Pottstown & Reading Street Railway, Pottstown, Pa.—This company advises that during the next 6 weeks it will let contracts for building a 5-mile extension of its tracks and also for building 4 new iron bridges. C. Taylor Leland, 2215 Land Title Building, Philadelphia, secretary.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—This company is making surveys for an extension of its railway from Greenville to Mount Holley, via Gastonia and Kings Mountain.

***Bristol, Tenn.**—Surveys have been made to build a proposed electric railway from Bristol to Kingsport, a distance of 26 miles.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company contemplates building an 8-mile extension of its tracks from its present terminal in Chattanooga to the top of Lookout Mountain.

Houston (Tex.) Electric Company.—This company is building an extension of several miles to its Fanning Street line in Houston.

Kenosha (Wis.) Electric Railway.—This company plans to extend its tracks from Middle Street, Kenosha, to Washington Island. This work would require the rebuilding of a bridge at a cost of about $10,000.

Badger Railway & Light Company, Milwaukee, Wis.—This company advises that it will begin construction Mar. 1, 1911, on its proposed 21-mile railway to connect Whitewater, Elkhorn and Lake Geneva. Capital stock authorized, $10,000. Headquarters, 711 Majestic Building, Milwaukee, Wis. Repair shops will be located at Whitewater and the company will furnish power for lighting purposes. Officers: H. B. Kamschutte, Milwaukee, president and chief engineer; Victor Lachmund, vice-president, and Gustav Pickhardt, Milwaukee, secretary. [E. R. J., Sept. 3, '10.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company is planning extensive improvements in its terminal building in Los Angeles.

Southern Pacific Railroad, Los Angeles, Cal.—This company will begin work on its railway station at Sixteenth Street, Oakland, early in January. All of the suburban electric trains are to be handled through the second floor of the depot and will approach it on elevated tracks. The depot will be 278 ft. long and will provide a main waiting-room with news stands, telephone and telegraph stations, checkrooms and other features. At the north end there will be a baggage-room and express offices, transfer stations and cab and automobile stands. On the second floor there will be a waiting-room for suburban passengers. The offices of the depot attachés and officials of the company will also be located on the second floor.

Central California Traction Company, Sacramento, Cal.—This company has awarded the contract to Keating & Bradford Company for building stations along its line. Work on the freight station and waterfront terminal facilities to be erected at Front Street and X Street in Sacramento will begin shortly. The cost of constructing the station is estimated to be about $7,500.

Denver (Col.) Tramway Terminal Company.—This company will build a railway station in Arapahoe Street, Denver. The waiting-room will be 25 ft. x 70 ft., and the walls and ceiling will be finished in dark oak. The officials of the company will occupy eight rooms on the second floor. The roof of the structure will be of tile and steel sheds will cover concrete platforms from which passengers enter the cars.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—This company is building a new car house and repair shops at Alton. All material has been ordered.

Springfield (Mo.) Traction Company.—This company expects to build a new car house in Springfield the early part of 1911 and has ordered special track layout from William Wharton, Jr., & Company, Philadelphia, Pa.

Dayton, Covington & Piqua Traction Company, West Milton, Ohio.—This company advises that it has built a new freight house at Pleasant Hill and is now building an extension, 60 ft. x 25 ft., to its freight house in Piqua.

Oklahoma (Okla.) Railway.—It is said that this company has arranged with the Oklahoma Electric Terminal Company for the construction of three one-story buildings. The structures are to be 55 ft. x 112 ft., 57 ft. x 95 ft., and 55 ft. x 95 ft. The company will also erect two-story-and-basement waiting-room and trainmen's quarters 44 ft. x 55 ft. and train sheds 60 ft. x 106 ft. The buildings will be of reinforced concrete faced with red vitrified brick and steel trim. The cost is estimated to be about $500,000. The contract is let to the Selden-Breck Construction Company, Fullerton Building, St. Louis, Mo.

Portland Railway, Light & Power Company, Portland, Ore.—This company expects to build a two-story frame stock house at the foot of East Lincoln Street, Portland. It is estimated by the company that the building will cost about $10,000.

POWER HOUSES AND SUBSTATIONS

San Diego (Cal.) Electric Railway.—This company has placed an order with the Westinghouse Electric & Manufacturing Company, Pittsburgh, for two 1000-kw, 600-volt, 514-r.p.m. generators to be driven by Westinghouse-Parsons low-pressure steam turbines running at 3000 r.p.m. The generators and turbines will be connected through Melville-McAlpine reduction gears. In addition to this equipment the Westinghouse company will shortly ship one 1200-kw, 600-volt, 80-r.p.m. engine type d. c. generator to this company.

Western Railway & Light Company, Champaign, Ill.—This company is preparing to begin the construction of its new hydro-electric power plant at Marseilles. The cost is estimated to be about $300,000.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company reports that it is now building a new power house at Alton. All orders have been placed.

Lexington & Interurban Railways, Lexington, Ky.—This company has begun the preliminary work for the extension of its power plant in Lexington. It has just purchased from the Babcock & Wilcox Company a 500-hp boiler and from Henry R. Worthington two feed-water boiler pumps. I. L. Oppenheimer, general manager. [E. R. J., Nov. 19, '10.]

Sarnia (Ont.) Street Railway—This company advises that during the next two months it expects to purchase a new 350-kw generator. H. W. Mills, Sarnia, general manager.

Citizens' Railway, Waco, Tex.—This company, through the National Light & Improvement Company, Pierce Building, St. Louis, is asking bids on various additional equipment, including a 1500-kw steam turbine, with equivalent condensing capacity. Judson H. Boughton, St. Louis, secretary.

Manufactures & Supplies

ROLLING STOCK

Warren & Jamestown Street Railway, Warren, Pa., expects to purchase four new city and interurban cars.

Sanford (Fla.) Traction Company has ordered two storage battery cars from the Federal Storage Battery Company.

Mason City & Clear Lake Railway, Mason City, Ia., expects to purchase two double-truck pay-as-you-enter city cars.

Birmingham Railway, Light & Power Company, Birmingham, Ala., is building 23 double-truck car bodies in its own shops.

Pottstown & Reading Street Railway, Philadelphia, Pa., is considering the purchase of several motors and trucks of various sizes, either new or second-hand.

Oklahoma (Okla.) Railway has purchased from the Westinghouse Electric & Manufacturing Company four quadruple 101-B motor equipments with K-28 controllers.

Citizens' Railway, Waco, Tex., is receiving bids, through the National Light & Improvement Company, St. Louis, Mo., for several semi-convertible cars. Judson H. Boughton, St. Louis, secretary.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 19 as having ordered 50 semi-convertible cars from the Laconia Car Company, will equip these cars for pay-within operation. They will be 48 ft. 2½ in. long, 8 ft. 8¾ in. wide and 12 ft. high.

TRADE NOTES

Ackley Brake Company, New York, N. Y., has shipped an order of 50 Ackley brakes to Yokahoma, Japan.

Chicago Fuse Wire & Manufacturing Company, Chicago, Ill., has moved its offices into its new building at 1014-1022 West Congress Street, Chicago.

United States Electric Signal Company, West Newton, Mass., has received an additional order from the Public Service Railway, Newark, N. J., for 50 blocks of type "G" signals.

Universal Safety Tread Company, Boston, Mass., reports the Universal safety tread is to be installed on the steps of the 50 cars recently ordered by the Boston Elevated Railway from the Laconia Car Company.

De Laval Steam Turbine Company, Trenton, N. J., announces that the Dravo-Doyle Company, which heretofore has represented it in Pittsburgh, Philadelphia and Cleveland, will open an office in Chicago at the Marquette Building in charge of H. S. Budd.

W. J. Fauth, formerly treasurer of the W. K. Kenly Company, Chicago, has severed his connection with that company and has opened an office at 310 Monadnock Building, Chicago. Mr. Fauth will represent manufacturers of track and signal supplies.

W. F. Goltra Tie Company, Cleveland, Ohio, has been organized to manufacture and deal in cross ties. The officers are: W. F. Goltra, president and general manager; L. C. Mambourg, vice-president, and P. J. Gallagher, secretary and treasurer. Headquarters are at 804 Rockefeller Building, Cleveland.

Dossert & Company, New York, N. Y., have arranged through their Canadian representative, Irving Smith, of Montreal, for the Northern Electric & Manufacturing Company, Limited, to act as sales agent for the Dossert solderless connectors through its branches at Toronto, Winnipeg, Regina, Calgary and Vancouver.

Edgar Allen American Manganese Steel Company, Chicago, Ill., has appointed Walter Brinton consulting engineer, with headquarters at its plant in New Castle, Del. Mr. Brinton was formerly superintendent of the manganese steel department of the Taylor Iron & Steel Company's plant at High Bridge, N. J., from which position he has just resigned.

American Brake Shoe & Foundry Company, New York, N. Y., has elected William G. Pearce vice-president, effective Jan. 1, 1911. Mr. Pearce will have headquarters in

New York. It is stated that Mr. Pearce will retain his financial interest in the Griffin Wheel Company, of which he was formerly vice-president and general manager, and will continue as a member of its board of directors.

Western Electric Company, New York, N. Y., has received an order from the Central Vermont Railroad for telephone equipment for dispatching trains on its northern division from St. Albans to Windsor., Vt., 150 miles. Among other New England roads which are using the telephone for dispatching trains are the New York, New Haven & Hartford Railroad, Boston & Maine Railroad and the Boston & Albany Railroad.

Curtis Motor Truck Company, Decatur, Ill., will furnish Curtis all-forged non-galloping single trucks, type CS-58-96, for the 31 cars which are being built for the Illinois Traction System by the Danville Car Company. The Curtis Motor Truck Company has also delivered to the Illinois Traction System 16 heavy trucks for interurban service. Four pairs of these go under express cars and four pairs under combination express cars.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has leased the 8-story building at 429 First Avenue, Pittsburgh, for a term of years and will move its north-side warehouse to the new location, the north-side quarters being too small to meet the demand of increasing business. A repair department will also be established in the First Avenue building, which work has heretofore been sent to East Pittsburgh.

Ohio Brass Company, Mansfield, Ohio, will furnish to the New York, New Haven & Hartford Railroad, for the Hoosac tunnel electrification, a large number of strain insulators, with a mechanical strength of 35,000 lb. each. The insulators have an electrical dry flash-over value of 170,000 volts, and a wet flash-over value of about 100,000 volts. The railroad company has also purchased several hundred suspension insulators of special design to prevent possible grounding. These suspension insulators also have a high flash-over value.

Wagner Electric Manufacturing Company, St. Louis, Mo., has appointed L. G. Bassett sales representative for the western part of New York, with headquarters in Buffalo. Mr. Bassett has for some time been the manager of the apparatus department of McCarthy Brothers & Ford, who have represented the Wagner Company in this territory. McCarthy Brothers & Ford will continue their representation of the Wagner Company in the Counties of Erie and Niagara and Mr. Bassett will make his office in their building, 41-43 East Eagle Street.

Galena Signal Oil Company, Franklin, Pa., has elected Samuel Addison Megeath president and general manager to succeed General Charles Miller, who becomes chairman of the board, succeeding J. C. Sibley, resigned because of ill health. Mr. Megeath became connected with the Galena Signal Oil Company in 1895, and in January, 1909, he was elected vice-president and general manager. L. J. Drake, second vice-president, has been elected first vice-president, succeeding Mr. Megeath, and C. C. Steinbrenner has been elected second vice-president, succeeding Mr. Drake.

The Noiseless Typewriter Company, Middletown, Conn., and New York City, has recently completed the development of a noiseless typewriter which is now being put on the market. The special feature of this machine is that the typing is done by a pressure stroke instead of a blow. Hence the machine is practically noiseless and has a low maintenance cost. Less force is required to operate it and it gives a clearer impression than the ordinary machine. Moreover, the number of legible carbon copies which can be made by it is greatly multiplied. The president of the company is W. Caryl Ely, of Buffalo.

ADVERTISING LITERATURE

Dearborn Drug & Chemical Works, Chicago, Ill., have issued a booklet describing Dearborn boiler preparations for use in connection with the treatment of boiler feed waters.

Locke Insulator Manufacturing Company, Victor, N. Y., has issued a booklet entitled "Power Giants," discussing the merits of Victor insulators and briefly describing some of their installations.

Precision Instrument Company, Detroit, Mich., has issued catalog D, which explains the principles upon which its Simmance-Abady patent automatic combustion recorders are based and also describes their construction in detail.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a 40-page booklet entitled "Graphite Products for the Railroads." It covers the Dixon line of products widely used in railroad service. These include the various graphite lubricants, protective paint, crucibles, facings, etc.

National Electric Lamp Association, Cleveland, Ohio, has issued a bulletin describing the engineering and scientific activities of the association. Illustrations are shown of the various departments where this work is carried on. The National Electric Lamp Association began the work of research and development in 1903 with six employees and at present employs 200 trained men. Its work costs approximately half a million dollars a year to carry on.

NEW PUBLICATIONS

The History of the Telephone. By Herbert N. Casson. A. C. McClurg & Company, Chicago, 1910; 315 pages, with index. Price, $1.50 net.

This book is a résumé of the history of the Bell telephone system treated from a popular rather than from a technical standpoint.

World Corporation. By King C. Gillette. The New England News Company, Boston, Mass., 1910; 240 pages. Price, $1.

Mr. Gillette's idea is to displace the present economic system in part competitive and in part monopolistic by one co-operatively owned organization termed by him "World Corporation." The latter has already received an Arizona charter, in which the scheme of proposed action is set forth in detail.

The Railway Library, 1909. Compiled by Slason Thompson, Bureau of Railway News and Statistics, Chicago, 1910; 403 pages, with index. Price, 75 cents.

This work is a compilation of a number of interesting articles and statistics on steam railroad matters published during 1909 by the Bureau of Railway News and Statistics. Among subjects of interest to electric railways are those on "Railway Mail Pay," "Diminishing Purchasing Power of Railway Earnings" and "Employees and Their Compensation."

Dynamo-Electric Machinery — Direct-Current Machines, Eighth Edition. By Samuel Sheldon and Erich Hausmann. D. Van Nostrand Company, New York, 1910; 328 pages, including index. Price, $2.50 net.

This book needs little further recommendation than to state that it is now in its eighth edition. The latest imprint contains much new matter, such as a set of problems at the end of each chapter; a discussion of the theory of commutation; means for predetermining the operating characteristics of d.c. motors and generators; discussions on storage batteries, balancers and boosters, and a treatise on costs, prices and operating expenses of machines and plants. The method of presentation is adapted for students who are reasonably familiar with simple equations.

Electric Trains. By H. M. Hobart. D. Van Nostrand Company, New York, 1910; 201 pages, including index. Price, $2.50 net.

Mr. Hobart is not only a recognized authority in the realm of heavy electric traction, but he is also an engineer who has the ability to explain his methods in clear English. A large part of his latest book is devoted to simple practical methods of calculating the energy requirements of electric cars. Another important feature is the system of obtaining approximate costs of electric rolling stock. Mr. Hobart has introduced a novelty in his calculations by using the meter for short lengths, while retaining the mile for long ones. To avoid misunderstandings regarding short and long tons he has treated the British (2240 lb.) and the metric (2204 lb.) ton as identical, so that the kilogram is designated as the thousandth part of either ton. The excellent typographical and pictorial details of the work show the great care taken to make the salient points stand out with due prominence. Most of Mr. Hobart's data are derived from English underground railway and electrified steam railroad practice, but, of course, this does not invalidate his work for the American reader.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, DECEMBER 3, 1910 No. 23

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, DECEMBER 3, 1910.

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The New Committee on Signals

At the suggestion of President Brady, of the American Association, the Transportation & Traffic and the Engineering associations have decided to appoint a joint committee to study and report on signals for interurban electric railways. The art of signaling as applied to electric railways is in its infancy and this new committee cannot be expected in the first year of its existence to do more than to recommend a few fundamental requirements for adequate and safe systems of signals. This by itself, however, would be of very great benefit to the electric railway industry. In view of the recent action of the convention of the National Association of Railway Commissioners in adopting a recommendation for the enactment of laws requiring interurban electric railways to be equipped with adequate block signals, the appointment of a joint committee on signals has come none too soon. To be of help to the industry the railway association must keep ahead of the times in matters of this kind. The conclusions of the committee will have great weight with those companies which are or soon will be considering the installation of signals and it is to be hoped that they may be instrumental in staving off hasty and unreasonable legislative action.

Courtesy in Travel

No person can travel to any extent on the rapid transit lines in the large cities of this country, or even on many trolley lines, without being impressed by the frequent—we might say general—disregard by passengers of many of the most ordinary rules of courtesy and politeness. This thoughtlessness, to use a complimentary term, is displayed in the scramble for seats on a crowded car or train when it stops to receive passengers. The rush hour is well named, because at that time, at every stop, there is a rush for seats in which the strongest and those that are best able to stand usually win. Women and aged people are pushed aside by young men and boys and have to take what is left or else stand. This condition is a comparatively recent development in this country, and, whatever its cause, should be thoroughly discouraged. The Boston Elevated Railway has recently taken the initiative in this reform and has installed signs at its stations and in its cars with the heading, "Women first, please." Underneath are the words: "The company respectfully requests male passengers to give women precedence at stations. Much complaint is made that men and boys board cars before they reach entrance stops." The request may not be obeyed, but at least it is a step in the right direction and might be copied elsewhere to advantage. Then, if the signs are not effective, conspicuous offenders against the decency of travel should be arrested. We believe that the term "disorderly conduct" is broad enough to cover the offense and that most judges would take pleasure in assisting to suppress this nuisance by imposing severe sentences upon those brought to trial.

Meeting of the Railway Business Association

The striking similarity in general conditions between the steam railroad and electric railway industries was strikingly exemplified in the character and tone of the speeches at the banquet of the Railway Business Association last week. Both industries are confronted with increases in the cost of labor and material, and both are endeavoring to secure authority to increase their rates. As opposed to this demand, charges are made that the transportation companies, to a greater or less extent, are overcapitalized. The Railway Business Association, whose object, broadly speaking, is to bring about a better understanding of railroad conditions by the public, was fortunate in being able to secure as speakers at its annual banquet last week such representative men as the president of the Baltimore & Ohio Railroad, the head of the H. B. Claflin Company and the chairman of the Interstate Commerce Commission, representing, respectively, the railroad company, the shipper and the arbitrator between them. Each speaker, of course, presented simply his individual views, but each had studied the question thoroughly, and it is interesting to note that their views did not differ radically from one another. Indeed, it has always been our belief and contention that this would be the case when broad-minded men carefully examined the economic problems of the steam or electric railway field. These questions are not those of sentiment, but of facts, and greatly divergent conclusions cannot be reached by whatever path one follows in attempting their solution.

The Losses of Initial Operation

Eli M. West, receiver of the Columbus, Delaware & Marion Railway, calls attention, in the report published in another part of this issue, to the apparent low operating ratio which prevailed prior to his appointment. He states that operating expenses were made abnormally low by the arbitrary charge of "all sorts of expense items, such as coal, interest, etc., as betterments or additions to property." Mr. West adds that, in spite of the fact that the property had deteriorated and was really not in a condition in which it was safe to operate, expenditures amounting to about $57,000, almost all of which were properly chargeable to operating expenses, were listed as betterments. At first thought the practice of compelling the capital account to stand the cost of items that are purely operating expenses appears to deserve unqualified censure. As a rule, no satisfactory explanation of such a course can be made. In the case of a new system, however, it is at least an open question whether losses of initial operation due to the necessity of developing the business to a satisfactory point are not fairly chargeable to the cost of the property. Of course, to expand the period of "initial operation" in a forlorn attempt to make a prosperous property out of a road that will never have sufficient traffic to justify its existence would cause only a postponement of the day of reckoning and a fall that would be greater when it did occur. The Wisconsin Railroad Commission, in some cases affecting public-utility properties, has held that the expense of building up the business until it yielded a reasonable return could properly be considered as a part of the capital cost. If such a plea, however, is to be made in the case of any property, it is reasonable to expect that the items of this nature should be carried separately and be distinguishable in the accounts, not only in the early stages of operation, but also in the later years.

LONDON ADVERTISING LITERATURE

Americans have the reputation of being the most aggressive and enterprising advertisers in the world, so that it is somewhat curious to find that one of the most extensive campaigns carried on by electric railway companies in advertising for traffic—if not the most extensive—has been conducted in London. We have published typical examples of the posters and other advertising literature issued by the Underground Electric Railways Company, Ltd., of that city, and in this issue present reproductions of others which have been brought out during the past year. Two things stand out strikingly in the series which has been published. One is the artistic character of the advertisements. There is nothing mediocre about the execution either in their design or in their printing. The other is the care with which each considerable class of patrons has been signaled out for conversion. The theater patron, the attendant at lectures, the shopper, the churchgoer, the museum visitor, the city resident who is thinking of moving into the suburbs or can be induced to do so by argument, the stranger in the city who wishes to know the location of the hotels and other points of interest, the person who wants to learn the quickest route to the different steam railroad stations, the excursionist, the man who simply wants to take a pleasant walk in the suburbs—all are remembered. The literature gotten out for each class is made convenient to carry and is as complete as possible as regards the information which will be required by the person for whom it is prepared.

Although the advertising published has been designed with direct reference to the needs of the underground electric railway system of London, many of the suggestions can be used by other companies and in other cities. Some of them, it is true, are applicable only to underground or heavy traction service. Thus, in some of its posters the company makes a very striking point of the advantage of the underground system over surface systems in the rapidity of passenger transportation, especially during the winter when the London fogs settle down like a blanket over the city and impede traffic on the surface. But other suggestions and arguments are as useful in any American city, and for the suburban or interurban line as well as for the road in the large city.

Advertising methods of all kinds have improved greatly during the past 10 years, and it is well known that the business of designing advertisements is followed now by a great many persons as a profession—indeed, it is often dignified by writers on the subject as a science. Display announcements which several years ago would have been thought good are now considered crude and inartistic. Independently of the business value or absence of value in an advertisement, any person who uses bill posters or other display advertising on the streets owes a duty to the community to make the announcement artistic and attractive. The passerby cannot avoid seeing what is thrust upon his attention, and if bad taste is shown by the advertiser the feeling of resentment inspired in some persons will often more than counterbalance the benefits secured in attracting the attention of others.

The series of advertisements of the Underground Railways of London also illustrates the proper attitude for anyone to take when preparing advertising literature, whether to secure traffic or for any other purpose. It is to put himself as nearly as possible in the position of the person whom he is addressing, and

then he will know the arguments and the information which such a person should have. Thus, if the average man is considering several suburban towns as a residence, he wants to know something of the cost of living in each, the taxes charged, the advantages in the way of schools, churches, clubs or other recreations, the time required to travel to and from his proposed residence to his place of business, and the cost of railroad fares.

CONCERNING COAL ANALYSIS

A recent important publication of the Bureau of Mines takes up the question of the relation of the composition of certain coals to their combustion and heat value. It deals especially with the volatile matter of the coal in its bearing on practical calorific usefulness. In particular it is a study of the nature of the volatile components of coal which have an important effect on the value of the fuel. The general principles involved as regards fuel composition are familiar enough, but few people adequately realize the very important difference which can be made by varying the character of the gaseous content. It is not so much the quantity of the volatile matter as its particular character that determines what is going to happen when combustion is undertaken. The ordinary calorimetric methods which insure the complete combustion of the material contained in the bomb are hence at times very misleading.

In the report in question the particular point brought to light is the large proportion of positively deleterious volatile matter contained in certain coals, largely CO and CO_2. When one remembers that the steaming tests made at St. Louis show 2 per cent drop in efficiency for each 0.1 per cent CO in the flue gases the difference between theoretical calometric results and some practical results is amply explained. The coals of the bituminous formation running all the way up from pure lignite are often particularly bad in their volatile components. One Western coal, for instance, showed nearly 36 per cent of volatile matter, not counting 11 per cent of water, and of this 19.5 per cent was CO and a little over 6 per cent N. As against this a first-class Pocahontas coal in a volatile content of about 21 per cent showed of this amount only 3.2 per cent CO and 1.2 per cent N. Not only do such coals vary widely in the fixed carbon, as everybody knows, but still more widely in the usefulness of their volatile constituents. If all the consumable volatile matter were utilized the disparity would be less marked, but with ordinary methods of combustion a good deal of the CO gets away and the heavier hydrocarbons are also likely to escape in part, not only losing efficiency but producing a large amount of smoke. The lower grades of Western bituminous coal, which with increasing use of the fuel supply must become more and more important, are particularly difficult to burn, not only on account of their unfavorable composition but from the fact that they give up their volatile matter at a more moderate temperature than the later coals, so that there is an extremely good chance of losing much of it up the chimney unconsumed or only partly consumed. These facts not only make it desirable to look carefully into the methods of coal analysis employed in sampling coal, but also lay emphasis upon the more familiar proposition that a very careful study must be made of furnace design before the poorer coals can be successfully used. With their characteristic of yielding volatile matter at moderate temperatures special care must be taken not only to give a plentiful oxygen supply but to give it under conditions favorable to rapid combustion, preheated if possible. Coal of this sort cannot be burned at a high rate per unit of grate surface without incurring great danger of very serious loss of efficiency. It can be burned, in spite of its undesirable characteristics, at a very moderate rate of combustion and with adequate air supply and air space. The same conditions that will insure smokeless combustion, which is quite possible even with the low-grade coals, are favorable to keeping up the efficiency in spite of the nature of the volatile matter. Some of the low-grade coals, however, give fairly good yield of by-products of coking, particularly ammonia and high-candle-power gas, so that they are likely to come into greater use than heretofore in this indirect way. In fact, one of the best coals in this particular was a Western specimen containing only about 51 per cent of fixed carbon but in its volatile matter yielding 5.7 per cent of illuminants.

Any process of coal analysis which ignores or passes lightly over the particular nature of the volatile matter seems likely to lead to results of dubious practical value, particularly when it is applied to some of the coals of the later formations which one day must become perhaps the principal reliance of the world for industrial purposes. It is somewhat difficult to say what methods are best suited to bringing out the practical relative values of such coals, as we are now fortunately familiar mostly with the coals of higher grade. Certainly complete combustion in a calorimeter tends to credit the poorer coals with more than practically belongs to them and by an amount that is a function of the particular quality of coal under test, so that no suitable correction is easy to make. It looks very much as if in sampling coals one would have to apply much more complete analysis than has been usual, particularly analysis of the volatile matter. There is also much to be said in favor of experimental steaming tests, not necessarily on a large scale, but with apparatus in which the flue gases can be conveniently estimated and studied and the amount and temperature of the air supply thoroughly regulated. The practical use of low-grade fuels comes down to proper furnace construction and enlightened methods of burning. Granted these, one has an immense extension of the fuel supply which every year will become of greater and greater industrial importance. It is a pretty poor coal that will not yield on complete combustion more than two-thirds the calories furnished by an equal weight of very high-grade coal. The problem of economical power production in the future lies in no small degree in such judicious methods of burning as shall utilize something like a due proportion of this possible output. At present the disparity of steaming power between a very good coal and a very poor coal is altogether out of proportion to the ultimate calories obtainable.

In connection with the general subject of fuel it may be of interest to refer to the tests with North Dakota brown lignite made by the Technologic Branch of the United States Geological Survey. The furnace used was of the semi-gas producer type, externally resembling a Dutch oven. Its most striking features were the deep-set grate and the construction of the space between the bridge wall and the end of the prolonged fire-brick arch. The results of the tests showed that under proper conditions lignite may be used with fair economy under boilers that generate their full rated capacity.

MERIT AS A REQUIREMENT FOR COMMISSION SERVICE

A committee report adopted by the National Association of Railway Commissioners at its last annual meeting expresses the opinion that there is great need for placing emphasis upon the simple elementary proposition that State commissions should be organized on the basis of merit. To the commissions and to those who appoint their members we urge the study of this proposition. The wholesome discussion of the subject written for the committee by Prof. B. H. Meyer, of the Railroad Commission of Wisconsin, was published in the Electric Railway Journal of Nov. 26, page 1064. If the report had included a description of the businesslike organization of the Wisconsin commission it would have cited an example that would be helpful to some of those to whom the suggestion was directed.

Merit in organization implies merit in men. The statement attributed to Governor-elect Dix of New York that he wanted experienced men on the commissions is the expression of a thought which exists in many minds and is based on a desire for practical results. It suggests the fact that while the principle of regulation may be a permanent feature of government, the details of the men and methods to conduct the supervision are still in an experimental stage in some States.

We believe that an advance will be made if both the commissions and their employees shall include some men with practical experience in one or more of the classes of public-utility properties over which jurisdiction is assumed in the name of the public. With the higher standard toward which the commissioners appear to be tending, there ought not to be any serious bar to the interchange of men between commissions and companies.

Long corporate service should not prohibit men forever from serving the public, and public service with a commission should not bar the way to corporate service. Reasonable co-operation between the companies and the representatives of the public will effect with a minimum loss of time a practical improvement in conditions, and the absence of such co-operation is a calamity that should be averted. A number of commissions need to have a keener appreciation of the problems of the companies than they have yet displayed, and it is equally evident that many companies, if they are to progress with the times, need to revise their ideas about the rights of the public that they serve.

Neither the employer of public servants nor the employer of corporate servants can expect to secure efficient aid without paying remunerative wages. Although the New York public service commissions law has set a new mark of liberality, public service ordinarily has paid less than corporate service. An even greater bar, however, to the diversion of capable and fair-minded corporate servants to public life has been the uncertain tenure of office which confronted them. Political expediency has been so often the motive in appointments to public office that frequently employees of merit have become discouraged in public service and have retired voluntarily or grown inefficient because the spirit of the organization was unbusinesslike and the discipline lax, while promotion was the result of "pull" and not of ability.

No self-respecting man would want to take office with a commission and find that all that was desired of him was a knowledge that could be used to press the companies harder, without regard to their rights; and we presume that before the commissions can secure many men combining character, ability and experience in public-utility management they will have to overcome some reluctance based on apprehensions of that nature. As a commissioner, a man of practical experience would have abundant opportunity for independence of action, although his opinions might not be upheld by a majority of his colleagues; but as an employee, with no statutory power, he might find himself completely deprived of all opportunities except those imposed by irksome and arbitrary orders of superiors.

Public life and corporate history are full of instances that show that it is in the man and not the training that the rare ability desired for some particular purpose may be found. But commissions will undoubtedly be strengthened as they increase in the understanding of the every-day practical needs of the companies and they can be aided greatly by the advice of experienced men within their ranks. More co-operation and merit, with less antagonism and inefficiency will help in the solution of problems.

THE TOLEDO SITUATION

The preliminary steps that have been taken in negotiations between the Toledo Railways & Light Company and the city of Toledo for a renewal of railway franchises indicate slight progress. The tangible steps include a report by public accountants employed by the city and a complete inventory by engineers representing the company of the physical property devoted to railway purposes. They do not give, however, any indication of the probable basis of settlement.

Representatives of both the company and the city wish a settlement and early improvement of the railway system. The advantage of a settlement without undue delay is evidently recognized by both interests. Cities in which long delay has intervened between the expiration of one franchise contract and the commencement of another have suffered by the inevitable restriction of railway development which attends such delay. It is hoped that the long period of uncertainty which has prevailed in other places will not become part of the record which Toledo will make in this matter.

It is essential to an understanding of the real condition in Toledo that the franchise situation and the financial status of the company be made plain. On Nov. 9, 1910, the franchise rights of the company on 9 miles of street, out of a total of 68 miles of streets on which cars are operated in the city limits, are claimed by the city to have expired. These rights covered sections in the important central business districts. No controversy has arisen over the operation of cars in this district. The city, to protect its position, has given formal notice that the franchises have expired and an arrangement will probably be perfected whereby the company will pay a rental until a final settlement is made.

The near termination of the contract with the city was the immediate cause of the present adverse financial position of the company. A default in interest on the consolidated mortgage 4 per cent bonds accompanied an announcement that the company was unable, because of the early maturity of franchises, to dispose of securities either to fund floating debt or to provide cash with which to meet maturing funded obligations. A committee representing holders of these bonds was appointed immediately and it has secured deposits of a majority of the outstanding issue. As the interest due on these bonds on July

1, 1908, and on subsequent interest dates is in default, and the bonds, though due as to principal on July 1, 1909, are also unpaid, the control of the company is at present practically in the hands of this committee.

While some financing is, therefore, an imperative part of the future program of the company, capital is also needed for rehabilitation purposes. After an exhaustive investigation it was estimated that to provide proper service commensurate with the future needs and increase in population of the city the company should spend in the period of five years, beginning on Jan. 1, 1909, a total of $3,000,000 for rehabilitation purposes. Some of the improvements suggested have been made since that date. The cost has been defrayed in part by funds available because of the default in interest on the consolidated mortgage bonds. In the calendar year 1909 $210,000 was expended toward the recommended improvements and during the present year about $550,000 additional will be applied in this way. In two years, therefore, one-quarter of the improvements estimated to be necessary in five years will have been made.

The report of Nau, Tanner & Rusk, the accountants employed by the city of Toledo, which has been filed with the City Council, contains information relating to earnings, expenses and schedules. The accountants took the position that without a valuation of the property a correct solution of the Toledo problem could not be found. Albion E. Lang, president of the Toledo Railways & Light Company, in a letter discussing this assertion, stated that if the authorities thought it advisable to agree upon a method of reaching a valuation of the street railway properties as a factor in a comprehensive solution of the problem, he was willing to submit all data to a board of engineers upon whom the company and the city might agree. In other words, the problem was assumed to be one on which engineers should pass. Later, at the repeated request of the city authorities, Mr. Lang submitted an inventory of the portion of the physical property used for railway purposes. A letter of Ford, Bacon & Davis, which accompanied the inventory, was published in the ELECTRIC RAILWAY JOURNAL of Nov. 12, 1910, page 990. It represents, presumably, the position which the company will take if the city authorities adhere to their apparent present plan of relying in part upon the results of a valuation.

It is an evidence of foresight that the company has prepared itself for possible emergencies by giving such study to the subject that it will be ready to enter upon negotiations based on a valuation, if an agreement to follow that course is made. We have referred frequently to elements of value of a non-physical nature which should be considered in an appraisal of the complete property of a street railway company, and repeat that the intangible elements may easily reach a large percentage of the total amount that can be ascertained by an appraisal which takes into account only the purely physical or present visible items of property.

Under the laws of Ohio the only franchise arrangement which can be effected between the city and the company will be for a limited term. It is unfortunate that the law does not provide for the unlimited franchise whose wisdom Mr. Lang and other executives of street railway companies praise. The Toledo company needs a status of recognized solvency and a definite franchise contract, and the city needs a railway system with ample resources and credit in order that it may provide necessary improvements.

THE CASE OF THE COMMUTER

It has long been a complaint among steam railroad companies that their commuter business in the neighborhood of large cities is unremunerative. It was this claim that led to the recent advance in commutation fares about New York, but, according to the testimony presented at the hearings before the Interstate Commerce Commission last week, the railroads are still losing money on this business. Indeed, one company claimed that even at the new rates the loss amounted to 5 cents per passenger, and others stated that their roads would be in better financial condition if they entered New York City through a desert. This statement certainly sounds remarkable to an electric railway operator who is accustomed to look upon territory as becoming more lucrative from a traffic standpoint with any increase in density of the population.

In the absence of detailed figures of operating expenses and receipts, which will be filed later with the commission, we have no intention of analyzing the question of profit from this business. But we do think, in view of some of the testimony elicited, this a very appropriate time to call attention to one very large factor in the cost of suburban steam railroad operation which is often ignored in comparisons between it and the cost of electric railway service. This is the expense of passing a suburban passenger through a steam railroad trunk line terminal. Some years ago one of the officials of the Pennsylvania Railroad testified that it cost the company 3 cents for every passenger brought into or taken out of the Broad Street Station at Philadelphia, and in the published reports of the hearing last week one manager was quoted as saying that on his road the average commuter traveled about 14 miles and that it cost to pass him through its Jersey City terminal 75 per cent of the expense of carrying him to his destination after he was on the train.

It is easy to understand that with through business a commodious terminal station with waiting rooms and extensive baggage facilities is necessary, and that even suburban steam railroad operation requires large and expensive switching yards and storage tracks. But the conclusion from these facts, as we see them, is not to abandon the commuter service, but to operate the suburban trains by electricity. It would then be easy either greatly to reduce the expensive terminal space required or to eliminate this charge altogether by distributing the passengers by rapid transit lines through the city. To avoid terminal charges of 6 cents, or even of 3 cents, for each suburban passenger, a railroad could afford to invest a considerable sum in electrical equipment, even without regard to any other advantages of electrical operation.

The plan of abolishing the terminal station, as outlined above, is indeed the plan proposed by the Pennsylvania Railroad, so far as the bulk of the commuters fram Newark is concerned, as this traffic, when the line of the Hudson & Manhattan Railroad is extended to Newark, will not pass through either the Jersey City station of the Pennsylvania Railroad or that at Thirty-second Street, New York. Instead, it will be carried under the former station to the existing distributing points in New York on the McAdoo tube. The cost of handling the commuters on the other New Jersey lines served by the McAdoo tubes will also be reduced, so far as the railroads are concerned, because as more commuters use the tubes they no longer pass through the stations or use the ferries, and both the latter are thereby relieved for the greater accommodation of those who are obliged to patronize them.

RECENT ADVERTISING FOR TRAFFIC IN LONDON

Several articles have appeared in past issues of this paper in regard to the vigorous advertising campaign for traffic conducted by the group of roads represented by the Underground Electric Railways Company, Limited, of London. This company controls the London United Tramways Company, the District Railway in London, and several of the deep tube lines. The most extended article on the advertising campaign of the company published in a previous issue appeared in the Electric Railway Journal of Dec. 4, 1909. This advertising, which consists of posters, pamphlets, circulars and practically every other kind of printed matter, has been marked by great originality, and the pictorial designs used have been not only striking but so artistic as to attract wide attention and favorable comment in poster art circles. In preparing its posters the company has utilized the services of artists having a very high reputation in London. The other advertising literature published by the company has also been of a high grade, and it is pleasing to note that the results, in the opinion of Albert H. Stanley, general manager of the company, have been very satisfactory. In fact it has proved so successful in stimulating traffic that the company has continued the policy and has published a variety of new posters and other matter during 1910. It is the intention in this article to describe and illustrate a few of the new designs used during the past 12 months.

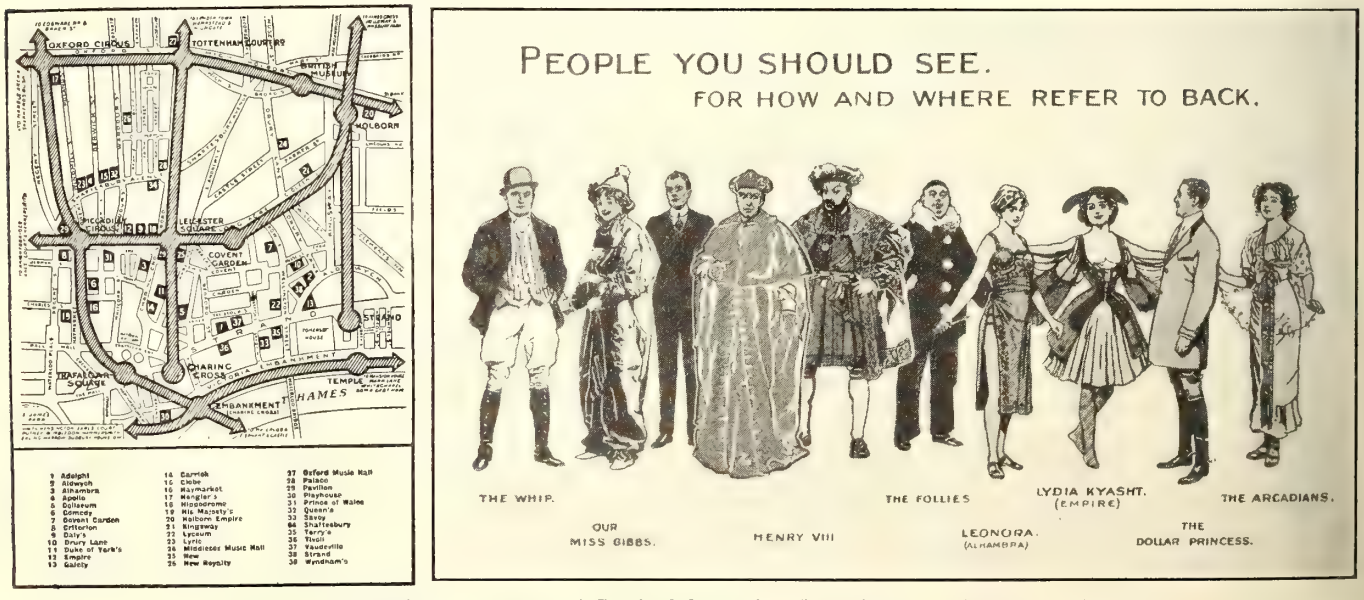


London Advertising—Traffic Posters, Original Size 8½ in. x 20½ in.

POSTERS

The largest posters issued by the company measure 24 in. in width by 40 in. in height and are mounted on special billboard frames at the entrance and inside of the stations and in other public places. In these posters maps appear frequently or else schematic diagrams showing the routes of the systems operated by the company and the points of interest which can be reached by them. Others are of a pictorial character only. Three of the large posters of the size mentioned, and also two smaller posters 8½ in. wide by 20½ in. high, published recently, are reproduced herewith. One of the smaller posters advertises the service given to Hampton Court, a historic palace formerly occupied by royalty but now a public art gallery and museum, located in a beautiful park in the suburbs of London. The other small poster gives a view at night of the power station of the company and describes briefly its equipment and the work done by the energy supplied by it in transportation service "for the use and benefit of the people of London."

The three larger posters illustrated are samples of a number of posters of this kind recently used by the company. They are of course printed in colors, which are not shown in the photographic representations of them. One is intended to advertise the suburban service of the company and encourage residents of the city to secure homes in the suburbs. It gives a conversation between a town mouse and a country mouse, and the latter tells the town mouse to live like him in fresh air and freedom. Another presents a picturesque view of a suburban electric train of the company on the top of a high hill. A third illustrates the difficulties and delays of transportation by bus and carriage, and even on foot, on the street surface, while travelers on the underground road are carried quickly and comfortably to their destinations.



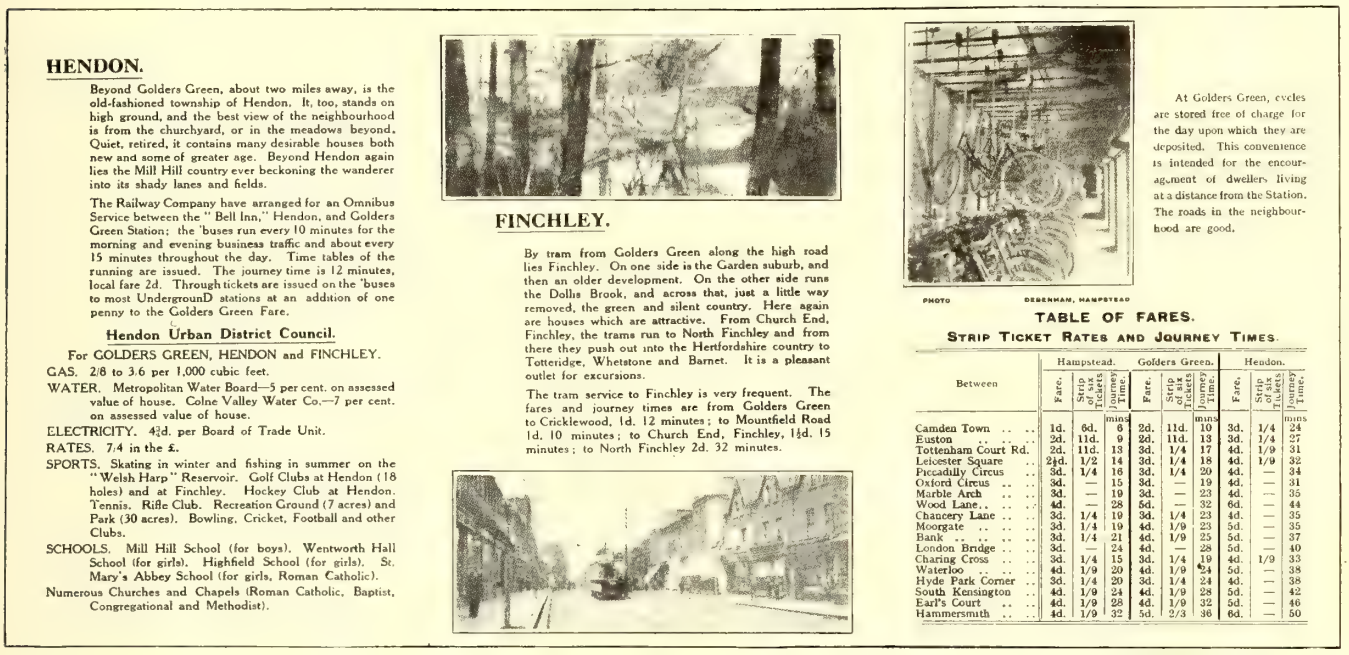
London Advertising—Portions of Cards Advertising Locations of Theaters and Plays

THEATER ADVERTISEMENTS

In addition to general advertising designed to reach all grades of traffic, the company has very successfully conducted a campaign of special advertising designed to reach among others the attendants at theaters, university and other public lectures,

churches, etc. It would be impossible in the confines of one article to describe all of the circulars issued to appeal to each of these different kinds of traffic. A few of the more striking of them will be mentioned.

One pocket card shows diagrammatically the location of the



HENDON.

Beyond Golders Green, about two miles away, is the old-fashioned township of Hendon. It, too, stands on high ground, and the best view of the neighbourhood is from the churchyard, or in the meadows beyond. Quiet, retired, it contains many desirable houses both new and some of greater age. Beyond Hendon again lies the Mill Hill country ever beckoning the wanderer into its shady lanes and fields.

The Railway Company have arranged for an Omnibus Service between the "Bell Inn," Hendon, and Golders Green Station; the 'buses run every 10 minutes for the morning and evening business traffic and about every 15 minutes throughout the day. Time tables of the running are issued. The journey time is 12 minutes, local fare 2d. Through tickets are issued on the 'buses to most UndergrounD stations at an addition of one penny to the Golders Green Fare.

Hendon Urban District Council.

For GOLDERS GREEN, HENDON and FINCHLEY.

GAS. 2/8 to 3/6 per 1,000 cubic feet.

WATER. Metropolitan Water Board—5 per cent. on assessed value of house. Colne Valley Water Co.—7 per cent. on assessed value of house.

ELECTRICITY. 4½d. per Board of Trade Unit.

RATES. 7/4 in the £.

SPORTS. Skating in winter and fishing in summer on the "Welsh Harp" Reservoir. Golf Clubs at Hendon (18 holes) and at Finchley. Hockey Club at Hendon. Tennis. Rifle Club. Recreation Ground (7 acres) and Park (30 acres). Bowling, Cricket, Football and other Clubs.

SCHOOLS. Mill Hill School (for boys). Wentworth Hall School (for girls). Highfield School (for girls). St. Mary's Abbey School (for girls, Roman Catholic).

Numerous Churches and Chapels (Roman Catholic, Baptist, Congregational and Methodist).

FINCHLEY.

By tram from Golders Green along the high road lies Finchley. On one side is the Garden suburb, and then an older development. On the other side runs the Dollis Brook, and across that, just a little way removed, the green and silent country. Here again are houses which are attractive. From Church End, Finchley, the trams run to North Finchley and from there they push out into the Hertfordshire country to Totteridge, Whetstone and Barnet. It is a pleasant outlet for excursions.

The tram service to Finchley is very frequent. The fares and journey times are from Golders Green to Cricklewood, 1d. 12 minutes; to Mountfield Road 1d. 10 minutes; to Church End, Finchley, 1½d. 15 minutes; to North Finchley 2d. 32 minutes.

At Golders Green, cycles are stored free of charge for the day upon which they are deposited. This convenience is intended for the encouragement of dwellers living at a distance from the Station. The roads in the neighbourhood are good.

PHOTO DEBENHAM, HAMPSTEAD

TABLE OF FARES.

STRIP TICKET RATES AND JOURNEY TIMES.

Between	Hampstead. Fare.	Hampstead. Strip of six Tickets.	Hampstead. Journey Time.	Golders Green. Fare.	Golders Green. Strip of six Tickets.	Golders Green. Journey Time.	Hendon. Fare.	Hendon. Strip of six Tickets.	Hendon. Journey Time.
			mins			mins			mins
Camden Town	1d.	6d.	6	2d.	11d.	10	3d.	1/4	24
Euston	2d.	11d.	9	2d.	11d.	13	3d.	1/4	27
Tottenham Court Rd.	2d.	11d.	13	3d.	1/4	17	4d.	1/9	31
Leicester Square ..	2½d.	1/2	14	3d.	1/4	18	4d.	1/9	32
Piccadilly Circus ..	3d.	1/4	16	3d.	1/4	20	4d.	—	34
Oxford Circus	3d.	—	15	3d.	—	19	4d.	—	31
Marble Arch	3d.	—	19	3d.	—	23	4d.	—	35
Wood Lane..	4d.	—	28	5d.	—	32	6d.	—	44
Chancery Lane	3d.	1/4	19	3d.	1/4	23	4d.	—	35
Moorgate	3d.	1/4	19	4d.	1/9	23	5d.	—	35
Bank	3d.	1/4	21	4d.	1/9	25	5d.	—	37
London Bridge	3d.	—	24	4d.	—	28	5d.	—	40
Charing Cross	3d.	1/4	15	3d.	1/4	19	4d.	1/9	33
Waterloo	4d.	1/9	20	4d.	1/9	24	5d.	—	38
Hyde Park Corner ..	3d.	1/4	20	3d.	1/4	24	4d.	—	38
South Kensington ..	4d.	1/9	24	4d.	1/9	28	5d.	—	42
Earl's Court	4d.	1/9	28	4d.	1/9	32	5d.	—	46
Hammersmith	4d.	1/9	32	5d.	2/3	36	6d.	—	50

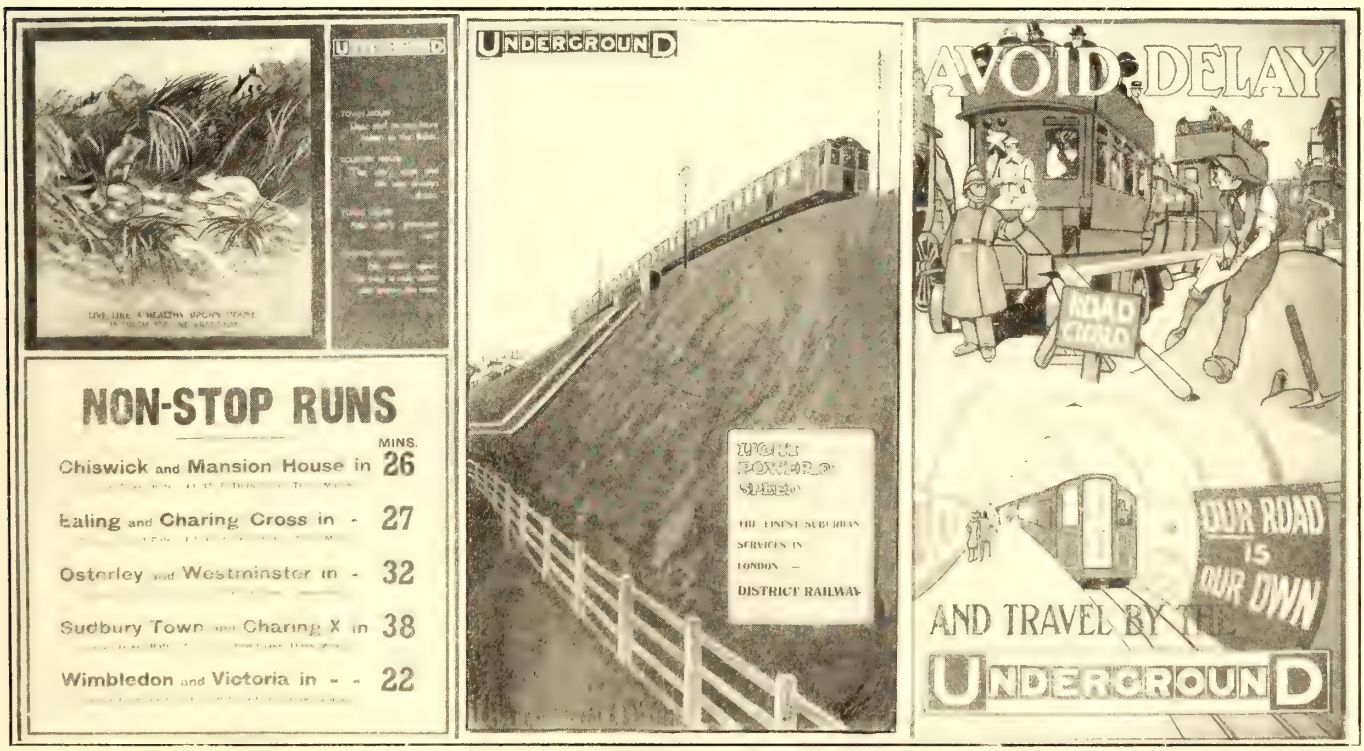
London Advertising—Three Pages from Circular Descriptive of Suburban Residence Towns

39 principal theaters, music halls and museums in the theater district of London, and the location of the lines and stations of the company. On the back of this card is a notice of the late theater trains run by the company to different destination points in the city. Another card gives the names of the plays

folder bears the motto: "It is no longer he who runs may read, but he who travels underground may learn all arts and all knowledge."

ADVERTISING FOR SUBURBAN TRAFFIC

This article would not be complete without a description of



London Advertising—Traffic Posters, Original Size 24 in. x 40 in.

being conducted at the different theaters and the names of the nearest underground station. On the back of this card is a colored sketch, reproduced herewith, of a number of the principal characters at eight of the leading theaters in London. A list of University of London Extension lectures is printed on

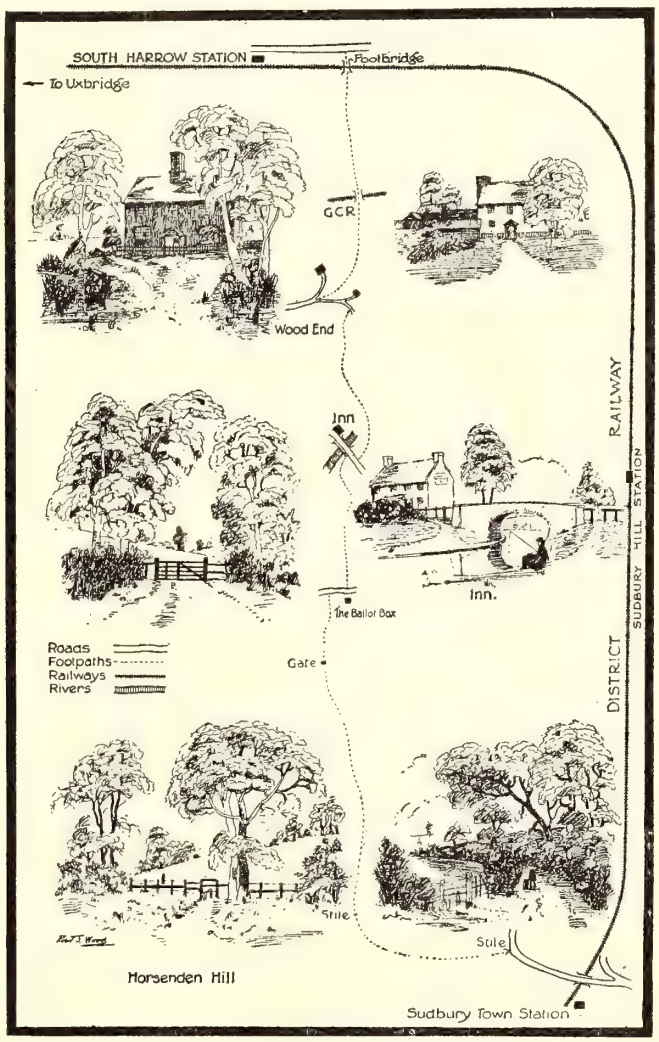
some of the circulars recently issued by the company for the development of suburban traffic, both of the excursion and commuter class. Among the former is a series of leaflets devoted to country walks around London. These are printed on single sheets 5 in. x 7½ in. One side has an inviting de-

scription of a walk. The pedestrian is told how to reach the starting point by the District Railway and the station at which he should alight. He is then told just what route he should take and particulars are given of the points of historic and other interest of the localities through which he will pass.

INSTITUTIONS.	Evenings and Time.	Nature of Work.	Nearest UNDERGROUND Station.
Birkbeck College, Chancery Lane, E.C.	Mon.-Fri. 6	University Courses, Science Art, etc.	**Chancery Lane or Temple**
Borough Polytechnic, Borough, S.E.	Mon.-Fri. 7	Technical and Trade Schools, Engineering, Science, etc.	**Elephant or Borough**
Beaufoy Institute, Princes Road, S.E.	Mon.-Fri. 7.30	Technical Classes Preparatory to Polytechnics	**Kennington**
Barnsbury Park Centre, N.	Mon.-Fri. 7.15	Commercial and Art	**Caledonian Road or Highbury**
Battersea Polytechnic, Battersea Park Road, S.W.	Mon.-Fri. 7	Science, Engineering, Art, Women's Subjects, etc	**Change at Victoria**
Camden School of Art, Camden Road, N.	Mon.-Fri. 7	Arts and Crafts	**Caledonian Road**
Central School of Arts & Crafts, Southampton Row	Mon.-Fri. 7	Arts and Crafts	**British Museum or Holborn**
Clapham School of Art, High Street, S.W.	Mon.-Fri. 7	School of Fine Art	**Clapham Road**
City of London College, Moorfields, E.C.	Mon.-Fri. 6.30	Commercial, Science, Art	**Moorgate**
College for Working Women, 7, Fitzroy Street, W.	Mon.-Fri. 8	First Aid, Nursing, Hygiene, etc.	**Warren Street**
University of London—East London College, Mile End Road, E	Mon.-Fri. 7	University Courses, Science, Arts, Engineering	**Mile End or Stepney Green**
Hammersmith School of Arts and Crafts, Lime Grove, W.	Mon.-Fri. 4.30	Arts and Crafts, Trade School for Girls	**Shepherd's Bush**
"Hugh Myddelton" Centre, Clerkenwell, E.	Mon.-Fri. 7	Commercial and Art	**Farringdon Street**
University of London—King's College, Strand, W.C.	Mon.-Fri. 6	Art, Science, Engineering, Medicine, Law, Architecture, etc.	**Strand or Temple**
Kennington Road Centre, S.E.	Mon.-Fri. 7.15	Commercial	**Oval**
Leathersellers' College, Tower Bridge Road, S.E.	Mon.-Fri. 7.30	Leather Manufacture, Dyeing, Dressing, etc.	**London Bridge**
"Marlborough" Centre, Draycott Avenue, S.W.	Mon. Thur. 7.15	Commercial and Art	**Sloane Sq. or Brompton Rd.**
Montem Street Centre, Tollington Park, N.	Mon.-Fri. 7	Commercial and Art	**Finsbury Park**
Myrdle Street Centre, Commercial Road, E.	Mon. Thur. 7.15	Commercial and Art	**Whitechapel**
Northampton Polytechnic Institute, Clerkenwell, E.C.	Mon.-Fri. 7	Artistic Crafts, Engineering, Aeronautics, Technical Optics, Horology, etc.	**Angel**

London Advertising—Card Tabulating Public Lectures and Nearest Underground Station

Finally, there is a statement of the fares charged on the railway in going to the starting point and returning home. On the other side of this leaflet is a pictorial map of the route. One of these maps, that of "Country walk No. 8, from South



London Advertising—Back of Leaflet Descriptive of a Suburban Walk

Harrow to Sudbury on the Fields," is published. Such a system for describing walks has a number of advantages over the usual method of publishing the information in book form, because a single sheet is easy to carry in the pocket and easy to consult while on the trip, and when the pedestrian returns home it can be thrown away.

The other guide referred to is a small pamphlet designed to benefit the city resident who is considering moving into the country. The introduction says:

"If you are seeking a house, why not follow the Underground out of town? If you live on a main line, you use the Underground from the railway terminus to your place of business. Why not use it the whole way and travel in a through train? It makes town much more accessible, and must make traveling cheaper.

"The Underground Services are all-day services. The trains are so frequent that there is scarcely any need to hurry to catch particular trains. It is just as convenient to go and come between the suburb and the town in the middle of the day as in the morning and evening busy times. This is an advantage to your family."

The rest of the pamphlet is devoted page by page to a statement of the facts which a person who was considering moving into the town described would like to have, that is, some information in regard to the character of the town, the cost of living and the cost of transportation. Each description is accompanied by a half-tone illustration of the town described. The character of the description is illustrated from the following, which relates to Wimbledon:

"The neighborhood is fully developed, with good shops, cafés, schools, churches and chapels, and a public library. The houses at Wimbledon are of the better class. Houses at more moderate rents can be obtained at Wimbledon Park (£40 to £60), while at Merton and Raynes Park there are houses or flats for those of moderate means.

"Rates: Wimbledon Urban District, 6s. 10d. in the £.

"Water: Metropolitan Water Board, 5 per cent on assessed value of house.

"Gas: 2s. 10d. per 1000 cubic feet.

"Electric Light: 4½d. per B. of T. unit.

"Sports: Wimbledon and Wimbledon Park golf clubs, All-England lawn tennis courts, skating on the large ponds on the Common and in Wimbledon Park, many sports grounds of various kinds.

"The District Railway provides a 15-minute service of trains throughout the day, with six trains hourly and non-stop trains morning and evening for business men. The journey time between Wimbledon and Mansion House for these trains is 33 minutes.

"The season ticket rates are low. A third-class 3 months' ticket between Wimbledon and Charing Cross costs £1 18s. 0d., and Mansion House £2 5s. 6d."

NEW PUBLIC SERVICE BUILDING IN NEWARK

The Public Service Corporation, Newark, N. J., has recently moved its offices to its new building at the corner of Broad Street and Bank Street. The building is a twelve-story structure, having a frontage on Broad Street of 75 ft., and a depth of 160 ft., with an extension on the second and third floors reaching to Halsey Street and Academy Street.

The basement will be used for testing and show rooms, which will be equipped with all the newest gas and electric supplies. The first nine floors are for the general and executive offices of the railway, gas and electric companies. On the tenth floor is an assembly room, 34 ft. x 67 ft., which will seat about 300 persons. Also on this floor are a small private dining- and a larger one to be used by the executive and junior officers respectively.

The eleventh floor will be used for the employees' dining-room, where about 625 persons will have luncheon daily. The company calculates, by paying $25,000 a year toward the expenses of this dining room, that meals can be purchased by the employees for one-half actual cost, or about 15 cents apiece.

The top floor will be used as the kitchen for all dining-rooms, and will be equipped with gas and electric cooking devices.

DEVELOPMENT OF THE OFFICE OF SUPERINTENDENT OF THE DAY, BOSTON ELEVATED RAILWAY COMPANY

BY EDWARD DANA, ASSISTANT TO THE SUPERINTENDENT OF TRANSPORTATION, BOSTON ELEVATED RAILWAY

In the ELECTRIC RAILWAY JOURNAL for July 3, 1909, brief mention was made of a recent development in Boston in connection with the specialized study of traffic conditions by the establishment of an office filled by a so-called superintendent of the day, for the purpose of concentrating at a single central point the authoritative handling of the entire elevated subway, tunnel and surface system of the Boston Elevated Railway, upon which are operated nearly 52,000,000 revenue car-miles per year.

Form 3400-8-10-500

BOSTON ELEVATED RAILWAY COMPANY

Surface Cars Reported Defective Causing Delay or Accident and Derailment

5 A. M. ..... 19 . TO 5 A. M. FOLLOWING DAY

..... SUPT. OF DAY ..... SUPT. OF DAY

TIME OF DELAY	TIME REPORTED	Car No.	Car House	Location of Delay or Accident	Min. Del.	Reported Cause	REMARKS: Lines Affected or Diverted

Superintendent of Day—Fig. 1, Form for Recording Defects Causing Delays of Over Three Minutes and Derailments

The office is filled by a different man each day, the list being composed of division superintendents, chief inspectors and representatives from three of the general offices, the total number on the roster being 20. Each man serves approximately three times in two months. The hours of duty are from 8:00 a. m. to 8:00 a. m. the following day. The period was made one of 24 hours to allow sufficient time to get thoroughly in touch with conditions and carry through an entire day, which could not be accomplished with a shorter tour of duty. It will be seen that for the time being each incumbent of the office is leaving his own particular duties behind him and gaining slowly but surely an accurate knowledge of the various parts which go to make up the system and by so doing is himself becoming a broader thinker. The energetic man, when matters are running smoothly, has an opportunity to improve his time through study.

Form 3395-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With VEHICLES Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT. OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Owner and Driver and Address	Location of Accident	Min Del	REMARKS. Particulars, Damage, Injuries, Etc.

Superintendent of Day—Fig. 2, Form for Reporting Accidents to Vehicles

Form 3396-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With CARS Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Car Hit	Conductor / Motorman	Location of Collision	Min Del	REMARKS. Particulars, Damage, Inquiries, Etc.

Superintendent of Day—Fig 3, Form for Reporting Collisions of Cars

It might prove of interest to examine the details and methods of this office which have been developed after nearly two years of existence. Primarily, the superintendent of the day is the mouthpiece of the superintendent of transportation and he has no authority except such as may be delegated to him by his superiors from time to time. His chief cause for existence is to keep in touch with conditions and bring about uniformity of operation throughout the system, as well as to secure quick, concerted action when an emergency arises, and he has nothing to do with the regular schedule. In this way he may be of undisputed value in securing normal conditions in the shortest space of time.

Form 3397-250

BOSTON ELEVATED RAILWAY COMPANY

Collisions With PERSONS Reported 5 A. M. ..... 19 to 5 A. M. Following Day

..... SUPT. OF DAY ..... SUPT. OF DAY

Time of Coll. / Time Reported	Car Colliding	Conductor / Motorman	Name and Address of Persons Collided With	Location of Accident	Min Del	REMARKS. Particulars, Injuries, Etc.

Superintendent of Day—Fig. 4, Form for Reporting Collisions with Persons

Now a word as to the actual detail. A general log is kept on a sheet of plain ruled paper, 8½ in. x 14 in., with two ruled columns, one for the time matters are reported and the other for the subject; the rest of the sheet is used for the notes.

Such matters as do not have a classified place on the other forms are entered on this log sheet. Matters which lend themselves to ready classification are noted on card forms 6 in. x 12 in. (Figs. 1 to 8), to each matter being given a distinctive color. These are filed in a desk box easily accessible when a report comes in, thus minimizing the time necessary to receive a report and saving work through the need of but one copying and this on a form covering all important points. The divisions have been instructed to report occurrences just as called for by the form and in this way no time is lost over the telephone.

Forms 3395, 3396 and 3397 (Figs. 2, 3 and 4) are ruled in very nearly the same way, being used respectively for collisions with vehicles, a salmon card; cars, a buff-colored card; and persons, a blue card. As these cards are ruled on both sides it is rarely necessary to use more than one and never more than two in one day. Form 3393 (Figs. 5 and 6) is, so to speak, a compound one. One side is used for a tabulation of heater signals displayed at different periods by divisions, as well as the weather and rail conditions. The reverse side is used for the sand car or wagon operation, a record being made of every time a sand car goes out or comes in, the district covered and the division sending it out.

Form 3400, Fig. 1, a green card, is used for all surface cars reported defective causing delay or accident of over 3 minutes and derailments. These cards date from 5:00 a. m. in the morning to 5:00 a. m. the next morning, in other words they start approximately with the first cars in the morning.

Form 3402 (Figs. 7 and 8) is also used for different purposes, fire alarms being noted on one side and excavations on the reverse. In this connection it is the duty of the superin-

Form 3393-7-10-500

BOSTON ELEVATED RAILWAY COMPANY
Heater Signals Displayed, Weather and Rail Conditions

Below 20° Fahr — Signal 3
Between 20° and 32° Fahr — " 2
Above 32° Fahr — " 1 or 0

Date 191

	Division 1		Division 2		Division 3		Division 4		Division 5		Division 6		Division 7		Division 9	
	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.	Reported	Sig.
Period 1 First Car to 9 a.m.																
Period 2 9 a.m. to 3 p.m.																
Period 3 3 p.m. to 6.30 p.m.																
Period 4 6.30 p.m to Last Car																

	Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail		Temp.	Wind	Weather and Rail
1 a.m.				7 a.m.				1 p.m.				7 p.m.			
2 "				8 "				2 "				8 "			
3 "				9 "				3 "				9 "			
4 "				10 "				4 "				10 "			
5 "				12 "				5 "				11 "			
				Noon				6 "				"			

Superintendent of Day—Fig. 5, Form for Tabulating Heater Signals, Weather and Rail Conditions

SAND CAR OR WAGON OPERATION. ..... } **Supt. of Day**

Date 191

Out	In	District	Div.	Out	In	District	Div.	Out	In	District	Div.

Superintendent of Day—Fig. 6, Form for Recording Sand Car Operation

Form 3402-9-10-250

BOSTON ELEVATED RAILWAY COMPANY
FIRE ALARMS

Supt. of Day 5 A. M. ..... 5 A. M. Following Day ..... Supt. of Day

Alarm Sounded	Box	Fire Located At	REMARKS—Interference with Traffic, etc.

Superintendent of Day—Fig. 7, Form for Recording Fire Alarms

EXCAVATIONS

Div.	Nature of Excavation	Location of Excavation	Watched by No. of Men	Lighted

Superintendent of Day—Fig. 8, Form for Recording Excavations and Men Assigned to Them

tendent of the day to make sure that all excavations affecting the company are properly watched and lighted at 1:00 a. m.

Form 6142, Fig. 9, is not a card form but a block 8 in. x 11 in., used only in winter for the hourly reports of snow plows operated in each division. The form shown in Fig. 10 is the heading of a sheet 14 in. x 9½ in., used for recording the various notices placed on the bulletin boards at any of the 25 car houses on the system. All important matters affecting cars en route, such as diversion of cars, oil on rails, important street work necessitating cars running with caution, are posted in chalk on large bulletins in plain sight at each car house.

The information available in the office is of the broadest character. On the wall there are a large map of the territory comprising the entire system with the tracks shown in red; a large map of the tracks in Division 8, the central district; a map showing the boundaries of each emergency district; a map of the grades and signals in the East Boston Tunnel; a framed chart of the night car service; a framed special car tariff; a framed fire alarm schedule; a bulletin board composed of removable strips of white cardboard with ½-in. black letters of important telephone numbers such as emergency hospitals, city departments, etc.; a similar board for tracks which

Form 6142-2-10-500

BOSTON ELEVATED RAILWAY COMPANY — Snow Storm No

BUREAU OF OPERATION. OFFICE SUPT OF TRANSPORTATION — Started

DATE ..... SNOW PLOW OPERATION — Ended

	Div. 1			Div. 2			Div. 3			Div. 4			Div. 5			Div. 6			Div. 7			Div. 9			Total	
	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Time Reported	Plows	Lev.	Plows	Lev's.
A.M. 1																										
2																										
3																										
4																										
11																										
12 M.																										

REMARKS:

Supt. of Day ..... Supt. of Day

Superintendent of Day—Fig. 9, Form for Recording Hourly Reports of Snow Plows

Date_____

Notices on Bulletin Boards.

Div. 1			Div. 2					Div. 3			Div. 4			Div. 5		Div. 6					Div. 7						Div. 9			
Grove Hall	Dorchester	Forest Hill	Ch. Hill	Lenox St.	Rox. Crossing	Sewall St.	Jamaica Pl.	Milton	Neponset	Park St.	Tunnel	Eagle St.	Chelsea	Dorch. St.	North. Point	Chas. Neck	Everett	Clar. Hill	Summer St.	Salem St.	Mt. Auburn	Watertown	Murray St.	Arl. Hgts.	River St.	No. Camb.	Allston	Oak Sq.	Reservoir	Boulevard

Electric Ry. Journal

Superintendent of Day—Fig. 10, Form for Recording Notices Posted on Bulletin Boards at Different Car Houses

Form 3990-10-15-250

CAR HOUSE..... CAR DEFECTS MONTH OF..... 19

BODY	Total		Total		Total
Bell		Tr. Pole		Charged	
Bell Cord		Tr. Cord		Cir. Breaker	
Cards, Adv. & Pub.		Tr. Base		Contactors	
Curtain		Tr. Wheel		Controller	
Cushion		Tail Lights		Fuse Box	
Dasher		Ventilator		Fuses	
Door, Car		MECHANICAL		Headlight	
Door, Pneumat.		Air Brake Fuse		Hea er or Sw.	
Door, Vest.		Air Brake		Main Mtr. Sw.	
Draw Bar		Air Gauge		Master Cont.	
Draw Bar Rest		Air Compressor		Motor	
Fender		Air Pipe Leaks		Motor Flash	
Fender Castings		Air Valves		Motor Susp.	
Floor		Axle		Lamps	
Glass		Brake Dog		Lead Wires	
Gong		Brake Handle		Lt. Sw. or Fuse	
Grab Handle		Brake Rod		Pump Governor	
Hand Strap or Rail		Brake Shoe		Relays	
Lifeguard		Brake Staff		Resistance	
Reg. Clocks		Brakes		Reverser	
Reg. Cord		Gear and Casing		Rheostat	
Reg. Cord Hanger		Hot Box		Sign Lights	
Roof Leaks		Shaking		Gauge Lights	
Running Board		Snow Scraper		MISCELLANEOUS	
Sand Box or Spout		Springs, Journal		Clothing Caught	
Seats		Squealing		In Collision	
Seat Arm		Wheel		Derailed	
Side Bar		Bolster		Paint Sticky	
Signs		ELECTRICAL		Dirty	
Step or Hanger		Bucking		Slow	
Tr. Catcher		Cable			

Superintendent of Day—Fig. 11, Form Used at Car Houses for Recording Car Defects

for one reason or another are closed to operation, and at the bottom of this bulletin are slides for important notices which run over from one superintendent of the day to the other.

In addition to the above, which are all on the walls, there are accessible:

A file of all current transportation matters.

A file of the daily layout for the road department.

Blueprints of the entire track layout of the system.

All general orders and bulletins.

All rule books.

A book of city traffic regulations.

A book of emergency routes for the diversion of cars in the congested district.

A street directory.

Route books.

Various literature of connecting roads.

A list of bridges over which the heavy cars on the system cannot operate.

A list of all station masters, starters and their hours of duty.

A list of street inspectors, with districts, hour of duty and call boxes.

A card timetable of all lines which run throughout the day on the system.

Memorandum blocks for claims, complaints and special cars, which are used after the offices close for the day.

Lastly, a standard clock, thermometer and fire alarm tapper.

All special cars are checked up by the superintendent of the day a short time before they are due to pull out from the car house, and in this way the liability to error is reduced to a minimum. Dasher posters are also regulated from the office so that no posters will be displayed after their expiring date.

A recent addition to the duties has been the checking up of all disabled cars. Each morning there is received the report from the starters of the 25 car houses giving the disabled cars of the day previous and the causes. These are entered on form 3410, Fig. 11, there being one card for each car house. At the end of the month these are totaled in the office of the superintendent of transportation. An accurate record of all car defects is secured which can then be checked with the mechanical department.

It will be seen, therefore, that there has developed a well-equipped office, relieving the superintendent of transportation of an enormous amount of detail, thus permitting his attention to broader fields and also exercising a very valuable function of taking up many loose ends and stimulating the proper performance of duty in transportation matters by division officials.

ATTRACTING PARK BUSINESS IN LYNCHBURG, VA.

The Lynchburg Traction & Light Company, of which R. D. Apperson is president and general manager, operates a pleasure resort known as Rivermont Park. No admission is charged to the park. The latter is only 2 miles from the center of Lynchburg, but owing to the hilly character of this section practically all of the visitors come on the company's cars. In addition to the staple amusements for summer parks, such as free dancing and moving pictures, theatrical performances at nominal charge, penny arcade, bowling alleys, pool rooms, etc., the company tried recently two interesting departures which were very successful. One of these was to give in the park casino illustrated concerts by means of a string quartet and Victor Gold Seal opera records. The musicians and the hornless instrument known as an auxetophone were placed amid artistically grouped palms so that the whole effect was very pleasing. These concerts were given on Sunday afternoons and on weekday evenings. They were followed by moving pictures and dancing on weekday nights.

The other novelty which the company tried was to have the Salvation Army hold services at the park on Sunday nights, accompanying them by stereopticon views of Bible history. It took some time to convince the Salvationists that this scheme would be desirable, but after the first meeting they were very enthusiastic over it. The company gave the use of the park to the Army without any charge whatever while two Salvation Army girls accepted offerings at the gates.



Casino at Rivermont Park, Lynchburg, Va.

Mr. Apperson is also president of the Roanoke Railway & Electric Company, which operates a resort known as Mountain Park. The latter place is operated along quite different lines from the one at Lynchburg, as Roanoke has a cosmopolitan population. Thus, vaudeville is one of the most popular features at Roanoke, whereas it has not been at all successful at Lynchburg.

"North Dakota Lignite as a Fuel for Power-Plant Boilers" is the title of Bulletin No. 2, just issued by the Bureau of Mines. This bulletin describes a series of tests with brown lignite at the pumping plant of the United States Reclamation Service at Williston, N. D. The furnace was of the semi-gas producer type. The results of the tests on the lignite show that this fuel, though generally considered unsatisfactory, may be used with fair economy under boilers that generate their full rated capacity. The tests were conducted by the Technologic Branch of the Geological Survey, which is now a part of the Bureau of Mines. The authors of the bulletin are D. T. Randall and Henry Kreisinger.

TRACK DEPARTMENT STANDARDS OF NEW YORK STATE RAILWAYS

A number of standard designs of track and right-of-way structures have recently been adopted by the Rochester interurban lines of the New York State Railways. These standards have been designed by B. E. Tilton, engineer of maintenance of way, and are being gradually installed on the Rochester & Eastern Rapid Railway and the Rochester & Sodus Bay Railway as part of the regular maintenance work. It is the intention to have the track and structures of both of these railways completely standardized in the near future.

The standards which have been adopted may be divided into special track signs, standard track construction details and miscellaneous standards relating to the track department.

STANDARD TRACK SIGNS

A number of typical standard track signs are illustrated in the accompanying engravings. The following brief descriptions of a few of the standard signs may be of interest.

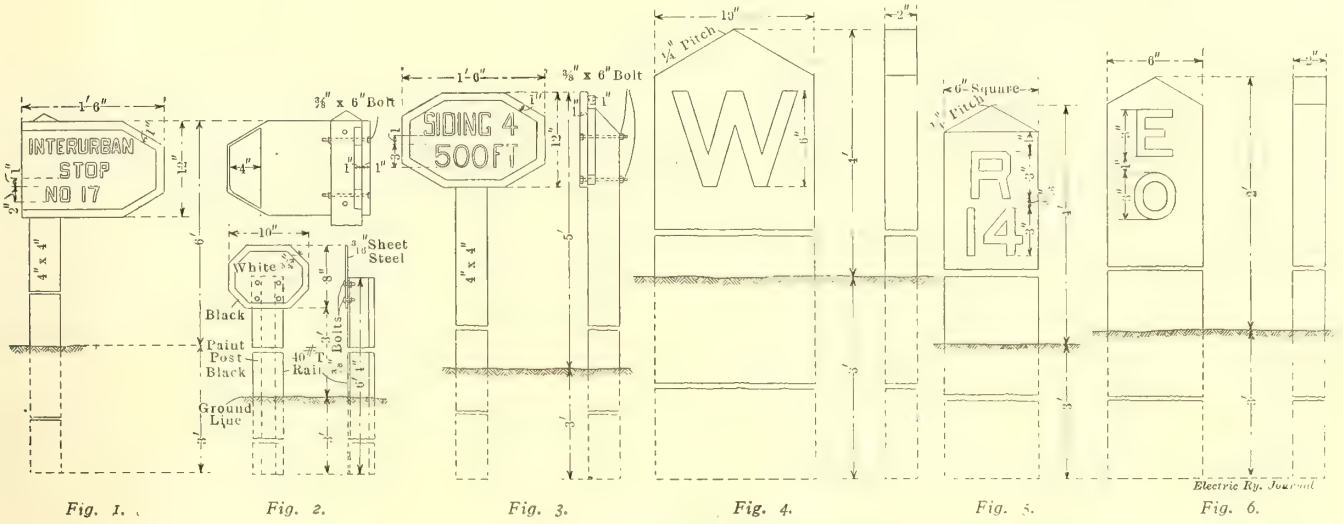


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6.

Figs. 1 to 6—Standard Signs

The sign erected at all highway crossings where interurban cars stop is shown in Fig. 1. The post is set 8 ft. to one side of the center line of the track on the far side of the highway. When the track is located in the center of a street in a village the sign is placed back of the curb line. The letters, which are 2 in. high, are painted black on a white field, surrounded by a black border 1 in. wide. The post and the back of the sign are painted black.

The section boundary sign is similar in shape to the stop sign, but is smaller, being 8 in. x 12 in. and mounted on a 3-in. x 3-in. post, 4 ft. above the ground. The word "Section," with the number of the section below it, is painted in black letters 1½ in. high on a white field, with a 1-in. black border. The back of the sign and the post are painted black. This sign is also placed 8 ft. to one side of the center line of the track.

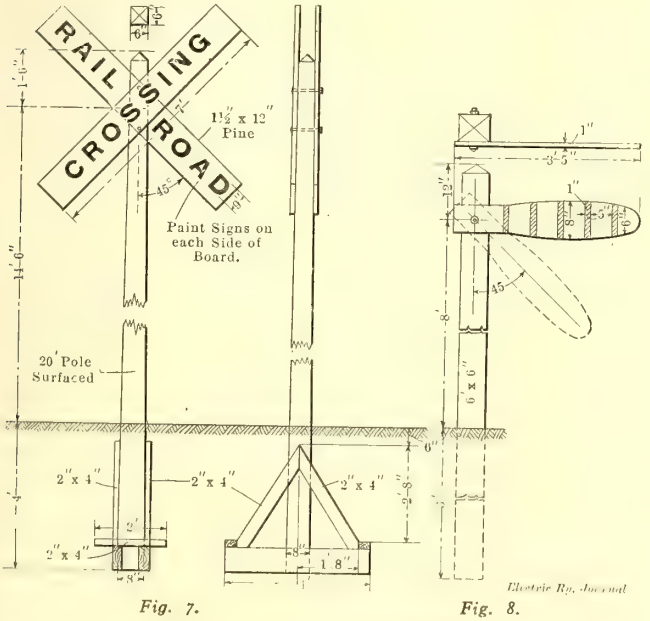


Fig. 7. Fig. 8.

Figs. 7 and 8—Standard Signs

The standard siding shown in Fig. 3 is placed 500 ft. in advance of each siding as a marker. The letters, which are 3 in. high, are white on a black field surrounded by a white border. The post and the back of the sign are painted black.

The yard limit sign, used to warn cars entering yard limits, is of the same size and shape as the siding sign. It is 5 ft. high and is located on the right-hand side of the track 8 ft. out from the center line so that it can be seen from cars entering the yard. The letters are 4 in. high, painted white on a green field with a white border. The post and back of the sign are black.

The trespass sign placed at all highway crossings and at points where private right-of-way begins is the same size and shape as the siding sign and has printed on one side the words "Private Right-of-Way; Trespassing Forbidden." The letters are 1¼ in. high, painted black on a white field with a black border.

The town-line sign is placed at all points along the route where town boundaries intersect the right-of-way. These signs consist of two boards of the same size and shape as the siding sign mounted back to back on the top of a 4-in. x 4-in. post 5 ft. above the ground. On each board are painted the words

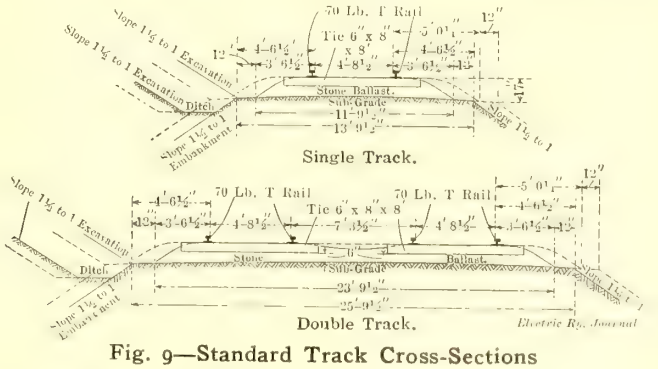


Fig. 9—Standard Track Cross-Sections

"Town Line" in black letters 1¼ in. high with the name of the town below in black letters 2 in. high. The field is white, surrounded with a black border 1 in. wide.

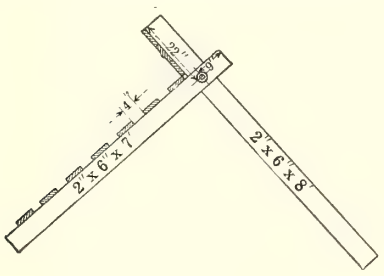
The post for marking the right-of-way boundaries is made of oak, 4 in. x 4 in., set 3 ft. in the ground and projecting 3 ft. above the ground. On all four sides of the post are painted

the letters "R of W." The capital letters are 2 in. high and the small letters 1¼ in. high. They are painted black and the body of the post is painted white. These posts are placed along the right-of-way at places where there is no fence.

Where the speed of cars is limited in passing through a village a slow sign is placed alongside of the track 500 ft. from the village limits. This sign is made of 2-in. x 10-in. oak plank on which is painted the letter "S." The post is set in the ground 3 ft. and projects above the ground 4 ft. It is painted black on all four sides and the letter "S" is painted white.

Rochester, and below it the number of miles to the terminal. The letters are black and are 3 in. high; the posts are painted white. The standard mile post is shown in Fig. 5.

On certain curves, where a maximum speed of 20 m.p.h. or less is the limit for safe running, a curve signal illustrated in Fig. 8 is used. This signal, which is in the shape of a semaphore arm 3 ft. 5 in. long and 8 in. wide, is painted green with 1-in. vertical black stripes. When the arm is mounted in the horizontal position it indicates a curve above 15 deg., over which the maximum running speed is 10 m.p.h. For curves



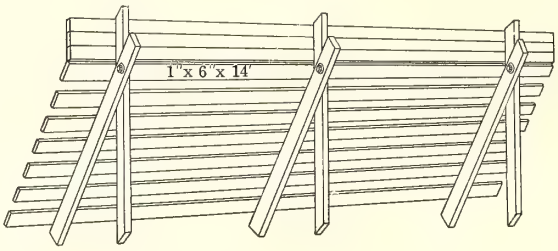


Fig. 10—Standard Portable Snow Fence

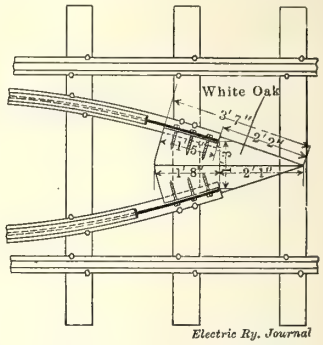
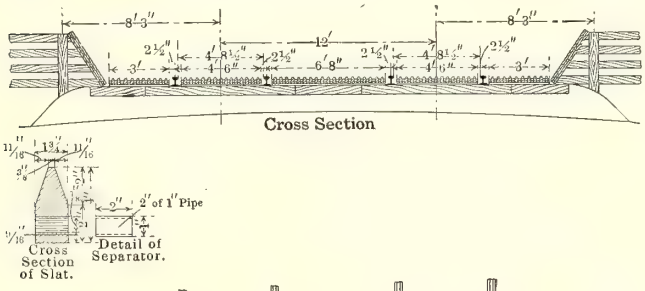


Fig. 11—Guard Rail Point Block

The whistle sign shown in Fig. 4 is the same as the standard slow sign except that it has the letter "W" painted in white on a black ground. It is placed 1000 ft. in advance of all public highway crossings at grade.

One of the most difficult tasks in maintaining interurban track is to preserve accurate and uniform superelevation of the outer rails on curves. A standard superelevation post is now being used on all curves of the Rochester interurban lines for the guidance of section foremen. Such a post is shown in Fig. 6. Four of these posts are used for each simple curve, whether spiraled or not. A post marked $\frac{E}{0}$ is placed near the beginning and end of each curve on the tangent track, indicating zero superelevation. Similar posts are also placed at the



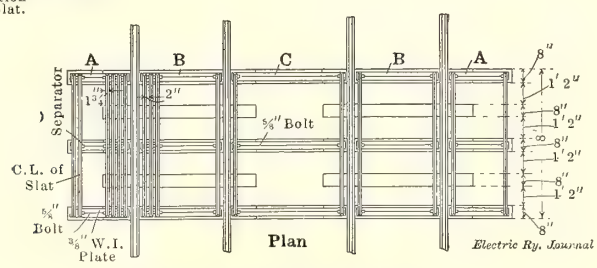


Fig. 12—Wooden Cattle Guard

beginning and end of the true circular curve and the amount of superelevation is painted on them below the letter "E," as for example, $\frac{E}{2\frac{1}{2}}$. On the back of the post marking zero superelevation is painted the number of the curve. These superelevation posts are white and the letters are, 3 in. high, painted black.

The standard mile post is of oak, 6 in. x 6 in., set 8 ft. out from the center line of the track with the faces at an angle of 45 deg. with the center line. On each of the faces nearest the track is painted the letter "R," indicating distance from

above 10 deg. and below 15 deg., on which the maximum speed is 20 m.p.h., the arm is placed at an angle of 45 deg. from the horizontal. These signs are mounted 500 ft. in advance of the curves for which they serve as a warning signal.

All bridges on the interurban lines are numbered and near each bridge a standard bridge number sign (Fig. 2) is mounted on the right-of-way near the track. The sign consists of a piece of 3/16-in. sheet steel, 8 in. x 10 in., bolted to the base of a short piece of old T-rail, set vertically in the ground. The face of the sign is painted white with a black border ¾ in. wide and the number of the bridge is painted in black figures 3½ in. high.

The standard highway crossing sign is shown in Fig. 7. The letters are 9 in. high and are painted black on a white ground.

TRACK DETAILS

The standard cross-section of roadbed for single and double track is shown in Fig. 9. The full lines indicate the present cross-section of slope and ballast and the dotted lines indicate the outlines which are being used in all new construction and which are being attained gradually in ballasting and in general track maintenance.

The standard rail rest used for supporting extra rails along the right-of-way is made of oak, 10 in. x 12 in., and the top is shouldered so as to support three rails. For supporting rails

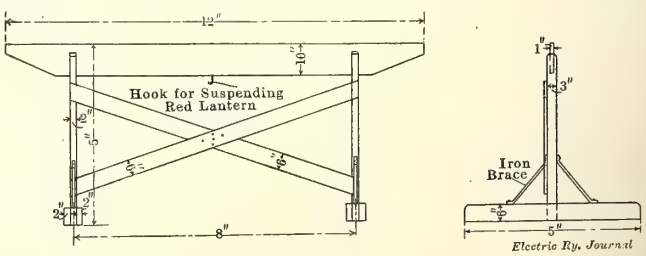


Fig. 13—Street Barrier

33 ft. long two posts set 17 ft. apart are used. For supporting 60-ft. rails three posts set 21 ft. apart are used.

Guard rails of the same height as the track rails are used on all bridges. They extend 50 ft. beyond the bridge on each side and are brought together at their ends with a white oak point block shown in Fig. 11. The guard rails are gaged 5 in. inside of the track rails and are spiked to every other tie. Where a short radius curve leads on to a bridge the guard rail is drawn out to 1½ in. from the gage line of the track rail and is continued on around the curve. The oak guard rail point is placed on tangent track in all cases.

Wooden cattle guards are being installed at all intersections with public highways. The details of construction of these guards are shown in Fig. 12.

Much trouble is experienced from drifting snow in Western New York and portable snow fences of the design shown in Fig. 10 are extensively used to protect cuts and other places where snow accumulates. These fences are made in sections 14 ft. long and are self-supporting. They can be stored or transported flat and are quickly set up or taken down.

RECORDS OF WHEEL GUARD INSTALLATIONS IN BROOKLYN

The Brooklyn Rapid Transit Company is installing at present a total of 2563 wheel guards of the H-B, Hipwood and Parmenter types. In this connection the car equipment department devised the tabular record reproduced herewith to keep track of the shipments of these guards as received at the Thirty-ninth Street and Fifty-second Street shops. Columns are provided on this record for the classification of the type of car, the number of each type, the car serial numbers, the delivery dates and, finally, a series of ruled sections corresponding to the total number of equipments for each group of cars. These sections are filled in as the corresponding equipments are received, so by a glance at the chart one can see immediately just what proportion of the order has been filled to date.

Type of Life Guard	Schedule	TYPE OF CAR	No. of Cars	CAR NUMBERS	Date Cars Measured	DELIVERY 1910 June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A	A	Standard Closed Brill M.T. Truck	504	300-369, 370-394 396-399 500-550, 552, 554 555, 557, 560, 561 566, 567, 570-577, 579 700-786 1700-1799, 1900-1949 2100-2199			15	300	189			
	B	Convertible Brill M.T. Truck	1	787			1					
	C	Standard Closed Standard O-45 M.T. Truck	2	796, 797			2					
	D	Standard Closed Peckham 14-D-5 M.T. Truck	20	1-20			20					
	E	Semi-Convertible Brill M.T. Truck	7	789-795			7					
	F	Semi-Convertible Standard O-45 M.T. Truck	100	2500-2599	5-24-10	100						
	G	Semi-Convertible Brill M.T. Truck	250	2700-2761, 2766-2787 2791-2794, 2796-2799 2900-2999, 3100-3154	5-24-10	200	50					
	H	Semi-Convertible Peckham 14-D-5 M.T. Truck	204	3155-3199, 3300-3399 3500-3551, 2788-2790 2795			204					
	I	Convertible	452	3555, 3556 3700-3799, 3900-3999 4100-4199, 4300-4349 4500-4599	5-24-10	152	150	150				
	J	Parlor Car	1	Columbia			1					
	K	Double Truck Open	495	455-499 800-899, 1000-1099 1200-1299, 1400-1499 1600-1649					111	200	184	
			2036			452	450	450	300	200	184	
B	L	Single Truck Closed	8	1-8		8						
	M	" " "	95	100-194	5-27-10			95				
	N	Single Truck Open	6	14-19		6						
	O	" " "	163	1800-1899 2000-2062				27	34	34	34	34
			272			14		122	34	34	34	34
C	P	Double Truck Open	255	200-299, 400-454 600-699					255			
			255						255			

Brooklyn Rapid Transit Schedule Showing Delivery of Wheel Guards for Various Types of Cars.

A daily report of the guards as installed on specified types and numbered cars is sent to the superintendent of equipment from the two shops mentioned. Copies of this report are transmitted at once to the transportation department and to the claim agent. The daily reports are assembled on a progress sheet which shows the car numbers, the date when the cars went in and out of the shops and their types. These progress reports are sent monthly to the Public Service Commission of the First District and also to the interested departments of the railway.

The annual report of the State Railroad Commission of Michigan for 1909 has been issued. In all 88,848 men are employed by all railroads operating in the State. The total passenger fares collected by electric roads doing an interurban business were $9,723,832.

HEARING ON SERVICE AND VENTILATION IN BROOKLYN

A hearing was held before Commissioner McCarroll of the Public Service Commission of the First District of New York on Nov. 21, 1910, on the motion of the commission to investigate the question of improving and adding to the service and equipment of the Brooklyn Union Elevated Railroad, Nassau Electric Railroad, Sea Beach Railway and the South Brooklyn Railroad. G. H. Backus, as counsel, conducted the case for the commission and W. S. Menden, assistant general manager of the Brooklyn Rapid Transit Company, appeared for the companies. Mr. Backus said the Brooklyn Rapid Transit Company, which controls the companies previously mentioned, contended that tests made in the presence of representatives of the commission to determine the ventilation of the convertible cars in use on its elevated lines showed that the cars were well ventilated and established the fact that the complaint about insufficient ventilation was caused by temporary conditions at the beginning of October when the cars were converted into closed cars and the weather continued to be more than usually warm.

Walter E. Johnson, chief draftsman of the mechanical department of the Brooklyn Rapid Transit Company, said he had made readings in the convertible cars with an anemometer and from these readings he had calculated the amount of air taken in and exhausted from these cars. Streamers were also installed in the cars opposite the ventilators and photographs of them were taken to indicate the circulation of the air.

William G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, said that the tests made by Mr. Johnson convinced him that the convertible cars were properly ventilated. Tests were made of cars equipped with 10 ventilators, 12 ventilators and 14 ventilators. Fourteen ventilators, the largest number possible, were installed and the intake of fresh air per passenger per minute was 922 cu. ft.

Clifton W. Wilder, electrical engineer of the commission, said that the accepted standards of ventilation varied from 5 cu. ft. per minute per person to 50 cu. ft. per minute per person. He considered the ventilation adequate and if more ventilators were installed per car the movement of air would not be so positive.

Mr. Menden said that the company was considering putting some movable sash in the car, so that some of the windows could be lowered if necessary. The hearing was then closed.

SETTLEMENT OF BROOKLYN TRANSFER CASE

After further testimony had been offered before the New York Public Service Commission of the First District in regard to the new transfer system of the Brooklyn Rapid Transit Company subsidiary surface railway companies an agreement was made whereby the complaint was withdrawn upon the promise that certain modifications would be made in the regulations. Accounts of the hearings before the commission in this case have been published in the Electric Railway Journal of Oct. 29, Nov. 5 and Nov. 19, 1910.

At the hearing on Nov. 15 E. G. Connette, transportation engineer of the commission, testified that his department had investigated all of the complaints that had been received in relation to the transfer system. He was prepared to make recommendations covering approximately 23 or 24 complaint points. These covered a large part of the complaints, those which were the most important and which should be remedied. They covered four fundamental locations in the transfer system. One was reached by a reverse direction trip, but Mr. Connette thought the people in this particular district, who were now required to pay 10 cents fare, should have one fare with transfer privileges. This could be arranged with full protection to the company by the issue of duplex tickets. Mr. Connette presented a statement showing the changes which he recommended. These changes, together with those that had already been made by the companies, would take care of practically 75 per cent to 80 per cent of the complaints which had been received. Some of the remaining complaints were considered unfounded and unwarranted.

Under examination by Grosvenor H. Backus, assistant counsel for the commission, Mr. Connette stated that he considered all of the changes essential to reasonable and adequate service by the several defendant companies in order to provide a 5-cent fare to passengers going in the same general direction for a distance, not unreasonable, which would ordinarily be covered by a 5-cent fare. Passengers could now travel between some of the points involved for a 5-cent fare, but only by long, circuitous routes. From an operating point of view it was to the advantage of the company to carry passengers by the shortest routes possible.

C. D. Meneely, secretary and treasurer of the companies, testified that the modifications which it was proposed to install would, he thought, with one exception, be established by Nov. 21. A statement presented by Mr. Meneely showed that the number of transfer privileges which existed under the old transfer system was 5147. The number under the new system was 3210, a reduction of 1937. The 1937 withdrawals consisted of 231 on account of illegal stop-overs; 266 two-ride routes; 551 on account of reverse directions or three-ride routes; 878 limitations of free rides on routes involving two or more companies; unnecessary transfers, 11. The use of transfers for stop-overs was never intended under the law. Wherever lines of two companies exchanged transfers at a point the transfer was limited to a cash fare and the second transfer or third ride was eliminated.

A map, prepared under the supervision of the franchise bureau of the commission, showing the streets in Brooklyn over which two or more street railway companies operate jointly, was submitted in evidence. George D. Yeomans, counsel for the companies, objected to the introduction of the map, but the objection was overruled by Commissioner McCarroll. Exception was taken to the ruling.

At a subsequent hearing on Nov. 17 Mr. Backus stated that representatives of the company had told John J. A. Rogers, the complainant, that they would be willing to adopt the suggestions made by Mr. Connette on Nov. 15 if Mr. Rogers would withdraw his complaint.

Commissioner McCarroll said that the withdrawal of the complaint was a question for Mr. Rogers to decide, but it was for the commission to determine what should be done as a result of the investigation.

On Nov. 23 Mr. Yeomans stated that, subject to the wishes of the commission, it had been agreed that the companies would make the changes suggested, that Mr. Rogers would withdraw his complaint and that the matter should be closed.

Mr. Rogers stated that the causes of his complaint would be removed if the companies modified their schedules in accordance with the recommendations of the commission, and he asked for an order directing that the modifications be put into effect and that as to other matters the complaint be dismissed.

Mr. Yeomans said that the companies would consent that the suggestions of Mr. Connette and Mr. Meneely be ordered put into effect.

Commissioner McCarroll said that the proper method would be for Mr. Meneely to state what changes it was proposed to make and the commission would then consider the case and make such order as seemed to be required. Mr. Meneely, therefore, stated the proposed changes in detail.

The hearing was then closed.

ANNUAL DINNER OF THE RAILWAY BUSINESS ASSOCIATION

The annual diner of the Railway Business Association was held at the Waldorf-Astoria, New York City, on Nov. 22, 1910 President George A. Post presided, and addresses were made by Hon. Martin A. Knapp, chairman Interstate Commerce Commission; Daniel Willard, president Baltimore & Ohio Railroad; John Claflin, president H. B. Claflin Company, and Thomas A. Daley, the editor of a Philadelphia newspaper.

Mr. Willard, the first speaker, referred to the hazards involved in financing the first railroads. Capital was difficult to obtain, and some railroads failed. Others earned large rewards or there would have been no railroads. It is claimed that in these early days rebates were granted, that the railroads exercised a controlling influence in some legislatures through the issue of free transportation or the payment of money, that some of the railroads were overcapitalized, and that large individual fortunes were made by improper, if not illegitimate, practices in that connection. Doubtless there was sufficient cause for complaint. To hold otherwise would be to hold that the men engaged in railway affairs were not subject to the same human limitations and weaknesses that are known to be the common heritage of mankind. The feeling aroused by these practices finally found expression in laws, notably in the Interstate Commerce Act. Mr. Willard said that, as a result of legislation, rebates and unjust discrimination have disappeared, or, if not altogether, then relief could be found in existing laws. He considered no additional law necessary in that direction. In regard to the claim that the American railways are overcapitalized, he quoted the capital per mile of track for railroads in different countries. American roads were the lowest in the list. To keep pace with the development of the country the additional investment of $1,000,000,000 per year would be absolutely necessary for at least a number of years. During the last 10 years the railroads had spend enormous sums for improvements, such as reducing grades, eliminating curves and enlarging terminals to offset the constantly increasing cost of operation. The possibilities of future economies resulting from further similar expenditures were largely exhausted, so that if costs continue to increase the only way to meet the situation was by an increase in rates. A great deal had been said in regard to what constituted a fair and reasonable return on money invested in railway securities. If the railroads were finished and no new capital was needed it might then be of interest to discuss what rate of interest or dividends should be paid in the future on money borrowed in the past. But the railroads were not finished and a large amount of new capital was required by them. This money would not be obtained if the man who had money was told simply that he would be paid a fair rate. He would insist upon having not what others thought would be a "fair" rate, but what he himself considered a satisfactory rate, and in reaching that conclusion he would be influenced by many elements, which, taken as a whole, constituted credit.

In conclusion Mr. Willard said that he thought that the rail-

roads should keep out of politics and, through their proper officers, should co-operate as far as possible with the Interstate Commerce Commission. He thought that in the minds of railroad managers there was a feeling of hesitancy and uncertainty about the future. Possibly that feeling was not justified, but the question was how it could be corrected. He thought that the way to bring this about would be for the people to adopt a liberal policy in future legislation and possibly to try what could be done under the existing laws.

Mr. Knapp made a long, interesting speech, saying, in part:

"If our country is to grow and prosper as it ought, if its untold resources are to be developed and its swelling numbers find profitable employment, we need and must have railway earnings sufficient for three things:

"First—A return on railway investments of such amount and so well assured as to attract and secure the necessary capital—an enormous sum in the aggregate—to improve existing roads and to construct without delay thousands of miles of new lines in fruitful districts now destitute of any means of transportation. It is a matter of common knowledge that the output of traffic for the fiscal year 1907 exceeded our entire carrying capacity on land and water. With the rapid increase of population and of productive efficiency—that is, with a greater army of workers and better industrial organization—the volume of that year ought to be and will be nearly doubled in another decade if we can provide for prompt and proper distribution.

"Second—The payment of liberal wages to an adequate number of competent men. This not only to insure increasing skill and reliability in a service which is all the while becoming more exacting and on which the safety and comfort of the public constantly depend, but also because of the very great influence of railway wages upon the compensation of labor in every other sphere and grade of private employment.

"Third—The betterment of existing lines so as greatly to augment their serviceableness to the public, as can in varying degree be done everywhere, without unnecessary and undesirable increase in capitalization. Every dollar borrowed to improve a road now in operation involves a permanent addition to the interest charge which the public is required to pay; the improvement from current earnings puts no lien upon the property, but rather augments its value and usefulness, and by adding to the security of the capital already invested tends to a lower rate of interest upon that capital."

In discussing the question of a reasonable return on money invested in railroad properties, he said that without specifying any exact rate or rates he considered that the return should be sufficient to encourage capitalists greatly to extend the railroad facilities in all parts of the country.

Mr. Claflin spoke as a shipper interested as an investor not only in the wholesale merchandise business, but also in retail merchandise stores throughout the country. He stated, as an example, that a retail business in the Far West with sales of about $1,000,000 per annum would pay freight and express rates from the East of about $25,000 per annum. If the freight rates should be raised 12 per cent the increased expenses to this store would be about $3,000 per annum. He thought that the retail merchants would find that their prosperous years coincided largely with the years of railway extension and improvements and their unprosperous years with railway retrenchment. and he believed that if the increase in freight rates mentioned by him would mean the prosperity of the railroads the profit of the retail business cited would be far greater than the $3,000 mentioned. With a business further east, or near the Ohio River, the gain to the merchant would be materially greater. Merchants wanted, of course, the best rate for transportation which they could get, but recently many of them had been thinking more about the quality of the service and the prosperity of allied interests than about the rate.

At the annual meeting of the Railway Business Association the following officers were elected: President, George A. Post; vice-presidents, H. H. Westinghouse, C. H. Cutler, W. H. Marshall, E. S. S. Keith, A. H. Mulliken, O. P. Letchworth, A. M. Kittredge; treasurer, Charles A. Moore.

WEAR OF RAILWAY MOTOR GEAR AND PINION TEETH—CAUSES AND SUGGESTED MEANS OF RELIEF*

BY T. W. WILLIAMS, GENERAL ELECTRIC COMPANY

The early 15-hp motors used cast-iron gears and rawhide pinions. Later pinions were made of alternate strips of rawhide and steel. Finally, cast steel replaced cast iron for the gears and forged steel rawhide for the pinions.

Many factors enter into the causes for wear of gear and pinion teeth. The most important are the following: The proper selection and treatment of steel; the effect of wear of axle and armature bearings causing improper alignment of gear and pinion teeth; the proper methods of lubrication.

The following comments with respect to these causes for wear are perhaps worthy of attention.

THE PROPER SELECTION AND TREATMENT OF STEEL

Until recently untreated machine-steel forgings were used exclusively for pinions and cast steel for gears. An examination of such gear or pinion teeth when outworn shows that the metal has been squeezed from the face of the teeth and has flowed over the sides and the top, especially in pinion teeth. The ductility of such steel is high and any peening action will make it flow very readily. Gear teeth are cut to a curve that assures a rolling motion between the meshing members, but this rolling motion no longer exists as soon as the curved teeth become flattened out from peening. Instead there is introduced a grinding action which causes the increasing ratio in wear of teeth during the life of gears. The increase in the life of gear and pinion teeth has been brought about by two different treatments of steel—oil-quenching and case-hardening.

OIL-QUENCHING TREATMENT

The first treatment involves the use of steel containing about 0.7 per cent carbon, heating it to a predetermined value and quenching it in oil. Before treatment such steel has approximately the following physical characteristics:

Tensile strength	85,000 lb. per sq. in.
Elastic limit	40,000 lb. per sq. in.
Reduction in area	40 per cent
Elongation	18 per cent
Hardness	120

After the heat treatment the physical characteristics would be changed to the following values:

Tensile strength	120,000 lb. per sq. in.
Elastic limit	85,000 lb. per sq. in.
Reduction in area	30 per cent
Elongation	15 per cent
Hardness	300

This treatment serves two purposes: First, it practically doubles the strength as revealed by the difference between the elastic limits before and after treatment; second, it also more than doubles the degree of hardness. This increased hardness, however, can be obtained only at a sacrifice to ductility, or, in this case, a reduction in area value. Great ductility is a cause of the peening action which readily distorts the teeth.

It may be urged that if the ductility is reduced the metal may be so brittle that it will break when it receives some unusual blow. Undoubtedly it will, but this objection can be answered by making the elastic limit of the metal high enough to take care of any strain to which the motor can subject it.

CASE-HARDENING TREATMENT

Since a lack of ductility with a corresponding high elastic limit and extreme hardness tends to increase the life of gear and pinion teeth, the furthest step in that direction would seem not to be amiss. Such results can be obtained by using the case-hardening or carbonizing treatment, whereby free carbon is impregnated into the face of the steel to be hardened.

Several methods are employed to impregnate the carbon. Perhaps the best known process is to place the untreated pinion or gear in a metal box containing bonedust, after which the box is placed in a furnace and kept at a predetermined heat for several hours, the time depending on the depth the hardness is required to penetrate the metal. As the bonedust is carbon-

*Abstract of a paper read before the meeting of the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

ized, the free carbon impregnates the face of the teeth to about 1 per cent on the surface, but the proportion gradually tapers off to the original quantity at a depth of about 0.1 in. below the surface. After this process has been completed, the metal while still at a bright heat is plunged into cold water to harden the face of the steel.

Steel with a very low carbon content is necessary for this case-hardening process because the object is to make the face of the teeth very hard (and necessarily brittle), but to keep the center tough in order that it may act as a shock-absorbing cushion. Steel containing 0.2 per cent combined carbon is unaffected in its hardness characteristic when heated and quenched in water, but after 0.3 per cent and over of carbon is introduced the hardness increases with the added content of carbon. Since the carbon introduced from the outside source decreases in amount as it goes toward the center of the tooth, a gradually increasing ductility necessarily obtains in the same direction. It is practically impossible to obtain the true physical characteristics of the carbonized portion of this metal, but they are approximately as follows:

Tensile strength	140,000 lb. per sq. in.
Elastic limit	135,000 lb. per sq. in.
Reduction in area and elongation	2 per cent or 3 per cent
Hardness	625

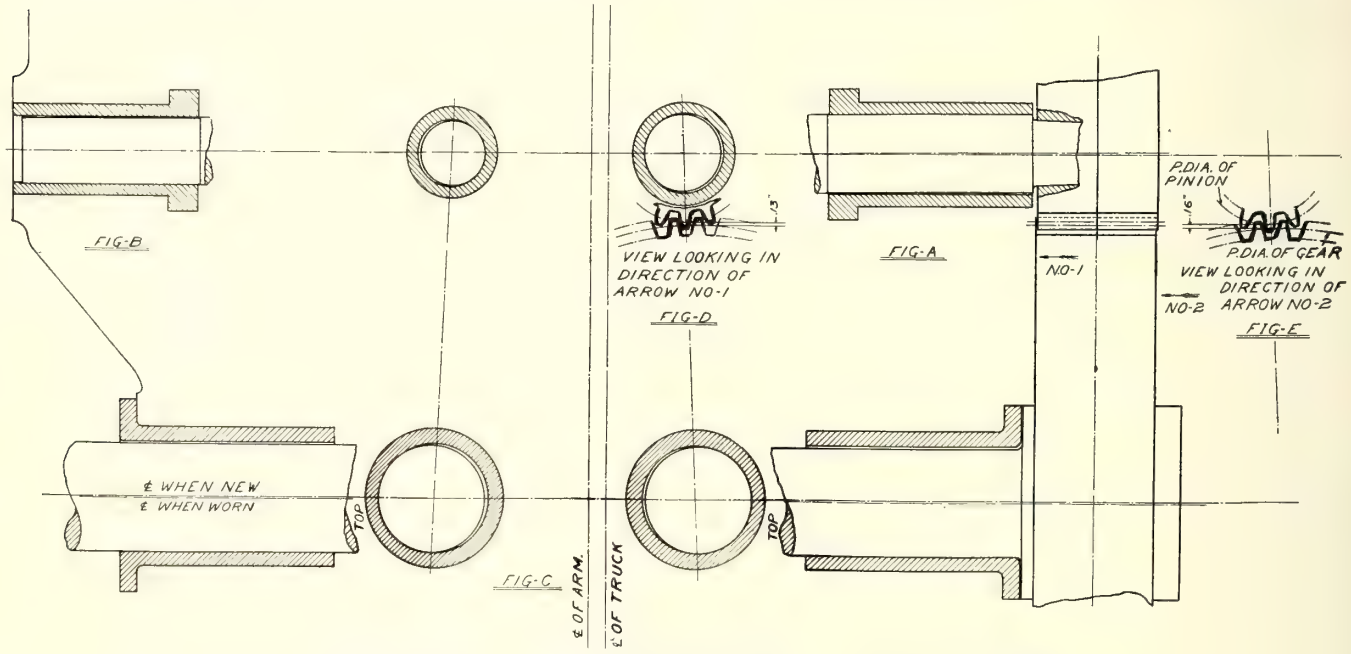
Here is a case where the hardness is doubled again, for it is over twice the figure for the oil-hardened steel previously mentioned. On the other hand, the brittleness has greatly increased, but to offset this the elastic limit has been raised from 85,000 lb. to 135,000 lb., or higher than the tensile strength of the oil-hardened steel.

It remains to be demonstrated that carbonized steel gears and pinions have sufficient tooth strength to meet the heavy service demands for which high-carbon, oil-treated steel has proved adequate. However, the results so far attained strongly indicate that by reason of its long life carbonized steel will be generally used for street railway and interurban service.

THE EFFECT OF WEAR OF ARMATURE AND AXLE BEARINGS

The wear of gear and pinion teeth would be greatly reduced if it were possible to place a bearing on each side of the gear and pinion, because under present conditions, when power is transmitted from the pinion to the gear, the armature and axle shafts tend to spring away from one another. The accompanying drawings show in detail the very disadvantageous way gears and pinions have to operate when the armature bearings have worn 1/16 in. and the axle bearing ⅛ in. In Fig. A the armature-shaft bearing adjacent to the pinion has worn on the side which is further from the axle, while the bearing at the other end, Fig. B, has worn on the side near the axle. This allows the pinion teeth to take a position at an angle to the gear teeth, which means that the end of the teeth nearer the motor do most of the work while the pitch lines at the other end of the gear and pinion teeth are so far apart that they do not transmit their share of the energy. At the same time the axle bearings on which the motor is mounted have worn on the side away from the motor, Fig. C. Figs. D and E show the unsatisfactory condition under which a new gear and pinion would have to operate if they were mounted on the axle and armature shafts when the bearings had worn ⅛ in. and 1/16 in. respectively. Fig. D shows the end of the teeth near the motor—here the middle pinion tooth is meshing with the gear tooth and the pitch circles have to spread apart 0.13 in. Fig. E shows the other end of the same teeth—here it will be seen that the middle pinion tooth does not touch the gear tooth by 1/32 in., while the pitch lines have spread 0.16 in.

If a soft-steel gear and pinion were used in this case it



Views Illustrating the Effect of Bearing Wear on Gears and Pinions.

would be only a short time before they aligned themselves on account of the rapid peening action at the meshing end. It is a question what would happen to the case-hardened product under similar circumstances, especially if the tooth were heavily loaded. Common sense would certainly dictate the installation of new bearings when the gears and pinions are renewed.

Both tooth wear and bearing wear would be largely eliminated if a gear and pinion could be mounted on each side of the motor. Such a scheme would be particularly beneficial where an extreme width of gear face is necessary in the case of large-capacity motors, but unfortunately these motors now occupy nearly all the available space between the wheels.

The question, then, is what portion of the motor can be shortened to allow room for the second gear and pinion. Obviously neither the bearings nor the commutator can be shortened, so that only the armature is left. Now, if the length of the armature is shortened, the diameter must be proportionately increased. Under existing conditions the clearance between the bottom of large motors and the roadbed is a minimum. Hence the increased diameter of the armature would necessitate an expensive redesign of the trucks and an increased diameter of wheels; in other words, the increased expense of manufacture would be greater than any saving possible in the bearings and gearing.

LUBRICATION AND METHOD OF LUBRICATION

The lubrication of meshing teeth in a train of gears is quite different from the lubrication of bearings. No lubricant can prevent the peening action on the teeth; it can only prevent

grinding caused by actual friction. The teeth would run satisfactorily in a bath of machine oil if they could be cut by the epicycloidal or two-curve method, which would provide a true roll, and if the faces of the teeth were very hard. Unfortunately a single-curve or involute tooth has to be employed on account of its greater strength at the base and this design does not offer an absolutely true rolling motion. (The epicycloidal teeth cannot operate unless the distance between the gear centers remains constant.) To overcome this defect of the involute tooth there must be used a lubricant which will act as far as possible as a cushion between the meshing members. The lubricant must also be of such consistency that it will adhere to the faces of the teeth, forming a coat strong enough practically to prevent the faces of the meshing teeth from touching one another. Gritty matter blown from the roadbed into the gear case has a very hurtful effect on the life of gear teeth. A lubricant which is able to fulfil the conditions mentioned has characteristics greatly in its favor. Gear cases are designed to hold the gear grease and so take care of the proper lubrication of the gear and pinion. The present designs are not dustproof. To make them so would entail increased weight and expensive machining.

Soft-steel gears run against hard-steel pinions and vice versa do not show the best results for the hardened product because the gritty matter which has drifted into the gear case becomes embedded in the face of the soft tooth and laps the hardened tooth. Where hardened gears and pinions are run together trouble from grit does not seem to be so great. Doubtless the present design of gear cases will be good enough, owing to the general trend of master mechanics to recommend the hardened gearing.

The writer offers the following suggestions, to sum up, in answer to the question of how to obtain long life for gears and pinions:

Use the hardest metal possible in the teeth consistent with an elastic limit higher than any strains that can be imposed upon them. Do not let the armature or axle bearings wear more than 1/16 in., less if possible. Use a heavy clinging gear grease that is unaffected by ordinary limits of atmospheric temperature. Keep the gear cases as dustproof as possible.

RECENT DEVELOPMENTS IN CAR HEATING AND VENTILATION*

BY H. S. WILLIAMS, CHIEF ENGINEER, PETER SMITH HEATER COMPANY

The latest development in heaters for electric cars is a system combining heating and ventilation. This has been brought about by the long-felt need for proper ventilation, particularly on crowded city cars. Deck sash ventilators have failed to meet these requirements. This demand for ventilation is but a part of a general movement for better sanitary conditions. Already at least one State and several of the larger cities have taken the matter up, and through by-laws and ordinances have established standards for both heating and ventilation to which the railway companies must conform. It is also noticeable in current discussions on the arch roof for cars that the subject of ventilation is one of the main points considered in connection with it.

The early electric cars were without vestibules and the doors and windows fitted loosely. Consequently, enough air leaked in to supply all that was needed for ventilation. Through the introduction of closed vestibules, double floors, double windows and weather strippings the cars have become more nearly airtight, hence the leakage of air into the car is largely cut off and other means must be tried in order to supply the required amount of ventilating air.

HEATING AND VENTILATING REQUIREMENTS

Three conditions must be satisfied in meeting the requirements of heating and ventilating cars: First, the heat within the cars must be maintained at a given point; second, sufficient fresh air must be introduced to keep the air up to a standard of purity, and, third, it must enter without producing a disagreeable draft. An electric car is one of the hardest places to heat and ventilate. It is exposed on all sides. It has a large proportion of glass, which means that a relatively large amount of heat must be supplied to make up that lost by surface radiation. Furthermore, a car meets many conditions of exposure and shelter, so that its conditions are not uniform.. It runs at full speed one minute and stands still the next; doors are opened and closed at irregular intervals and for irregular spaces of time; it is full of passengers at one time and almost immediately afterward it is empty. Then, too, opinions differ widely as to the proper temperature to be maintained.

For example, the city of Chicago requires its cars to be heated to 50 deg. Fahr.; the Massachusetts Railroad Commission requires that the street cars under its jurisdiction shall be heated when the temperature of the atmosphere is less than 40 deg. above zero and that the temperature be maintained in the cars at a point not lower than 40 deg. nor higher than 50 deg. A common standard among operating companies is to maintain 60 deg. Fahr. This standard of the Massachusetts Railroad Commission will be found fairly satisfactory for city service, but not sufficient for interurban service, where long rides at high speed are the rule. For the latter service the temperature within the car should be maintained at about 65 deg. Owing to the fact that travelers in winter are heavily clothed, this temperature will be found quite satisfactory. For extremely long runs, however, where the traffic compares with steam train service the temperature should be 70 deg.

After having determined the temperature which should be maintained in the car, the next problem is to determine the necessary quantity of heat. It is difficult to determine this quantity theoretically owing to the many variable factors encountered. For example, the heat to be supplied depends upon the temperature to be maintained, the amount lost through radiation from the car body, the amount supplied to make good that lost by the air used for ventilation and the number of people in the car. The heat lost through radiation is in turn dependent upon the material of which the car is built, thickness of walls, proportion of glass installed, whether double windows are used or not and the speed of the car.

The heat required to supply that lost by ventilating air includes the heat lost by warm air within the car which escapes through ventilators and the heat which is used to warm the air leaking in through the doors and around the windows. It will be readily seen that this is a difficult quantity to determine with accuracy, as it depends upon car speed, frequency and number of stops, whether windows and doors fit tightly or not, number of ventilators open and many other minor details. The number of passengers in a car has a larger bearing upon the heat required than is usually supposed, because passengers

TABLE I—RADIATION LOSSES AND OTHER DATA ON FOUR LENGTHS OF CLOSED CARS

Length of car-body	B.t.u. for radiation only.	Cu. ft. ventilating air per minute	B.t.u. for ventilation loss	Total b.t.u. required per hour	Passenger radiation	Net b.t.u. required per hour
20 ft.	31,280	133	9,100	40,380	8,000	32,380
30 ft.	44,696	200	13,700	58,396	12,000	46,396
40 ft.	58,103	266	18,200	76,303	16,000	60,303
50 ft.	71,509	330	22,750	94,259	20,000	74,259

enough to occupy half the seats will radiate sufficient heat from their bodies nearly to make up that lost by ventilating air. The average person gives off heat every hour equivalent to 400 b.t.u. Therefore, 10 passengers will supply per hour an amount of heat approximately equivalent to ½ lb. of coal or to 1 kw-hour.

The quantity of heat lost by radiation may be obtained theoretically by means of well-known formulas. The writer has

*Abstract of a paper read before the meeting of the Central Electric Railway Association at Dayton, Ohio, Dec. 1, 1910.

computed the heat lost per hour for four different lengths of cars, based upon the construction of a thoroughly modern car of the closed type. These figures are given in Table I.

This table is based upon the quantity of heat necessary to maintain a temperature of 60 deg. Fahr. during zero weather. Consequently it shows nearly the maximum amount of heat required for the various sizes of cars selected. In the figures given in the second column account has been taken of heat given off by enough passengers to form approximately two-thirds of a seated load in each case.

In order to determine the value of double car windows from a heating standpoint, the saving of heat units has been computed and is shown in Table II.

TABLE II—HEAT SAVING DUE TO THE USE OF DOUBLE CAR WINDOWS

Car body length	B.t.u. required	B.t.u. saved by double windows	Per cent saving
20 ft.	32,380	4,238	13.0
30 ft.	46,396	6,360	13.7
40 ft.	60,303	8,450	14.0
50 ft.	74,259	10,600	14.3

This shows that by use of double windows, under ordinary conditions, a saving of from 13 per cent to 14 per cent of the cost of heating may be effected.

Owing to the extensive use of steel sheathing for car sides it is well to note its effect on heating when the steel is not protected and is in contact with the heated air within the car. It may be determined theoretically that under such conditions 22 per cent more heat is required than if wood were used or if the steel were protected or insulated from the warm air within the car.

To obtain the best results from the heating equipment on city cars it is unquestionably the best to employ a man to take care of the fires and to hold him responsible. This insures more nearly uniform results and greater economies, as this man may be thoroughly taught to become an expert in his line. This removes the care of the fires from the car crews entirely. Some operating men go so far as to advocate locking the heaters in such a manner as to prevent any one from regulating the fires other than the one responsible for their care. Such a procedure would hardly be feasible on long interurban runs.

THEORETICAL AND PRACTICAL VENTILATION STANDARDS

It is entirely impracticable to secure absolutely perfect ventilation on electric cars, as the apparatus would be too cumbersome and very expensive to operate. The practical thing is to strike a happy medium and use apparatus that will give good ventilation at a fair cost. An eminent authority gives 1800 cu. ft. of fresh air as the quantity which should be supplied per hour to every person in a room. To heat this amount of air would entail the use of bulky apparatus and the cost of operation would be unreasonably high. The Chicago Board of Health, which has gone into the subject of ventilation very exhaustively, has set a standard which requires the amount of air to be delivered into the car to be approximately 14 per cent of the amount required for perfect ventilation. It realizes that this amount does not impose undue hardship on the operating company, and, on the other hand, the public is given good air to breathe. On this basis the writer has prepared Table III, giving the amount of outside air which should be delivered to a car to give perfect ventilation and also that required to ventilate it according to the Chicago standard. This tables assumes a standing load equal to a seating load and consequently represents nearly maximum conditions. Therefore, if the amount of air shown in the fourth column of this table is delivered the results will be a ventilation far above the standard at all times except during rush hours.

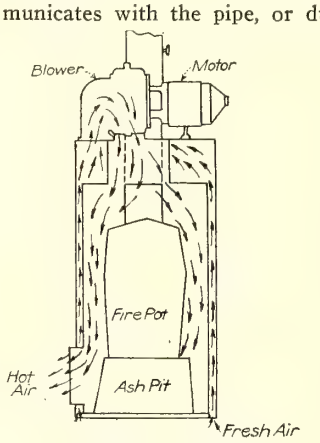
TABLE III—AMOUNT OF AIR WHICH SHOULD BE DELIVERED TO A CAR ACCORDING TO IDEAL CONDITIONS AND THE RULES OF THE CHICAGO BOARD OF HEALTH.

Length of car body	No. of passengers	Cu. ft. of fresh air per hour at 1,800 cu. ft. per pass	Cu. ft. fresh air per hour at 14 per cent of theoretical requirements
20 ft.	52	93,600	13,100
30 ft.	78	140,400	19,050
40 ft.	104	187,200	26,200
50 ft.	130	234,000	32,750

As noted before, the railways are now considering the adoption of a type of car in which the monitor roof will be modified to a great extent. If this change is made it will mean an improvement in heating, because a large glass area will be eliminated. The adoption of the arch roof or any of its modifications will make it necessary to provide for the entrance of fresh air and the exit of foul air without producing a disagreeable draft in the car.

COMBINED HEATING AND VENTILATING APPARATUS

A description of apparatus in which ventilation is combined with the heating will not be out of place in the discussion of this subject. Its essential parts are a coal stove, surrounded by air chambers, and a motor-driven blower, to circulate the air across the heating surface and to force it out into the car. The construction of the heater proper may be more easily understood by reference to the accompanying sectional view. From this it will be seen that the stove or combustion chamber is surrounded by two sheet-steel casings which form two air chambers. The blower, which is mounted on top of the heater, has its intake connected with the outer air chamber, the lower end of which communicates with the atmosphere through suitable holes cut in the car floor. The discharge from the blower is connected to the inner air chamber, which in turn communicates with the pipe, or duct, that leads into the car, and serves to distribute the heated air. Consequently, when the blower is started fresh air is drawn from outside the car and in passing through the outer air chamber is partly heated, then going through the blower the air is driven into the inner chamber against the heated surface of the stove and thence into the interior of the car. So it will be seen that the air has a long continuous passage over the heating surface. It will also be noted that the circulation is so designed that the air just before leaving the heater passes over the hottest part of the combustion chamber. Hence, owing to the large area of heating surface, the manner of circulation and the fact that a large volume of air is forced through the heater, the efficiency of the apparatus is very high and the operating cost correspondingly low.



Air Currents in Heater-Ventilator Equipment.

From experience it has been found that it is necessary to distribute the hot air from one side of the car only. This is due to the method of forcing the air out of the distributing duct in a horizontal direction, which means that the current of hot air will carry across the floor to the opposite side of the car. Another advantage of forcing the hot air across the floor is that it keeps the passengers' feet warm, and this is the secret of successful car heating. The current of hot air sweeping across the floor also tends to keep it dry—an effect which is highly desirable. The distributing duct usually consists of a rectangular galvanized-iron pipe, in which small openings are cut at points about 2½ ft. apart to insure an equal distribution of the hot air throughout the car.

In addition to the economical and effective heating given by this apparatus it has the great advantage of securing the proper amount of ventilating air and bringing it into the car without undesirable effects. If the same amount of ventilating air were introduced in the same manner without being heated the disagreeable and dangerous drafts which would be experienced would condemn the system, but, as the air is heated, the effect is quite the reverse. Another feature in the ventilating system is that the fresh air is introduced at the proper point, that is, at the floor line. Since this air is warm and under pressure it must rise, mix with the foul air and carry the latter out of the top of the car. Thus the system is positive, for if fresh air is forced into the car continuously the foul air must leave.

WOOD PRESERVATION*

BY A. L. KUEHN, GENERAL SUPERINTENDENT, AMERICAN CREOSOTING COMPANY

It is quite natural to assume, in view of the great amount of steel and concrete which is taking the place of wood in all manner of structures, that the use of wood is greatly on the wane. It is a startling fact, however, that the actual use of wood is on the increase. The adoption of steel and concrete buildings, steel poles, steel furniture and steel cars seems to be of little avail in materially checking the use of wood per capita in this country. The following information on the consumption of wood per capita was compiled from the United States Census reports and from the National Lumber Manufacturers' Association's report of 1910:

Year.	Lumber per capita in U. S.
1850	220 ft. B. M.
1860	250 ft. B. M.
1870	340 ft. B. M.
1880	360 ft. B. M.
1890	380 ft. B. M.
1900	460 ft. B. M.

This is also the experience of the older European countries, which have for a century been confronted with a shortage of wood, and, notwithstanding the shortage, have been required to meet an increased use. It is pertinent to state, however, that whereas the present consumption per capita here is in excess of 400 ft. board measure, it is only 60 ft. to 75 ft. board measure in Europe.

In the face of the increasing use of wood, we have a waning timber supply. The annual consumption of lumber is about 40,000,000,000 ft., board measure, cut from about 8,000,000 acres of forest. At this rate the present forest areas are estimated to last variously from 40 to 60 years. It is quite evident that the greatest efforts must be made to stop and prevent wastes and to procure the maximum utilization of wood. Wood preservation is playing a highly important part to produce this end, even at the present time, and it will continue to do so to a much greater extent. Wood preservation is generally understood to play its part in that properly treated timber lasts longer than untreated timber. However, its greatest effect lies in the fact that timbers which have had little or only a limited use heretofore are made available.

THE CAUSES OF DECAY OF WOOD

The decay of wood is due to the growth of fungi, which are plants of low order. They require for their development moisture, air and a proper degree of warmth, but the spores are not killed when kept in low temperatures. When the temerature is raised to 50 deg. Fahr. or 60 deg. Fahr. the latter immediately develop. Generally speaking, fungi and spores are killed by temperatures over 175 deg. Fahr.

The basis of wood preservation is the introduction into the wood of poisonous substances which will kill fungi. Copper sulphate, mercury chloride, zinc chloride and dead oil of coal tar are all poisons which will prevent fungus growth. More than a century ago European countries began to experience a timber shortage and about that time active work was begun to prolong the life of exposed timber. The British were most active, because of their great number of wooden ships. Sir Humphry Davy recommended mercury salts; Thomas Wade, in 1815, recommended copper salts, iron salts and zinc chloride. The early activity was in the use of poisonous salts. By 1840 timber preserving was fairly well on its way in England.

Corrosive sublimate was used in several places for preserving wood in the eighteenth century, but preservation of timber by its use was patented by J. H. Kyan in 1832. It was used for about 50 years to a limited extent.

Preserving timber by sulphate of copper was patented by Margary in 1837, but its use was not very extensive on account of the action of the sulphate on the containing vessels.

The use of chloride of zinc in a wood-preserving process was patented by Sir William Burnett in 1838. The method was called "Burnettizing."

The use of dead oil of coal tar (creosoting) in timber preservation was patented by John Bethell in 1838.

The first methods of applying the preservatives consisted of brushing, painting or steeping. About 1830 M. Breant invented an apparatus for applying preservatives, consisting of a closed cylinder in which the wood was placed, the voids filled with the preserving fluid and pressure applied to inject the fluid into the wood. Bethell adopted the method and from this time the modern timber-preserving practices really date.

The results obtained by corrosive sublimate, sulphate of copper and chloride of zinc in the early stages seem to have been varying, but good enough to warrant their use for some time. However, by 1885 creosote was practically the only preservative in use in England, which is the case at the present time.

The first impetus in America to the demand for preserved wood came after the census of 1880. Previous to this time numerous trials had been made of all the preserving methods heretofore mentioned. Notable among these are the Kyanizing of chestnut track ties by the Northern Central Railroad in 1838, the Burnettizing of track ties by the Cambridge Railroad in 1835, and the Burnettizing of track ties in 1866 by the Chicago, Rock Island & Pacific Railway. A most notable record in this country is that of timber preserved for bridges on the New Orleans, Mobile & Texas Railroad (now the Louisville & Nashville) in 1876, 1877 and 1878. This timber was creosoted at works at West Pascagoula, Miss. A considerable amount of this timber is still in place. At the present time there are 76 wood-preserving plants in this country, of which 46 use creosote exclusively; and of the remainder all but 18 use creosote to some extent.

PREPARATION AND KINDS OF WOOD USED

Wood requires proper preparation before it can be successfully treated. The sap or moisture must be removed to such an extent as to allow proper penetration of the preservative. In general, the proper method to prepare the timber for treatment is to air-season it. This not only maintains the strength of the timber, but allows a more uniform distribution of the preservative. The sap wood of all timber can be completely penetrated if air-seasoned, but it has not yet been possible to penetrate the heart wood of all timbers. The principal woods treated in this country are: yellow pine; red and black oak and other oaks of these species; beech; elm; fir; red, black and tupelo gum; hemlock; maple and ash. The time required for sufficient air-seasoning to allow proper treatment varies for the different woods. For pine this period is from 4 to 6 months; for oak 8 to 12 months. This time also depends upon weather conditions. The different woods have various resistances to penetration by the preserving liquid under pressure, and it is necessary that the several species be properly segregated so that each may be subjected to its proper period of treatment.

PRESERVATIVES USED

The preservative used by most wood-preserving plants is creosote. At the beginning of the present era of wood preservation in this country the principal preservative used was chloride of zinc (Burnettizing). This was due, of course, to its cheapness in first cost. The objection to chloride of zinc is that it is soluble in water and will be leached out of the wood. The ordinary solution used consists of 2 per cent to 4 per cent, by weight, of the chloride of zinc dissolved in water. The strength of the solution is gaged by the amount of solution which is taken up by the timber. The strength must not, however, exceed 5 per cent, as a strong solution will injure the wood. To prevent leaching several methods were used to put a coating, insoluble in water, on zinc-treated timber. Notable among these methods was the Wellhouse process, which consisted in coating the timber with a solution of tannin and glue. This process has now been practically abandoned. The life of timber and ties treated by chloride of zinc is given as from 10 to 14 years.

Creosote oil, which is recognized as the best wood preserva-

*Abstract of a paper read before the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

tive, is the product of distillation of coal tar. It is a by-product in the manufacture of coal-tar pitch. It is pretty well determined that a heavy oil—that is, one in which the light fractions are reduced—is the most desirable. It has been found that when the treated wood is exposed to the air the light fractions rapidly evaporate. The heavy creosote oil, in addition to its antiseptic qualities, carries with it also the property of waterproofing, which is valuable in the prevention of decay. The American Railway Engineering & Maintenance of Way Association has adopted as standard a specification for creosote oil which specifies a heavy oil. The specification is as follows:

"The oil used shall be the best obtainable grade of coal-tar creosote; that is, it must be a pure product of coal-tar distillation and must be free from admixture of oils, other tars or substances foreign to pure coal tar; it must be completely liquid at 38 deg. C., and must be free from suspended matter; the specific gravity of the oil at 38 deg. C. must be at least 1.03. When distilled according to the common method, that is, using an 8-oz. retort, asbestos-covered, with standard thermometers, bulb ½ in. above the surface of the oil, the creosote, calculated on the basis of the dry oil, shall give no distillate below 200 deg. C., not more than 5 per cent below 210 deg. C., not more than 25 per cent below 235 deg. C., and the residue above 355 deg. C. if it exceeds 5 per cent in quantity must be soft. The oil shall not contain more than 3 per cent water."

The proper amount of creosote oil to be injected depends upon the use to which the timber is to be put and also upon the kind of timber. In bridge structures and places where the replacement is difficult higher quantities are used than in track ties. In pine timber it is possible to inject more oil than in the red oaks. The customary way to state the quantity of oil is to give the average number of pounds per cubic feet of timber. In general, present practice in this country is to use from 7 lb. to 10 lb. per cubic foot for track ties and from 10 lb. to 18 lb. for poles, bridge and structural timber. In some cases as high as 24 lb. per cubic foot has been used in pine for wharves and piling, which are subject to the attack of marine borers.

The principal object in using large quantities of oil in timber is to obtain depth of penetration. A distinct advance has been made in methods of injecting the oil (which will be described later on) by which depth of penetration may be obtained without the use of such large quantities of oil. However, it is conceded that it is not good practice, even with these methods, to go much below 7 lb. or 8 lb. per cubic foot as an average because in practical operation there will be, even with the greatest care in segregating the species of wood, a great variation in the pieces treated.

Crude petroleum oil is now being tried to some extent where, on account of long hauls, creosote is very expensive. A notable example of this is its use by the Atchison, Topeka & Santa Fé Railroad on its western lines. Petroleum has no antiseptic qualities, so its protection against decay must necessarily depend upon its waterproofing qualities. The examples of this are as yet too recent to justify any general conclusion.

METHODS OF APPLICATION AND PROCESSES

The modern timber-treating methods consist, essentially, in the injection of the preserving fluid into the wood under pressure. Some use still is made of the dipping methods. Notable among these is what is known as the open-tank process of creosoting, in which the timber is placed first in hot oil and then in cold oil. This has, however, only a very limited use, and only wood which is easily penetrated, such as sap pine, can be used. The pressure used in injecting the fluid depends upon the kind of wood. Well-seasoned sap pine can be completely penetrated with creosote oil with pressure as low as from 50 lb. to 60 lb. per square inch. Red oak requires from 150 lb. to 175 lb. per square inch. Proper temperatures are necessary during the treatment. This temperature must be kept low enough to avoid injury to the wood; a good limiting temperature is about 200 deg. Fahr. With creosote oil the element of heat is most important, because the oil becomes more fluid as it is heated.

The method of treating timber with zinc chloride is as follows: The timber to be treated is placed in a closed cylinder or retort. A vacuum is then produced in the cylinder and maintained for 20 to 30 minutes. The chloride of zinc solution is then introduced and the voids in the cylinder are filled. When the cylinder is full, pressure is applied and maintained until the proper amount of solution has been injected. The surplus solution is drained off and the timber removed.

An interesting modification of the zinc chloride treatment to prevent the leaching out of the zinc chloride was developed in Germany some years ago by the Ruetgers Works. This consisted in making an emulsion of the zinc chloride solution and creosote oil. The oil remained on the outside and was to form a protective coating. This process, however, has since been abandoned in Germany, but is being used in this country to some extent in what is known as the Card process. This consists in keeping the oil and water solution agitated by a centrifugal pump.

The creosoting process which was followed up to about 1904 was exactly that introduced by Bethell in England in 1838. This is as follows: The timber, when air-seasoned, is placed in the retort and a vacuum produced and maintained for 20 minutes to 30 minutes. The creosote oil is then introduced without breaking the vacuum until the cylinder is filled. Pressure is then applied until the proper amount is injected. The surplus oil is then drawn off and the timber removed. When green timber is treated it is steamed before applying the vacuum.

By the Bethell process the portion of the wood which is penetrated is filled with oil as nearly as possible. It has been called "the full-cell creosoting method." In 1903-4 there was developed in this country a method by means of which a portion of the surplus oil in the cells and voids of the wood is removed. This allows a deeper penetration with a given quantity of oil. This is the Lowry process used by the American Creosoting Company. Almost simultaneously a similar method was developed in Germany by Rueping. These methods, on account of the removal of the oil, have been called "the partially filled or empty-cell processes."

In the Lowry creosoting process air-seasoned timber is placed in the closed cylinder and the oil is introduced to fill the cylinder; pressure is then applied until a proper penetration has been secured. The surplus oil is then quickly drained off and a vacuum applied to reduce the oil first injected to the specified quantity. The oil is then again drained from the cylinder and the timber removed. In the Rueping process air pressure is applied before introducing oil into the cylinder. The oil is then introduced without reducing the air pressure and further pressure produced to inject the oil on top of the air pressure. After the injection is completed the pressure is released and the air in the wood forces out the free oil.

WOOD-PRESERVING PLANT

The modern wood-preserving plant consists primarily of one or more impregnating retorts. They are steel-plate cylinders 6 ft. or 7 ft. in diameter and from 100 ft. to 150 ft. long. The ends are fitted with doors which can be tightly closed. The cylinders are fitted with running rails on which are run small tram cars loaded with timber. There are also steam coils in these cylinders to allow accurate manipulation of the temperature. Tanks are provided which are placed either above or near the cylinders connected to them by pipes. The preserving fluid is held in these tanks for charging and filling the cylinder. These tanks are essentially measuring tanks in which the amount of preservative used is measured. The necessary pressure and vacuum pumps are provided for the manipulation of pressure and vacuum. The plant further includes a haulage system for handling the timber and also the necessary power plant. The modern plants, of course, are provided with large seasoning yards. A most important part of the plant equipment consists of proper devices for measurements of the preservative used. This is accomplished by means of tank floats with accurate registering means. In the plants of the writer's company this measurement can be easily made to within one-half of 1 per cent.

THE DEVELOPMENT OF PASSENGER TRAFFIC *

BY W. O. WOODARD, TRAFFIC MANAGER CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY

The electric railway magazines recently issued special editions on the subject of traffic which contained many able articles covering both passenger and freight traffic. Since our line does not handle freight at present, I will devote my remarks to passenger traffic.

One important thing which electric railways do is to change their schedules without giving the public due notice. I know of one electric railway which recently changed its schedule without notice to the public other than one brief newspaper notice, nor was the new timetable distributed until a week after the change became effective. This action naturally caused many complaints.

The electric railway which can operate the same schedule the year around is very fortunate. However, with us physical and traffic conditions will not permit this to be done, but we do try to retain the confidence of the public by giving them due notice of any change in schedule. We make it an important matter to have the new public timetable in the hands of all agents for distribution at least three or four days prior to its becoming effective. To do this we print a card 9 in. x 11 in. which is posted in all stations and in all cars 10 days or a week previous to a change. This card informs the public of the change and also states when the new public timetables can be secured. We have had much favorable comment on this plan. On our change in schedule last spring more than 10,000 folders were distributed before the change became effective.

At present we are publishing an individual folder of our line, size 9 in. x 4 in., showing only the time of our trains and connections to and from Chicago via the Illinois Central suburban trains. During the past summer we devoted two inside pages to advertising Hudson Lake and its park as well as Michigan City and its bathing beach and amusement park. From the number of inquiries received we feel this advertising has given us the results we desired. In our new folder we are devoting the same two pages to half-tones and reading matter featuring our new Chicago "Special" and South Bend "Special"; also our double track, of which we now have 11 miles in operation. We also publish the same folder in vest pocket size, 5 in. x 2½ in.

The western terminus of our line is 14 miles from the heart of Chicago, but we have direct connection at this terminus with the Illinois Central suburban trains, which are operated by steam. In order to transfer passengers safely and without exposure, a viaduct has been provided from our station platform to the Illinois Central station platform over our own as well as the Illinois Central tracks. The Illinois Central suburban trains run along the lake front from Fifty-third Street north and land passengers at Van Buren Street and Randolph Street, which is within a block of Chicago's largest department stores. To advertise our line in Chicago through the daily papers would cost a large sum, and especially so since railroad advertising rates are higher than any other class of advertising. However, we use some newspaper space, mostly in the Sunday editions. A class of announcement which appeals to us is car and billboard advertising. We have cards 16 in. x 24 in. in all Illinois Central suburban cars and on all platforms we place posters 28 in. x 42 in. on billboards. These posters catch the eye of many passengers who are waiting at each platform as well as those passing by on trains. In addition to this we have display cards 18 in. x 24 in. and time cards 10 in. x 20 in. in all suburban stations, with stocks of our folders. The Illinois Central Railroad allows us one page in its suburban folder for timetable or display. We consider our display advertisement the better of the two, inasmuch as the space allowed is not sufficient for our timetable.



Painted Sign on Freight Station.

Our line parallels the tracks of the Illinois Central Railway for about two miles east of our western terminus. Within this distance we have two stations. On the roof of our Pullman station we have erected an electric sign 30 in. high by 25 ft. long, double-faced. On the roof of our Kensington station we have a painted sign of the same description and midway between these stations we have erected a painted billboard 12 ft. high and 50 ft. long. Considering the fact that 142 pas-



Electric Sign Over Platform at Pullman



Electric Sign in Front of City Waiting Room

*Abstract of a paper read before a meeting of the Central Electric Railway Association, Dayton, Ohio, Dec. 1, 1910.

senger trains are operated daily over adjacent tracks by the following lines, Illinois Central, suburban and main line trains, all Michigan Central, Big Four and Chesapeake & Ohio trains, we feel we are getting good results from this kind of advertising, so much so in fact that we are negotiating for billboards 12 ft. x 25 ft. uptown in Chicago. We also have an electric sign across the sidewalks in front of our South Bend station. This is 18 ft. long by 30 in. high and double-faced. At our Gary station we placed, across the end of the station facing Broadway, an illuminated sign 25 ft. long x 30 in. high.

Our timetable is published in the *Official Railway Guide* of Chicago on the page opposite the Illinois Central suburban time card. Under our contract with this publication we are given one front page each year for advertising purposes. This arrangement applies to all advertisers in this guide, which is published weekly.

We have contracts with many of our local newspapers on a transportation basis for carrying our timetables and other display matter. In those papers with which we do not have contracts we do not advertise our timetables, but carry excursion advertisements on a card basis. In addition to this space we carry display advertisements in a college weekly and in a baseball bulletin which is published daily during the season. A park owned by our company and leased to a park manager is located on our line at Hudson Lake. Around the lake are many cottages for rent at reasonable rates. These cottages make this place popular with Chicago people for week-end visits. In all our summer advertising we make a special feature of this resort, and with the improvements which are being made this year at this park it bids fair to become even more popular.

The greater part of our picnic business to this park is secured by personal solicitation. Out of Chicago we have been compelled to handle this business at such rates as would not appeal to the average electric railway operating single-car trains. However, as we handle the business in long trains we consider it profitable. With two or three exceptions all of our picnic and excursion business this season was handled on regular trains by attaching extra coaches. One exception to this was the operation of our 11-car train from Pullman to Hudson Lake Park, said to be the longest electric railway train ever operated for a distance of 60 miles.

In handling special business, by providing a sufficient number of cars on our regular trains we have eliminated a large per cent of cost of train operation, and also eliminated the operation of all extra trains. On last Labor Day we sold at our South Bend station 1944 round-trip tickets to Michigan City and handled this business on our regular trains, each train handling five, six or seven cars.

In advertising our new Chicago-South Bend "Special" trains, we have had post cards printed of our three-compartment cars, and show on the address side of card the schedule of these trains. Five thousand of these cards were mailed to firms and individuals in South Bend, Michigan City and Gary.

In handling all special business on our line I have endeavored to accompany these parties on both going and returning trips. This plan has been found to be very beneficial to us, since it gives the officials of the traffic department an opportunity to meet more people.

Officials of interurban railways in Indiana will be invited to attend a conference in the State House, Indianapolis, at 2 p. m. on Dec. 13, 1910, to consider the subject of operation and suggested improvements in methods. The conference will be called by Governor Marshall of Indiana. It is understood that Governor Marshall has no disposition to recommend legislation calculated to harass the interurban roads, but that he is anxious to receive suggestions from the officials. It is stated that the position of the Governor is a conservative one and that, while he desires to take any steps that may appear advisable to secure better protection, he realizes that no legislation should be enacted that would hamper the successful operation of the interurban railway systems of the State.

HEARING ON NEW YORK COMMUTATION RATES

The New York Public Service Commission, Second District, held a hearing in the United Engineering Society Building, New York, on Nov. 29, to consider complaints regarding the increase in commutation rates on the New York, New Haven & Hartford Railroad. Samuel Higgins, general manager of the New Haven road, testified that the increases in rates were the result of the large expenditure made by the company for the electrification of its terminal. Mayor Fiske, of Mount Vernon, Mayor Lennon, of Yonkers, and Thomas G. Hall, chairman of a citizens' committee of New Rochelle, testified personally or were represented by counsel to argue against the increases in rates. It was charged that the New Haven company paid the New York Central & Hudson River Railroad too large a rental for the use of the Grand Central terminal, that the resulting burden was levied upon the commuters and also that property values had depreciated on account of the increases in rates. It was testified that the New Haven company had paid the following sums to the New York Central company for the use of the Grand Central terminal: 1907, $560,000; 1908, $1,082,000; 1909, $1,060,514, and 1910, $1,131,000. These sums included the rental of the Grand Central terminal and the operating expenses.

After the conclusion of the hearing the following statement was issued by the New York Central company in reference to the contract for the use of the terminal:

"In connection with the evidence introduced by the New Haven road to-day, showing that a charge was made by the New York Central & Hudson River Railroad against the New York, New Haven & Hartford Railroad of $0.0394 for each commutation passenger brought into Grand Central terminal by the New Haven road, it is desired that the public understand that the relations between the New York Central and New Haven roads are the relations of landlord and tenant—the New York Central leasing to the New Haven and the New Haven leasing from the New York Central the privileges of entry into Grand Central terminal, including trackage facilities to Woodlawn.

"All of these relations are set forth in a contract agreement dated July 24, 1907. The charges made by the Central and paid by the New Haven are based strictly on a proportionate charge for the operation of Grand Central terminal, including station and tracks. North of Fifty-seventh Street the charge is so much per passenger; south of Fifty-seventh Street it is a proportion of the operating expense of the terminal distributed according to the actual use made of such terminal by the respective parties to the agreement.

"But the point to be borne in mind is that all charges made by the Central and paid by the New Haven for Grand Central terminal are proportionate charges of the expenses of the terminal, based upon the actual use made by the New Haven railroad of such terminal.

"The entire contract is available at any time for representatives of the press who may desire to see it."

Similar complaints regarding increases in commutation rates on the New York Central road will be taken up at another hearing.

REFUND BY A CONSCIENCE-STRICKEN PASSENGER

The Michigan United Railway, of Jackson, Mich., recently received the following letter with 60 cents inclosed: "Eight years ago a company of three boarded a city car near the end of the line, riding three or four blocks, and not being called upon for our fares left the car without paying. Occasionally I have been reminded of it, but have dismissed it from my mind as of trivial moment. There was no thought of defrauding the company at the time. Recently I have been again reminded of it and am inclosing 60 cents, the scriptural measure of four-fold, as restoration to the company of what should have been theirs. (Signed) One Who Wants to Be Right with God and Man."

VALUATION OF THE CHICAGO CONSOLIDATED TRACTION PROPERTY

The principal figures of the valuation of the property of the Chicago Consolidated Traction Company were published in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 3, 1910, page 374. This valuation was made by Bion J. Arnold and George Weston, as a traction valuation commission, for the purpose of determining a value to be incorporated in the new ordinance granting authority to the Chicago Railways Company to purchase the property of the Consolidated company and to rehabilitate it. In a letter addressed on Aug. 10, 1910, to Alderman M. J. Foreman, chairman of the local transportation committee of the City Council, Messrs. Arnold and Weston stated that the property was found to be in such physical condition that it would be necessary to make certain deductions for deferred maintenance in arriving at the physical valuation. The figures stated by Messrs. Arnold and Weston in this communication are as follows:

	With paving	Without paving
Value of physical property as a "going" concern	$4,078,057.69	$3,446,549.88
Value of intangible property as a "going" concern	751,325.77	751,325.77
Total value of physical and intangible property as a "going" concern	$4,829,383.46	$4,197,875.65
Deductions due to ordinance requirements:		
(a) Robey Street, on account of isolation of tracks due to prior expiration of ordinance	$3,277.68	
(b) Removal of tracks from streets at expiration of ordinances as required	91,063.00	
Total deductions	94,340.68	94,340.68
Total values after deductions	$4,735,042.78	$4,103,534.97

The letter adds that, at the request of Walter L. Fisher, special traction counsel of the city, a valuation was made in which all franchise and paving values were eliminated and only such property included as could be utilized in the rehabilitation. This value was found to be $3,037,818.56.

In a subsequent letter, dated Aug. 17, 1910, Messrs. Arnold and Weston stated to Alderman Foreman that they had taken into consideration the basis of settlement suggested at a meeting on Aug. 12. The premises upon which the figures were to be based were as follows:

1. No intangible values to be returned.

2. The valuation of the physical property, including paving, to be made on a rehabilitation basis, that is, such value to be returned for the various items composing the property as presumably could be certified to by the board of supervising engineers, Chicago traction, on the assumption that the Chicago Railways was purchasing the property of the Consolidated company and the paving the same as if it were purchasing rails or other material from manufacturers and that it was to be allowed to use such paving, rails, etc., as had remaining life until such life was realized.

I.	Track		$1,121,216.38
II.	Electric power distribution		693,481.95
III.	Rolling stock		195,118.77
IV.	Power plant equipment		417,886.81
V.	Tools, supplies and furniture		71,999.52
VI.	Buildings		265,417.00
VII.	Real estate		84,228.00
VIII.	Paving		437,226.70
		$3,286,575.13	
	Legal expenses, carrying charges and contingencies, 5 per cent	164,328.76	
		$3,450,903.89	
	Conducting work, furnishing equipment and brokerage, as per ordinance of Feb. 11, 1907—15 per cent	517,635.59	
	Total		$3,968,539.49

To the amount thus obtained an additional charge for legal expenses, carrying charges and contingencies of 5 per cent was to be added instead of 10 per cent as included in the original figure of $3,037,818.56 (this 5 per cent deduction being included in the 15 per cent hereafter mentioned), the sum thus obtained to be the amount to which the board of supervising engineers could certify.

Upon these premises, the figures showed a total of $3,968,539.49, divided as shown in the accompanying table.

Subsequently Messrs. Arnold and Weston confirmed these figures comprising the value of the property as it would be appraised under the terms of the ordinance recommended for passage by the committee subject to the deductions for which the ordinance provides. They also confirmed the figures given in the letter of Aug. 10 as the values based on the same principles as those followed in the valuations of the Chicago City Railway and the Chicago Railways Company in 1906 and adopted by the ordinances of 1907. In the lower valuations all franchise values were excluded and the physical property was appraised at its value for rehabilitation purposes.

The letters quoted and the detailed exhibits of the physical property of the Consolidated company inside the city limits as of Nov. 1, 1909, accompanying the valuation report, have been published in book form. The introduction to the book gives an analysis of the premises adopted and the methods used in determining the values. The property was divided into eight divisions, as shown in the foregoing, but further subdivisions were made. Track, for instance, was subdivided into tangent track, track special work, track on bridges, tangent track in car houses and yards and track special work in car houses and yards. An abstract of the statement of methods followed in the valuation follows:

TRACK

Tangent Track.—The track in this section was divided into classes, according to the varying weights and types of rails and the styles of construction. Under each class an estimate was made of the cost of material and labor required to reproduce the track new at the time of this valuation under the original specifications; and to this amount has been added 15 per cent for organization, engineering, incidentals, etc. Data were obtained from detailed examination of the track in the field, in which the length of rail, kind of joints, type of rail and substructure were determined. Additional information was obtained from the track map in the office of the company and from representatives of the company.

All distances shown are the actual field measurements. Special work was excluded in the determination of tangent track lengths.

In depreciation of the track, three factors were considered: (1) The condition of joints. (2) The condition of ties, including ballast. (3) The wearing life of the head of the rail. From examination it was found that none of the rail would have to be discarded on account of broken or defective wagon treads.

Present value of rail, excepting joints, was determined in terms of the wearing value remaining in the head of the rail. To determine the height of the head of the rail, measurements were taken along the track with a specially constructed vernier device, by means of which the actual distance between the head and the tram was obtained in sixty-fourths of an inch. These measurements were obtained at frequent intervals on each section, sufficient number being taken to determine the average height of the head of the rail. From this determined height was deducted the scrap height of 40/64 in., the remainder representing the present wearing value of the rail. In this method the depreciation of rail is entirely independent of the life of the track substructure.

All joints were depreciated on the assumption that it would be necessary to renew them at some time in order to realize the full wearing value of the head of the rail and that at the time of renewal the ends of the rail would be cut off and the life of the rest of the rail lengthened thereby.

The average life of ties and joints was taken for all old tracks at 20 years, and the normal depreciation was determined by application of this depreciation rate to the age of the property as determined.

In many respects the property had not received ordinary maintenance and the estimated amount of deferred maintenance was segregated in making up valuations of the property as a going concern. The application of the method of in-

dication of the deferred maintenance on track was as follows:

In case of rails the present value of the rail was determined by readings indicating the wear of the head, and from these readings the remaining wearing value of the rail was computed. In case of bad alignment of rail the additional depreciation due to this condition was expressed in terms of a percentage of the wearing value. It was estimated that with proper maintenance the life of substructure and joints should be 20 years, and where improper maintenance was evident one or two years were added to the age as determined from the records, this being equivalent to depreciation of this part of the property for a period of time in excess of its actual life. Each line was considered separately in application of this additional depreciation.

In the case of Class A and Class A1 track, built recently and corresponding to type 2A and type 3 of the board of supervising engineers, the average life of the substructure was taken as 25 years. The welded joints were assumed to have the same life as the rail.

Track Special Work.—Each piece of special work was measured, listed and sketched. There was added to the cost of the layout the cost of ties, ballast, excavation, labor and miscellaneous items.

It was found that most of the layouts, excepting 9-in. manganese cross-overs, were in bad shape, and that some of the layouts were field-built. A scrap value of 25 per cent of the cost new was placed on all special work, except the 9-in. manganese cross-overs and the new 9-in. curved rail, which were put in during the summer of 1909 and were not depreciated.

Track on Bridges.—The cost of track on bridges includes the cost of rail laid, together with that of miscellaneous track material used in bridge construction.

Track in Car Houses and Yards.—The track was measured in detail, and unit estimates were made of the cost to construct new. A scrap value of 25 per cent of the cost new was allowed in all houses and yards, except Edgewater house.

Track Special Work in Car Houses and Yards.—Each house layout was measured and listed and sketch of layout made. The cost of these layouts was determined by the same method used with tangent track special work. Excepting the Edgewater house, all layouts were listed at a value of 25 per cent of the cost new.

ELECTRIC POWER DISTRIBUTION SYSTEM

This system was divided into overhead trolley construction, feeder system, electrical track bonding and conduit system.

The exhibit includes a detailed estimate of all poles, cross span construction, fittings, trolley wire, feeder wire (positive and negative), feeder attachments and supports, track bonding, cable wire, etc., together with special work construction at the curves and in car houses.

In computation of the cost new of all the equipment, the actual cost of material and labor was estimated at the time of valuation, and to this was added 15 per cent for organization, engineering and incidentals.

The detailed inventory of the entire system was made by inspection, and quantities, kinds, conditions and character were noted in detail. Depreciation of the various parts was determined by inspection, tests and measurements. In many instances it was impossible to obtain from any source correct information as to the age of the various parts. Owing to insufficient maintenance of the system during the past few years, an abnormally high depreciation has resulted, consequently it was necessary to depreciate these parts on their condition as found by inspection.

In calculation of the life of poles the condition of setting, thickness of metal at setting time and the upkeep were taken into consideration. It was necessary to apply different averages of life for the various sections.

The average length of life of a cedar pole was determined from pole renewals and inspection of poles in place to be 20 years. Iron poles set in concrete were figured on the basis of 40 years' life.

Trolley.—In calculation of the wearing life No. 0 wire was assumed to have a wearing value of 80.5 lb. per 1000 ft., and No. 00 wire of 106.8 lb. In a few instances, where the trolley wire had reached the estimated wearing value, and was in need of renewal, but still in service, it was indicated as having "excessive wearing value."

Feeders.—On account of the absence of data on the year of installation or renewals of feeders, and on the interchange of wire from and to the various sections, each section was inspected to determine the present worth and the depreciation of insulation fixed accordingly.

It was deemed essential, after examination of the companies' records, that all feeder be shown as found on March 1, 1910, the time of inspection; and that the companies' present records be taken for work done between Nov. 1, 1909, and March 1, 1910.

Bonding.—The various types of track and special work were inspected, and the quantity, size and kind of wire, etc., used were noted in detail, and in depreciation the life of 20 years was taken.

ROLLING STOCK

Cars and car equipment were divided into groups according to the type, style, maker and age. A typical car body was taken from each of these groups, and general specifications covering this type were prepared, from which a unit cost for each group was obtained. Similarly unit costs new were obtained covering all parts of the equipment such as motors, trucks, and miscellaneous car equipment. From these unit costs for all parts of the rolling stock equipment total values of cost new were determined, and 5 per cent was added for organization, engineering and incidentals.

To determine the present value of all parts of the equipment, including car bodies, motors, trucks and miscellaneous car equipment, a thorough inspection was made, and a depreciation was applied based on their type and suitability for service.

In order to valuate the amount of the deferred maintenance on car bodies, a ruling of the valuation commission was applied, namely, that 25 years should be taken as the average life of all car bodies in service a part of the year, such as open car bodies in service during the summer season, or closed car bodies in service during the winter, and 20 years as the life of car bodies in continuous service. The difference between actual present value of the car bodies as depreciated by inspection and the value determined by application of the above average depreciation rate was considered to be the deferred maintenance.

The entire rolling stock equipment of the company was listed, and the cost new and present value determined. The equipment was then proportioned between the portions of the line outside and inside the city in proportion to the car miles operated inside and outside the city by small single-truck cars, this estimate leaving out of account the car-miles operated inside and outside with rented double-truck cars.

To the total present value 5 per cent was added for organization, engineering and incidentals, as was done with the cost new.

POWER PLANT EQUIPMENT

A detailed inventory was made of all boilers, pumps, engines, generators, piping and accessories, and values were fixed in accordance with present prices.

Each piece of apparatus was inspected to determine its present condition, and a list of all heavy repairs obtained from the chief engineers of plants.

Each machine was depreciated and account was taken of present physical condition and extent of heavy repairs made throughout the life of the machine and the character of the service performed.

Rates of Depreciation.—The annual rates shown in the table on page 1113 were used. Apparatus was depreciated at these rates down to 20 per cent of its wearing value, the wearing value being determined by subtraction of the scrap value from the cost new. All power plant equipment was considered as worth 20 per cent of its wearing value as long as it was in operating condition.

TOOLS, SUPPLIES AND FURNITURE

A detailed inventory was made in the field of all tools, supplies and furniture at the various plants, car houses and office. These were appraised in the office, the depreciation being fixed from notes and values set while in the field.

BUILDINGS

Detailed measurements were made and detailed inventory taken of the kinds and amount of materials required to reproduce buildings. These quantities were estimated at prices as of Nov. 1, 1909, to which was added 15 per cent for organization, engineering and incidentals. Buildings that had not been properly maintained were depreciated by application to each division of the building cost of a depreciation factor determined by inspection. Buildings that had been properly maintained were depreciated uniformly at the rate of 1½ per cent per annum.

RATES OF DEPRECIATION ON POWER PLANT EQUIPMENT

	Per Cent
Machinery foundations	Note
Coal and ash handling machinery	7
Fuel oil handling machinery	4
Grates and stokers	Note
Boilers and settings	3½-4
Breeching and connections	3½-10
Stack	3
Heaters	4 -5
Water purifying apparatus	3
Pumps	5
Air compressors	4 -5
Engines	3 -5
Condensers	4
Piping and covering	4 -4½
Generators	3 -8
Switchboard and generator leads	3
Miscellaneous items	3 -5

NOTE: Machinery foundations were depreciated at a percentage determined from the life of the apparatus supported.

The fixed parts of stokers depreciate very little and the moving parts and grates very rapidly. As the moving parts are renewed and maintained in good condition, 10 per cent of the wearing value of stokers was depreciated at 20 per cent per year for 2½ years, and 90 per cent of the fixed parts at 5 per cent per year during the life of the machine.

Engines and generators that had been rebuilt or had had extensive repairs were credited with the cost of repairs at the time they were made and this cost was depreciated at the same rate as machines on which repairs were made.

REAL ESTATE

The valuation of the real estate was made by William A. Bond and the values submitted were those determined by him.

PAVING

Actual measurements of pavement at various parts were made, and the cost to reproduce was determined from the cost of labor and materials as of date of this valuation. Only the actual width of paving was considered, the width of the head and tram of the rail being excluded in the square area listed. The items of excavation and concrete base, when used, were included in the cost of track, and do not appear as part of the paving cost.

The various sections of pavement were depreciated by inspection of their present condition, from which the present value was been determined.

CAPITAL ACCOUNT VALUE OF PROPERTY

The capital account value of the property was determined on the basis of premises included in the ordinance under which the Chicago Railways acquired the part of the property of the Consolidated company inside the city limits. Under these premises the values to be returned were made the values for rehabilitation purposes. In compliance with the ordinance, certain rehabilitation work must be done at once, and additional rehabilitation work within the succeeding one or two years. In case part of the property is to be rehabilitated on or before Feb. 1, 1911, the scrap or second-hand value at that time was determined, and to this value was added an amount equal to the wearing value of the property from Nov. 1, 1909, to Feb. 1, 1911; the sum is the present value for rehabilitation purposes as of Nov. 1, 1909.

In the case of the portions that are to be rehabilitated during 1911 a similar procedure was adopted, two years' additional wearing life being added to the scrap or second hand value of the property as of Nov. 1, 1911, to determine the present rehabilitation value. Similarly for property rehabilitated during the year 1912 three years' wearing life was added.

In case of property, such as track, on which semi-rehabilitation is contemplated, namely, the provision of a new substructure under rails that are not sufficiently worn to require removal, the going value was returned as the rehabilitation value. The company will realize the full remaining wearing value in the rail, ties and substructure. The ties have already been depreciated to an amount which corresponds to their present condition, and in case of removal whatever life remains would be realized in the form of a small percentage of ties that can be used for renewals elsewhere.

This method was applied to all parts of the property which must be rehabilitated in order to comply with the ordinance. It was estimated that approximately 29 miles of track would be rehabilitated before Feb. 1, 1911, that 22.56 miles would be rehabilitated in 1911, that 0.87 mile would be rehabilitated in 1912, and that 39.59 miles would be semi-rehabilitated, the date at which this latter work is done having no bearing on the value returned for the property. The rest of the track, consisting of 15.27 miles recently rebuilt under specifications of the board of supervising engineers, 15.21 miles that is considered satisfactory in its present condition, and 0.587 mile that is to be removed from the street, completes the total track mileage inside the city.

Further requirements of the ordinance as to rehabilitation contemplated that ultimately not more than 50 closed and 50 open single-truck motor cars should be operated by the company. The rehabilitation value was returned on the assumption that the company might permanently retain in operation the 100 cars referred to, that it may retain in operation for one year 72 cars in addition to the above, that it might retain in operation for two years 36 cars of the 72, and that it should immediately dispose of all remaining passenger car equipment at second-hand or scrap value. Similarly, the company is allowed to retain such sprinklers and sweepers as are in satisfactory condition at their present value, and is required to dispose of the balance at second-hand or scrap value. The passenger cars, in this case, were proportioned between the lines outside and inside the city in proportion to small cars operated outside and inside. The miscellaneous cars that have been retained were proportioned between the lines outside and inside in proportion to track mileage.

It was assumed that the California Avenue power plant will still be operated, and for this reason it was given its going value for rehabilitation purposes. The operation of the Edgewater power plant is not economical and it was assumed that it will be discontinued as soon as substations can be provided, and for this purpose this power plant equipment was given its second-hand value as of 1911, to which was added two years' wearing value of the plant as a whole to determine the rehabilitation value as of Nov. 1, 1909.

The present value of paving was allowed in case of streets recently rebuilt, as well as streets on which track is to remain in its present condition. On streets where the track is to be rehabilitated the second-hand value of the paving was returned as the rehabilitation value.

The remaining exhibits, including electric power distribution, supplies, tools and furniture, buildings and real estate, were returned at the same value for rehabilitation purposes as was assigned them in the case of the property as a going concern.

The book has a total of 713 pages and includes various exhibits containing details of work and photographs of cars and diagrams showing the electrical power distribution and the location of power plant equipment, etc.

An abstract of the ordinance relating to the rehabilitation of the property of the Consolidated company, which was passed by the City Council on Oct. 10, 1910, was published in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 22, 1910, page 887. The ordinance grants to the Chicago Railways Company, which is to purchase the property of the Consolidated company at foreclosure sale, the right to construct, maintain and operate certain extensions and additions of its lines of street railway. Property to the value of $235,709.10 is scheduled as property of the Consolidated system which the Chicago Railways may elect not to acquire.

MEETING OF RAILWAY COMMISSIONERS

Abstracts of some of the reports presented at the meeting of the National Association of Railway Commissioners in Washington, D. C., were published in the issue of the Electric Railway Journal for Nov. 26. Portions of some of the other reports of committees which were presented and considered at the same meeting are given below:

COMMITTEE REPORT ON RATES AND RATE MAKING

George F. Montgomery, Georgia Railroad Commission, presented the report of the committee on rates and rate making. The report was in part as follows:

"If the business of the carrier was confined to a single character of service, or if in the performance of its service to its patrons it brought into play in every instance all of its property, it could be ascertained with a degree of accuracy what proportion of the total expense of operation any given service absorbed. But where the property of the carrier extends over and through a large number of States, and where its business is not confined either to State or interstate business, or to any one commodity, but where it daily carries shipments of hundreds of different commodities between its hundreds of stations, and where the quantity of movement in any given commodity and between any given stations is constantly changing and with those changes there is a constant change in the proportion of its property used, how hard it is to ascertain what charges are just and reasonable on the fair-return-on-value basis. The apportionment of the total value of the property of any carrier according to the property used in a specific instance upon an exact basis is impossible, and if it is impossible to determine exactly the value of the property employed in a given case, and to get at the value as nearly as possible some allowance is made somewhere along the line in the scientific working out of rates, the science falls with the allowance. And to what extent will any known science help in making rates which are affected by water competition or commercial conditions, which oftentimes necessarily disarrange any fixed method of making rates? But, granting that reasonable and just rates can be reached by scientific methods, if this theory is to be observed with every change in value of the property devoted to any given service, the charges for that service must be correspondingly changed, and the task of making rates in this manner would hardly be finished in any case when by reason of changed conditions revaluations and new rates would have to be made. Thus the plan is impracticable, even if it should enable the making of rates in such manner that the property employed in each and every instance would earn its fair return.

"As to the value-of-the-service theory and the plan of making rates as high as the traffic will bear and the plan of making such rates as will permit of a free movement of freight and free business intercourse between the patrons of the carrier and the general public, hardly more than one valuable thing could result were these plans adopted and practised, and that would be improved service, because of the carriers being certain to receive such returns from their operations as to enable them to furnish the best of service and facilities.

"The question which rate-making authorities ought to consider is not merely the saving of railway companies from bankruptcy, but where the service rendered by the carrier is altogether satisfactory let not the giver of the service be envied a remunerative measure of profit.

"Your committee offers the following suggestions for the making of a mileage tariff and for the making of a classification of freights and special or commodity rates not based on a mileage scale, but made to meet such competitive conditions of transportation or commerce as may be found to exist:

"1. Adopt a mileage tariff by fixing first class and then arrange all other classes on a percentage relation to first class.

"2. Adopt a classification to govern the tariff by classifying such articles as are universally accepted to be articles of first-class freight and then classify all other articles in relation thereto.

"3. Wherever transportation or commercial conditions make necessary a departure from the mileage-tariff basis adopt special or commodity rates.

"Your committee is of the opinion that no fixed rule can be observed, but that after all, as in the successful doing of all things, it is a matter of judgment based on experience. Rate making is no new work. Tariffs and classifications after the same fashion used to-day were in effect many years before any State created a railroad commission. It is not a matter of experiment now. The experimental period has passed. The same system now employed has been in use since the early history of railroad operations. If no rate had ever been made and we were now called upon to invent some rate-making plan, scientific methods of mathematical calculations might then serve our purpose well. But we have seen how the existing plan works, where it fits well and where it does not, and, as stated, it is a matter of judgment, supported by an honest purpose, to keep the good and remove the bad."

SHIPPERS' CLAIMS

William Kilpatrick, Illinois Board of Railway & Warehouse Commissioners, read the report of the committee on shippers' claims on common carriers. In part the report said:

"Through unjust and inefficient treatment on the part of the carrier and unjust claims on the part of the shipper, both have come to approach the matter of claims in an antagonistic and retaliatory spirit, which will be dispelled only by a realization on the part of both that undue advantages obtained through claim settlements are as obnoxious to the law as any other form of discrimination."

The report was adopted.

CAR SERVICE

Halford Erickson, Wisconsin Railroad Commission, read the report of the committee on car service and demurrage. The report showed the probable effect of an increase of the time for loading and unloading upon average mileage of freight cars per day and said in part:

"The facts certainly raise the question whether at this time we are warranted in recommending any change that may cause such drastic increases in the expenses of transportation as would result from any considerable increase in the free time allowed for the loading or unloading of cars. The carriers are ordinarily entitled to reasonable rates for the services they render; and such rates, in one way or another, they are undoubtedly in a position to obtain, at least in the long run. This simply means that increases in the expenses may have to be made up from increases in the rates and that the burden of such changes as those caused by the increase of this free time will ultimately have to be borne by the consumers. In view of these facts, it would seem that extensions of the free time should not be granted unless justified by necessity rather than by convenience."

The report was received and ordered printed.

UNIFORM CLASSIFICATION

F. M. Cockrell, Interstate Commerce Commission, presented the report of the committee on uniform classification. The report, referring to provisions in the act of June 18, 1910, amending the interstate commerce laws, said:

"These provisions seem very clearly to give the Interstate Commerce Commission full authority to prescribe such a classification with reasonable rules and regulations. It is respectfully recommended that the Interstate Commerce Commission take the necessary steps to secure at as early a day as practicable the uniform-classification rules and regulations which the law quoted makes it the duty of carriers to establish and observe; and when such work has been prepared that the commission give to the commissions of the various States and all parties interested an opportunity to be heard before the final adoption of a uniform classification."

DELAYS IN ENFORCING STATE COMMISSION ORDERS

A. T. Siler, Kentucky Railroad Commission, read the report of the committee on delays attendant upon enforcing orders of State railroad commissions, which, in part, was as follows:

"The orders of State railroad commissions and of the

Interstate Commerce Commission are of a public nature and affect the interests of the public generally and should be entitled to consideration in advance of private interests. These delays are so general and have wrought so much harm and dissatisfaction that your committee is of the opinion that some vigorous, positive steps should be taken by this convention that will awaken new interest in these cases, and to that end your committee submits to the convention for its adoption the following resolution, which resolution has heretofore been adopted by this same convention at one of its annual meetings:

"'*Resolved,* That this convention respectfully request the Supreme Court of the United States, if it has power, to adopt a rule by which causes which involve the validity of orders of any State railroad commission shall be placed upon the calendar as soon as the record is filed in that court and at once be advanced and set for argument during the pending term; and if the court finds that it has not jurisdiction to regulate this matter by rule, then we recommend that Congress pass such legislation requiring the advancement of such cases.

"'*Resolved further,* That a copy of this report be furnished to the Supreme Court of the United States, and that the various members of the several State railroad commissions be requested to call the attention of their members in Congress to this report and recommendation, and solicit their support of any measure which has for its object the placing of this line of cases in a condition for a more speedy trial.'"

The resolution was adopted by the convention.

GRADE CROSSINGS AND TRESPASSING

George W. Dickinson, Michigan Railroad Commission, read the report of the committee on grade crossings and trespassing on railroads, which was in part as follows:

"In some States the law prescribes a division of the expense between the interested parties, the States in some cases sharing in such expense. By reason of the variety of the conditions presented, we do not feel that any hard and fast rule can be equitably applied, otherwise we would recommend assessing at least 25 per cent of the expense of this work to the State. In one case the street may be occupied by an electric line, or some interurban line may use the overhead structure together with the steam road. For this reason we believe authority to determine not only the necessity for the separation but also to apportion the expense of the same should be given the railroad commission of the State, which, being free from political or other influence, could act without bias. We believe, however, that the State should bear a certain portion, say not to exceed a certain per cent or fixed sum in each case.

"We make the following recommendation: 'That in States now having no law governing conditions under which grade separation shall be made, or not requiring any given number of crossings to be separated each year, the legislators of such State have the matter properly placed before them, with suggestions as to what is needed, that they may enact laws granting to the commission of their State the necessary power to act; that they be given discretionary power to require each railroad in their State to separate a certain number of grades, in proportion to their mileage, each year.'

"To this end we recommend that a committee of this association be appointed to prepare such data and suggestions as they deem best for presentation to the Legislatures of the several States; that said committee be composed of one member of the railroad commission of each such State and they be authorized to formulate and present such suggestions as such committee may deem proper and as will tend to a uniformity of the laws on this subject in the different States.

"In the year 1909, in Michigan, there were 8357 street and highway crossings at grade; protected with gates and flagmen, 600; protected with electric bells, 270; unprotected, 7487; separation of grades, 360; showing about 13 per cent protected and 4 per cent separated. In the same year there were steam railroad crossings at grade, 500; electric railroad crossings at grade, 500; protected by interlockers or derails, 260; unprotected, 240; separation of grades, 150.

"In the building of improved highways the people now recognize that a part of the main thoroughfares, known as county highways, should be, in part, paid for by the county as a whole, and no reason exists why, if such roads are so important for the use of the people of a county as a whole as to justify a burden on the county, the county as a whole should not pay a part of the cost of the elimination of a dangerous crossing thereon. Cases may frequently arise where an important highway only crosses through an extreme corner of a town or village and where very few people of that municipality use the road. The advantages arising from the abolishment of such a crossing would not accrue to the town itself except in a very small way, but would accrue to the adjoining towns and the county generally.

"The statute ought to provide that any municipality and steam railroad, and, if necessary, street railroad, subject to the approval of the State commission, could voluntarily contract for the abolishment of crossings within a municipality. All over the country municipalities are now contracting with steam railroads for the abolishment of crossings, and in each case a special act is required. The general law ought to be such that such contracts, with the approval aforesaid, could be carried out without special legislation.

"There is no provision in a great many States having grade-crossing laws for the abolishment of crossings of interurban high-speed lines. The tremendous growth of these high-speed interurban lines is resulting in the same conditions that arose at the time steam railroads were constructed. The laws relating to grade crossings ought to apply to high-speed interurban lines, as there is practically no difference between the present methods of construction and operation.

"The State laws are very diversified as to who can institute the application, but the statute should provide that the proceedings can be commenced either by the State public service commission or by any municipality interested or by any steam or street railroad occupying the crossing.

"Your committee well realizes that the elimination of grade crossings in cities and villages where the volume of travel on the railroads and in the streets is very large and where land necessary for such improvements is very expensive is the most serious financial problem which our railroads and the public have to face jointly, and with the rapid increase of business it becomes more pressing every year, but if we realize our duty and responsibility and realize that the protection of the general public is a burden we must bear and which must therefore receive our serious consideration, we must not relax in our efforts to bring about such conditions as will represent the largest measure of safety in the least possible time."

The recommendation of the committee for the appointment of a general committee was carried after a slight change had been made in the phraseology of the report with the intent of giving representation to each State that has a railroad commission.

COMMITTEE ON LEGISLATION

The report of the committee on legislation was presented by the chairman, Ira B. Mills, Minnesota Railroad and Warehouse Commission. It was in part as follows:

"The committee recommends that as soon as possible the States not having commissions pass laws establishing them, and suggests that the laws of Wisconsin or New York might be taken as a model. Under recent decisions it would be well to examine very carefully the statutes of the different States, with a view of seeing if the rate-making power given by them will stand the test."

Judson C. Clements, Interstate Commerce Commission, spoke of the importance of a friendly co-operative spirit and willingness to confer between the Interstate and the State commissions.

Edward M. Bassett, New York Public Service Commission, First District, said that the Constitution put under the federal government the control of commerce between the States. The Interstate Commerce Commission was only fulfilling its particular function when it did this work right up to what it conceived to be the twilight zone of federal authority. And, on

the other hand, the State commissions did their work under the powers not delegated to the federal government in the United States Constitution when they performed their functions right up to the limit of the twilight zone. But there was a twilight zone that had to be patiently worked out and greater light thrown upon it.

RAILROAD STATISTICS

Prof. Henry C. Adams, in charge of statistics and accounts, Interstate Commerce Commission, presented the report of the committee on railroad statistics. The committee repeated recommendations which were contained in the report of the previous year, but, through inadvertence, were not formally presented to the convention. Modifications of the Interstate Commerce Commission form of annual report were suggested. The committee wrote a letter of inquiry regarding the date of the fiscal year to State railway commissioners and carriers subject to the jurisdiction of the Interstate commission. The replies did not indicate any strong desire in favor of a change of the date for closing the fiscal year. A bill passed by the last Congress permits the Interstate commission by order to substitute Dec. 31 as the date for closing the fiscal year. The committee submitted the classification of additions and betterments and the form of general balance sheet statement promulgated by the Interstate commission for steam railroads and called attention to the fact that the general system of accounts for steam railroads prescribed by the Interstate commission and approved and accepted by the State commissions still lacks an authoritative classification and definition of income items. On the subject of assignment of revenues and expenses of railways by State lines the committee said in part:

"This question of the separation of operating revenues and operating expenses by State lines—as also a separation for interstate and intrastate traffic—has long engaged the attention of the railway commissioners and the carriers. In 1907 your committee met with a committee representing the Association of American Railway Accounting Officers, for the purpose of considering this question, and, as the result of their joint labors, there was worked up a complete and comprehensive plan for the separation of operating expenses by State lines. From the point of view of expenses exclusively, the rules then adopted are now regarded by your committee as in the main satisfactory.

"The difficulty, however, arises when it is attempted to assign operating revenues by State lines in such a way as to secure a correct statement of net revenues from operation. The embarrassment arises from the fact that some States have expensive terminals, whereas other States are relieved from the necessity of bearing the expenses incident to such terminals; and it would be manifestly unfair to assign expenses to the State where the expense is in fact incurred, and to assign revenues according to a mileage pro rata basis. As a step toward the solution of this difficulty, it was recognized that it would be necessary to apply the principle of constructive mileage in the localization of railway revenues, and the chairman of your committee was instructed to correspond with the representatives of the States for the purpose of learning whether or not the States would approve the application of the rule of constructive mileage for the localization of revenues. Nothing very definite resulted from this investigation and largely on that account the attempt to formulate any definite rule for the application of the principle of constructive mileage was abandoned.

"The committee is able to report some progress in that provision has been made for a general investigation of the location of especially expensive terminals, of the arbitraries which are allowed by carriers on account of such terminals, of contracts which result in the establishment of arbitraries on account of other kinds of disabilities, and other pertinent items of information.

"The question at issue is one which touches not only the work of railroad commissioners, but the taxing agencies of the States as well; and the question has arisen as to the likelihood of the acceptance by the States of any uniform rule for localizing the operating revenues and operating expenses of railways in case such a rule can be worked out as would commend itself to the members of this convention.

"So far as the majority of States are concerned, there is no serious reason why a uniform rule approved by this convention should not become generally effective. However, there are a few States whose taxing laws or administrative practices must be modified in greater or less degree before a rule for assigning revenues and expenses by State lines could be universally adopted, provided the interests of taxing commissioners as well as of railway commissioners are to be considered by such a rule."

THE WORK OF THE BOARD OF PUBLIC UTILITIES OF LOS ANGELES

The Board of Public Utilities of Los Angeles, Cal., has submitted to the Mayor of Los Angeles a report covering its work from the time of its organization, late in December, 1909, to June 30, 1910. The original commissioners appointed by Mayor Alexander on Dec. 20, 1909, were Meyer Lissner, whose term of office expires on June 30, 1912; Frank J. Hart, whose term of office expires on June 30, 1911, and Paul Haupt, whose term of office expired on June 30, 1910. On March 18, 1910, Mr. Haupt resigned, and J. M. Hunter was appointed to serve out his time. Mr. Hunter was later reappointed to serve until June 30, 1913. Mr. Lissner has been elected president of the board. On Jan. 5, 1910, the board appointed Theo. B. Comstock executive officer and secretary with the official title of engineer of the board. The members of the board serve gratuitously. The sum of $12,000 a year is appropriated for salaries and other expenses involved in the work of the board. The principal duties of the board as prescribed in the ordinance which created the body follow:

"1. To investigate each year the affairs of all persons, firms or corporations operating or maintaining water, electric lighting, power, gas or telepehone systems, or street railways, of interurban railroads, or other public service utilities in Los Angeles, and compile such data as may be necessary to determine the proper charges for the service furnished or supplied, as provided in the charter of said city, or otherwise by law. Such data shall include a valuation of the physical properties, a detailed statement of gross and net earnings and of expenses, and the capitalization and indebtedness thereof, and such other matters as the board may deem proper, and shall also include such facts and figures as may be obtainable regarding the operation and maintenance of similar systems and utilities in other municipalities.

"2. To recommend to the City Council, prior to the first day of March of each year, a schedule of charges for the services specified in subdivision 1 of this section.

"3. To investigate complaints against the service or the charges of any person, firm or corporation operating any public service utility in Los Angeles, and to recommend legislation or action to executive officers of the city whenever in the judgment of the board such legislation or such action may be necessary.

"4. To superintend the inspection of all public utilities and services in Los Angeles, as to their compliance with their franchises and with law and the ordinances, their service and charges, and their treatment of the public, and from time to time to recommend such legislation or executive action as may be required.

"5. To prepare and keep a detailed and indexed record of all public service franchises granted by the city that are now in existence or that may hereafter be granted, showing the date, location, term thereof, and all other essential facts, and a similar record, so far as practicable, of all other public franchises exercised in Los Angeles.

"6. To report to the City Council in June of each year the essential facts and figures concerning the aforesaid public utilities operated and maintained in Los Angeles, comparing their charges and character of service with those of similar utilities in other municipalities."

The report of the board for the six months ended June 30, 1910, contains 194 pages. According to the report the board has 18 water companies, four gas companies, three electric companies, two telephone companies and four electric railways under its jurisdiction. The 31 companies involved have "combined physical property amounting to $65,000,000 or more." A digest of the report of the board relating to street railway affairs follows:

"The subject of transfers is not specifically covered by the Constitution of California nor by the codes or statutes. No specific provision of the City Charter relates directly to transfer requirements. There are demands for transfers in some instances from interurban to city lines and vice versa. At present only two or three of this class are allowed, although there are other cases in which exchange service appears to be reasonably justifiable.

"Early in 1910 a study of the situation was undertaken by this board. There were found some 25 car connections where transfers were not allowed, which came within reasonable demand of the patrons of the lines operated by the Los Angeles Railway. After full discussion, the conditions of the board were, in the main, conceded by the company and these additional transfers are now regularly issued.

"It has been the policy of the board to present the facts to the railroad officials in such manner as to enlist their co-operation, and we believe that they are now inclined to meet the legitimate demands of the people to a greater extent than formerly.

"The investigations of the board have clearly shown that the crowding of cars, which has caused much complaint, is largely the result of conditions which are peculiar to Los Angeles.

"In a city growing as rapidly as Los Angeles it is impossible for city officials or the officers of corporations to look ahead far enough to provide for all contingencies in advance of actual requirements. There must necessarily be periods of radical reconstruction in methods and equipment, and very serious problems are involved in the practical handling of traffic while such work is under way.

"The whole subject is receiving earnest and thoughtful consideration on the part of the board and its engineer in consultation with other city officials and with duly accredited representatives of all the street railways.

"The term of grant for street railway is not limited by State laws, but the City Charter of Los Angeles allows not more than 21 years. Spur track grants are made revokable at will of the city authorities by legislative enactment. Certain other conditions, as the payment of 2 per cent of gross earnings annually, beginning with the fifth year of operation; the method of application, the bidding for and granting of franchises, and the mode of reversion to the city, if demanded at end of term, are all covered in the statutes of California, leaving to the city the enforcement of its own edicts regarding operation, traffic regulation, transfers and other matters, exclusive of fares, which also are now prescribed in the statutes.

"With a view to securing attention from those best fitted to advise the board and to get full expression of the opinions of both sides in matters open to controversy, a resolution was passed by the board in April providing for a traffic conference to include the members of the board and the officers of the railways and railroads operating in Los Angeles. The time of the board and its staff has been so steadily occupied, however, that it has not been possible to convene the traffic conference up to the date of closing this report. The engineer of the board has made preliminary studies of some of the questions which will soon be brought up for discussion, and the valued experience of the city engineer and city attorney has been freely drawn upon in such matters as have required immediate attention in this regard.

"The expansion of the city limits of Los Angeles has been so extensive recently as to change materially the relations of the interurban lines without equivalent increase of earning capacity. For this reason, although technical application of the law may be supposed to warrant enforcement of 5-cent fares over any and all lines to the city limits, it has appeared to this board that full and fair consideration of all interests is proper before rigidly enforcing this regulation. The board has made progress in bringing the facts into clear light, and we confidently expect to reach satisfactory conclusions for report to the Council within a short time.

"The board is satisfied that there is anything but a public demand for the cessation of freight traffic. On the contrary, the business community and the people generally desire that it shall be given freedom to expand and continue development along healthy channels. But it is evident that some provision must be made ere long for distinct arteries to be devoted mainly or wholly to the circulation of freight and express within the city. The elimination of grade crossings is intimately interwoven with this, and other important questions must be considered coincidently. Negotiations looking to settlement by give-and-take concessions will accomplish better and more speedy results than any other method of procedure."

MEETING OF RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission, appointed by President Taft to consider the issue of railway stocks and bonds, held its first public hearing in Washington, D. C., on Nov. 28. All of the members of the commission were present, as follows: President Arthur T. Hadley, of Yale University, chairman; F. N. Judson, of St. Louis; Frederick Strauss, of New York; Walter L. Fisher, of Chicago, and B. H. Meyer, of Madison, Wis.

Judson C. Clements, member of the Interstate Commerce Commission, testified at the first hearing. He said in part:

"The Interstate Commerce Commission believes that a physical valuation of the railroad properties of the United States is the first step toward adequate regulation of rates; and I believe the same principle applies to the establishment of a basis for the control of stock and bond issues."

It was also stated by Commissioner Clements that he opposed the measure introduced in the last Congress to regulate the issue of securities because he thought that it did not embody all the features which should be included in a law on this subject. He objected to the provision that no new road should be allowed to sell its stock and bonds below par. He thought that any official body with control of railroad securities should be authorized to allow the issue of such securities at less than par when lower prices were justified.

At a hearing on Nov. 29 testimony was offered by Chairman W. P. Hall and Clinton White, of the Board of Railroad Commissioners of Massachusetts. James F. Jackson, former chairman of the Massachusetts commission, also testified.

Mr. Hall advocated a physical valuation of railways. He admitted that there were difficulties to overcome, but said that it was possible to arrive at approximate values. The Massachusetts commission had been able to secure satisfactory results. Mr. Hall said that if a new national commission was created it should deal only with new issues and that actual values should be the basis of all new issues. He said that short-term notes as well as stocks and bonds should be considered, for the effect of such notes was to increase the floating debt.

"The Effect of Keyways on the Strength of Shafts," by Herbert F. Moore, has just been issued as Bulletin No. 42 of the Engineering Experiment Station of the University of Illinois. This bulletin records the results of tests made to determine the relative strength of solid shafts and shafts with keyways. Various sizes of shafts were tested, and for each size of shaft the weakening effect of keyways of several proportions was determined. Tests were made on shafts subjected to twisting only and on shafts subjected to twisting and bending at the same time. The results show that the weakening effect of keyways of the usual proportions upon the strength of shafts is considerable, a square keyway of the usual size causing a reduction of about one-sixth in the strength of the shaft. Free copies of Bulletin No. 42 may be obtained from W. F. M. Goss, University of Illinois, Urbana, Ill.

NEW CONVERTIBLE CARS FOR TORONTO

The Toronto Railway has adopted a new double-truck convertible car of the type shown in the accompanying illustration. The new cars, of which 16 out of 50 are in service, are to be used in connection with the prepayment fare system, inaugurated on the Yonge Street line on Nov. 27. This change from the portable fare box system hitherto in use was adopted for the entire Toronto system on Dec. 1. Special pay-as-you-enter fare boxes have been installed on the Yonge Street route and will be placed on several of the other lines; but pending the construction of a sufficient number to cover all the lines in the city, the company is making use of its regular hand box in connection with the prepayment system.

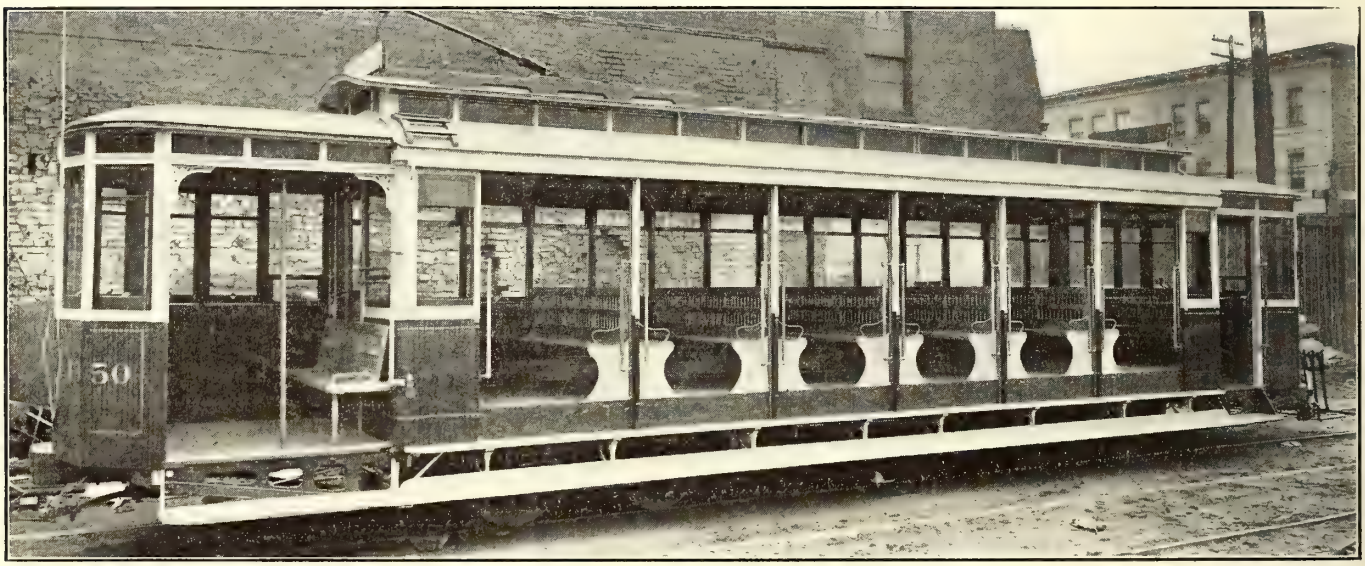
The new car, called Class 1300, has a body 30 ft. long and an over-all length of 44 ft. 9 in. As a closed car this vehicle seats 38 passengers and as an open car it seats 70 passengers. The general design is the invention of the company's master car builder, M. Power, under whose direction all the cars of this type are being built in the company's shops. The following descriptive details were furnished through the courtesy of R. J. Fleming, general manager.

The vestibule also has an outside mirror to give the motorman a clear view of the whole car side.

The back vestibule is made very convenient for prepayment operation. To facilitate the Toronto practice of leaving by the front door, Mr. Fleming conceived the idea of dispensing with the front door or bulkhead, leaving almost all the end open. This gives excellent operating results as well as extra capacity both winter and summer.

The cross-seats used in summer are placed longitudinally for winter use, and covered by a cushion. A leg is required only at the extreme end of each length of cross-seats, the center supports consisting of truss-rods underneath the seat. Since very few legs are required the space under the seats is left open, thus giving the interior of the car a very sanitary appearance. A clear passage in and out is given by a space left at each door. The seat backs are very light to handle as each side has two sections. They rest on the seats, being securely held by means of clips with which they are engaged. The tops of these seats are secured by gate hooks to facilitate removal.

For summer use the side sections of the car are removed. The cross-seats are placed in position and supported by lugs on the panels and car wall, and held in place by buttons.



Toronto Convertible Car When Open.

The bottom framework is of semi-steel construction. The side sill-plates are placed on the extreme outside of body, reinforced by an inside angle under which the wheels are allowed to curve. This angle carries all the cross-floor supports, which are reinforced by truss rods. The only platform steel comprises the two light outside platform supports, made on the cantilever principle and reinforced on the bottom side by a light angle. The platform centers are supported by adjustable trusses which have their bearing on the bottom of the cantilever under the car-body sill. In this position the weight is cared for by the ordinary platform suspension bolts.

The front of the car is fitted with a wide sliding door, operated by the motorman and locking each time it closes. Two switch-irons are inserted in the floor over the rails, while alongside of these irons there is placed a metallic frame containing plate glass. This frame is so constructed as to open in order to be cleaned. Through this device the motorman can see the switch; furthermore, the frame prevents the cold from entering the car. The platform rail behind the motorman has a double purpose inasmuch as it separates the motorman from the passengers and provides a location for the sandbox, the open lid of which serves as a comfortable seat for the motorman. The placing of the sandbox in such a position prevents dampness and makes it easy for the operator to see the condition of the sand at all times. A curtain is suspended from the roof over the platform rail. When this blind is drawn down light from the car cannot interfere with the view of the motorman. The Wooden backs are dropped into slotted castings, making a cool and comfortable seat. The bottom running board is attached by means of suitable suspension castings and connected to both platform steps. The second running board is contained in the wall of the car; it makes a support for the sections in winter and also acts as a guard to prevent the car from being sidewiped by wagons.

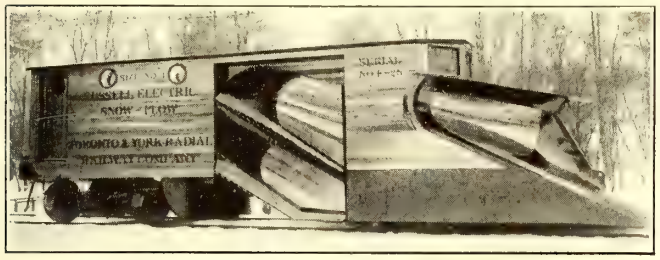
By a special switch, controlling an extra number of lamps, additional lights can be provided during the rush hours to give the conductor better facilities for handling fares and transfers.

Each car will carry four GE-80a 40-hp motors equipped with open-hearth, cut-steel gears and pinions. The new gear cases are of pressed steel replacing the old type heavy malleable-iron cases. All of the motors operate with "Le Carbone" brushes. The resistances are of the Toronto Railway standard, removable grid type. The rest of the electrical apparatus includes a K-6 series-parallel controller and M.R.-type automatic circuit-breaker; General Electric standard car lightning arresters and Toronto Railway roller-bearing trolley stands with a Shelby seamless steel trolley pole. The Consolidated buzzer system, operated from the power circuit, is used in place of batteries.

The trucks are the Curtis D-2 type manufactured by the Canada Foundry Company. They have all-steel frames and swinging bolsters. The braking equipment consists of the Magann storage air and the National Brake Company's hand brake for an auxiliary. All of the new cars have Watson automatic fenders.

SNOW PLOW FOR HEAVY INTERURBAN SERVICE

The Russell Car & Snow Plow Company, of Ridgway, Pa., has recently built for the Toronto & York Radial Railway Company, Toronto, Ont., a snow plow of the type of its well-known steam-road plows. As shown in the accompanying cut this plow is provided with wing elevators and flanger, which are operated by air under the control of the motorman. It can be propelled by a locomotive attached to the power bar by means



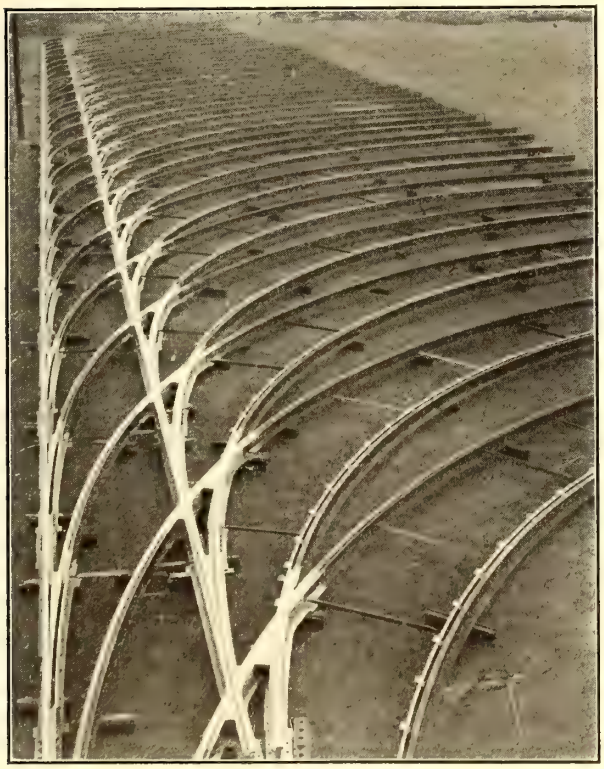
Snow Plow for the Toronto & York Radial Railway.

of an automatic coupler at the rear of the plow or by motors attached to the trucks. The trucks are of the "Russell" B-6 all-steel type for inside-hung motors.

The dimensions of the plow are as follows: Height over all, 12 ft.; weight of moldboard, 8 ft. 5 in.; length over all, 32 ft.; extreme width of body, 10 ft. 1 in.; extreme width of wings extended, 14 ft. 1 in.; width of bit, 9 ft. 4 in.; approximate weight, 50,000 lb.

A REMARKABLE TRACK LAY-OUT IN LEEDS, ENGLAND

Edgar Allen & Company, Ltd., Sheffield, England, have recently completed for the Kirkstall Road car house of the Leeds



Leeds Track Layout.

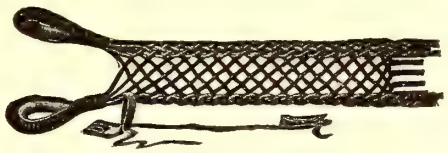
City Tramways what is believed to be the largest piece of track work of this class yet constructed as one lay-out in England. The lay-out as assembled at the works was 346 ft. long 48 ft. wide.

As shown in the accompanying cut, all of the switches on the main track couple together without intervening rails, thus reducing the number of joints. All the switches are 75-ft. radius center track. All the left-hand switches are movable. The right-hand side consists of compound open switches and crossings cast in one piece and repeated throughout, thus standardizing the work. All curves off the main track are 35 ft. radius, spiralized to suit the varying distances of the pits in the car house, thereby standardizing the castings as far as possible. All the curved tracks are fitted on the inside rail with Holt's patent guard rail, of which over 1200 ft. was required. This rail is rolled in 20-ft. lengths as a miniature type of bull-head rail, in order that it may be reversed to double the life. Special cast-steel fishplates are fitted to the castings at the places to which the guard is connected.

The total weight of the lay-out is approximately 85 tons, the switches and crossings comprising over one-third of the total weight. The rails used in the lay-out were rolled by Walter Scott, Ltd., of Leeds, to the new section adopted by the Leeds City Tramways. They weigh 105 lb. per yard. The plans of the lay-out were prepared by J. B. Hamilton, general manager, and R. B. Holt, permanent way engineer, of the Leeds City Tramways.

WIRE OR CABLE GRIPS

The "Gem" wire or cable grip, shown in the accompanying cuts, is made by the Perfection Electrical Manufacturing & Supply Company, Brooklyn, N. Y., in various forms and sizes to suit the conditions of underground and overhead wire installations. It is made of coarse-strand steel wire because fine-strand wire wears out too readily and because the tangents the coarse strands make with the cable give an ideal gripping condition. The flaring ends form a funnel-shape entrance for the cable end, which makes the application of the grip instantaneous. The grip can be slipped on in one second, the hauling rope applied and the pull begun. Its usefulness is not limited to a single wire or to lead-covered cable alone, for it can be used to pull in a three-wire feeder or a larger number of wires. No wire or lead-covered cable is destroyed in the pulling operation. On an average the same grip can be effectively used about 20 times in a gritty duct.



Split Grip Open.

A single-eye type is used for underground purposes where a simple pulling operation is to be made. This grip is also used for pulling aerial wires or cables that cross pole tops. The double-eye grip has the advantage of being able to take hold at any point when slipped on from the end. On releasing the grip by pulling the end opposite the eye or funnel-shaped end it can be slid along to the next holding point. The double-eye type is used especially for pulling out cable already installed and for tailing-in. Where the grip cannot be applied at the



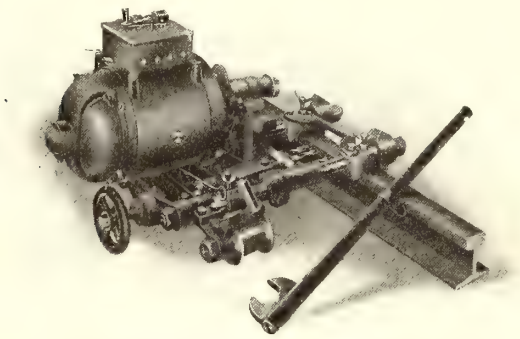
Split Grip Applied

end and a hold is desired at an intermediate point there is used the double-eye split grip illustrated. This grip is so constructed that it can be laced on at any point desired. The split type is particularly valuable for handling live cables and taking up slack at turns in aerial construction.

The grips are made in three different styles, as described, and 13 sizes, giving an equipment for pulling every size and combination of wires that will fit into the various size conduits from ½ in. to 4 in.

MOTOR DRILL FOR BONDING

The accompanying illustration shows the improved No. 22 motor drill now made for twin-terminal bonds by the American Steel & Wire Company, Worcester, Mass. This drill is of the four-spindle type, simultaneously boring all four holes in the head of a rail for this company's standard twin-terminal bond. Two men can easily operate this machine and drill holes for eight joints per hour. This reduces the cost of installing the twin-terminal bonds to a very low figure. The machine, as shown, makes a very compact and efficient portable drill. It is a well-developed, high-speed tool, made of high-grade steel and



Four-Spindle Motor Drill for Bonding

provided with ball bearings to reduce friction and to endure the very severe conditions of track work.

The motor will operate directly on a 600-volt trolley circuit. The internal windings are thoroughly protected and insulated. The armature shaft is geared direct to the drill spindle. The machine has two small carriage wheels which can be placed on the rail to move the tool along easily from joint to joint.

CORRUGATION REMOVAL WITH THE NICHOLS GRINDER

It will be recalled that several years ago H. B. Nichols, chief engineer of the Philadelphia Rapid Transit Company, constructed a machine for removing corrugations which was described and illustrated in the Electric Railway Journal of April 3, 1909, page 649. Owing to the satisfactory results secured in Philadelphia the commercial rights for using this machine elsewhere were taken over by William D. Gherky, of Philadelphia. The following paragraphs give particulars of what has been done with this machine in other cities, both for the removal of corrugations and the grinding of joints.

The Public Service Railway Company, Newark, N. J., has been using the rail grinder for the past two years, during which period it rehabilitated 6500 ft. of rail on different lines. Some of the corrugations were almost ⅛ in. deep and it would have been necessary to renew the rails if it had not been possible to grind out the depressions. One great advantage of the grinder was that it could be used without interfering with the regular operation of cars.

The Brooklyn Rapid Transit Company first put the grinder on during 1909. It has since removed over 20,000 ft. of corrugations and is still in service.

The United Railways & Electric Company, of Baltimore, eliminated corrugations on approximately 6700 ft. of track up to the early part of November, 1910. The contract with Mr. Gherky calls for the treatment of 16,813 ft. of rail in all. The average depth of the corrugations removed is from 1/16 in. to 3/32 in. The grinder has not been used for battered joints in Baltimore. The company is a firm believer in electric welding and any joints requiring attention are given proper treatment when welding operations are under way.

The New York State Railways, Rochester, N. Y., used this grinder in 1909 to treat 3033 ft. of track. In addition to this, the machine ground 235 old pounded joints. No measurements were made of the depth of the corrugations, but they were deep enough to be annoying.

Another large Eastern company, which does not wish to be quoted, states that it has ground out 3804 ft. of rail and 897 joints. Work with the machines is progressing elsewhere in cities not mentioned in the foregoing paragraphs.

All the work has been done with machines built according to the original design. Mr. Gherky, however, has introduced changes and improvements, intended principally to quicken the action of the machine and to increase its output. Machines of the latest design now under construction will turn out from a third to a half more work, tending thereby to a reduction in cost. To handle the growing business better, Mr. Gherky and his associates have incorporated and are greatly increasing their working facilities. After Jan. 1, 1911, the business will be handled by the Railway Track-Work Company, of which Mr. Gherky is president, William B. Goodall secretary and A. M. Aardini treasurer.

IMPROVEMENTS IN THE BLAKE DISPATCHER SIGNAL

Several slight improvements have been introduced in the dispatchers' signals which the Blake Signal & Manufacturing Company is installing on the lines of the Illinois Traction System. As will be remembered, the Blake system of dispatchers' signals depends upon the operation in the signals of pendulums of different lengths corresponding to master pendulums in the dispatcher's office. To bring these pendulums to rest promptly the company has added a check at the base of each pendulum. This check is drawn out of the way of the lower end of the pendulum rod by means of a coil, which is in multiple with the coils acting upon the pendulum to make it swing and is, therefore, synchronous with them, but is automatically thrown into engagement when the current conveying the impulses to the pendulum is cut off. This improvement tends to make the action of the signal more positive and eliminates the voltage regulating relays which were formerly a part of the dispatcher's equipment. The improvement also permits the signals to be operated much more rapidly in succession.

On the Illinois Traction lines the signals are being mounted in a novel way. Special iron stands are used for their support instead of transmission or line poles. The purpose of this change is to obtain a more rigid support than is possible with a pole set in loamy soil. The base of the steel-pole support is set upon a 5-ft. section of 8-in. or 9-in. steel channel to which it is guyed on each side from a point about 6 ft. from the base of the pole. The pole with this broad base is then set 6 ft. in the ground with the channel in a horizontal plane and at right angles to the track. This form of construction is considered more firm than a concrete base and less expensive.

The company further advises that it has made a contract with the Illinois Traction System for placing its improved signals from Decatur through Champaign, Urbana and Danville to Ridge Farm. This places one of its improved signals, mounted on steel poles, at every siding and "Y" on 260 miles.

NEW THERMIT JOINTS AT HOLYOKE

During the last few weeks the Goldschmidt-Thermit Company has been installing about 100 of its new joints in Holyoke and Northampton. This is the joint completely welding the web of the rail, as described by F. Lange, chief engineer of the Goldschmidt-Thermit Company, at the convention of the American Electric Railway Engineering Association at Atlantic City, and published on page 718 in the Electric Railway Journal for Oct. 12, 1910. Altogether about 60 joints in the straight tracks were cast on the lines of the Holyoke Street Railway and Northampton Street Railway, and about 40 compromise joints. These companies have always been enthusiastic over the Goldschmidt-thermit joint, and the Holyoke Street Railway was one of the first to install them. Winter conditions in Holyoke and Northampton are severe, and the company believes that the test given these joints during the winter will demonstrate their value for similar climatic conditions elsewhere.

LONDON LETTER

(From Our Regular Correspondent)

The London County Council recently received 25 visitors from Paris, comprising members of the Conseil Municipal de Paris, who represented omnibus companies and engineers. The side slot, central slot and surface contact traction systems are in use in Paris, but as the systems there are to be transformed the delegates to London included members of the Technical Commission of Control of the Works Department and members of the Municipal Commission. The methods of execution of public works and the various methods of paving employed in London were studied. Several conferences were held and visits were made to the car houses and to such points in the tramway system as the Elephant and Castle, where traffic is greatly congested.

The highways committee and the improvements committee have submitted to the London County Council a list of tramways for the construction of which they recommend that Parliamentary powers should be sought. Some of these schemes are for the construction of new tramways. The total cost of constructing the lines recommended amounts to £1,178,900, with £346,860 for improvements. Much opposition, however, is being encountered. Paddington has decided to exercise its right of veto, and the Hampstead Borough Council is opposed to the plan.

As has already been stated in this letter, several towns have obtained powers from Parliament to install trackless trolley systems and the Leeds Tramway committee has recommended the purchase of four motors and chassis at £600 each and of omnibus bodies at £100 each. The Keighley Corporation intends to apply to Parliament this session for permission to install a trackless system through Bingley, and the Bushey and Watford Urban Councils are trying to formulate a plan for a trackless trolley to connect these towns.

The Hull Tramways have done so well during the past five years, having made a net profit of more than £122,000, that there is a general feeling that the system should be extended immediately.

The Liverpool Corporation Tramways have had a very successful year, even the record year, 1907, having been surpassed. Perhaps one of the most interesting features of the report concerns the first-class cars. These cars have proved very successful, and the residents on other tramway routes have asked that first-class cars be placed on their particular routes. Sir Charles Petrie, the chairman of the tramways committee, in referring to the subject, said that he felt one class of people deserved to be catered to quite as much as another. If people were willing to pay for better accommodations there was no reason why they should not have them, particularly if it paid the committee to provide them.

The Board of Trade has intimated to the Town Council of Torquay that it will renew the license to continue the Torquay trams, which are operated on the Dolter surface contact system. This concession is merely a temporary one, as it has been decided to substitute the overhead trolley system for the surface contact system. An amicable arrangement will probably be made soon between the tramway committee and the Torquay Tramways Company, and the conversion of the system and the work of extending the service to Paignton will then proceed.

The Bournemouth Town Council has decided to substitute the overhead system for the conduit system in use in the center of the town. Three thousand pounds will be saved annually by this change. Bournemouth was the first town in the United Kingdom to introduce the conduit system. Previous to the corporation constructing the tramways many efforts had been made to secure rights to run tramways through Bournemouth, but they were all unsuccessful, because it was feared that the appearance of the town would be spoiled. When the corporation itself took up the question, however, the conduit system was adopted, and J. G. White & Company constructed a model system. The cost of operation, however, has been too great for a town of the size of Bournemouth and with the better knowledge of the working of the overhead trolley in other towns Bournemouth has concluded that the overhead system is not necessarily ruinous to a health resort of even its importance.

As a result of the amalgamation of the Bakerloo, the Piccadilly and the Hampstead tubes a number of through fares on a reduced scale have been made available. It is now possible to travel from Edgware Road to Waterloo for 2½d. and from King's Cross, Knight's Bridge or Baker Street to Waterloo for 2d. There are also new penny fares which provide longer rides, the reduction in fares in many cases being as much as 50 per cent. One of the objects of the companies has evidently been to foster Knight's Bridge as a shopping center and encourage traffic to that point.

A syndicate has been formed to build an electric railway between Worthing and Brighton. The general purposes committee of the Brighton Corporation has, however, passed a resolution against the construction of tramways in the borough. Encouraged by the small plurality by which the corporation rejected the tramway, the promoters intend to proceed with the application for Parliamentary powers.

As a result of the resignation of J. H. Rider, of the London County Council, J. K. Bruce, the present traffic manager, has been promoted to deputy chief officer at a salary of £1,000 a year, and an assistant is to be appointed at a salary of £600 a year to take charge of the traffic work. As regards the electrical work of the department, now that the Greenwich generating station is practically completed, an assistant will be placed in charge of the electrical section at a salary of £800 a year. The present assistant electrical engineer will be promoted to the new position.

About a year ago the London County Council installed the G. B. surface contact system on the route from Whitechapel to Bow as an experiment, and after many vicissitudes it was removed and the overhead system substituted. At that time remarks were made in the papers regarding the system by Sir John Williams Benn, formerly one of the progressive members of the London County Council. An action has recently been brought by the G. B. Company for alleged libel and slander in connection with these remarks, as the company claims that its business has been ruined since the system was removed from this route. The result of the suit will be of uncommon interest, as the G. B. Company has maintained that it was not permitted a fair opportunity to show the merits of the system; that the system installed between Whitechapel and Bow was a modification of its system, and that W. Mordey, the expert who was employed to look into the matter, reported that the system could be operated successfully.

Negotiations have been concluded between the London County Council and the City Corporation about the proposed St. Paul's Bridge, which is to be built in the vicinity of the present Southwark Bridge, and which is to have approaches leading into St. Paul's churchyard. The corporation has agreed to allow the tramways to be brought over the new bridge and will widen the eastern side of St. Paul's churchyard by pulling down the block of warehouses between the churchyard and Old Change. The Council will contribute half the cost of this widening, which is estimated at £600,000.

The Morley Corporation is about to construct the tramlines necessary to connect Morley with the Leeds system, and has asked J. B. Hamilton, the general manager of the Leeds Corporation Tramways, to help in a consulting capacity. The Leeds Tramways Committee has agreed to ask the City Council to allow Mr. Hamilton to accede to this request.

News of the death of Sir J. Clifton Robinson in New York on Nov. 6, 1910, made a profound impression in London and throughout the Empire. Practically all the important daily papers carried obituaries in which the career of Sir Clifton was reviewed at considerable length. One of the papers in a leader, "The Man That Counts," said: "If there had never been such a person as Sir Clifton Robinson, we should have had electric tramways all the same. They became inevitable as soon as the electric motor was a commercial possibility, but without this man, who saw the great possibilities of the new scheme, and who was able to persuade others to take his view, how many years should we have had to wait for that which is ours to-day, which has, indeed, become so much a part of our daily life that we have ceased to regard it as a novelty, or even to wonder at it, or to feel any particular sentiment of gratitude with regard to it."

A. C. S.

News of Electric Railways

1911 Mid-year Conference of the American Electric Railway Association

Friday, Jan. 27, 1911, has been selected by the executive committee as the date for the mid-year conference of the executive heads of the member companies of the American Elctric Railway Association. The meeting will be at the headquarters of the association, 29 West Thirty-ninth Street, New York. These meetings are executive in character, and are open only to those authorized, under the by-laws of the association, to attend. In the evening of the same day the visiting officials will be invited to become guests of the American Electric Railway Manufacturers' Association at a banquet to be held at the Hotel Astor. Speakers prominent in public and business life will address those present. On Thursday, Jan. 26, 1911, the day preceding the mid-year conference, a meeting of the executive committee and of various committees of the association will be held at the office of the association in New York.

Service in Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, was quoted as follows by the Cleveland *News* in its issue of Nov. 28, 1910:

"The service being given by the Cleveland Railway is rotten. The officials of the company are doing all in their power, however, to give the best possible service under the existing conditions, but I can see no way out of the difficulty. In the first place our equipment is entirely inadequate. For three years extensions and improvements of the system were neglected. Now the company cannot keep pace with the growth of the city.

"We need at the very least 150 more cars and need them immediately. Our operating force of men should be increased by 500 or 600 men. For power plants alone we need more than $1,000,000. We need better tracks, more car houses and more and better equipment of a general nature. To bring our service up to what it should be we need immediately all these things that I have named. But our hands are tied. When the settlement was made it was agreed that when such improvements were needed they should be made out of money secured by the sale of stock. But it is an absolute impossibility for us to sell the issues we have made. We must sell stock at par while investors may go to the Cleveland Stock Exchange and buy it at $97. Possibly the chief reason that we cannot sell our stock is that the rate of interest it bears is not high enough to attract investors. In the last analysis 3-cent fare is undoubtedly responsible for the existing state of things and the wretched service that the company is obliged to give."

Transit Affairs in New York

William G. McAdoo, president of the Hudson & Manhattan Railroad, conferred on Nov. 22, 1910, with Comptroller Prendergast and President Mitchel of the Board of Aldermen and with Chairman Willcox of the Public Service Commission in regard to his original proposal to operate a modified tri-borough subway system, and it is expected that Mr. McAdoo will submit another proposal which will include a plan to operate two elevated extensions of the tri-borough in the Bronx and the Fourth Avenue route in Brooklyn.

Mr. McAdoo said that the conferences were intended to produce a better understanding of the offer of his company, and to assure the public officials that he was willing to meet them half way on all the questions that might be raised in connection with it. It is understood that Mr. McAdoo discussed with Mr. Mitchel and Mr. Prendergast, among other things, their desire to have the city in a position eventually to add the Hudson & Manhattan's loop from Thirty-third Street to the Grand Central by way of Forty-second Street and Sixth Avenue to the tri-borough system, provided the Broadway local link was constructed as proposed by the McAdoo companies.

The Comptroller and the President of the Board of Aldermen issued together this statement:

"We think this conference will be productive of an amplification of Mr. McAdoo's offer. We are confident that arrangements to operate the Fourth Avenue route may be made. Our conference with Mr. McAdoo was known to Chairman Willcox of the Public Service Commission."

On Nov. 23, 1910, Mayor Gaynor addressed a letter to H. R. Towne, president of the Merchants' Association, in which he said:

"I shall be most glad to see your suggestions carried out that the Chamber of Commerce and the Merchants' Association appoint a joint committee to consider the various subway routes, plans and offers which have been and may hereafter be submitted, and assist the public authorities to a wise selection.

"Some are talking of an expenditure of $180,000,000 or $200,000,000 by the city in the building of subways immediately, or within five years, as glibly and nimbly as though the city actually had that much credit available. But the fact is that the city has now an available credit of only $57,000,000.

"If some company would put in all the capital needed over and above the $57,000,000 which the city has available the subway difficulty would be solved and the work of construction could go on in all of the boroughs simultaneously, instead of piecemeal. Under the provisions of the law applicable to the case the subway would belong to the city from the start whether built by city money or private money on the limited franchise term which the city gives.

"Some persons, again, are so prejudiced against the present subway company on account of the crowded condition of its cars that they scorn any proposition of that company for the building of additional subways to relieve the congestion. This sounds odd, but it is woefully true. The committee you propose can do good work in dissipating all of these errors and prejudices and stop all bickering."

Both Comptroller Prendergast and President Mitchel of the Board of Aldermen commented on the Mayor's letter. Mr. Prendergast said:

"Nearly every member of the Board of Estimate pledged himself to a municipally built and controlled subway system before election. Every man has a right to change his views, but his judgment in doing so and the sufficiency of his reasons for so doing are subjects for judgment by the people.

"We have practically $60,000,000 available, and it was planned all last spring by the Transit Committee of the Board of Estimate, whose members are the Mayor, Comptroller and President of the Board of Aldermen, that an outlay of $20,000,000 a year would enable the city to construct what is absolutely necessary in the way of a new system.

"To urge now that the $60,000,000 available and such additions as may be available in the next five years are not sufficient for a transit system suggests a pessimistic view of the city's financial ability not justified by facts.

"I am opposed to the city furnishing its present available funds for subways in any partnership with any interest which eliminates the possibility of an independent system. It is now important that the city decide whether it shall be independent of existing systems or whether it is going to surrender its independence."

Mr. Mitchel said:

"I am pledged to an independent municipally owned subway whose integrity shall be maintained, and I believe other officials are pledged likewise. I know that $57,000,000 was pledged by the Board of Estimate for such a system.

"I do not agree with the idea that $57,000,000 only is available, for I know that more millions will be realized from the increased borrowing capacity. I recollect that it was the sense of the Board of Estimate that more money would be available each year for transit development, and that, too, while providing for current needs. I recollect also that every member of the board, when a candidate for his present position, was convinced that money could be found for an independent system.

"It is time for the people to see the situation clearly. The pressing demand is for an independent, integral system, such as is fairly well outlined by the tri-borough plan. That plan is far from perfect and its details must be studied with care, but the underlying idea is right."

Samuel Rea, second vice-president of the Pennsylvania Railroad, said that the offer of the Hudson & Manhattan Railroad would not provide transit for the west side or for the Pennsylvania station. He insisted no person with intimate knowledge of the transit problem will believe a two-track line under Broadway from Herald Square to Tenth Street, with a moving platform to the Pennsylvania station, offers any more conveniences to the west side than do existing lines.

The terminal station of the Pennsylvania Railroad in Seventh Avenue, between Thirty-second and Thirty-third Streets, New York, was opened to pasengers between New York and points south, west, and southwest at 9:30 p. m. on Nov. 26, 1910, just 2 hours and 32 minutes before the first regular passenger train to pass through the Pennsylvania's Hudson River tunnels was scheduled to leave the new station. The first train to leave the new station was a local for Perth Amboy, N. J., and intermediate points. This train was dispatched two minutes after midnight. It was followed 20 minutes later by a through train for Philadelphia, Baltimore, Washington, Jacksonville, Atlanta, Birmingham, New Orleans and other cities in the Southeast and Southwest. At 1 a. m. the first express to start from Manhattan Island for Philadelphia left the station. The new schedule provides for the operation of 116 trains in and out of the station on weekdays and 89 on Sundays.

Association Meetings

Street Railway Association of the State of New York—Syracuse, N. Y., Dec. 6 and 7.

Central Electric Traffic Association—Indianapolis, Ind., Dec. 12, 13 and 14.

Massachusetts Street Railway Association—Boston, Mass., Dec. 14.

New England Street Railway Club—Boston, Mass., Dec. 22.

American Electric Railway Association—New York, N. Y., Jan. 27, 1911.

Statute Creating Ohio Railroad Commission Is Claimed to Be Unconstitutional.—In the case of the Baltimore & Ohio Railroad against the Railroad Commission of Ohio before Judge Kinkead, attorneys for the company recently argued that the law creating the commission is not constitutional because it confers legislative and judicial powers upon the members.

Election Result in Detroit Settled.—The final figures of the city canvassing board of Detroit, Mich., on a recount show that William B. Thompson, Democrat, was elected Mayor of Detroit over Proctor K. Owens. In the recount Mr. Owens made a total gain of 11 votes and Mr. Thompson lost 129, making Mr. Owens' net gain 140. The original count gave Mr. Thompson a plurality of 5287, but the recount reduces it to 5147.

American Association Papers.—The American Electric Railway Association has just republished in pamphlet form for distribution among the members the papers read at the convention of the association at Atlantic City, N. J., Oct. 10 to 14, 1910, by James F. Shaw, Frank R. Ford, Patrick Calhoun, Charles V. Weston, Joseph A. McGowan and G. E. Tripp. The pamphlet also contains the report of the committee on Interstate Commerce Commission affairs, presented at the same meeting. The pamphlet is entitled "Publicity, Problems and Progress."

Meeting of New England Street Railway Club.—On account of the regular date for the meeting of the New England Street Railway Club coming on Thanksgiving evening the executive committee changed the date of the meeting to Nov. 30, 1910, at the American House, Boston, Mass. The program for the evening included the presentation of papers entitled "Freight and Express Possibilities for Electric Railways," by C. V. Wood, vice-president of the Electric Express Company and traffic manager of the New England Investment & Security Company, Springfield, Mass.; George H. Dunford, general express and freight agent of the Old Colony Street Railway, Brockton, Mass., and C. T. Battey, manager of electric express of the Union Street Railway, New Bedford, Mass.

Grand Trunk Railway to Electrify Lines in Montreal.—It was announced at Montreal, Que., on Nov. 18, 1910, that the plans for elevating the tracks of the Grand Trunk Railway from the Bonaventure station of the company in Montreal to St. Henri, which are being prepared for submission to the Board of Railway Commissioners at a meeting to be held at Montreal shortly, embrace a scheme for handling all traffic within the city with electric locomotives. Steam engines will be detached from trains entering Montreal from the east at St. Lambert and from the west at St. Anne's. It is proposed to secure power from St. Timothy, where the plant of the Canadian Light & Power Company is situated. The Grand Trunk Railway will apply to the Dominion Parliament at the present session for authority to raise funds for electrification. The direct-current system will be used.

Pittsburgh Committee Studies New York and Philadelphia Subways.—The members of the sub-committee of the committee on subways of the Council of Pittsburgh have returned to Pittsburgh after inspecting the subways in New York and Philadelphia with a view to obtaining ideas of possible application to the rapid transit problem in Pittsburgh. A. G. McConnell, chairman of the committee, is quoted as follows in an interview with him which was published in the Pittsburgh *Dispatch:* "We have collected enough data to be of great help [illegible] project comes up before the C[illegible] here that I firmly believe Pit[illegible] transit within three years. F[illegible] mittee were so impressed with [illegible] and the manner in which crowds are handled that they have made up their minds to work zealously to relieve Pittsburgh of its transit congestion."

Decision Regarding Right of Interurban Railway to Parallel Steam Railroad.—In the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1077, reference was made to the decision of the Appellate Court of Indiana in the injunction suit brought by the Lake Shore & Michigan Southern Railroad against the Chicago, Lake Shore & South Bend Railway, in which is was alleged that the high-tension wires of the Chicago, Lake Shore & South Bend Railway interfered with the transmission of messages over the telegraph lines of the Lake Shore & Michigan Southern Railroad. This suit was originally brought in the Circuit Court of Elkhart County, which denied an injunction. The Appellate Court, which is a court of last resort, has sustained the trial court. In the previous reference to this case it was made to appear that the plaintiff had appealed from the finding of the Appellate Court, whereas the case was appealed to the Appellate Court from the Circuit Court.

Revision of National Electrical Code.—Norman Litchfield, secretary-treasurer of the American Electric Railway Engineering Association, has issued the following announcement of the meeting to revise the National Electrical Code: "The biennial meeting of the electrical committee of the Underwriters' National Electric Association will be held in March, 1911, in New York. The day and place of the meeting will be announced later. As usual the provisions of the National Electrical Code as they now exist will be the principal matter for consideration, and you are requested to forward to the undersigned, on or before Jan. 1, 1911, any desired changes in or additions to the code, so that they may be transmitted promptly to the Underwriters' National Electric Association. As heretofore, the meeting will be open to all interested, and such persons will not only be welcome, but are urged to be present and give the committee the advantage of their experience and advice."

Columbus Dynamiter Apprehended.—Alfred N. Strader, who is accused of perpetrating dynamite outrages during the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, was arrested at Princeton, W. Va., on Nov. 17, 1910. Strader was arraigned in court on Nov. 21, 1910, and held in default of $8,000 bail to appear for hearing on Dec. 7, 1910. Immediately after Strader's arrest it was reported that half a dozen other men who feared that they would be connected with the dynamiting outrages had left Columbus. On Nov. 22, 1910, Charles Davis, a switchman on the Toledo & Ohio Central Railroad, was arrested on the charge of complicity in the

dynamiting. Witnesses for the defense in the trial of George W. Brady, alias Gerald O'Leary, charged with shooting and wounding two women and a girl during the strike, were examined on Nov. 22, 1910. Harrison Christ and Ernest Hameter were acquitted on Nov. 22, 1910, of the charge of stoning cars. These are the first acquittals secured in these cases.

New Governor of Pennsylvania on Railroad Commission.—In a newspaper interview which he gave recently John K. Tener, Governor-elect of Pennsylvania, supplemented in part as follows the statements made by him in his pre-election speech delivered at Norristown on Nov. 4, 1910, in which he referred to the question of enlarging the powers of the Railroad Commission of Pennsylvania: "I have not thought of any new regulation nor have I had time to think out any means of making the State Railroad Commission a more powerful, not to say arbitrary, tribunal. But this I do think and know—a commission that merely suggests that an error or an omission be remedied or supplied and has no power to enforce its recommendations is worse than no commission at all. I want to see the commission armed with the power to compel a railway to remedy defects, not merely to suggest that faults be eliminated. If a railway cannot keep up its lines in the manner they should be kept up it should get out of business. The public makes it possible for that railroad to operate, and the railroad should serve the public first and serve it well." The speech made by Mr. Tener at Norristown was referred to in the Electric Railway Journal of Nov. 19, 1910, page 1037.

San Francisco's Municipal Railroad Tax.—Judge Seawell has declared invalid the tax of $720,000 which was levied in 1906 by the Board of Supervisors of San Francisco to rebuild the Geary Street, Park & Ocean Railroad as a municipal line. Since this tax was levied a bond issue has been authorized for the reconstruction of the Geary Street Park & Ocean Railroad and bids for material have been received by the Board of Public Works. From the bids received those of the Pennsylvania Steel Company and the Lorain Steel Company have been taken under advisement. The offers were to supply approximately $130,000 worth of steel rails. The Pennsylvania Company offered to supply steel grooved girder rails per long ton at $34.25 and steel guard rails at $44.25. These prices were f. o. b. for railway shipments from the points of manufacture. For delivery to ship's side at New York, Philadelphia or Baltimore the offer was $38.40 for both types, and for delivery at San Francisco the prices were $50 and $60 respectively. The Lorain Company offered to deliver grooved girder rails on cars at its plant for $36.90 a long ton and the guard rails for $46.90; to deliver at ship's side for $38.40 and $48.40 respectively, and to deliver in San Francisco the prices were the same as those of the Pennsylvania Steel Company.

Cleveland Subway Suits to Be Pushed.—Attorney James E. Matthews, acting for David Evans, a taxpayer, is preparing to push the suit which has been brought in the Supreme Court to test the validity of the recent grants to the Cleveland Underground Rapid Transit Railroad for the construction of underground lines in Cleveland. Mr. Matthews stated that the same situation prevails in relation to the suit of George B. Harris against the city, in which the validity of the first subway ordinance was attacked. While the Evans suit involves only the claim that the City Council has a right to repeal the subway ordinances and that its action on Jan. 17, 1910, was according to law, the Harris suit is much broader. It questions the right of the old Council to pass the subway ordinances by simply dividing into two parts the old ordinance which the people had voted down at the polls. Mr. Harris says that if the combined contentions in the two suits are wrong a City Council can enforce its dictates by simply making minor changes in measures that have been repudiated at the polls. Mayor Baehr would not commit himself upon the amendments to the subway ordinances proposed by the Chamber of Commerce, and stated that he would prefer to await the result of the suits now pending. If the Supreme Court should hand down a decision adverse to the subway grants then the vote would be null and there would be no need of amendments. On the other hand, should the court uphold the grants, the suggestion will probably be acted upon by the city authorities.

Financial and Corporate

New York Stock and Money Market.

Nov. 29, 1910.

After a week of extreme stagnation in the Wall Street market selling was insistent on Nov. 28 and prices declined from three to six points on the active issues. To-day the market was irregular and less active than yesterday, and slight recoveries were recorded. For many days there has been a feeling of insecurity among traders, and while the decline is attributed to the pessimistic utterances of James J. Hill, it was not unexpected.

The market for bonds continues very slow, while the money market is easy and rates are cheap for demand loans. Quotations to-day were: Call, 2@2½ per cent; 90 days, 4@4½ per cent.

Other Markets

In the Philadelphia market the traction shares are merely marking time, waiting for a definite agreement upon refinancing plans. There are still fairly liberal sales of Rapid Transit and Union Traction, but there is no definite tone or direction to prices.

In Chicago there is still considerable movement in Railways certificates, especially Series 1 and 2. Prices have displayed much strength. Series 1 during the week has sold as high as 92½, and Series 2 has touched 26⅜.

Both Massachusetts Electric and Boston Elevated continue to be active in the Boston market. Almost every day sees trading in these issues, but the prices remain practically unchanged.

There has been little trading in traction securities in the Baltimore market during the week. Some United Railways bonds are still bought and sold at former prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 22.	Nov. 29.
American Railways Company	43	a43
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a90	a90
Boston Elevated Railway	a129½	127½
Boston & Suburban Electric Companies	a16½	*16½
Boston & Suburban Electric Companies (preferred)	a72	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a41	a40
Brooklyn Rapid Transit Company	78	76⅜
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83⅛	82⅝
Capital Traction Company, Washington	a128	a128
Chicago City Railway	*170	a180
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a82¼	a92
Chicago Railways, ptcptg., ctf. 2	a22¾	a25½
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a6	a6½
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a74	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	a57	a54½
General Electric Company	156¼	a155⅞
Georgia Railway & Electric Company (common)	a118	*118
Georgia Railway & Electric Company (preferred)	a88	*88
Interborough-Metropolitan Company (common)	20⅞	19⅝
Interborough-Metropolitan Company (preferred)	56	53¾
Interborough-Metropolitan Company (4½s)	80⅜	80
Kansas City Railway & Light Company (common)	a21¼	a21¼
Kansas City Railway & Light Company (preferred)	a75	a75
Manhattan Railway	141½	140
Massachusetts Electric Company (common)	a20½	a19½
Massachusetts Electric Companies (preferred)	a88¾	86
Metropolitan West Side, Chicago (common)	a21	21
Metropolitan West Side, Chicago (preferred)	a68	*68
Metropolitan Street Railway, New York	*22	19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*65½	61½
Northwestern Elevated Railroad (common)	a22	a22
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	45½	a45
Philadelphia Company, Pittsburg (preferred)	42	a42
Philadelphia Rapid Transit Company	a18	a18½
Philadelphia Traction Company	*82	*82
Public Service Corporation, 5 per cent col. notes	a95	a95
Public Service Corporation, ctfs.	a101	a101
Seattle Electric Company (common)	a107½	a107¼
Seattle Electric Company (preferred)	a103	*103
South Side Elevated Railroad (Chicago)	a65	*65
Third Avenue Railroad, New York	a123¾	105⅝
Toledo Railways & Light Company	*10	a8
Twin City Rapid Transit, Minneapolis (common)	108½	a109½
Union Traction Company, Philadelphia	a41¾	a43½
United Rys. & Electric Company, Baltimore	a15	a14½
United Rys. Inv. Co. (common)	*14¾	*14¾
United Rys. Inv. Co. (preferred)	57	*57
Washington Ry. & Electric Company (common)	a34	a33½
Washington Ry. & Electric Company (preferred)	a87½	a87½
West End Street Railway, Boston (common)	a90½	a90½
West End Street Railway, Boston (preferred)	*100¾	*100½
Westinghouse Elec. & Mfg. Co.	71⅜	69
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	*124
Westinghouse Elec. & Mfg. Company (1st pref.)	124	*124

a Asked. * Last sale.

Earnings of New York City Companies.

The New York Public Service Commission, First District, has issued a statement showing the earnings of the street railway companies under its jurisdiction. The accompanying table has been compiled from the statement of the commission. It gives the earnings of the principal companies for the year, and also the total results of all the street railway companies in the city. The totals shown in the tables include results of a number of companies which are not shown in detail in the statement published herewith.

EARNINGS OF STREET RAILWAY COMPANIES OPERATING IN NEW YORK CITY DURING YEAR ENDED JUNE 30, 1910, AS REPORTED BY PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT

	Hudson & Manhattan	Interborough Rapid Transit Co. — Elevated Division.	Interborough Rapid Transit Co. — Subway Division.	Interborough Rapid Transit Co. — Total.	Brooklyn Rapid Transit Co	Metropolitan Street Railway (Receivers)	Third Avenue Railroad System (excluding Yonkers Railroad)	Coney Island & Brooklyn	New York & Queens	Total for all companies (including minor companies)
Passenger revenue	$2,141,999	$14,684,845	$13,435,535	$28,120,381	$20,455,130	$12,929,259	$6,924,738	$1,451,507	$1,013,888	$75,949,252
Freight, mail, etc., revenue	9	38,378	8,269	46,647	291,589	.....	10,382	1,283	6,050	411,700
Total transportation revenue	2,142,008	14,723,224	13,443,805	28,167,028	20,746,719	12,929,259	6,935,120	1,452,790	1,019,938	76,360,952
Advertising and other privileges	89,036	250,000	207,500	457,500	157,045	240,820	85,000	12,905	6,907	1,096,340
Sale of power	4,461	32,209	279,951	312,159	.....	.....	754,289	.....	3	1,075,236
Other street railway operating revenue	1,953	49,710	1,250	50,960	444,134	47,038	287,294	4,978	3,069	888,384
Total street railway operating revenue	2,237,459	15,055,142	13,932,506	28,987,648	21,348,498	13,217,117	8,061,704	1,470,672	1,029,918	79,420,911
Maintenance of way and structures:										
Actual expense	120,982	778,508	670,049	1,448,557	1,519,328	2,033,671	691,949	170,557	89,729	6,280,472
Depreciation reserve	81,653	71,117	a 5,605	65,513	a 72,256	.....	.....	.....	1,284	180,336
Maintenance of equipment:										
Actual expense	40,122	844,490	712,964	1,557,454	1,866,488	1,059,154	412,965	111,519	69,119	5,454,738
Depreciation reserve	52,239	37,076	79,257	116,333	123,419	72,000	.....	.....	1,670	404,470
Power:										
Operation of power plant (gross)	199,934	1,037,967	1,134,813	2,172,810	1,920	b 1,040,334	527,228	c 79,672	c 8,617	d 4,278,181
Power bought or exchanged	e 43,005	.....	.....	.....	2,704,243	a 243,910	661,566	29,787	239,012	3,756,557
Injuries and damages	26,806	170,024	147,003	317,027	855,533	f 1,314,388	312,072	107,910	99,294	3,163,907
Operation of cars	400,218	2,849,864	1,714,630	4,564,494	5,109,629	3,450,997	1,836,530	402,309	304,626	17,015,809
Traffic and other general expenses	92,146	467,645	303,309	770,954	709,733	529,674	467,081	110,078	62,343	2,911,676
Total operating expenses	971,095	6,256,693	4,756,450	11,013,143	12,818,037	9,256,309	4,909,792	1,011,831	875,694	43,451,148
Taxes	g 210,341	1,525,142	225,280	1,750,422	1,291,149	1,265,116	520,121	80,519	67,787	5,254,037
Operating income (profits)	1,056,023	7,273,307	8,950,776	16,224,083	7,239,312	2,755,691	2,631,791	378,322	86,437	30,715,727
Non-operating income	882,656	25,635	385,389	411,024	401,625	186,839	25,855	2,026	a 348	h 2,036,694
Gross income (or profits)	1,938,679	7,298,942	9,336,165	16,635,107	7,640,938	2,942,531	2,657,646	380,348	86,089	32,752,421
Interest	i 1,759,827	98	2,298,530	2,296,627	3,630,267	590,000	676,467	155,069	252,727	9,723,288
Rent for lease of road	.....	5,851,080	2,181,204	8,032,284	2,285,758	1,810,661	.....	100,000	.....	12,228,703
Other rent deductions	119,682	6,577	2,543	9,119	302,490	202,449	195,469	33,502	44	960,886
Other deductions	39,881	.....	212,930	212,930	.....	5,009	.....	.....	.....	296,353
Total deductions	1,919,390	5,857,754	4,695,206	10,552,960	6,218,515	2,608,119	871,936	288,571	252,771	23,209,229
Net corporate income (or profits)	19,290	1,441,188	4,640,959	6,082,147	1,422,423	334,412	1,785,710	91,777	a 166,682	9,543,192

a—Decrease, loss or negative.
b—Horse-power, $203,473; electric power plant, $836,861.
c—Electric power plant.
d—Including $3,836,149 for electric power plant, $1,920 for cable power plant and $440,112 for horse-car stables.
e—Credit on account of power supplied to terminal buildings.
f—Including $569,955 reserved for unsettled claims, etc.
g—On properties operated.
h—Includes income from outside operations as follows: Hudson & Manhattan Railroad's terminal building, $870,069; Richmond Light & Railroad Company's lighting department, $111,226.
i—On capital employed in operation.

Report of the Columbus, Delaware & Marion Railway.

A report of Eli M. West, receiver of the Columbus, Delaware & Marion Railway, Columbus, Ohio, covering the fiscal year ended Aug. 6, 1910, has been filed in the common pleas court of Franklin County, Ohio. A statement of A. F. Elkins, auditor, which accompanies the report, shows the following earnings and expenses for two years:

FISCAL YEAR ENDING AUG. 6

GROSS EARNINGS

Main Line (Interurban):	1910	1909
Cash fares	$97,481	$83,294
Tickets	93,087	87,085
Chartered cars	2,245	2,836
Mileage	6,403	6,656
Freight	22,446	20,627
Express	5,721	2,536
Milk	7,563	5,723
Package and baggage	742	791
United States mail	233	250
Light and power	6,556	4,399
Rent of land and buildings	314	104
Advertising	708	735
Rent of track and terminals	3,003	2,455
Newspapers	776	562
Other sources	1,309	1,297
	$248,587	$219,350
Delaware (Railway)	8,719	5,769
Marion (Railway and Light)	101,831	89,845
Total	$359,137	$314,964

COST OF OPERATION

Main Line (Interurban):	1910	1909
Maintenance of way and structures	$22,691	$10,556
Maintenance of equipment	13,191	10,237
Operation of power plant	32,996	35,146
Operation of cars	43,326	39,102
General expenses	32,362	30,648
	$144,566	$125,689
Delaware (Railway)	11,629	7,171
Marion (Railway and Light)	50,190	46,330
Total	$206,385	$179,190
Income from operation	$152,752	$135,774
Fixed charges	140,197	137,699
Other deductions	8,272	.....
Net income	$4,283	*$1,925

*Deficit.

The cost of additions to the property during the year was $26,953.

Mr. West says in his report in part:

"It may be needless for me to tell you that the track had been neglected. The average life of ties is about eight years, provided they are of good quality and what are termed first-class ties. Unfortunately, the ties in most of this track must have been of an inferior quality when the line was built. The track has been built about eight years, which would necessitate the removal of nearly all the ties to put it in first-class condition, but from what I can learn very few of the ties had ever been renewed prior to the receivership, consequently it was necessary to replace approximately 10,831 ties, at a cost of 70 cents per tie, including labor, to insure safety. The lack of ballast has shortened the life of ties on this road, and in many places they were laid in mud, no ballast to speak of having been supplied.

"The Green Camp branch had not been operated for some time prior to the appointment of the receiver, and the business would not warrant its operation in my judgment. I would recommend, if no legal complications would arise, that this branch be taken up. There are timbers in the bridge, trolley wire, poles and rails that could be used on the main line. The ties on this branch are of poor quality and of very litle use. The bridges along the main line are generally in poor condition and were really dangerous until needed repairs were made. They have been materially strengthened by renewal of timbers at a cost approximately of $3,000, and I feel sure they are safe for the winter. Eventually these bridges should be replaced by culverts and filled.

"The output of current has been increased during the past year, due to more cars. The loss of power could be greatly reduced by bonding the rails. The rail bonding is in a deplorable condition, and the track between Delaware and Marion has never had but one rail bonded.

"The shops at Stratford—while there is a good deal of machinery to make needed repairs—are not large enough,

and it is a source of expense at all times to make repairs and is costing considerably more to maintain our equipment, due to this condition.

"The passenger cars had been neglected and had reached a point where extensive repairs were necessary.

"The Delaware City cars were found unsafe to operate, and in many of them passengers could not ride on rainy days without the use of an umbrella. The public would not ride, and the fact that there were only four cars which filled the line made it impossible to maintain any schedule. These cars have all been overhauled and repainted and are now safe for operation, and patronage has increased.

"The Marion City cars were also in bad condition and, with the returns from junk picked up along the road, five cars were purchased of the Cleveland Railway for about $800 each, including a thorough going-over through the shops, painting, etc. The old city cars in Marion have been thoroughly gone over and painted in our shops and are now in good condition. I have also purchased another closed car to fill the lines in Marion with a 10-minute schedule. This has materially increased our earnings in Marion.

"A readjustment of our rates has had the effect of producing a better feeling along the road, which, in my judgment, is the best asset we have and which the road never before enjoyed.

"When this road was turned over to the receiver it was being operated with verbal orders and was the only interurban road in the State that did not use written orders. To change this system, in order that the cars might be operated with the least possible danger, necessitated the purchase of order blanks and the installation of telephone booths along the line, large enough to permit the trainmen to write their orders under cover. This was done at no little expense.

"The men were working without a standard rule book and there was a constant disregard of orders, due to ignorance and lack of definite rules to guide them. These were purchased and a copy furnished to each employee.

"The freight rates were raised and our reports will show increased earnings. This company had a contract with the Wells-Fargo Express Company and was handling the express at a substantial loss to this company. The contract was canceled, the mileage cut in half, and the express company now pays on a mileage basis.

"The earnings from this business are over $500 per month, as against $200 per month last year.

"Wages have of necessity been increased on the line in the various departments, from the track men to the heads of all departments.

"The road has been extremely fortunate in the small number of accidents since its receivership.

"By making some needed changes and alterations, our insurance was reduced about $900 a year, with an expenditure of about $200.

"Prior to the receivership a nominal sum of $50 per month had been paid by the Prospect Lighting Company for current furnished by this company. The contract called for 2 cents per kilowatt, but no meter had ever been installed to measure the current. After installing a meter, the revenue was increased to an average of $95.41 per month. I have instructed our attorney to bring suit to collect the amount due this company since the contract was made. Power had been furnished the Columbus, Marion & Bucyrus Railroad since its operation, as well as terminal facilities, and passengers were carried over the tracks of the Columbus, Delaware & Marion Railway in Marion by the Columbus, Marion & Bucyrus Railroad. Little had ever been paid this company for such service prior to the receivership. Since that time between $600 and $800 per month has been collected.

"The court is already familiar with the apparent low operating expense prior to the receivership. This operating expense was kept abnormally low by charging all sorts of expense items, such as coal, interest, etc., to betterments or additions to property. In spite of the fact that the property was being allowed to deteriorate and was, in fact, not safe for operation, the books for the year just prior to the receivership showed charges of about $57,000 which were listed as betterments. I am convinced that almost every dollar of this was properly chargeable to operating expenses, and that this property is now being operated at a smaller per cent than ever in its history."

Bloomsburg & Millville Street Railway, Bloomsburg, Pa.—The Commonwealth Trust Company, Harrisburg, Pa., has filed a bill in equity against the Bloomsburg & Millville Electric Railway to foreclose a mortgage for $250,000, given in 1905, on which the company has defaulted in the payment of interest.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—The directors of The Indianapolis & Cincinnati Traction Company, incorporated as the successor to the Indianapolis & Cincinnati Traction Company, as noted in the Electric Railway Journal of Nov. 26, 1910, page 1079, have organized as follows: C. L. Henry, president and general manager; T. F. Rose, vice-president; J. F. Wild, secretary and treasurer. Judge Carter, of the Superior Court, has confirmed the sale of the property of the Indianapolis & Cincinnati Traction Company to J. J. Appel, representing the bondholders.

Interstate Railways, Philadelphia, Pa.—The stockholders of the Interstate Railways have ratified the plan to issue $1,000,000 of preferred stock at par, the proceeds to be used to liquidate the company's floating indebtedness and to pay overdue interest and the coupons due on the bonds in February. The stockholders of the American Railways have ratified an arrangement by which the 4 per cent bonds of the Interstate Railways held by the American Railways are to be returned to Edward J. Moore and Caleb F. Fox and others. The American Railways holds about $1,700,000 of the 4 per cent bonds of the Interstate Railways acquired in exchange for its own 4½ per cent debenture bonds on a basis of par for the latter to 50 per cent for the former, in accordance with a plan for taking over the properties of the Interstate Railways, which was abandoned. The American Railways is unwilling to accept the preferred stock plan as a bondholder. The proposed basis of exchange provides that the bonds of the Insterstate Railways shall have the February coupons attached and the bonds of the American Railways the July coupons or be accompanied by the cash equivalent. According to the Philadelphia *News Bureau*, it is intended, if the re-exchange is effected, to retire the debentures of the American Railways which were issued for this purpose only. Up to Nov. 22, 1910, about $740,000 of the proposed $1,000,000 of preferred stock issue of the Interstate Railways had been subscribed.

Ocean Shore Railway, San Francisco, Cal.—At the instance of the committee which represents the bondholders of the Ocean Shore Railway Judge Van Fleet, of the United States Circuit Court at San Francisco, has postponed the sale of the property of the company under foreclosure until Jan. 17, 1911. The committee representing the bondholders has requested the deposit of bonds of the company with the Union Trust Company, San Francisco, Cal., under the terms of a new plan which provides for the issuance by a successor corporation after foreclosure of the following securities: $3,500,000 of first mortgage bonds, $5,500,000 of second mortgage 5 per cent bonds, $500,000 of 5 per cent non-cumulative preferred stock and $8,500,000 of common stock.

Railways Company General, Philadelphia, Pa.—The directors of the Railways Company General have declared an extra cash dividend of 5 per cent on the $700,000 of stock of the company, payable on Dec. 2, 1910, to holders of record on Nov. 21, 1910. The company has paid five quarterly dividends of 1 per cent each. In September, 1909, an initial cash dividend of 10 per cent was distributed. It was recently voted to change the date of the annual meeting from the third Monday in September to the third Monday in February and also to change the date of the fiscal year from June 30 to Dec. 31.

Springfield (Mass.) Street Railway.—The Railroad Commission of Massachusetts has approved the consolidation of the Springfield & Eastern Street Railway and the Springfield Street Railway and has authorized the Springfield Street Railway to increase its stock not more than $900,000 and to exchange this stock share for share for the stock of the Springfield & Eastern Street Railway.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—The sale of the property of the Wilmington, New Castle & Southern Railway under foreclosure, to which reference was made in the Electric Railway Journal of Nov. 12, 1910, page 1007, has been fixed for Dec. 23, 1910.

Traffic and Transportation

Reduction in Fare Ordered Between Albany & Rensselaer

The Public Service Commission of the Second District of New York has decided that the United Traction Company, Albany, N. Y., is entitled to charge only 5 cents fare between Albany and Rensselaer and has required the company to notify it not later than Dec. 10, 1910, whether or not it will desist from charging the present 6-cent fare and accept the order. The complaint was made in behalf of the Rensselaer Chamber of Commerce. The rulings of the commission, made in an opinion written by Commissioner Decker, are summarized as follows:

"1. The contract entered into April 29, 1895, between the Albany & Greenbush Bridge Company and the Albany Railway furnishes no basis for a determination that the railway company or its successor, the Cohoes Railway, was to act as agent of the bridge company in the collection of a bridge toll of one cent per passenger carried in the cars of the railway company.

"2. When the Albany Railway, subject to the laws of the State at the time and thereafter in force, undertook to become a common carrier of passengers by electric railway between Rensselaer and Albany such undertaking involved the carriage of passengers upon a bridge across the Hudson River, and as such common carrier between the two cities and over the bridge known as the Albany and Greenbush Bridge it has assumed the obligations and enjoys the privileges of a common carrier corporation.

"3. The fact that in 1897 Rensselaer granted a franchise to the Albany Railway conditioned upon a 6-cent fare between Rensselaer and Albany cannot be held to constitute a contract which forecloses the Legislature from exercising thereunder its dominant control of this and every other railway corporation of the State in respect of fare to be charged or service to be rendered.

"4. The regulation by the Legislature in 1864 of passenger fares for the Albany Railway was merely an exercise of the power of restraint by the State that is never exhausted and which has been further exercised by the Legislature in the Barnes act of 1905 as applied to this line and again in the way of general and systematic regulation in the public service commissions law of 1907 and its amendment in 1910.

"5. In this case complainant invokes chapter 358 of the laws of 1905, which became effective May 1, 1905, and is known as the Barnes act, under which the fare for the transportation of passengers by electric railway between Rensselaer and Albany is limited to 5 cents per passenger. The respondent, Cohoes Railway, is charging 6 cents per passenger, one cent of which under the contract of its predecessor, the Albany Railway, with the old Albany & Greenbush Bridge Company is paid to the bridge company as a license charge for a right-of-way across the bridge. This rental or license charge is one-fifth of the total 5-cent fare prescribed by the Barnes act and is plainly a large addition to what would be the ordinary cost of service and is actually in addition to the cost of construction, maintenance and operation of the track and electrical equipment upon the bridge.

"No question is raised in this case as to the reasonableness of the present 6-cent fare. The sole contention is that the respondent is limited to a fare of 5 cents under the Barnes act of 1905. Under sections 49 and 57 of the public service commissions law this commission is directed to secure enforcement of provisions of law applying to common carriers which it finds to have been violated. In rate cases the main function of the commission is to pass upon the reasonableness or justness of the challenged rate. In this case the commission is held by the complaint and character of the case solely to determine whether the 5-cent fare fixed by the Barnes act applies to respondent under all of the circumstances. The complainant is seeking to have an act of the Legislature enforced and respondent is here contending that the act in question is unconstitutional. Such a case, which is one peculiarly for action by the courts, may be raised before the commission only under and because of the provisions for the enforcement of laws applying to common carriers set forth in sections 49 and 57 of the public service commissions law above quoted. *Held*, that the Barnes act of 1905 applies to the transportation by the respondent of passengers between Rensselaer and Albany, and it is the duty of the commission to require respondent, the Cohoes Railway, to put in force a fare of 5 cents between Rensselaer and Albany in conformity with the provisions of said act and to comply generally with the requirements of that statute."

Operating Statistics of the New York City Railways.

The table published herewith showing the operating statistics of the principal street railway companies in the various boroughs of Greater New York for the year ended June 30, 1910, has been compiled from a statement issued by the New York Public Service Commission for the First District.

OPERATING STATISTICS OF NEW YORK CITY RAILWAYS FOR YEAR ENDED JUNE 30, 1910, AS REPORTED BY PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT

Company.	Miles of track	Passenger cars operated	Passenger car hours	Passenger car miles (active)	Car seat miles	Total revenue car miles	Number of transfers	Number of passenger fares
Hudson & Manhattan Railroad	12.879	140	319,184	5,482,809	241,243,599	5,542,601	.....	42,839,979
Interborough Rapid Transit Company	199.970	2,402	7,002,899	112,260,905	5,587,547,128	113,905,006	.....	562,788,395
Elevated division	118.030	1,573	4,237,634	62,504,996	3,000,239,808	63,646,232	.....	293,826,280
Subway division	81.940	829	2,765,265	49,755,909	2,587,307,320	50,258,774	.....	268,962,115
Brooklyn Rapid Transit System	582.640	2,911	8,780,971	77,939,345	3,729,559,287	79,584,829	151,279,806	415,277,754
Metropolitan Street Railway, receivers	159.480	1,453	(a)5,095,062	36,916,774	(b)1,344,513,893	37,737,542	120,762,597	260,555,510
Third Avenue Railroad System (excluding Yonkers Railroad)	242.743	793	3,181,789	24,147,886	1,084,662,313	24,361,227	36,392,652	138,494,167
Coney Island & Brooklyn Railroad	47.190	174	717,911	5,988,572	292,212,932	6,022,140	5,382,403	30,052,084
New York & Queens County Railway	74.010	121	541,824	4,868,179	210,070,544	5,054,635	8,265,276	20,277,770

(a) Estimated by Bureau of Statistics and Accounts on basis of seven and one-third car miles per car hour, electric, and 5975 horse car; (b) estimated by Bureau of Statistics and Accounts on basis of ratio of car-seat miles reported October to June to car miles.

Withdrawal of Residents' Tickets in Baltimore

The United Railways & Electric Company, Baltimore, Md., has withdrawn from sale the special residents' tickets sold on one of its suburban lines. An explanation of the reasons for this action has been published by the company in the newspapers of Baltimore. It is in part as follows:

"First—In a case recently before the commission certain residents of Ellicott City complained, among other things, that they did not have a special rate like that enjoyed by the residents of Catonsville. The commission decided that the regular Ellicott City rate was not unreasonable, but at the same time expressed the opinion that any special rate limited to residents of a particular place was a violation of the law. Neither before nor after this decision did the company seek or desire or welcome any change of the existing conditions. The commission, however, had the right to expect and did expect the company to stop violating the law without waiting for a specific order to that effect.

"Second—It has been thoughtlessly urged and repeated that the commission did not order the withdrawal of the special rates. Since, however, the law, as necessarily construed by the commission, forbids any special rate limited to residents, it is obvious that all residents' books had to be withdrawn from sale; and it is further obvious that the special rates enjoyed by residents could only be continued by making them applicable to all riders between the same termini.

"Third—In all cases the residents' rates were of long standing, and, while unprofitable to the company, they in-

volved a comparatively small number of riders. But to have made these reduced rates applicable to all riders would have been to increase an existing loss to the extent of crippling the service.

"Fourth—The company has received from some users of residents' books suggestions made in a friendly spirit and intended to meet the difficulty. Unlike the case of a steam railroad or an interurban electric line, a suburban railway is compelled by the obvious necessities of the case to employ the fare-zone system. It is natural enough that a person living just beyond a fare-zone line should object to paying an additional fare, but it is obvious that wherever the zone line is established there will be some one living a little beyond it. The length of a fare-zone must depend not so much upon distance as upon the riding population in the zone; in other words, the life of a suburban railway company depends upon its earnings per car mile and not per track mile. The fare in a sparsely settled zone, if reasonable service is to be supplied, would necessarily have to be more than the fare in a thickly settled zone of the same length.

"In conclusion, this company calls attention to the fact that it operates a large system with many ramifications, and that it is more or less impossible to satisfy all of its patrons in the matter of fare charges.

"In recent years large sums of money which would otherwise have gone to the security holders have been applied to increasing the frequency, efficiency and dependability of the service. The continuation of such a service is incompatible with any reduction of rates; and, while it may be conceded that the residents who have heretofore enjoyed reduced rates are entitled to consideration, it is also true that they constitute but a small portion of the entire riding public. It would seem reasonable, therefore, that the question involved should be discussed temperately and with a recognition of the fact that the public service law and not the company's choice has caused the disturbance of the pre-existing conditions."

Rules to Govern Operation in Montreal.

The Public Utilities Commission of Quebec has ruled as follows as a result of an investigation which it conducted recently of 20 street railway accidents in Montreal:

"1. No further cars of the single truck pattern are to be placed upon any of the routes without permission of the commission.

"2. The number of such cars must be reduced each year by 50, and if sufficient reasons are shown such cars will be permitted to operate.

"3. All cars 30 ft. or more in length and weighing 25,000 lb. must be equipped with air as well as hand brakes.

"4. Cars on severe grades must also be equipped with emergency brakes.

"5. As soon as the cars are so equipped and have the 'H-B' or other type of automatic mechanical drop wheel guard with apron attached to the truck, fender shall be removed.

"6. Draw guards must not project from the platform of cars.

"7. All projecting iron or steel bumpers must be removed.

"8 Speed limit of 8 m. p. h. must be adhered to.

"9. All accidents must be reported to the commission immediately with all necessary information.

"10. Cars must be thoroughly examined as to all parts of their equipment before going out, and no defective cars shall be taken out.

"11. If an accident occurs, motormen must report at nearest station.

"The above work and alterations must be carried out within four months as to double-truck cars, and within ten months on all other cars. The work is to be done to the satisfaction of the engineer of the commission."

Changes in Routine and Discipline in Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company, through William Seibert, superintendent of surface lines of the company, has announced the following modifications in the routine covering the service of employees and in the handling of discipline, effective Dec. 1, 1910:

"1. The service is divided into the following periods:

"(a) Student period. From date of appointment to completion of instruction.

"(b) Probational period, which covers three months from date of appointment and includes student period.

"(c) Permanent period, which begins after completion of probational period.

"2. Reappointed employees.

"If previous service with the company in the position to which reappointed covers a period of three months, an employee will be passed at once to the permanent period of service as soon as there is seen to be no further need of instruction.

"If previous service with the company in the position to which reappointed is less than three months, employee will be required to serve a full probational period of three months before entering upon the permanent period.

"3. During service in probational period employees will receive no credits, nor will demerits be given unless for flagrant violations necessitating discharge. Discipline will be administered in the form of admonitions and a record kept of all violations reported, based upon which and upon the general qualifications the employee will be released from service or passed to his permanent period upon the recommendation of his assistant superintendent, approved by the superintendent of surface lines.

"4. If retained in service at the end of the probational period an employee will then receive the bonus, fixed at time of appointment, to cover time breaking in.

"5. An employee will be discharged upon accumulation of 80 demerits net.

"6. On or before the accumulation of 40 demerits net an employee will be cautioned and shown his personal record."

Transfer Complaint Dismissed in Pittsburgh.—The Railroad Commission of Pennsylvania has dismissed the complaint of A. Mezovitz regarding the transfer system of the Pittsburgh Railways because those who signed the petition which Mr. Mezovitz presented were not residents of the territory included in the complaint.

Seats for Motormen in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company proposes to equip its cars which are fitted with air brakes with seats for the motormen. The men will not be permitted to use the seats, however, within the territory bounded by the Delaware River and the west bank of the Schuylkill River, and between Girard Avenue and South Street.

Through Freight Between Louisville and Indianapolis.—Through freight service by electric railway between Louisville and Indianapolis has been arranged as a result of negotiations between the Louisville & Southern Indiana Traction Company, New Albany, Ind., and the Indianapolis, Columbus & Southern Traction Company, Columbus, Ohio. Heretofore freight has been carried out of Louisville by electric railway only as far as Seymour.

Heating Cars in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has notified the State Railroad Commission that the surface cars of the company will be heated this winter whenever the temperature reaches 40 deg. Fahr., except during the rush hours. Heretofore the cars have been heated when the thermometer registered 35 deg. Fahr. In a letter to the commission the company says that the power required to operate cars during the rush hours is so great that none can be spared for heating.

Depot Advertising Sign.—The Louisville & Northern Railway & Lighting Company, Louisville, Ky., has developed a profitable advertising medium in connection with its depot on Third Avenue, near Walnut Street, Louisville. A large sign has been erected in the depot and spaces on it have been divided and sold to the leading local advertisers. The company is furnishing statistics of the number of passengers who enter and leave the depot, so as to show the value of the spaces on the sign to advertisers.

Complaint Against Jersey Central Traction Company Dismissed.—The Board of Public Utility Commissioners of New Jersey has dismissed a complaint alleging failure of the Jersey Central Traction Company, Keyport, N. J., to run a car in connection with the boats of the New Jersey

Central Railroad which arrive at Atlantic Highlands at 5 p. m. and 6 p. m. The board finds that the complaint is not sustained and that the company provides such connections as may reasonably be required in view of the necessities of the service along the line as a whole.

Increase in Wages in Hamilton, Ont.—The Dominion Power & Transmission Company, Limited, Hamilton, Ont., has increased the wages of all the men employed on the lines of the Hamilton Street Railway and the Hamilton Radial Electric Railway 2 cents an hour, the increase to take effect on Dec. 4, 1910. The employees of the Hamilton Street Railway now receive 16, 18 and 20 cents an hour and the employees on the Hamilton Radial Electric Railway 17 cents and 18 cents an hour. The employees have extended the agreement under which they work from April, 1912, until April, 1914.

Freight Service Over the Northern Electric Railway.—In the ELECTRIC RAILWAY JOURNAL of Oct. 22, 1910, page 892, mention was made of the daily two-car freight service established by the Northern Electric Railway, Sacramento, Cal., from points in Butte County to Sacramento in conjunction with the Western Pacific Company and thence to San Francisco. In regard to this service S. W. Russell, general freight and passenger agent of the company, says: "We made no arrangements for any return loads from San Francisco and no special arrangements were made for the going loads. We have a vineyard located on our line and the grapes were disposed of in San Francisco. Consequently the arrangement with the Western Pacific Company. We have also hauled a very heavy tonnage of hay the same way."

New Terminal Facilities for Chicago, Lake Shore & South Bend Railway.—It it stated that the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has purchased nine acres of property adjoining the Illinois Central Railroad's depot at Pullman, Ill., where the Chicago, Lake Shore & South Bend Railway parallels the Illinois Central Railroad and where there is a joint platform for the exchange of passengers. The substantial growth of interurban traffic on the Chicago, Lake Shore & South Bend Railway necessitated the purchase and the station will become an important transfer point for street car patrons after the 111th Street extension of the Calumet & South Chicago Railway is completed. It is understood that the Chicago, Lake Shore & South Bend Railway will build a local station and lay out extensive storage and terminal tracks on the new property. The company has recently completed the work of double-tracking a considerable section of its line between Gary and Pullman.

Near-Side Stops in Baltimore.—As announced in the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1081, the United Railways & Electric Company, Baltimore, Md., began stopping its cars on the near side of the street on Nov. 25, 1910, in compliance with an ordinance passed by the City Council recently. The United Railways & Electric Company favors the ordinance, and W. A. House, president of the company, in commenting on the operation of the system is reported to have said: "What is now most needed is the permanency of some such system. It has been changed five times since 1891, when the first rapid transit cars were run in the city. It is but natural the patrons should at first become confused. The company did what it could to advance the passage of the ordinance which enforced the present method. It did this because it created a uniformity in the system. When the public once understands this we believe we can operate with fewer accidents and with little or no confusion."

Cincinnati Employees Impressed with Necessity of Being Courteous.—On Nov. 24, 1910, Robert E. Lee, superintendent of the Cincinnati (Ohio) Traction Company, conferred with about 1,000 motormen and conductors of the company and impressed upon them the necessity of being courteous to passengers on all occasions. Passengers frequently were inconsiderate, but the conductors should smile and look pleasant and restrain any desire to resent an insult. A pleasant, polite, accommodating and cheerful set of employees would win the good will of the public when other methods failed. The men were careful in these matters and must continue so to retain their reputation and that of the company. Mr. Lee cautioned the men about drinking while on duty. Any accident that might occur would be charged to drunkenness if the employees were seen to enter saloons while in uniform. After requesting the men to operate their cars still more carefully, he told them that they need not feel insecure in their positions, and that his office was always open to them for a conference.

Increase in Wages in Brooklyn Effective in January.—The Brooklyn (N. Y.) Rapid Transit Company on Nov. 23, 1910, announced an increase of practically 5 per cent in the wages of its trainmen, to date from Jan. 6, 1911, in recognition of the increasing efficiency of its employees as indicated by the merit system of the company, the intelligent attention given by the men to the many new questions relating to transfers, their general courtesy to the public and their care of the company's interest. The announcement was addressed to the trainmen of the Brooklyn Rapid Transit System by J. F. Calderwood, vice-president and general manager of the company, who directed the attention of the men who are ambitious for advancement to the importance of a record consistently free from demerit marks, as the company desires to make appointments from the ranks when filling vacancies in the transportation department. The bulletins addressed to the men which announce the change refer in detail to certain changes in the grading of the men under the merit system of discipline which is used by the company. The general plan of promotion for efficiency according to this system was published in the ELECTRIC RAILWAY JOURNAL of Jan. 15, 1910, page 126, in connection with the increase in wages announced by the company at that time.

Boston Elevated Railway Reprints Advertisements.—The Boston (Mass.) Elevated Railway has had printed in pamphlet form the advertisements which appeared in the Boston daily newspapers between Sept. 28, 1910, and Nov. 2, 1910, on "what the Boston Elevated has done for rapid transit." References to this series of advertisements appeared in the ELECTRIC RAILWAY JOURNAL on Oct. 15, 1910, page 856, and Nov. 19, 1910, page 1045. The preface that appears in this pamphlet follows: "The Boston Elevated Railway by a series of maps and explanatory notes published in the Boston daily newspapers between Sept. 28 and Nov. 2, 1910, gave to the public detailed information in relation to the additions to the street railway and rapid transit system that have been provided since it began operation in January, 1898. Much has been accomplished. The company means to give to this community the most adequate system and the most satisfactory service that can be provided. The co-operation of public authorities and the support of public opinion are essential in this undertaking. Believing that the maps and explanations contain a great deal of matter necessary to an intelligent understanding or study of the situation, the company has reprinted the same in this form, which is more suitable for preservation and more convenient for consultation than were the original advertisements in the newspapers."

Attempt to Limit Car Capacity in Kentucky.—The South Covington & Cincinnati Street Railway, Covington, Ky., has secured a restraining order in the Circuit Court of Kenton County, Ky., to prevent the City of Covington and its officials from enforcing an ordinance recently enacted for the regulation of the street railway traffic. The ordinance provides that the number of persons carried in a car shall be limited to one and one-third times the seating capacity of the car, except upon certain holidays; that railings shall be placed on both platforms so as to facilitate loading and unloading; that the cars shall be cleaned and fumigated once a week, and that the temperature shall never be permitted to go below 50 deg. Fahr. The chief of police is instructed to delegate a policeman to see that the ordinance is not violated. In its petition the company asserts that the city has no power under its charter to pass such an ordinance; that the ordinance is an unreasonable and unlawful regulation of the business of the company, and that the company cannot exclude from its cars passengers from Cincinnati bound for the other side of the river nor exclude those bound for Cincinnati who board the cars on the Kentucky side in order to comply with the regulation limiting the number of passengers to a car. The company also contends that it would be impossible to accommodate traffic during the rush hours under the terms of the ordinance. The hearing for a permanent injunction was set for Dec. 2.

Personal Mention

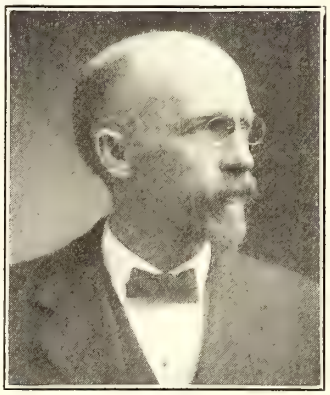
Mr. A. M. Bemis has been appointed general manager of the Oklahoma Railway, Oklahoma City, Okla., to succeed Mr. W. A. Haller, resigned.

Mr. Edward Goepper has been elected vice-president of the Cincinnati (Ohio) Street Railway, which is leased to the Cincinnati Traction Company, in order to afford Mr. John Kilgour, the president of the company, more leisure time, there having been no vice-president heretofore to act in Mr. Kilgour's absence.

Mr. A. J. Becht has been elected secretary and treasurer of the Cincinnati (Ohio) Street Railway to succeed James A. Collins, deceased. Mr. Becht has been secretary of the Cincinnati & Hamilton Traction Company for some years. This property is leased to the Ohio Traction Company and is operated as the Millcreek Valley Division of that company. Mr. Becht has also been assistant cashier of the Citizens' National Bank, Cincinnati, which position he will resign, effective on Jan. 1, 1911.

Mr. John Leisenring has been appointed signal engineer of the Illinois Traction System, Peoria, Ill. Mr. Leisenring's general experience in steam and electric railway signal work since he finished his college engineering course has included construction and maintenance signal work on the Lehigh Valley Railroad in New Jersey and the Hudson & Manhattan Railroad, operating the tunnel system between New Jersey and New York City. After serving through the construction period Mr. Leisenring was appointed signal engineer of the Hudson & Manhattan Railroad in July, 1910. He resigned from this position to become connected with the Illinois Traction System. The headquarters of the signal department of the Illinois Traction System will be at Peoria during the time that the recently purchased automatic block signals are under construction.

Mr. A. S. Kibbe has resigned as chief engineer of the American Railways, Philadelphia. His resignation took effect Nov. 30, 1910, and the office was abolished on that date. Mr. Kibbe has not yet fully decided on his future plans, but will probably engage in consulting engineering work, after a short rest. He has occupied the office which he has just resigned for the past 11 years. During this time Mr. Kibbe has had engineering charge of the construction and operation of the electric railway, lighting and power plants of the American Railways, which comprises about 350 miles of track and 15,000 kw capacity in power stations. For four years previous to his connection with the American Railways Mr. Kibbe was engineer of construction of William Wharton, Jr., & Company, and built the Fairmount Park Railway, Philadelphia. He was born in Albany, Aug. 8, 1865, and received the degree of civil engineer from the Rensselaer Polytechnic Institute in 1886. After two years' work in civil engineering, principally in connection with the Champlain Canal, he was appointed special assistant to the New York State Engineer in August, 1888, and was engaged in a number of important undertakings in connection with State surveying and water supply and regulation. In April, 1892, he resigned from the State Engineering Department to engage in electric railway work as engineer and superintendent of the Woodbridge & Turner Engineering Company, and was engaged in the construction of a number of electric railways, among them the Paterson Central Railroad of New Jersey, the Washington, Alexandria & Mt. Vernon Railway, the Chester (Pa.) Traction System and portions of the system of the People's Traction Company, Philadelphia. He severed his connection with the Woodbridge & Turner Engineering Company in September, 1895, to become engineer of construction of William Wharton, Jr., & Company, as previously mentioned. Mr. Kibbe is a member of the American Society of Civil Engineers.



A. S. Kibbe

Mr. Charles Remelius resigned Nov. 21, 1910, as superintendent of rolling equipment, Public Service Railway, Newark, N. J. Mr. Remelius has had a long experience in electric railway and mechanical work, having been connected with the Cleveland City Railway Company, the Detroit United Railway, the Indianapolis Traction & Terminal Company, the St. Louis Transit Company and the Brooklyn Rapid Transit Company. He became connected with the Brooklyn Rapid Transit Company in 1904 and was associated with that company as master mechanic of the surface division until he became connected with the Public Service Railway. Mr. Remelius is an inventor of note as well as an expert on railway mechanical matters, and has made a number of important inventions in brakes and other appliances for electric railway service. He has not announced his future plans.

Mr. W. A. Haller has resigned as general manager of the Oklahoma Railway, Oklahoma City, Okla., to enter the engineering field again. Mr. Haller was born in Pittsburgh in 1871. He was educated in the local schools in that city and entered railway work in 1897 with the West End Traction Company, Pittsburgh. In 1900 he became connected with Sanderson & Porter, New York, N. Y., and was employed by them in the reconstruction of the Galveston Railway, on general engineering work in their New York office and on the reconstruction of the property of the New Orleans Railway & Lighting Company from 1904 to 1908. Mr. Haller was next connected for nine months with the Mobile Light & Railroad Company, Mobile, Ala., and redesigned and reconstructed the power house of this company and supervised the laying of considerable track on steel ties. He became connected with the Oklahoma Railway in March, 1909, as general manager in charge of engineering, construction and operation.

OBITUARY

Robert W. Tayler, judge of the United States Circuit Court for Northern Ohio, mediator in the settlement of the street railway situation in Cleveland and author of the grant under which the Cleveland Railway is operating, died in Cleveland on Nov. 26, 1910. Judge Tayler was born at Youngstown, Ohio, in 1852, and was a son of Robert W. Tayler, State Senator and Auditor of Ohio and Comptroller of the United States Treasury from 1863 to 1878. He was graduated from Western Reserve University in 1872 at the age of 19 years. The following year he taught school at Lisbon, Ohio, and for the two succeeding years he was superintendent of the school at that place. He next became editor of the *Buckeye State* at Lisbon. In 1877 Judge Tayler was admitted to the bar, and engaged in the practice of law at East Liverpool, Ohio. In 1880 he was elected prosecuting attorney of Columbiana County, and in 1894 was sent to Congress from the Eighteenth District and was re-elected three times. Subsequently he became a member of the law firm of Arrel, McVey & Tayler, Youngstown, Ohio. This firm acted as counsel for the Mahoning Valley Traction Company, and Judge Tayler made a study of traction affairs while counsel of this company which served him well later on. In 1905 he was appointed to the Circuit Court for the district of Northern Ohio by President Roosevelt. Judge Tayler's greatest service to the people of Cleveland was in the settlement of the street railway controversy which had resulted from the attempt of Mr. Tom L. Johnson as Mayor of Cleveland to force the Cleveland Electric Railway to operate at a 3-cent fare. Judge Tayler decided a number of legal questions during the Goff-Johnson negotiations, and when the referendum vote was taken which resulted in the management of the railway property being taken out of the hands of the city administration Judge Tayler appointed the receivers for the company. In October, 1909, he agreed to preside at hearings to settle points in dispute between the company and the city. This work was completed on Dec. 14, 1909, and on Dec. 18, 1909, Judge Tayler announced his decisions and sent to the City Council the draft of a franchise. Judge Tayler was buried from Trinity Cathedral on Nov. 29, 1910. Out of respect for the man and the work which he did to bring about a settlement of the street railway controversy, every car of the Cleveland Railway was stopped for five minutes as the funeral cortege left the Cathedral.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Owens River Valley Electric Railway, San Francisco, Cal.**—Application for a charter has been made in California by this company to build an electric railway in the Owens River Valley. Capital stock, $200,000. Headquarters: San Francisco. Directors: Curtis Hillyer, E. A. O'Brien, G. Carter, R. C. Pardoe and T. W. Forsyth, all of San Francisco; M. R. Jones, Oakland, and D. D. Oliphant, Berkeley.

***Porter, Chesterton & South Shore Railway, Indianapolis, Ind.**—Application for a charter has been made in Indiana by this company to build an interurban electric railway between Porter and Chesterton to a junction with the main line of the Chicago, Lake Shore & South Bend Railway, near Baileytown. Capital stock, $40,000. Directors: C. N. Wilcoxon, F. J. Lewis Meyer, C. E. Palmer, F. M. Childs and J. M. Chillas, all of South Bend.

***Bowling Green & Northern Railroad, Frankfort, Ky.**—Application for a charter has been made in Kentucky by this company to build a railway from Bowling Green to Leitchfield. Capital stock, $30,000. Incorporators: B. F. Gardner, M. H. Crump and C. H. Felton.

Hagerstown & Clear Spring Railway, Hagerstown, Md.—Incorporated in Maryland to build a 25-mile electric railway to connect Hagerstown, Clear Spring, Md., and Mercersburg, Pa. Preliminary surveys have been made and rights-of-way are being secured. L. F. Downs, New York, N. Y., and James B. Kreps, Hagerstown, are interested. [E. R. J., Nov. 19, '10.]

Georgia & Carolina Railway, Spartanburg, S. C.—Chartered in South Carolina to build a 120-mile railway from Augusta, Ga., to Spartanburg, S. C., via Hamburg, Saluda, Edgefield, Newberry, Glenn Springs and Pacolet. Capital stock, $100,000, to be increased later to $2,500,000. Officers: Allen W. Jones, Midville, Ga., president; A. E. Padgett, Edgfield, secretary; William E. Jackson, Augusta, and J. W. Thurmond, Edgefield. [E. R. J., Sept. 24, '10.]

FRANCHISES

***Haywards, Cal.**—I. B. Parsons has applied to the town trustees for a franchise to build a 4-mile electric railway over certain streets in Haywards.

New Britain, Conn.—The Connecticut Company has received a franchise from the Council to build double tracks on certain streets in New Britain.

Paducah, Ky.—The Paducah Traction Company has applied to the Council for a franchise to build an extension to its line from Paducah to Tyler and Fisherville via Mechanicsburg.

Shreveport, La.—The Shreveport Traction Company has received a franchise to build an extension to its line through the Colonial Hill subdivision.

Clear Spring, Md.—L. N. Downs and H. L. Kirby, representing the Hagerstown & Clear Spring Railway, Hagerstown, have received a franchise from the Commissioners to build an electric railway through Cumberland Street in Clear Spring. This is part of a plan to build a 27-mile line to connect Hagerstown, Clear Spring, Md., and Mercersburg, Pa. [E. R. J., Nov. 19, '10.]

***Hattiesburg, Miss.**—W. S. F. Tatum and W. O. Tatum have applied to the Council for a franchise to build a street railway in Hattiesburg.

Lebanon, Ore.—The Albany Interurban Railway, Albany, has received a franchise from the City Council to build an electric railway through Lebanon. It will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. P. A. Young is interested. [E. R. J., Nov. 19, '10.]

Butler, Pa.—The Butler Passenger Railway has applied to the Council for a franchise to construct a 750-ft. viaduct on Center Avenue, Butler, to span the Bessemer & Lake Erie Railroad and the Baltimore & Ohio Railroad tracks.

Somerset, Pa.—The Somerset & Rockwood Street Railway has received from the Council a two-year extension to its franchise, in which to begin construction of its proposed railway in Somerset County. J. A. Berkey, president. [E. R. J., Feb. 20, '09.]

Johnson City, Tenn.—The Johnson City Traction Company has asked the City Council for a franchise to build a 1½-mile extension of its tracks on Main Street to the Southwest addition and the Normal School in Johnson City.

Beaumont, Tex.—The Beaumont-Porth Arthur Interurban Electric Railway has received and accepted a franchise from the Council to build an electric railway from Beaumont to Port Arthur. Q. D. Polk is interested. [E. R. J., Nov. 19, '10.]

***San Antonio, Tex.**—J. A. Logwood has received a franchise from the County Commissioners to build an electric railway on the Corpus Christi road from Harlandale.

Tacoma, Wash.—The Tacoma Railway & Power Company has received a franchise from the Council to build an extension to its tracks on North Thirty-fourth Street, between Madison Street and Stevens Street, Tacoma.

TRACK AND ROADWAY

Nanaimo General Electric Railway, Nanaimo, B. C.—A by-law is being prepared authorizing this company to build an electric railway over certain streets in Nanaimo, B. C. [E. R. J., Aug. 27, '10.]

Los Angeles-Pacific Railway, Los Angeles, Cal.—This company has completed surveys for its 10-mile extension to connect Hollywood and Van Nuys via Cahuenga Pass and Lankershim. No contracts have been made yet, and it is not known when construction will begin.

Pacific Electric Railway, Los Angeles, Cal.—This company has begun work grading on its proposed extension from Pomona to Claremont.

Santa Rosa & Clear Lake Railroad, Santa Rosa, Cal.—This company has awarded contracts for grading for its proposed 56-mile electric railway to connect Santa Rosa and Clear Lake via Burke, Markwest, Kellog and Mount St. Helena. [E. R. J., Sept. 11, '10.]

***Roswell, Ga.**—R. G. Broadwall, J. B. Wing and associates are said to be promoting plans to build an electric railway to connect Creighton and Cummings via Roswell and Atlanta. [E. R. J., Mar. 26, '10.]

***Albany, Ill.**—S. B. Dimand, J. W. Dinnun, C. E. Peck and James Beach are promoting a plan to build an electric railway through Albany from the tri-cities.

Decatur Southern Traction Company, Decatur, Ill.—This company has raised $1,500,000 for construction purposes, and it is expected that work will soon be begun on its projected 35-mile railway to connect Decatur, Macon, Assumption and Pana. H. C. Simmons, Virden, secretary. [E. R. J., July 30, '10.]

Illinois Light & Traction Company, Streator, Ill.—This company is planning to build an extension of several miles from Ridgefarm to Sharon.

Beech Grove Traction Company, Indianapolis, Ind.—This company has awarded the contract to D. J. Welch and John McGregor for ballasting and track-laying on its line between Indianapolis and Beech Grove. Work is to begin at once. All grading has been completed and the poles are up. C. F. Smith, secretary. [E. R. J., Sept. 17, '10.]

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company is said to be considering the purchase of automatic track-circuit block signal protection.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is said to be contemplating the purchase of automatic track-circuit block signal protection.

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company, which purchased the Crooked Creek line, connecting Lehigh with Webster City, a distance of 17 miles, will electrify it at once. It will also construct a spur from Gypsum to Lehigh to connect it with the main line, thus giving new means of transportation between Webster City, Lehigh and Fort Dodge. J. L. Blake, manager.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company expects to build a 16-mile extension of its

line to Fort Riley. Joseph T. West, 217 Yuma Street, Manhattan, purchasing agent.

Salina Street & Interurban Railway, Salina, Kan.—This company is considering plans for building an extension of its line in Salina. H. C. Smithers, president.

Paducah (Ky.) Traction Company.—This company is planning extensions of its lines to Tyler, Mechanicsburg and Fisherville. It has applied to the cities for the necessary franchises.

Shreveport (La.) Traction Company.—This company has begun double-tracking the extension of its line on Southern Avenue in Shreveport. All material is on hand.

Mexico (Mex.) Tramways.—The National Congress has passed a bill authorizing this company to construct two important extensions. One of the proposed lines will connect Mexico City and Pueblo, a distance of 125 miles, and the other will extend from Mexico City to Toluca, a distance of about 45 miles. Preliminary surveys have been made. Construction will begin soon.

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.,—This company has awarded the contract to the Heintz-Young Construction Company, St. Louis, Mo., for building the railway from Mexico to Hereford, a distance of about 20 miles. It will connect Perry, Mexico City, Santa Fe, Hereford, Columbia, Fulton and Mokane. Mathias Crum, president.

Syracuse (N. Y.) Rapid Transit Railway.—This company is considering plans for double-tracking its line through Liverpool.

Berwick & Nescopeck Street Railway, Berwick, Pa.—This company has resumed work on the construction of its line through Nescopeck.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company has awarded the contract to Ridge Brothers Company, Pittsburgh, Pa., for grading the first 6 miles of its proposed 30-mile railway to connect Clarion, Reidsburg, Sligo, Rimersburg and East Brady. Work will be begun at once. G. E. Arnold, Clarion, president. [E. R. J., Oct. 29, '10.]

West Penn Railways, Pittsburgh, Pa.—This company has awarded the contract to Reagan & Lynch, Uniontown, for building the extension of its line from Juniata to Bitner.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has completed and placed in operation its extension to Bergerville. A further extension has just been completed to the convent at Sillery.

Johnson City (Tenn.) Traction Company.—This company has decided to build a 1½-mile extension of its line on Main Street to the southwest addition and the normal school in Johnson City.

***Bay Shore Rapid Transit Company, La Porte, Tex.**—This company has begun the preliminary surveys for an electric railway to connect La Porte and Houston, via San Jacinto. O. L. Allen and Charles M. Boren are interested.

***Texas City, Tex.**—Fordyce Ridley, Galveston, and associates are reported to be promoting a plan to build a 5-mile street railway in Texas City from Bay Shore to Texas City Heights.

Grafton (W. Va.) Traction Company.—This company will build a 6-mile extension of its line from Grafton to Pruntytown.

SHOPS AND BUILDINGS

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company will place contracts during the next two weeks for building a division car house with a capacity for 24 cars at Granite City. C. F. Hewitt, East St. Louis, superintendent.

St. Joseph Valley Traction Company, Elkhart, Ind.—This company has awarded the contract to S. J. Stowe for building a car house near the city depot on North Martha Street in Angola.

Chicago, Lake Shore & South Bend Railway, South Bend, Ind.—This company has purchased a 9-acre site adjoining the Illinois Central Railroad Company's depot property at Pullman, Ill., on which it will build a local station and lay out extensive storage and terminal tracks.

Atchison Railway, Light & Power Company, Atchison, Kan.—This company has begun work building a concrete machine shop at Falls City.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company is preparing plans for a passenger and express depot to be built in Syracuse. The cost will be about $10,000.

Western Ohio Railway, Lima, Ohio.—This company has begun the construction of a new freight depot at Lima. It will cost about $12,000. The Western Ohio Railway and the Ohio Electric Railway occupied a freight station jointly until the former erected a new station. The Western Ohio Railway retained its present passenger station.

Janesville Traction Company, Madison, Wis.—This company has begun preliminary arrangements for building its car house in Janesville. [E. R. J., Nov. 19, '10.]

POWER HOUSES AND SUBSTATIONS

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company will place contracts during the next three months for building a modern 2000-kw power plant. All communications are to be sent to T. C. Roberts, Pueblo, superintendent.

Capital Traction Company, Washington, D. C.—This company has awarded the contract to the Clarke-Winston Company, Georgetown, for the 1700 piles to be used in building the foundation of a power house to be built on Thirty-sixth Street and M Street in Georgetown. Work has been begun.

Augusta-Aiken Railway & Electric Company, Atlanta, Ga.—This company will supplement its present local power plant in Augusta by a steam plant, developing 3000 additional hp.

Southwest Missouri Electric Railroad, Webb City, Mo.—This company is building a substation in Joplin. The cost, including machinery, will represent an expenditure of about $20,000. A. H. Rogers, Webb City, general manager.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has completed plans for a new power plant to be built at what is known as the Gorge Bridge, on the Cuyahoga River, where a dam will be constructed. It is probable that the present plant at Arkon will be retained for some time after the new one is put in operation. Under present plans the construction work on the new building will be begun during 1911. The cost of the plant is estimated to be about $1,500,000.

Mount Vernon (Ohio) Electric Railway.—This company is building a new power house at Mount Vernon. A. J. Darrah, superintendent.

Port Arthur & Fort William Railway, Port Arthur, Ont.—This company will purchase a 500-kw motor-generator during the next six weeks.

Clarion & East Brady Electric Railway, Clarion, Pa.—This company is receiving bids for a new power plant complete with equipment. The plant will consist of the following: Three 500-kw turbo-generator sets, condensing steam pressure, 200-lb. either vertical or horizontal, three 350-hp vertical or horizontal water tube boilers; fuel is gas or soft coal; three surface condensers, vacuum pump, open feed water heater, two boiler feed pumps, either duplex or multistage, driven by steam turbine; three 20-kw exciter sets, six motor-generator sets, three circulating pumps, hot well pump, transformers and substation equipment. G. E. Arnold, Clarion, president.

West Penn Railways, Pittsburgh, Pa.—This company is making extensive improvements at its Connellsville power house, which will double the capacity of the plant. It is stated that eventually the company will erect a new power house near Speers.

Galveston-Houston Railway, Houston, Tex.—This company is having the General Electric Company build four switchboards complete with the entire equipment, including meters, instruments, electrolytic lighting arresters, disconnecting switches and oil switches. One board of 10 panels will go in the main station and one of six panels in substation No. 2, which is located in the main station. In substation No. 1 and No. 3, which are each 14 miles distant from the main station, there will be a switchboard of six panels. The power will be generated at 2300 volts, transmitted at 33,000 volts and used in railway work at 600 volts.

Manufactures & Supplies

ROLLING STOCK

Interstate Traction Company, Duluth, Minn., is considering the purchase of two cars.

Manhattan City & Interurban Railway, Manhattan, Kan., is planning to purchase several new cars.

Lexington (Ky.) Railway has purchased two sets of M. C. B.-27 double trucks from The J. G. Brill Company.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont., is considering the purchase of four pay-as-you-enter cars.

Southern Wisconsin Railway, Madison, Wis., has ordered four 20-ft. 8-in. semi-convertible cars from the American Car Company.

Great Falls (Mont.) Street Railway has purchased a standard snow sweeper from the McGuire-Cummings Manufacturing Company.

Western Ohio Railroad, Lake Shore Electric Railway and Fostoria & Fremont Railway jointly will purchase four passenger cars and a number of freight cars, according to advice from F. D. Carpenter, general manager, Western Ohio Railroad.

Twin City Rapid Transit Company, Minneapolis, Minn., expects to build about 75 single-end closed cars at its own shops during the next few weeks. They will be 46 ft. 8 in. long for interurban and city service and will be equipped with safety gates.

San Juan Light & Traction Company, San Juan, Porto Rico, has ordered 10 30-ft. center-aisle open cars mounted on No. 39E trucks from The J. G. Brill Company. The cars that are now used by this company will be remodeled into the pay-as-you-enter type.

Richmond & Henrico Railway, Richmond, Va., has ordered 16 closed cars from The J. G. Brill Company instead of 20 cars, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 12, 1910. The cars will be of the pay-as-you-enter type, 32 ft. long and will be mounted on Brill 39-E trucks.

British Columbia Electric Railway, Vancouver, B. C., expects to add to its equipment 122 new cars. Orders for 30 of these cars have been placed already with car building companies. A number will be built in the company's own shops. The new equipment will be divided approximately as follows: 50 city passenger cars, 30 interurban passenger cars, 3 combination passenger and baggage cars, 1 baggage car, 2 chair cars, 25 freight cars and 4 locomotives.

TRADE NOTES

Pittsburgh Steel Products Company, Pittsburgh, Pa., has appointed Richard R. Harris general manager of sales, in charge of all products.

Union Switch & Signal Company, Swissvale, Pa., has moved its western district office to 1041 Peoples' Gas Building, Chicago, Ill.

R. M. Campbell, formerly eastern sales manager of the Peter Smith Heater Company, Detroit, Mich., has resigned his position with that company.

Ackley Brake Company, New York, N. Y., has shipped a large number of Ackley brakes to the tramway systems of Lima, Peru, and Valparaiso and Santiago, Chile. Another order for 60 brakes has also been shipped to Japan.

Nachod Signal Company, Philadelphia, Pa., has received orders recently from the following railways for its automatic signals: American Railways, Philadelphia, Pa.; Los Angeles Pacific Company, Sherman, Cal.; Illinois Traction System, Peoria, Ill.; Lewistown & Reedsville Electric Railway Company, Lewistown, Pa.; Michigan United Railways Company, Jackson, Mich.; Lehigh Valley Transit Company, Allentown, Pa.; Chattanooga Railway & Light Company, Chattanooga, Tenn.; Wheeling Traction Company, Wheeling, W. Va.; East St. Louis & Suburban Railway, East St. Louis, Ill.

Pittsburgh Engineering Agency, Pittsburgh, Pa., has formed a business company to take over the foreign and territorial representation of the Associated Bureau Service, comprising the several bureaus of technical references, engineering research, industrial commissions and American trade catalogs. Offices were opened in the Bessemer Building, Pittsburgh, Pa., on Dec. 1, 1910. The first and last-named bureaus will be operated in the interest of the engineering profession and industrial corporations gratis, upon reciprocal reporting arrangements, the aim being to develop an effective central clearing house of technical intelligence and service.

Pay-As-You-Enter Car Corporation, New York, N. Y., has recently licensed a number of southern railways to build and operate pay-as-you-enter cars. The Georgia Railway & Electric Company is now building 20 double-truck pay-as-you-enter cars, and it is expected that nine of these cars will be in operation about Dec. 15. The Norfolk & Portsmouth Traction Company has placed an order for 10 double-truck cars; the Richmond & Henrico Railway has ordered 16 new cars and the Columbia Street Railway, Light & Power Company, Columbia, S. C., has just placed four pay-as-you-enter cars in operation and is remodeling all of its other cars to this type.

Baldwin Locomotive Works, Philadelphia, Pa., have appointed S. A. Bullock manager of the electric railway truck department, succeeding J. R. Dickey, resigned. Mr. Bullock has been connected with this department of the Baldwin Locomotive Works for a number of years. Previous to his connection with the Baldwin Locomotive Works he was master mechanic of the Louisville & Atlantic Railway and chief draftsman of the American Car & Foundry Company at Berwick, Pa. His new position is one of rapidly-growing importance owing to the advances which the Baldwin Locomotive Works are making in the construction and sale of trucks for electric railway service.

ADVERTISING LITERATURE

Ohmer Fare Register Company, Dayton, Ohio, has issued a small booklet entitled "Responsibility," calling attention to the merits of its indicating, recording and printing fare registers.

J. A. Fay & Egan Company, Cincinnati, Ohio, has issued a 384-page catalog illustrated with a large number of half-tone engravings. The catalog describes all the latest woodworking machinery manufactured by this company.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued circular No. 1137 on the principles of construction and operation of watt-hour meters. It describes the latest form of Westinghouse type C induction watt-hour meters, with micrometer light-load adjustment and permanent magnets so arranged as to be permanent, both in position and strength. The ball and jewel type of bearing and other features are described and illustrated, also a method of meter testing without the use of a stop watch.

The J. G. Brill Company, Philadelphia, Pa., prints in the Brill Magazine for November a biographical sketch of Calvin G. Goodrich, president of the Twin City Rapid Transit Company and the Duluth-Superior Traction Company. The sketch is accompanied with an excellent portrait of Mr. Goodrich as a supplement. Among the feature articles are the following: "Conditions Which Government the Type of Car for City Service—Sydney, Australia;" "Pay-As-You-Enter Cars for the Northern Texas Traction Company," "New Rolling Stock for the Boston & Maine Railroad," "Cars for the Trenton (N. J.) Street Railway" and "Passenger Coaches for Porto Rico."

General Electric Company, Schenectady, N. Y., has issued a new edition of its bulletin, No. 4602-B, on the subject of automatic voltage regulators for direct-current generators. The company has also issued bulletin No. 4782 entitled "Direct Current Exciter Panels," which illustrates and describes exciter panels for use in connection with alternating current generator panels when for any reason separate control of the exciter is desired. Another bulletin, No. 4786, issued by the company under the title of "Signals, Auxiliary Apparatus and Materials," describes a simple and reliable motor signal having a single mechanism suitable for either two-position or three-position operation in either the upper or the lower quadrant. This standard mechanism is also applicable to either top or bottom mast operation with but slight modifications. The bulletin contains nearly 90 pages of information, including exterior and interior views of the signal and a detailed description of the signal and apparatus used in connection with its operation.

TABLE OF MONTHLY EARNINGS.

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table sh be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various fina years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit.

Company	Period	Gross Income	Operating Expenses	Gross Income Less Operating Expenses	Deductions From Income	Net Income
AKRON, O. Northern Ohio Tr. & Light Co.	1m., Oct '10	$208,342	$113,371	$94,971	$43,367	$51,604
	1 " " '09	184,815	100,800	84,015	44,114	39,901
	10 " " '10	2,045,748	1,123,229	922,519	433,528	488,991
	10 " " '09	1,818,987	988,530	830,457	437,456	393,000
BANGOR, ME. Bangor Ry. & Elec. Co.	1m., Oct. '10	49,593	20,041	29,552	13,734	15,818
	1 " " '09	49,173	20,041	29,132	12,965	16,167
	4 " " '10	216,472	87,53	128,933	54,645	74,288
	4 " " '09	210,051	84,894	125,167	52,449	72,708
BELLINGHAM, WASH. Whatcom Co. Ry. & Lt. Co.	1m., Sept. '10	33,781	17,331	16,450	9,084	7,366
	1 " " '09	34,836	18,957	15,878	8,069	7,809
	12 " " '10	410,968	240,704	170,264	104,216	66,049
	12 " " '09	397,272	223,798	173,474	101,026	72,448
CHAMPAIGN, ILL. Illinois Tr. System	1m., Sept. '10	529,291	296,457	232,834	.....	.....
	1 " " '09	455,137	254,141	200,996	.....	.....
	9 " " '10	4,404,389	2,588,747	1,815,642	.....	.....
	9 " " '09	3,870,153	2,224,972	1,645,181	.....	.....
CHICAGO, ILL. Aur., Elgin & Chic. R. R.	1m., Oct. '10	154,359	85,783	68,576	33,799	34,797
	1 " " '09	137,663	73,772	63,891	29,413	34,477
	4 " " '10	677,075	344,049	333,027	132,441	200,586
	4 " " '09	618,116	302,583	315,533	117,077	198,457
CLEVELAND, O. Cleveland, Painesville & Eastern R.R.	1m., Oct. '10	31,818	*16,397	15,421	8,083	7,338
	1 " " '09	29,467	*16,846	12,622	7,828	4,794
	10 " " '10	301,199	*155,443	145,756	80,690	65,065
	10 " " '09	271,673	*145,431	126,242	75,428	50,814
Lake Shore Electric Ry.	1m., Oct. '10	105,075	*55,941	49,135	34,669	14,465
	1 " " '09	94,255	*49,754	44,501	35,453	9,047
	10 " " '10	1,018,739	*529,101	489,638	347,678	141,961
	10 " " '09	929,316	*489,445	439,871	344,547	95,325
Cleveland, Southwestern & Columbus Ry.	1m., Oct. '10	93,188	51,256	41,932	27,926	14,006
	1 " " '09	81,524	51,392	30,132	26,358	3,774
	10 " " '10	849,659	480,563	369,096	280,341	88,755
	10 " " '09	748,517	458,613	289,904	248,141	41,763
DALLAS TEX. Dallas Electric Corporation.	1m., Sept. '10	119,804	75,538	44,266	26,013	18,253
	1 " " '09	107,570	74,512	33,058	25,109	7,949
	12 " " '10	1,426,433	935,236	491,197	320,133	171,064
	12 " " '09	1,277,466	803,271	474,195	338,863	135,332
DETROIT, MICH. Detroit United Ry.	1m., Oct. '10	821,951	523,058	298,846	178,429	120,417
	1 " " '09	724,792	471,500	253,292	155,972	97,320
	10 " " '10	7,963,091	5,008,484	2,954,607	1,689,549	1,265,058
	10 " " '09	6,796,430	4,174,033	2,622,397	1,565,480	1,056,917
DULUTH, MINN. Duluth-Superior Trac. Co.	1m., Oct. '10	95,278	50,295	44,983	24,066	20,917
	1 " " '09	87,235	51,503	35,732	20,757	14,975
	10 " " '10	906,006	511,111	394,895	202,649	192,246
	10 " " '09	810,837	481,486	329,351	188,847	188,847
EL PASO, TEX. El Paso Elec. Co	1m., Sept. '10	54,846	31,384	23,463	8,215	15,247
	1 " " '09	50,501	29,874	20,627	8,185	12,442
	12 " " '10	634,416	365,320	269,096	101,287	167,809
	12 " " '09	574,578	366,077	208,501	94,377	114,123
FAIRMONT, W. VA. Fairmont & Clarksburg Trac. Co.	1m., Oct. '10	58,504	19,386	39,119	13,112	26,006
	1 " " '09	41,433	14,353	27,080	12,655	14,425
	10 " " '10	504,497	175,833	328,664	126,739	201,925
	10 " " '09	387,874	133,665	254,209	123,803	130,406
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Trac. Co.	1m., Sept. '10	136,685	75,497	61,188	45,112	16,076
	1 " " '09	132,736	71,064	61,672	42,672	19,000
	9 " " '10	1,134,725	638,914	495,812	405,554	90,258
	9 " " '09	1,038,350	608,539	429,811	381,445	48,366
FORT WORTH, TEX. Northern Texas Elec. Co.	1m., Sept. '10	118,192	61,594	56,598	19,690	36,909
	1 " " '09	104,829	57,786	47,043	17,190	29,853
	12 " " '10	1,391,001	747,343	643,658	223,911	419,747
	12 " " '09	1,220,147	676,071	544,076	199,971	344,105
GALVESTON, TEX. Galveston-Houston Elec. Co.	1m., Sept. '10	110,145	63,308	46,837	26,199	20,638
	1 " " '09	100,837	56,363	44,474	22,824	21,650
	12 " " '10	1,278,075	776,278	501,798	281,519	220,279
	12 " " '09	1,190,398	692,020	498,378	257,198	241,180
GRAND RAPIDS, MICH. Grand Rapids Railway.	1m., Oct. '10	91,267	46,152	45,115	19,979	25,136
	1 " " '09	82,519	41,508	41,011	19,314	21,697
	10 " " '10	947,928	461,927	486,001	198,930	287,071
	10 " " '09	858,541	404,470	454,071	190,084	263,987
HARRISBURG, PA. Central Penn. Trac. Co.	1m., Oct. '10	68,365	50,379	17,986	.....	.....
	1 " " '09	62,773	44,555	18,218	.....	.....
	10 " " '10	691,474	493,321	198,153	.....	.....
	10 " " '09	627,520	463,195	164,325	.....	.....
HOUGHTON, MICH. Houghton County Trac. Co.	1m., Sept. '10	26,710	12,653	14,057	6,637	7,419
	1 " " '09	28,732	14,029	14,703	6,216	8,487
	12 " " '10	314,992	166,411	148,582	77,400	71,182
	12 " " '09	310,504	168,003	142,501	70,809	71,692
JACKSONVILLE, FLA. Jacksonville Elec. Co.	1m., Sept. '10	45,995	27,156	18,839	9,451	9,388
	1 " " '09	38,375	20,808	17,568	9,522	8,046
	12 " " '10	559,603	297,076	262,527	112,402	150,125
	12 " " '09	464,945	264,792	200,153	111,859	88,294
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1m., Oct. '10	693,420	413,920	279,500	193,806	8
	1 " " '09	642,239	359,914	282,324	175,293	10
	5 " " '10	3,184,790	1,902,094	1,282,695	943,532	33
	5 " " '09	2,944,481	1,666,415	1,278,066	865,630	41
LEWISTON, ME. Lewiston, Augusta & Waterville St. Ry.	1m., Oct. '10	43,090	25,928	17,162	13,780	
	1 " " '09	43,332	24,768	18,564	15,080	
	4 " " '10	217,712	116,769	100,943	54,965	4
	4 " " '09	220,686	110,113	110,573	59,310	5
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1m., Oct. '10	411,907	282,919	128,988	47,325	8
	1 " " '09	382,395	252,877	129,518	48,783	8
	10 " " '10	3,916,035	2,740,937	1,175,098	468,973	70
	10 " " '09	3,536,497	2,319,920	1,216,578	471,754	74
Milwaukee Lt., Ht. & Trac. Co.	1m., Oct. '10	134,287	53,877	80,409	54,691	2
	1 " " '09	122,802	46,185	76,617	52,177	2
	10 " " '10	1,362,082	543,814	818,268	552,868	26
	10 " " '09	1,235,009	458,152	776,857	512,986	26
MINNEAPOLIS, MINN. Twin City Rapid Transit Co.	1m., Sept. '10	694,853	323,061	371,791	140,286	23
	1 " " '09	645,197	270,035	375,162	140,251	23
	9 " " '10	5,620,369	2,688,107	2,932,262	1,261,653	1,67
	9 " " '09	5,176,420	2,432,567	2,743,852	1,248,510	1,49
MONTREAL, QUE. Montreal St. Ry.	1m., Oct. '10	386,688	205,750	180,938	31 998	14
	1 " " '09	354,007	174,735	179,272	31 079	14
NASHVILLE, TENN. Nashville Ry. & Lt. Co.	1m., Oct. '10	161,502	95,231	66,271	33,390	
	1 " " '09	148,992	89,193	59,799	33,023	2
	10 " " '10	1,503,354	873,229	630,125	335,646	29
	10 " " '09	1,415,675	836,322	579,353	328,306	25
NORFOLK, VA. Norfolk & Portsmouth Trac. Co.	1m., Sept. '10	172,065	98,032	74,033	62,857	1
	1 " " '09	158,234	88,373	69,861	63,058	
	3 " " '10	557,798	305,585	252,213	194,298	5
	3 " " '09	512,671	285,873	226,799	189,527	3
PADUCAH, KY. Paducah Trac. & Lt. Co.	1m., Sept. '10	21,251	11,264	9,987	7,126	
	1 " " '09	19,096	10,895	8,201	6,613	
	12 " " '10	243,496	144,300	99,197	83,377	1
	12 " " '09	223,390	130,742	92,648	81,791	1
PENSACOLA, FLA. Pensacola Elec. Co.	1m., Sept. '10	23,265	13,960	9,305	5,207	
	1 " " '09	21,649	12,828	8,821	4,335	
	12 " " '10	262,078	154,288	107,789	58,820	4
	12 " " '09	239,858	137,181	102,677	51,865	5
PHILADELPHIA, PA. American Rys. Co.	1m., Sept. '10	339,378	.....	.....	.....	...
	1 " " '09	310,419	.....	.....	.....	...
	4 " " '10	1,436,171	.....	.....	.....	...
	4 " " '09	1,330,432	.....	.....	.....	...
PLYMOUTH, MASS. Brockton & Plymouth St. Ry.	1m., Sept. '10	11,975	7,529	4,447	1,359	
	1 " " '09	12,833	9,359	3,474	1,641	
	12 " " '10	121,012	85,186	35,826	20,756	1
	12 " " '09	129,964	90,935	39,029	22,771	1
PORTLAND, ORE. Portland Ry., Lt. & Power Co.	1m., Oct. '10	503,485	225,118	278,367	152,229	12
	1 " " '09	426,708	188,721	237,987	126,893	11
	10 " " '10	4,609,974	1,992,387	2,617,587	1,399,194	1,21
	10 " " '09	3,974,255	1,839,949	2,134,406	1,238,208	89
SAVANNAH, GA. Savannah Elec. Co.	1m., Sept. '10	51,599	32,606	18,993	18,158	
	1 " " '09	49,523	32,031	17,493	17,445	
	12 " " '10	620,179	404,526	215,653	214,652	
	12 " " '09	611,840	391,412	220,428	209,139	1
SEATTLE, WASH. Seattle Elec. Co.	1m., Sept. '10	481,158	274,705	206,453	110,933	9
	1 " " '09	568,494	305,341	263,153	106,944	15
	12 " " '10	5,633,484	3,336,054	2,297,429	1,293,999	1,00
	12 " " '09	5,592,481	3,238,318	2,354,162	1,220,796	1,13
SIDNEY, N. S. Cape Breton Elec. Co., Ltd.	1m., Sept. '10	28,835	13,113	15,722	6,148	
	1 " " '09	25,890	13,266	12,623	6,191	
	12 " " '10	317,733	170,922	146,811	73,972	7
	12 " " '09	279,498	168,163	111,335	74,020	3
TACOMA, WASH. Puget Sound Elec. Ry.	1m., Sept. '10	160,545	98,608	61,937	51,973	
	1 " " '09	179,956	107,605	72,351	48,552	2
	12 " " '10	1,903,484	1,258,100	645,384	606,082	
	12 " " '09	1,822,449	1,208,142	614,307	553,272	
TAMPA, FLA. Tampa Elec. Co.	1m., Sept. '10	44,969	23,909	21,059	6,018	1
	1 " " '09	47,108	27,253	19,855	4,615	1
	12 " " '10	619,255	342,639	276,616	60,077	21
	12 " " '09	582,847	352,488	230,360	55,940	17
TOLEDO, OHIO Toledo Rys. & Lt. Co.	1m., Oct. '10	239,620	129,720	109,901	75,616	
	1 " " '09	259,097	162,861	96,237	78,452	
	10 " " '10	2,223,255	1,263,769	959,486	727,818	2
	10 " " '09	2,440,147	1,516,426	923,721	769,162	1
TORONTO, ONT. Toronto, Ry.	1m., Oct. '10	379,721	188,568	191,153	.....	...
	1 " " '09	332,977	168,658	164,319	.....	...
	10 " " '10	3,575,659	1,841,335	1,734,324	.....	...
	10 " " '09	3,190,268	1,618,380	1,571,888	.....	...

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, DECEMBER 10, 1910 No. 24

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
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CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, DECEMBER 10, 1910.

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Reviewing National Convention Reports at a State Meeting

A commendable feature of the quarterly meeting of the Street Railway Association of the State of New York held this week in Syracuse was the review of several reports made by committees at the last convention of the American Electric Railway Association. Thus Mr. French contributed an excellent synopsis of the report of the committee on way matters, Mr. Schreiber presented some interesting comments on certain points brought up in the same report, while Mr. Harvie discussed the work of the Engineering Association's committee on car equipment. The talks on the training of transportation employees also had a close bearing on the work done along this line of endeavor at Atlantic City in 1910. Those who are familiar with the hurly-burly inseparable from a big convention will appreciate how much more can be got out of the papers and reports there presented if they can be reviewed in the more informal surroundings of a local association meeting. This practice has the further merit of bringing out the sentiments of many important operators who could not attend the national convention, so that the different committee members are made better acquainted with the general trend of opinion on the subject which has been assigned to them.

Through Rates and Joint Routes in New York City

The acceptance by the receivers of the Metropolitan Street Railway of the terms of the order requiring the company to exchange transfers with the Fifty-ninth Street crosstown line indicates their desire to meet a public need in a liberal spirit. The concession is mainly one of principle. No one can seriously claim that the 8-cent and the 10-cent fare to be charged for a ride, with one or two transfers respectively, over the lines of the Metropolitan Street Railway and of the Central Park, North & East River Railroad is not an adequate charge compared with the rate paid on other parts of the Metropolitan system. At the same time we can easily realize that the number of the abuses practised with the present transfer system and the loss to the company which has followed its extension and illegitimate use have made the management dread the establishment of new transfer points. Another serious problem is the proper division of the fare. Should it be shared equally, or should it be divided according to the average distance traveled per passenger on the joint transfer? These questions have an important bearing on future arrangements of the same kind. But it is equally true that the order sets the precedent of a charge for transfers, and of a still higher charge for a double transfer. If the public becomes used to paying for the privilege of changing cars at Fifty-ninth Street it will not seem so strange to make the same payment for the extra service rendered when one changes cars at Twenty-third Street, or at Fourteenth Street, or at any other junction point.

The Result of a Track Improvement

A good track may justly be considered as the foundation upon which the entire physical well-being of a railway is built. Everything in important betterments in the track structure is sure to make its influence felt to advantage in more than one direction. A striking proof of this fact was offered recently on a system where a branch of about 21 miles was overhauled by straightening out some bad curves, reballasting low spots, replacing battered joints and otherwise improving the roadway. The immediate consequences were the reduction of the running time from 90 minutes to 60 minutes, and of the number of cars required to operate the schedule from three to two. Another and even more welcome result was an increase of 33 1/3 per cent in the gross receipts. The annual saving in trainmen's wages alone, conservatively estimated at say $2,500, would have paid 4 per cent interest on an improvement loan of $62,500; but to this saving should be added that due to furnishing power for and maintaining two cars on a good track instead of three on a bad one, not to speak of the decreased accident liability. The increase in receipts proves how quickly the public will take advantage of faster and better service, even on a road which seems to be getting all the business possible. Thus the wise expenditure made in this case to improve the track not only produced a large reduction in the operating expenses, but by swelling the gross earnings with new business proved that the traffic on this particular line had not reached its saturation point under the old conditions.

A Greater Subway System

Negotiations between the Interborough Rapid Transit Company and the New York Public Service Commission for the First District have crystallized into a proposal for sane, workable extensions of the present subway system. The new plan overshadows in practical value the modification of the proposed tri-borough subway offered by President McAdoo, of the Hudson & Manhattan Railroad. It will afford, with the existing subway, a system linking the four boroughs of Manhattan, Brooklyn, Queens and the Bronx and operated by the present company at a straight fare of five cents to any point. It promises the long-needed relief to the lower West Side and the upper East Side of Manhattan Island. The capital requirements of the plan are even more reassuring. Of the $128,000,000 estimated cost the company will furnish $75,000,000, leaving $53,000,000 for the city to advance. That sum the city now has available for subway construction. The proposal also provides for the extension of the Third Avenue elevated line and its equipment with a third track. The details of the plan are now undergoing analysis by the representatives of the public regulating bodies, and if they receive the same commendation which is being accorded to the general features it appears as if the city and the company, after years of vexatious delay, will make a deal. The statement of Mr. McAdoo that his offer would be withdrawn on Dec. 15 may have hastened the completion of the Interborough proposition, and if that be the case he is entitled to the thanks of the community, for action, and not delay, is the prime necessity in the solution of the transit problem in New York. If fair terms to each interest are assured by the new plan and the extensions will be capable of operation as an independent system in the future, should the city so desire, we do not see that the argument in favor of competition at any price is worth consideration.

LESSONS FROM RECENT BATTERY CAR DESIGN

It is yet too early to prophesy whether the modern storage-battery car will fulfil all the promises made for it, but it will undoubtedly have at least a good effect on the general question of the design and power consumption of the standard trolley car. This condition arises from the fact that the designers of the accumulator car must give far more thought to problems of minimum weight and maximum power efficiency than those who deal with vehicles which receive power from a central station.

If the two classes of cars are compared with regard to weight it is evident that the self-contained car is handicapped by being obliged to carry a storage battery plus all the usual electrical equipment except the trolley base and pole. Just what this means may be judged from the fact that in the very latest form of traction battery 1 lb. of cell must be carried for every 19 watt-hours output. To wipe out the difference in weight the designer has to depart radically from conventional standards. Thus, in a recent example the bold expedient has been adopted of welding the entire car frame as a unit structure. By this means the amount of steel is minimized because the different members co-operate most effectively in taking up all strains. The net result in this case is a completely equipped car weighing about 725 lb. per passenger. This figure is a very reasonable one, indeed, in view of the fact that the battery alone weighs about 3250 lb., or 81 lb. per passenger. This weight per passenger compares very favorably with such light designs as the convertible prepayment cars of the Third Avenue Railroad in New York, and it is 300 lb. to 500 lb. lighter per passenger than many cars operated in city service.

These figures show that there is apparently no question that with a full welded frame the weight of cars can be appreciably reduced without a sacrifice in strength. It is doubtful, however, whether such a construction would not present some serious difficulties from a maintenance standpoint. It is not likely, for instance, that broken parts could be re-welded without a great deal of costly stripping. Nevertheless, something might be gained by welding the floor framing and by substituting the lighter flat arch for the monitor roof. The platforms also might be welded but still be attached to the end sills as usual.

The possibilities of saving weight economically outside of the car bodies are more remote. It is likely that for given stresses some alloy steels could save a few pounds in trucks and axles. In axles, at least, the gain would not be great enough to justify, in most cases, the abandonment of the standard diameters and the journal and gear dimensions with which they are so intimately connected. The application of chrome-steel axles on the storage-battery car is no criterion, because this car is special in almost every respect.

Another field in which the storage-battery car has attained commendable results is that of maximum power efficiency per ton propelled. The splendid possibilities of anti-friction armature and journal bearings have already been demonstrated in ordinary trolley service by the recent work of the Philadelphia Rapid Transit Company; but the designers of the storage-battery car have effected a still greater power saving by using roller-bearing wheels on non-revolving axles. So far this roller-bearing wheel has been applied only to the chain-drive transmission of one particular car, but it can also be adapted to the standard forms of motor gearing. The application of anti-friction bearings and incidentally the use of high-efficiency tung-

sten lamps has kept the power consumption of the storage-battery car down to approximately 45 watt hours per ton mile. The significance of this figure may be appreciated from the fact that in A. B. Stitzer's article on "Car Tests in Philadelphia with Anti-Friction Bearings," published in the ELECTRIC RAILWAY JOURNAL of Aug. 27, 1910, the average ton-mile power consumption with plain-bearing cars was 138.2 watt hours for two-motor equipments and 151 watt hours for four-motor equipments. As both the storage-battery car and the Philadelphia cars were operated under city speed conditions, the higher power consumption of the latter cannot be laid altogether to harder track and service requirements. In this connection it is interesting to consider that if all the power-saving features of the storage-battery car could be duplicated in a trolley car, the net power consumption as measured at the generating station would be less for the trolley car, because the usual distributing losses are far below the 30 per cent which is usually assumed as a minimum of the energy lost in charging and discharging the battery.

All in all, the storage battery advocates are rendering a valuable service to the electric railway art in trying out such radical innovations in car design and power equipment as those described in the foregoing paragraphs. It is quite probable that the self-contained car will prove a boon on many lines where traffic is so light or irregular as not to warrant the installation of a system of direct supply.

THE INDUCEMENTS TO CAPITAL FIFTY YEARS AGO

An editorial reviewing the decision in which the New York Public Service Commission for the First District rejected the second plan for reorganization of the Third Avenue Railroad was published in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 1, 1910. We commented then incidentally upon the statement of the commission that dividends of 6 per cent, 7 per cent or 8 per cent probably could have been declared from the beginning and yet enough accumulated to write off the old horse-car and cable roads that have disappeared. It is clear, as we stated, that such dividends were below the going rates for money in the early days. For the sake of historical accuracy, we have searched the records of the years nearest to those in which the company was incorporated and its initial opening took place.

According to the decision of the commission, the Third Avenue Railroad Company was incorporated on Oct. 8, 1853. How soon after that the operation of the road was started we do not know, but it is probable that no great period of delay occurred. We found a statement of earnings for 1857. The facts which follow respecting money rates and the terms of sale of railroad, municipal and State bonds and of discount of commercial paper during the period 1853-59 are taken from the files of *Hunt's Merchant Magazine and Commercial Review*, later absorbed by the *Commercial and Financial Chronicle*.

In January, 1854, the money market in Boston, New York and Philadelphia was reviewed as follows: "The value of capital as shown by the street rates for prime business paper is about 9 per cent or 10 per cent per annum, and at this rate large amounts can be readily obtained. Confidence, however, is not fully established, and second or third class securities are almost unsalable. Even railroad bonds of the better class, if not strictly ratable as prime, are negotiated with difficulty."

One month later it was stated that loans had been negotiated readily outside of the banks in Boston, New York, Philadelphia and Baltimore at 9@12 per cent per annum. In March of the same year part of the time borrowers in Cincinnati were charged at the rate of 1½ per cent to 2½ per cent a month. In April the rates for prime paper in leading cities were 10 per cent to 12 per cent. On May 10, 1854, the New York & Harlem Railroad Company sold $1,700,000 of 7 per cent first mortgage bonds at an average price of 93¾.

In 1855 the tendency of commercial paper rates appears to have been a little easier. Savings banks of strength and good standing, which are doing business still, paid 4 per cent, 5 per cent and 6 per cent interest on deposits. About the middle of the year 1855 the Central Railroad of New Jersey "borrowed" to expend on the road $1,500,000 upon 7 per cent bonds at 85. In May, 1856, the sale was reported of $1,600,000 of New York City 6 per cent stock maturing in three years at par and a fraction. Several months later the Burlington & Missouri River Railroad, now a part of the Chicago, Burlington & Quincy Railroad system, sold $250,000 of 8 per cent bonds at 85. The range on two railroad bonds in the Boston market during 1856 was as follows: Illinois Central 7s, due in 1875, from 83 to 97; Michigan Central 8s, due in 1869, from 99 to 102. In 1858 United States Government notes were sold on about a 4½ per cent interest basis. New York City sold in March, 1859, $374,000 of 6 per cent bonds redeemable in 1887 at 101 to 102.

Other instances without number might be given, but these are enough to support our statement. Capital was scarce and in demand for enterprises of every character, investment and speculative. The unavailability of capital for new enterprises was more disturbing than the prices exacted by the owners of funds. The gist of the real point which the commission assumes is at issue in this part of its opinion is not, however, what the company paid for its first capital, but "what might have been." It may be observed that the commission, although suggesting, commits itself very guardedly in expressing an opinion. Thus it says: *"If* from the beginning a reasonable amount as depreciation had been set aside out of earnings to take care of the various changes which have taken place, *if* the company had been conservatively financed and expenditures carefully watched, it is *probably* true that dividends of 6 per cent, 7 per cent or 8 per cent could have been declared and yet a sufficient amount have been accumulated to write off the old horse-car and cable roads that have disappeared."

Although it is not a slight thing, we may ignore the discrepancy between 6 per cent and 8 per cent. Two per cent annually for 50 years, without compounding the interest, is 100 per cent; or for 25 years it is 50 per cent.

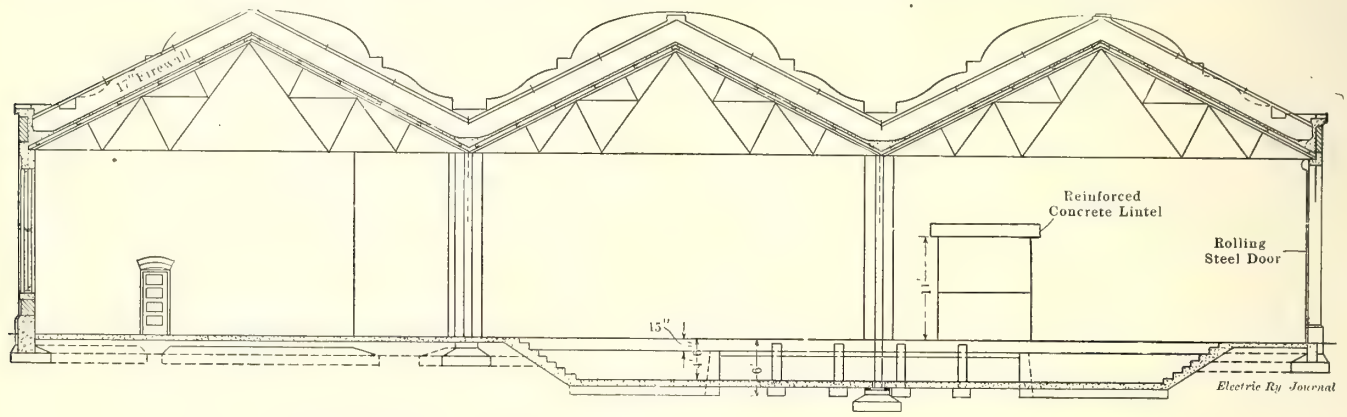
Unless the commission had facts with which to justify itself beyond peradventure, it might better, instead of hesitating in its conclusions, have withheld them altogether. The treatment of this subject tends to show that if foresight had only been equal to hindsight all would have been well with the Third Avenue Railroad system, its security holders and the public. We agree that it would have been easier for everybody concerned in this late day if those who first controlled the property had not only foreseen that the horse would pass and the cable would pass and electricity would come, but had also regulated their accounts and profits accordingly. But if the early investors or speculators had foreseen the destruction and substitution of motive power, who can say whether they would have been willing to advance funds for any but a brand new electric railway system?

NEW SHOPS OF UTAH LIGHT & RAILWAY COMPANY

Since the control of the Utah Light & Railway Company passed to the Harriman interests about four years ago, some extensive construction and rehabilitation work has been carried on in connection with the company's railway property as well as its light and power departments. In the convention issue of the ELECTRIC RAILWAY JOURNAL for Oct. 2, 1909, an extensive account was given of the improvements completed and under way at that time. The company's new car house under construction was then described, and this article has for its object some further reference to the car house and an account of the shops now being erected.

The site on which the car house and shop buildings stand consists of an entire city block located between Fifth South and Sixth South Streets and Sixth East and Seventh East Streets, a little over a mile southeast from the commercial center of the city. The block is 680 ft. square and has a general slope of 1 per cent toward the west, thus providing excellent drainage. The new car house, 430 ft. long x 229 ft. wide, is placed on the south half of the property, and, as previously described, is connected at both ends by tracks leading to the railway lines on Fifth South and Seventh East Streets. The architectural treatment is of the California Spanish Mission type, presenting a very pleasing appearance for so utilitarian a building.

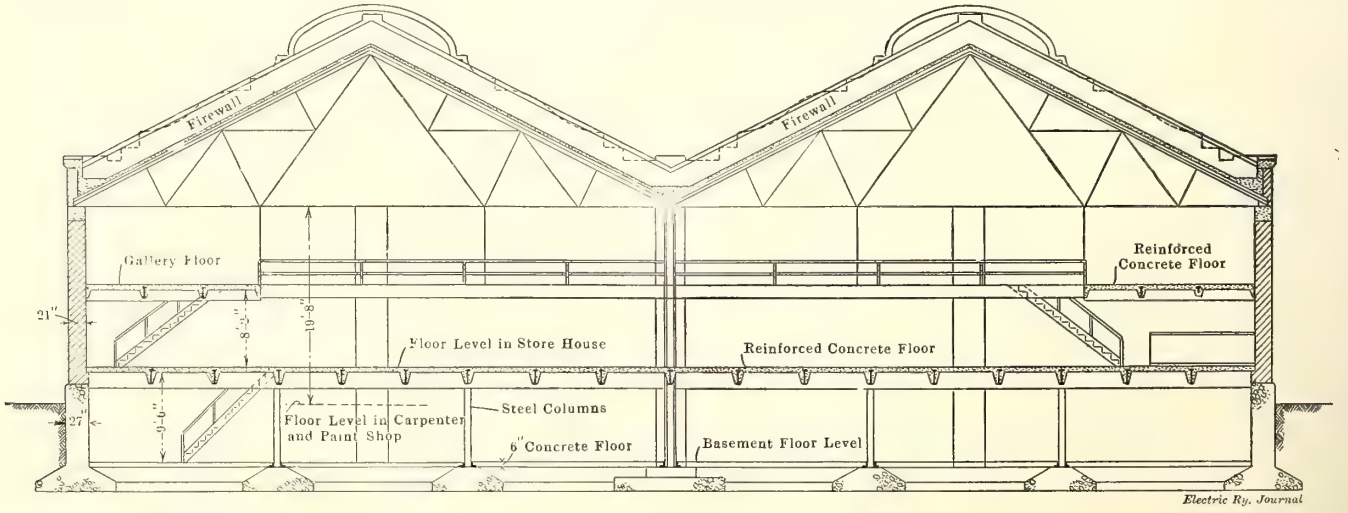
The new shops that are now nearing completion are located on the northwest quarter of the block, track connections being furnished by means of the ladder tracks leading from the west end of the car house to Fifth South Street, while the ladder on the east side of the grounds is connected by a spur leading to the east end of the transfer table pit. There are two principal shop buildings, the northerly one containing the storehouse, paint shop and carpenter shop. The southerly building contains the blacksmith shop and foundry and the machine shop. Between the two buildings is the transfer table pit, 50 ft. wide and 288 ft. in length, extending beyond the buildings at either end. The table operates on four 40-lb. rails, placed 18 in. below the yard trackage on 12-in. concrete walls spaced 16 ft. 1 in. center to center. A 6-in. gravel fill covers the entire pit.



Salt Lake Shops—Transverse Section—Machine Shop and Blacksmith Shop

CARPENTER SHOP

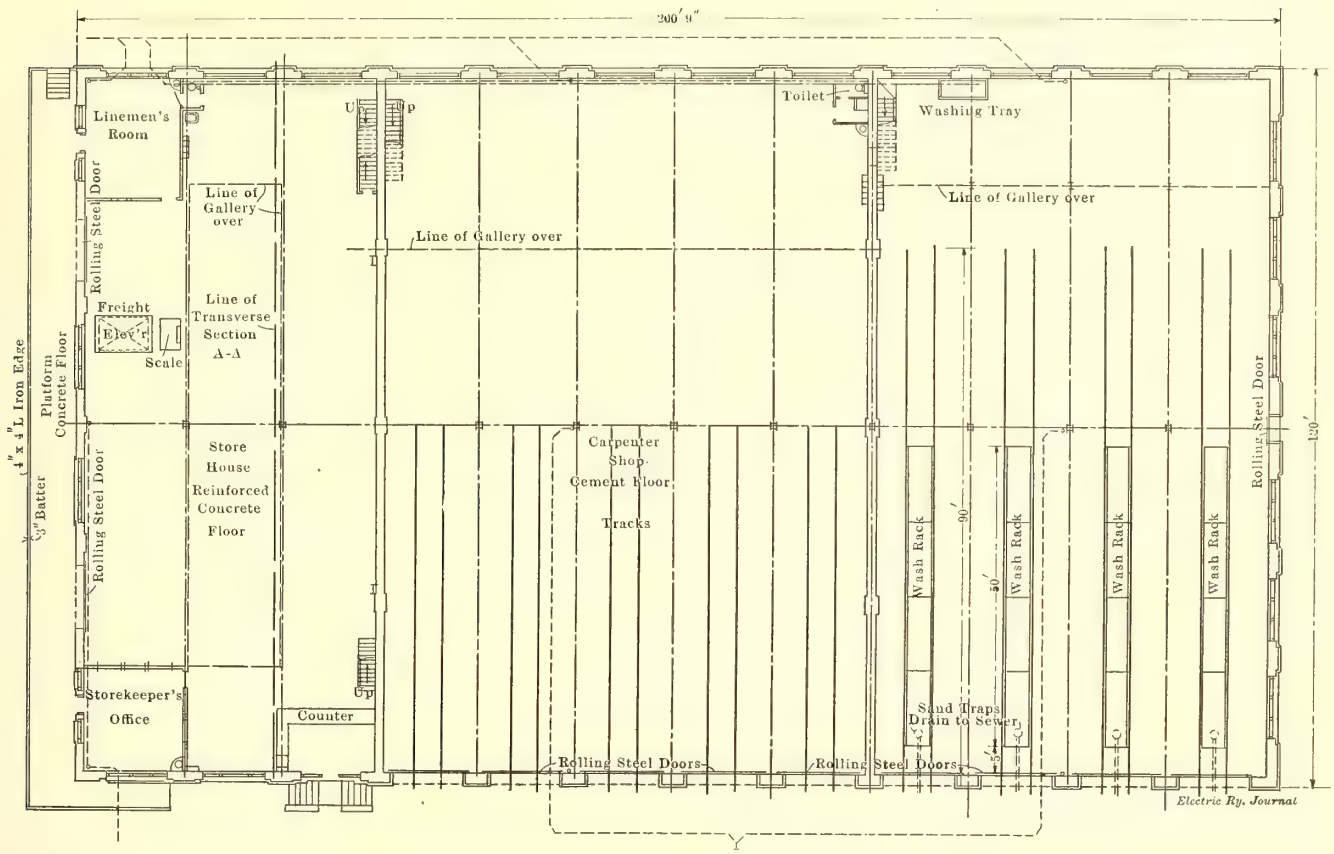
The carpenter shop building is 200 ft. 9 in. long x 120 ft. wide. The storehouse occupies 51 ft. 3 in. of the west end of the building, the paint shop 67 ft. 7½ in. of the east end and the carpenter shop the central portion, 81 ft. 10½ in., the length of each shop being the width of the building, 120 ft. The construction consists of 17-in. brick walls resting on 27-in. concrete foundation walls, with 21-in. brick pilasters carrying the steel trusses of the roof. The two division walls are of solid brick 17 in. thick, with no openings except one 3 ft. wide between the paint and carpenter shops, protected by means of a rolling steel door.



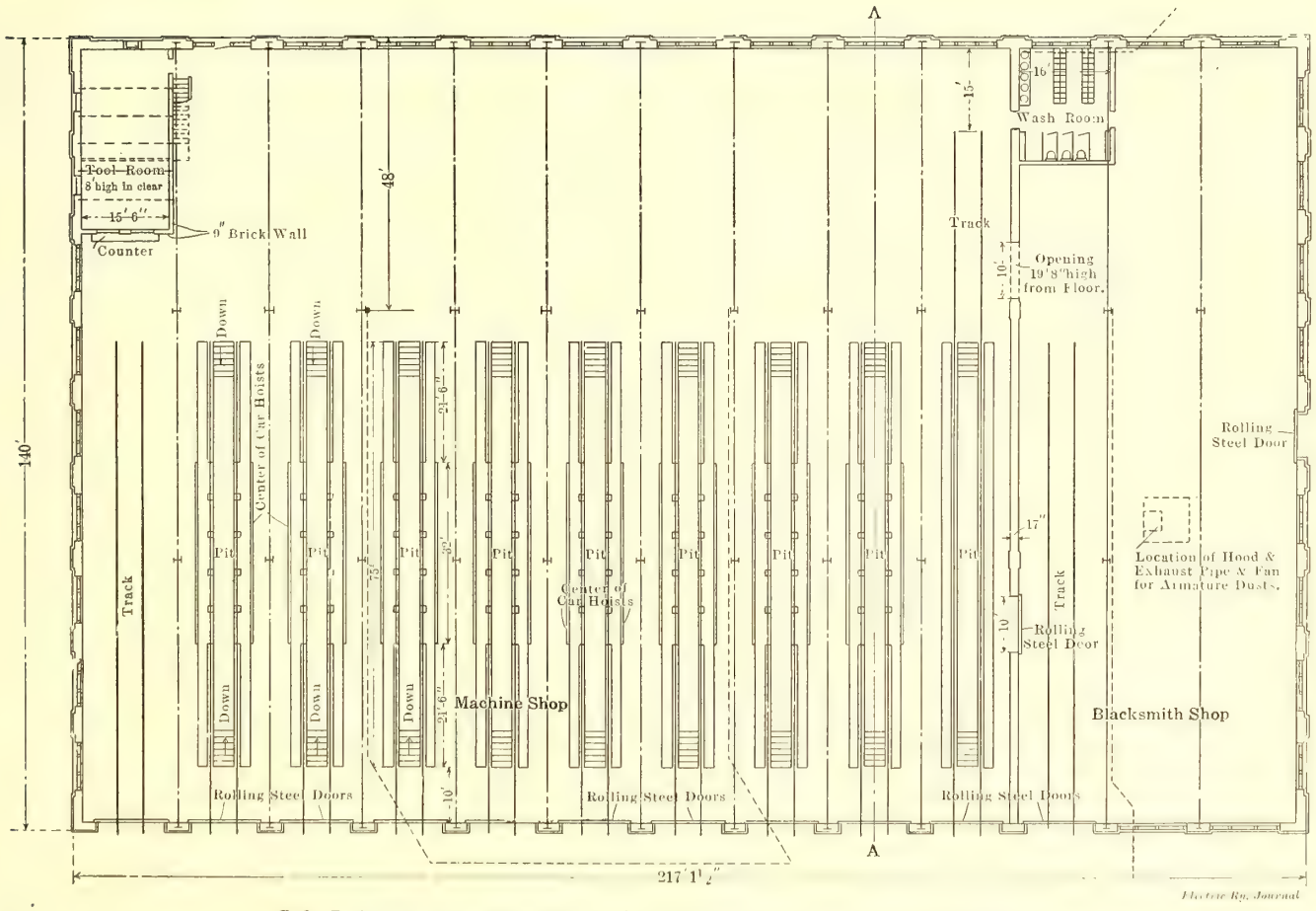
Salt Lake Shops—Transverse Section—Carpenter Shop, Paint Shop and Storehouse

A feature of this car house is the elaborate system of fire protection installed. For general protection purposes four sprinkler mains are run under the roof in each of the four bays, one directly over each track. There are also six lines of aisle sprinklers in each four-track bay, all supplied from a 50,000-gal. tank. The tracks at the west end of the car house are on grade, so that the cars can be run out by gravity if necessary. A low insurance rate has been obtained.

The storehouse has a gallery 16 ft. wide extending around all four sides, having a central court 15 ft. 11 in. high in the clear between floor and bottom of the roof trusses. In the southwest corner of the main floor, under the gallery, is partitioned off the storekeeper's office, 16 ft. square. In the northwest corner is the lineman's room, 16 ft. x 20 ft. The partition in each case is of metal lath with cement plaster. A basement 9 ft. 6 in. high under the floor shop is provided under the

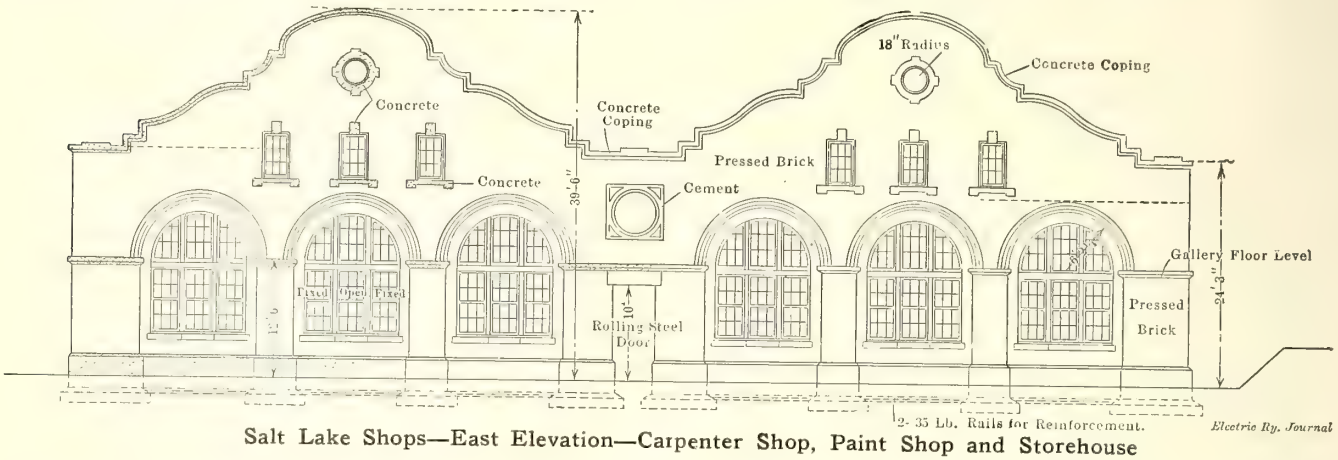


Salt Lake Shops—Main Floor Plan of Carpenter Shop, Paint Shop and Storehouse



Salt Lake Shops—Floor Plan of Machine Shop and Blacksmith Shop

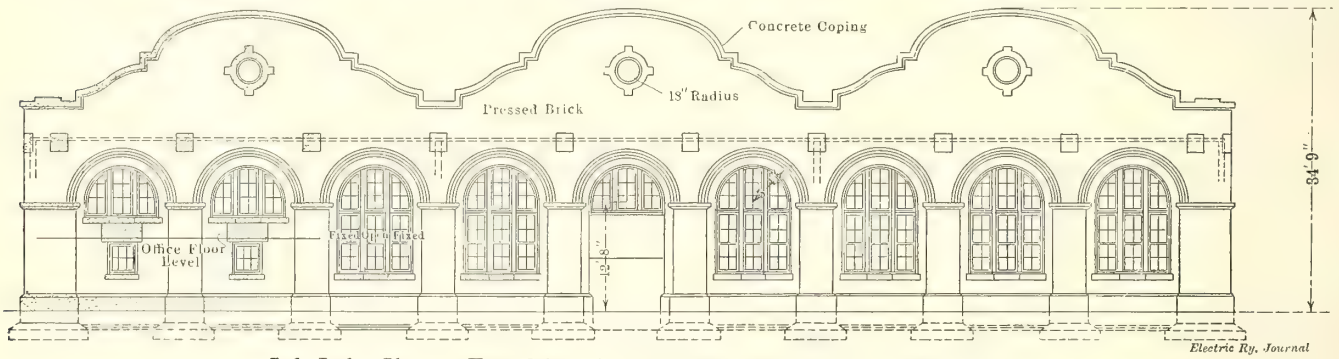
entire storehouse. All floors are of concrete and steel frame construction. Along the entire west side of the storehouse is an 8-ft. platform with concrete floor 3 ft. 9 in. above grade and level with the storehouse main floor. A track alongside the platform and also a wagon roadway permit ready unloading of supplies, while a runway to grade 5 ft. wide at the southwest corner of the building permits trucking of heavy stores from the storehouse. Entrance from the platform is afforded by two rolling steel doors 6 ft. 11 in. high and 10 ft. 6 in. wide.



Salt Lake Shops—East Elevation—Carpenter Shop, Paint Shop and Storehouse

An awning covered with metal Spanish tile covers the entire platform. As a protection from teams and trucking, the platform has a 4-in. x 4-in. angle-iron edge, and on the face of the platform wall, 22 in. above grade, is bolted an 8-in. x 10-in. fender. A freight elevator with platform 6 ft. x 8 ft. 6 in. serves the storehouse from basement to gallery. At the south-east corner of the storehouse are a counter and employees' entrance for dispensing stores and supplies.

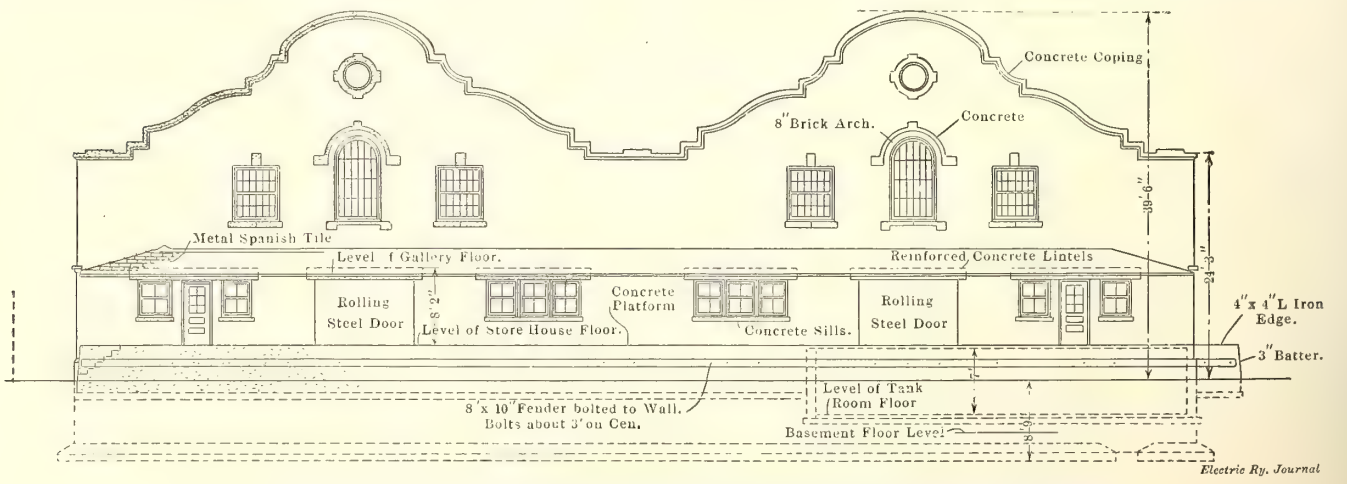
The carpenter and paint shops are each provided with tracks connecting at the south end with the transfer pit. The five tracks of the carpenter shop are carried only to the center of the shop, the remaining half of the room with a 28-ft. gallery over the northern end being left for woodworking machines, workbenches, etc. The four paint shop tracks are carried back 90 ft., each track having a wash rack grating installed in four removable sections 12 ft. 6 in. long. At the south end of each track is an 18-in. sand trap with drain to sewer. Across the northern end of the paint shop extends an 18-ft. gallery. Each track opening is 12 ft. 4½ in. wide x 19 ft. high and is protected by a Kinnear steel rolling door. Both carpenter and paint shops have concrete floors, their elevation being at grade or 3 ft. 9 in. below that of the storehouse.



Salt Lake Shops—East Elevation—Machine Shop and Blacksmith Shop

MACHINE AND BLACKSMITH SHOP

The machine and blacksmith shop building is 217 ft. 1½ in. long x 140 ft. wide. The western end, 51 ft. 3 in. x 140 ft., is given up to the blacksmith shop and foundry and has one

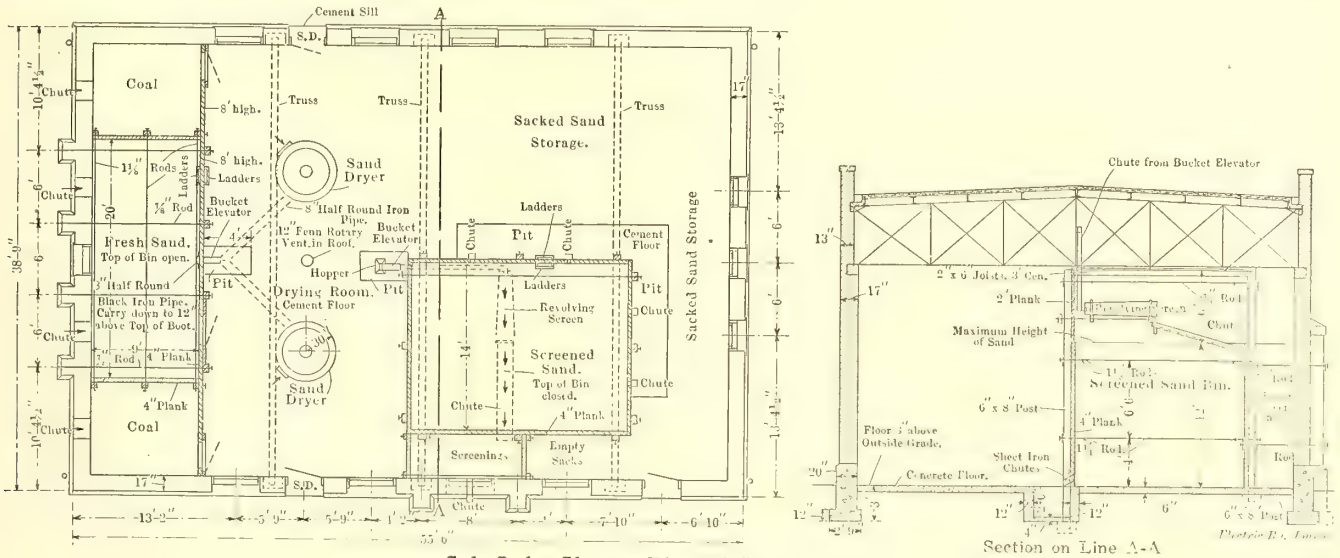


Salt Lake Shops—West Elevation—Carpenter Shop, Paint Shop and Storehouse

track extending back from the entrance a distance of 85 ft. Dividing this shop from the machine shop is a 17-in. brick fire wall, which has two 10-ft. openings, one being equipped with a rolling steel door. The machine shop is a single room 140 ft. x 165 ft. 10½ in. It has 10 tracks for the transfer pit, extend-

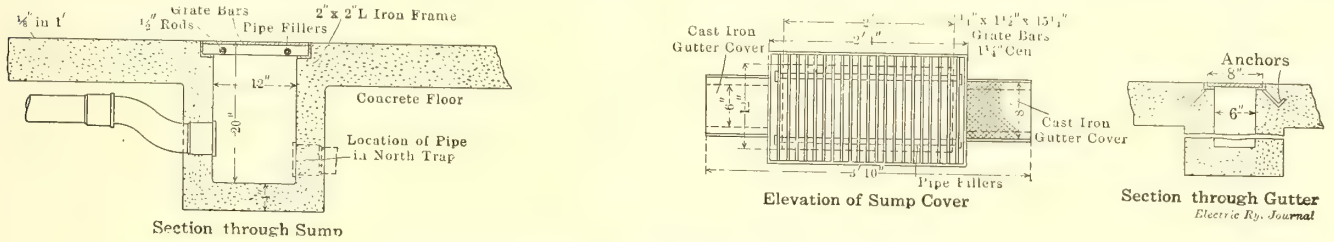
ing back a distance of 85 ft. from the entrances, with the exception of the one on the west end, which runs within 15 ft. of the rear wall. Nine of these tracks are provided with pits 75 ft in length, eight of which have, midway between their ends, a 32-ft. car hoist. The hoisting members of the latter consist of

In the southeast corner of the machine shop is partitioned off a tool room 32 ft. long x 15 ft. 6 in. wide, an office for the master mechanic being located directly over. The entire southern side of the machine shop will be utilized for machine tools and machining operations.



Salt Lake Shops—Plan of Sand House

12-in. I-beams, 31½ lb. per foot, spaced 9 ft. 6 in. center to center. For the length of the hoists the space between pits is open, supports for the hoists being provided by 12-in. x 18-in.

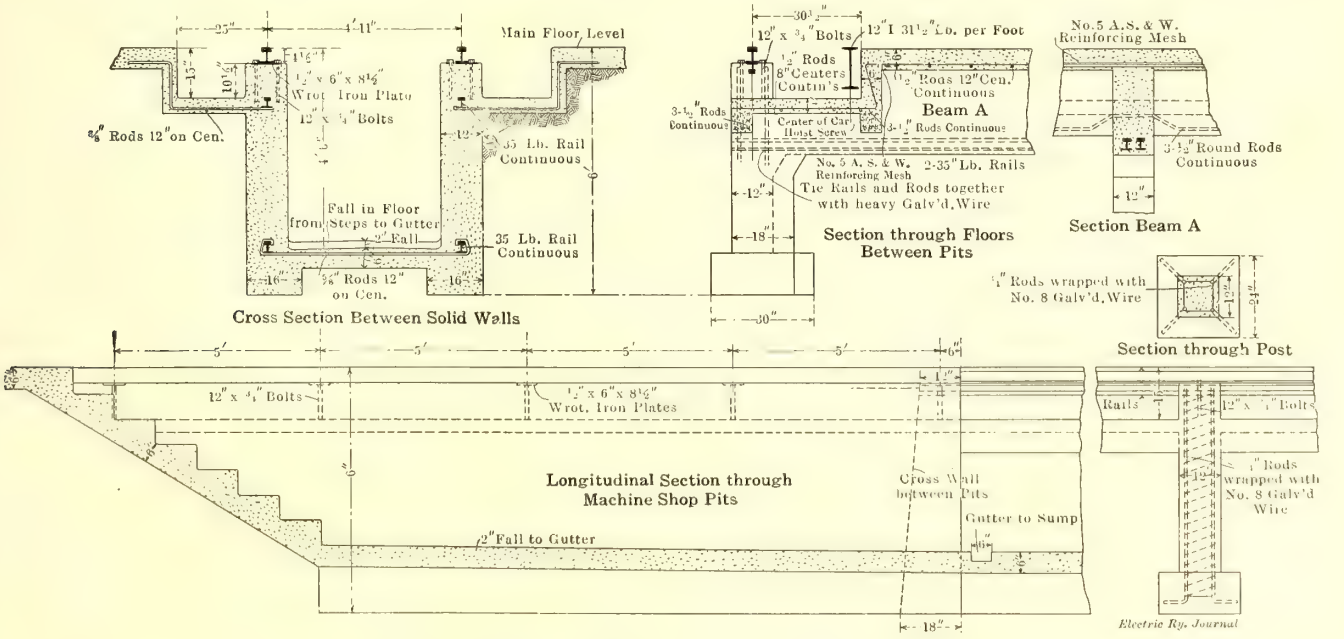


Salt Lake Shops—Details of Pits in Machine Shops

reinforced concrete posts and 30-in. x 12-in. cross beams, also of concrete. At the ends of the pits solid walls carry the track, the pits being 4 ft. 6 in. deep x 3 ft. 9 in. wide. Outside of

ARCHITECTURE

As in the case of the car house, the shop buildings are designed in the California Spanish Mission style. Red pressed brick is used for the exterior with concrete lintels, sills and copings. The roofs are of 3-in. concrete slab covered with magnesia roofing, and are supported on steel trusses, which



Salt Lake Shops—Details of Pits in Machine Shop

the tracks the pits are 21 in. wide x 15 in. deep. The floors of the pits drain to 6-in. gutters, which lead into a sump and sewer. A 6-in. concrete floor covers the entire machine shop.

divide the buildings into longitudinal bays, two in the case of the carpenter shop and three in the machine shop. In each building a clear height under the roof trusses of 19 ft. 8 in. is

provided. Special attention has been given in the case of the shops, as in the car house, to keeping the insurance risk down by providing fire walls, iron stairs, concrete floors and roofs, Kinnear steel rolling doors for all openings, metal lockers for the workmen, etc. The buildings are all heated from a central boiler house by means of a hot-water system built according to designs of Jesse C. Coogan, Milwaukee.

The company's monogram, cast in concrete, 6 ft. x 6 ft. in size, is set in the end walls of the buildings, adding to the general decorative treatment.

SAND HOUSE

Since the original plans for the car shops were drawn a very important addition has been made, consisting of a sand house, that is now nearing completion. This is located in a building by itself 55 ft. 6 in. long x 38 ft. 9 in. wide, located east of the machine shop and convenient to the car house. Fresh sand will be received at one end of the building in a 9-ft. x 20-ft. bin, from which it will be carried by means of a bucket elevator to two 8-in. half-round iron pipes that discharge into two 5-ft. diameter sand dryers located in the drying room. From the dryers the sand is fed by hand into a hopper and is taken by means of another bucket elevator to a chute which discharges into a revolving screen in the top of a 14-ft. x 18-ft. closed screened sand bin.

The revolving screen discharges the screenings onto a chute, from which they drop into a separate bin whence they can be removed outside the buildings by means of another chute A maximum height of 12 ft. is provided for the screened sand, so that a capacity of over 3000 cu. ft. is thus obtained. Sand is drawn from the bin by means of four chutes and is sacked and stored until needed. The storage for sacked sand will take care of over 6000 cu. ft.

EMERGENCY LIGHTING FOR INTERURBAN RAILWAY ROLLING STOCK

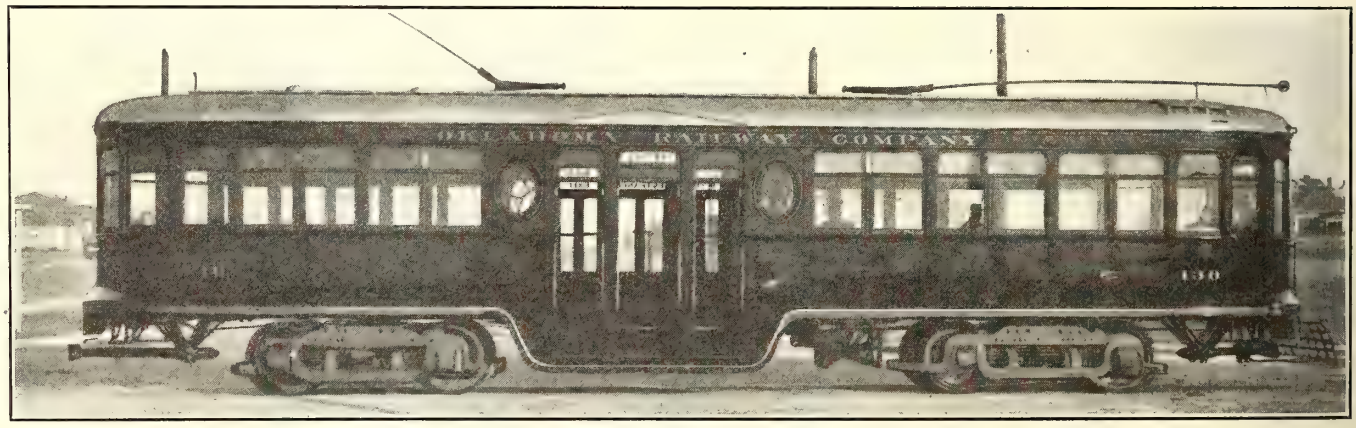
A point in the lighting of interurban railway cars which has received little attention is that of providing an emergency car-lighting service. It is decidedly annoying to have the entire car in darkness every time a gap in the third rail or overhead conductor is passed, when going over crossings and switches or through short tunnels in the daytime. A storage battery offers a very simple means of overcoming this trouble. The practice of one of the best high-speed lines in the East is to have one lamp in each of the five car clusters always in circuit with a storage battery. Even when the main-line current is cut off for an appreciable period, these battery lamps continue to burn, so that a car is never plunged into darkness. An emergency car-lighting system of this kind undoubtedly avoids many occasions for alarm on the part of nervous passengers. It can also prove very effective in minimizing the danger of an accident when, for one reason or another, the regular power supply has suffered interruption.

CENTER-VESTIBULE STEEL CARS FOR THE OKLAHOMA RAILWAY COMPANY

No better evidence could be presented of the rapid yet substantial growth of Oklahoma and the progressiveness of its electric traction companies than the decision of the Oklahoma Railway Company to use steel cars for its long-haul city and suburban service. The cars operated are of the prepayment center entrance and exit type and therefore no platforms are used. Ten of these cars have been constructed by the Niles Car Company in accordance with the design made by the engineering department of the Oklahoma Railway Company under the direction of W. A. Haller, former general manager. The first car of this type was placed in operation on Nov. 18 and proved an unqualified success as a prepayment car. The traveling public willingly co-operated in the introduction of the prepayment feature.



Center-Vestibule Car—End-On View of Car in Operation

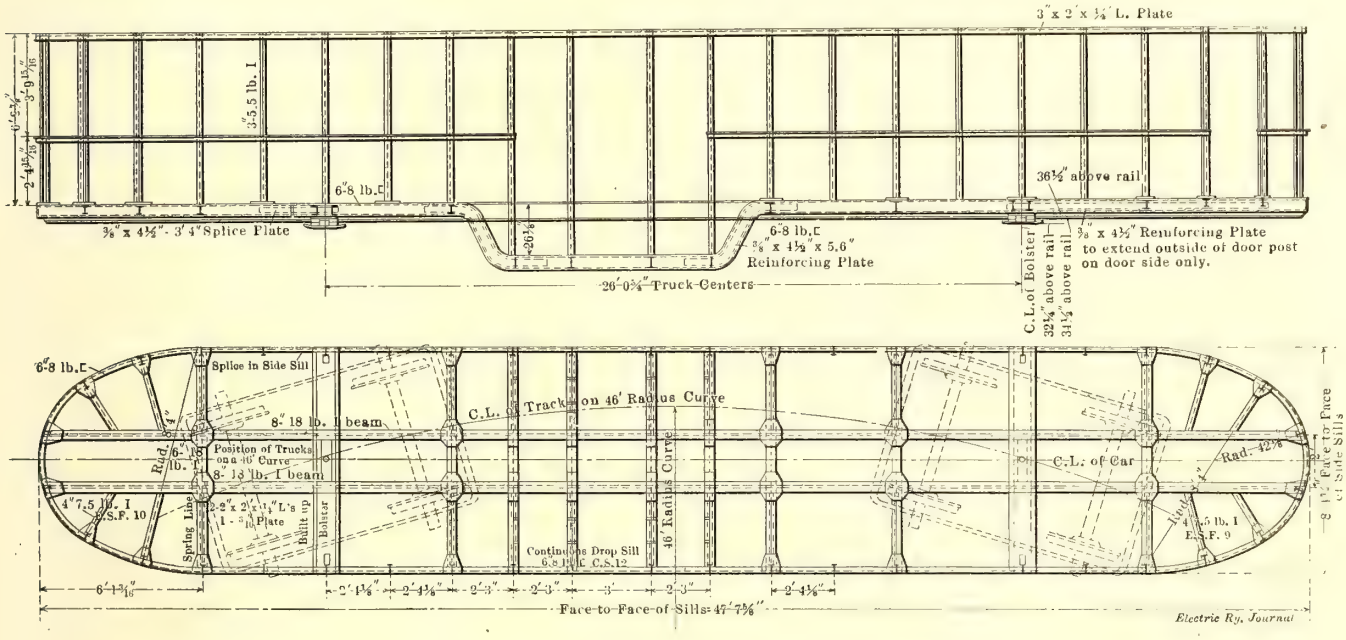


Center-Vestibule Car—Side View of One of the Ten Steel Passenger Cars Recently Placed in Service by the Oklahoma Railway

The principal purpose in adopting a steel car of this type was to attain the minimum dead weight per passenger consistent with strength. The latest gasoline-electric car built by the General Electric Company was considered so excellent an example of a light-weight design that it was used as a model with such modifications as were necessary to adapt it for use as a steel center-vestibule car for street railway service. The result is a car which, while seating 54 people, weighs only 53,000 lb., or 981 lb. per passenger. The value of this light weight is apparent from the designer's estimate that the sav-

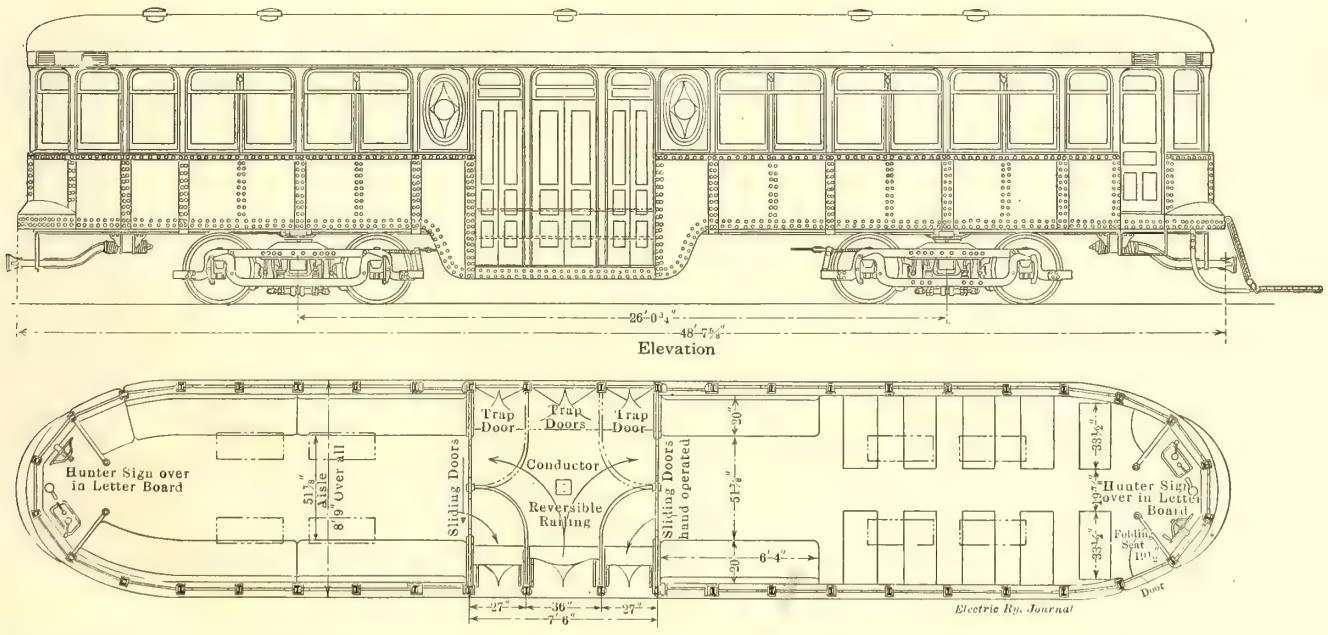
ing in power consumption over a standard wooden car will be nearly $500 a year. Thus, while the cars have cost approximately $7,000 each, or about $1,000 more than a wooden car, the power economy will soon offset the extra cost. Furthermore, as the car is stronger than one built of wood it should have a longer life, especially as the principal maintenance required will be merely the occasional painting of the framing and other parts subject to corrosion. It is believed that the use of the steel car is specially favorable for dry inland places like Oklahoma City.

The general features of the car are shown in the accompanying floor plan and elevation. It will be observed that there are no platforms and that the car is divided by a railed central area, 7 ft. 6 in. wide, with swinging door exits and entrances leading to a general passenger compartment on one end and a smoking compartment on the other end. The general compartment usually is the forward end of the car, although operation in either direction is possible. An emergency door is provided at one end for the use of the motorman. The plan shows that both transverse and longitudinal seats are used. The former seats are of mahogany with vertical square-spindle backs, and the latter seats are also of the slat type. The seat arrangements in both compartments give wide aisles and ample space opposite the doors.



Center-Vestibule Car—Side and Bottom Framing

When the car is in operation, passengers enter the 36-in. middle opening by ascending two 13⅜-in. steps and pass to the right or left after paying fare to the conductor. The latter is located in the middle of the vestibule as indicated. One duplex register is placed above the conductor, but there are no register rods or cords through the car proper.

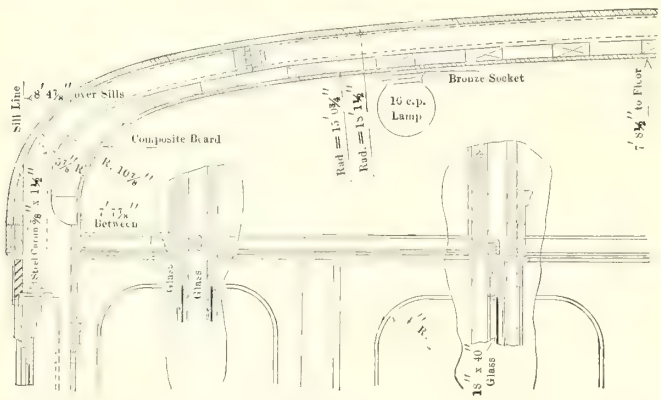


Center-Vestibule Car—Elevation and Plan, Showing Dimensions of All Exits and Entrances, Compartments, Etc.

The 27-in. exit doors located on each side of the entrance railings permit passengers to leave the car from the separate compartments without any confusion. This arrangement practically isolates the general and smoking compartments from each other and so insures the maximum comfort to both classes of passengers. The side entrance and exit doors are pneu-

matically opened and controlled separately by the conductor, who is in a position to see all that transpires while people are entering or leaving. The compartment sliding doors are operated by hand by the passengers. Dividing railings are also provided to isolate the motorman.

President A. H. Classen, Vice-president J. W. Shartel and A. J. Bemis, of J. G. White & Company, who is now manager of the company, are all favorably impressed with the design of this car. They believe that there is no question that this type will insure the collection of even a greater percentage of the



Center-Vestibule Car—Half-Section of Roof and Other Details

fares than a standard prepayment car with platforms, as it is simply impossible for passengers to ride anywhere except inside the car. One particular advantage over the platform prepayment cars is that the motorman can devote all his time to running the car, because he has no exit doors to operate. So far as the crew is concerned, the center-vestibule car is better than any full-vestibuled car, as it gives protection from the elements at all times. The only serious objection advanced is the problem of looking after the trolley. In this respect, however, the car is not at a much greater disadvantage than any platform car with closed vestibules.

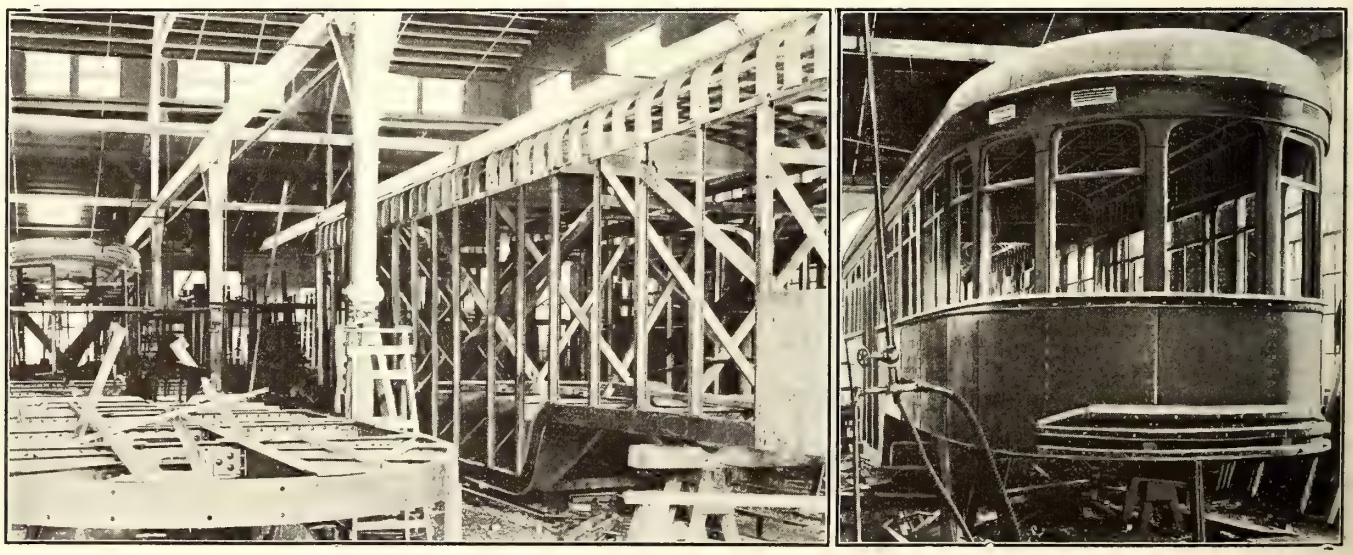
All of the steel used in the construction of these cars is composed of standard sections. The bottom framing comprises a continuous drop sill passing all the way around the car and built up of 6 in. 8 lb. channels; two continuous longitudinal sills consisting of 8-in. 18-lb. I-beams; floor beams made up of pairs of 2-in. x 2-in. x ¼-in. L's and 1 3/16-in. plate; short 4-in. 7.5-lb. I-beams from the longitudinal sills to the end sills, and two bolsters made up of L's and plates. The side framing is composed of 3-in. 5.5-lb. I-beams, which are spaced in most cases 2 ft. 3 in. or 2 ft. 4⅛ in. apart, but at the center the spacing is fully 3 ft. on account of the 27-in. entrance door. The sides of the car are sheathed with 1/16-in. steel and the ends with ⅛-in. steel. As shown on one of the detail drawings, the window frames and sash are of wood. The doors and bulkheads are also of wood. The roof, as illustrated in the sectional drawing, is designed to provide for a longitudinal air space, 6 in. high, between the composite board headlining and the roof. This chamber is in communication with louvers at each end of the car and has outlets at intervals throughout the car to secure the necessary air movement for ventilation in the regular passenger compartment, but the smoking room has Globe ventilators. The illuminated numbering and routing signs of the Hunter type are incorporated in the car construction. Edwards trap-doors cover the openings over the steps when the latter are not in use.

The principal dimensions of the cars are: Length over the buffers, 48 ft. 7⅝ in.; face to face of sills, 47 ft. 7⅝ in.; height over all, 8 ft. 9 in.; height from top of 6-in. continuous drop sill to top of side posts, 6 ft. 2⅞ in.; height from floor to center line of roof headlining, 7 ft. 8½ in. The body is mounted on two Standard C-50 trucks equipped with four Westinghouse No. 101-B 40-hp motors. Both air and hand brakes are installed.

RAILWAY POWER SUPPLY BY A MASSACHUSETTS CENTRAL STATION

Operating results for the past year at Greenfield, Mass., furnish evidence that an electric railway load is a desirable addition to the power business of a well-conducted central station. In this case the total power supply of the Connecticut Valley Street Railway Company is purchased from the local system of central-station service. The connected railway load is 980 kw; the connected industrial power load is 1313 kw, and the total connected load, including lighting services, 3406 kw. The total income of the Greenfield company for the year was $111,894, of which the railway company contributed $39,385 and industrial electric motor users $23,994. The railway company operated 47 miles of track and purchased 2,811,630 kw-hours for its service at a cost of 1.4 cents per kw-hour. Other power users paid 2.5 cents per kw-hour, and the average income of the central station per kw-hour sold was 2.72 cents.

The railway load thus accounted for 62 per cent of the central-station power income, and 35 per cent of the total earnings. Although the connected railway load was 29 per cent of the total, the demand for its service was spread through the day sufficiently to exert a powerful effect upon the load factor of the central station, which was 42.8 per cent for the year. The total generating capacity was 2850 kw.



Center-Vestibule Car—Steel Cars in Various Stages of Construction

DAYTON MEETING OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

The Central Electric Railway Association held an interesting meeting at Dayton, Ohio, on Dec. 1. About 75 railway and supply men took part in the discussions of several papers, which were read according to the program presented in an earlier issue of this paper. During the noon recess John F. Ohmer, president of the Ohmer Fare Register Company, Dayton, Ohio, entertained at a luncheon all the railway and supply men attending the convention. Several prominent business men of Dayton welcomed the railway men.

NEW CONSTITUTION AND BY-LAWS

At the beginning of the morning session George H. Whysall, president of the association, announced the reading of the new constitution and by-laws of the Central Electric Railway Association and the Central Electric Traffic Association. These were read by A. L. Neereamer, secretary, and after a short discussion were adopted unanimously. In general the notable changes in the new articles were made so that the articles would conform to the improved methods of doing business which have been found desirable since the formation of the association in 1906. These new constitutions and by-laws combine more closely the work of the two associations and make the Traffic Association more dependent on the parent body. The territory of the Central Electric Railway Association was extended to include the Illinois roads and the new by-laws make it a simple procedure for the association at any meeting, by a two-thirds vote, to extend the "scope of the association so as to include any State or States, or parts thereof, in the Mississippi Valley." The constitution includes the following sections regarding membership:

"The membership in this association shall be divided into two classes, active and associate. The active membership shall consist, first, of interurban roads or city lines wholly or in part within the territory embraced by the organization, to be known as railroad members; second, persons engaged in or connected with railway supply business in all its branches, to be known as supply members. Associate members shall consist of officials of electric lines outside of the territory and officers of other like associations.

"Railroad members will be admitted upon executing and signing the articles of agreement for the maintenance of the association.

"To become a member, supply or associate, a candidate's name shall be proposed in writing to the executive committee by at least two members in good standing, at least two weeks previous to a regular meeting. All applications must be accompanied by the dues for the first calendar year. The fitness of the candidate for membership shall be considered by the executive committee and, if approved, shall be reported to the association at the next regular meeting. The name of the candidate shall be acted upon, unless withdrawn at said regular meeting, and election be by ballot, hand, or yea and nay vote, a majority electing as the meeting may determine."

The by-laws of the Central Electric Railway Association include the following regarding voting and dues:

"On matters pertaining strictly to railroad methods, or standards or rules, each railroad member is entitled to one vote, to be cast by the highest ranking officer present, supply, associate and honorary members not voting on these subjects. On all subjects except those mentioned in the preceding section all representatives of member companies, supply members and association members may exercise the right of franchise.

"The annual dues of railroad members shall be, for interurban railways, a sum equal to $1 per interurban mile operated, per annum, to cover their proportion of the expense of the said association. Further, that this agreement may be made to include city lines owned or operated by the line signing upon the basis of $1 per mile of city (single) track. For city lines depending upon gross receipts for railway operation the dues shall be upon the basis in the accompanying table.

"The annual dues for supply members shall be $8 for each calendar year and shall be payable at or before the annual meeting.

"The annual dues for associate members shall be $3 for each calendar year and shall be payable at or before the annual meeting."

The first section of the by-laws of the Traffic Association in part is as follows:

"The Central Electric Traffic Association is organized to comprise interurban roads, members of the Central Electric Railway Association, who have furnished the chairman of this association with the necessary power of attorney or authority for the filing of tariffs for or on behalf of their company.

MEMBERSHIP DUES OF CITY COMPANIES

Gross Receipts			Annual Dues
Under	$50,000		$10.00
Between	50,000	and $100,000	12.50
"	100,000	and 250,000	25.00
"	250,000	and 500,000	37.50
"	500,000	and 1,000,000	50.00
"	1,000,000	and 2,000,000	75.00
Over	2,000,000		100.00

"Connecting railways and transportation companies not in the above-described territories may become members by a majority vote by all members of the association and by signing articles for the maintenance of the Central Electric Railway Association."

The new constitution and by-laws will be printed and distributed to member companies.

RAILWAY GUIDE AND MAP INSURANCE

The president reported that the executive committee, after a full discussion of the advisability of publishing an electric railway guide for the Central States, had appointed a committee to ascertain the best means for carrying out this work. He also stated that the executive committee had reconsidered the advisability of authorizing the secretary to publish a map of the Central Electric territory. As a result the executive committee had referred the matter to the Traffic Association committee with power to act.

The committee on insurance, it was stated, had met and resolved that the association should sanction the appointment of a consulting insurance engineer and expert, but definite action had been suspended pending the completion of a report on the same subject by the insurance committee of the American Electric Railway Association.

REMARKS OF MR. BRADY

Arthur W. Brady, president of the American Electric Railway Association, was invited to address the meeting. Mr. Brady, in acknowledging the compliment paid him in President Whysall's introduction, said that he regarded his election as president of the American Electric Railway Association as the result of an effort on the part of that association to give every section of the country equal representation in the executive affairs of the American Association. Mr. Brady then told of the successful convention at Atlantic City and spoke a few words in praise of the exhibit made by the Manufacturers' Association. He said the Central States were well represented at the meetings and that the sessions of the American Association had been particularly valuable. Mr. Brady then called special attention to the address of Patrick Calhoun, characterizing it as one of the strongest that had ever been presented before the association. He also called attention to the valuable papers read in executive session by Charles O. Kruger, president of the Philadelphia Rapid Transit Company, and Charles V. Weston, president of the South Side Elevated Railroad Company, Chicago. One of the most notable indications of the broadening scope and the advancement of the association was the recent accession of the Pennsylvania Railroad to the membership.

Mr. Brady pointed out that the work of the Central Electric Railway Association did not conflict with that of the American Electric Railway Association and its affiliated bodies. There was neither rivalry nor competition, except that which ought to exist in order to get the best results. The larger association

could do some things better than the smaller. There were likewise many problems which the small association should properly handle first. Such questions as that of insurance could best be handled by the larger association. Mr. Brady called attention to the excellent work which H. J. Davies, of the Cleveland Electric Railway, had done in furthering electric railway insurance matters and stated that Mr. Davies had again accepted the chairmanship of the insurance committee, for which the executives of the association were thankful. The insurance situation had been a difficult one to work out, but Mr. Brady hoped that the committee would find a good and satisfactory solution.

Another line of work which the American Association, or committees of the affiliated associations, would shortly take up would be that of attempting to obtain a reduction in the differential in price between "T" and girder rails. Some of the railway men thought that this differential was too high and it was hoped that the prices could be made more equitable. Mr. Brady concluded his remarks by urging non-member companies to join the American Association and individuals to take out associate memberships. He repeated that there was no rivalry between the two associations and said that during his presidency it would be his aim to do everything possible to further the good of the industry and also to assure co-operation and continued harmony between the American Association and the sectional associations.

President Whysall announced that the executive committee had decided that the next meeting, which would be the annual meeting, would be held at Indianapolis on Jan. 19.

RECENT DEVELOPMENTS IN CAR HEATING

The first paper of the meeting, by H. S. Williams, of the Peter Smith Car Heater Company, Detroit, entitled "Recent Developments in Car Heating," was then read. This paper was published in last week's issue on page 1105.

Mr. Whysall called attention to the extreme lightness of the hot-air heating equipment as compared with hot-water heaters and piping, and asked what provision had been made for heating a car if power were not available for operating the fan motor which normally distributed fresh warm air.

In reply Mr. Williams said that a damper had been provided at the top of the front side of the heater casing so that in the situation pointed out by Mr. Whysall the natural movement of the hot air past the fire box would give sufficient circulation to warm the car. A No. 2 heater, as described in the paper, weighed about 230 lb. complete. The heating company recommended the removal of the heaters in the summer in order to save the cost of power. With arched-roof cars, Mr. Williams stated, some vents in the roof were practically necessary. These outlets permitted the incoming fresh warm air to drive the foul air out of the top of the car. It had been shown that the best method of ventilating was to deliver the warm air at the floor and allow it to rise and the foul air to pass out at the upper level. If the ventilators in the monitor or arch roof were closed then the foul air would have to be forced out through the leakage openings. Thus additional work would be put on the circulating fan.

R. M. Hemming, general manager, Ohio & Southern Traction Company, stated that he had installed a hot-water system in his car houses so that the piping system on a car which was heated by hot water could be quickly filled with hot water and the car warmed early on its run. Mr. Hemming asked if the hot-air heating equipment included any device for automatically controlling the temperature of the car. Mr. Williams replied that it would be an easy matter to arrange such control, but experience so far had not proved it necessary and on account of the delicacy of thermostatic control it hardly would be practical for installation on a street car.

W. H. Evans, superintendent of motive power, Indiana Union Traction Company, inquired how hot-air distributing ducts were arranged to furnish heat to long, three-compartment interurban cars. Mr. Williams replied that it was customary to place the heater in the forward compartment and distribute the warm air to the other two compartments through a steel duct carried under the seats. The openings in this duct were graded in size so that a uniform amount of hot air could be distributed in each part of the car. Also, an opening in the side of the heater casing might be used to distribute warm air in the compartment in which the heater was installed. With the single duct extending the full length of the car and the graded openings it was possible to adjust the flow of air so that an equal number of heat units would be delivered through each duct opening in a given space of time. On the roads which had installed this type of heater no automatic regulation of the speed of the motor had been found necessary because of low voltage conditions. The dry air delivered into the car did not permit the window glass to become so frosty as when hot-water heat was used.

The efficiency of the hot-air heater, as stated by Mr. Williams, was from 25 per cent to 30 per cent higher than the hot-water heater in so far as the consumption of coal was concerned. The heater manufacturers recommended burning chestnut size anthracite coal. Coke would be found cheaper, but the experience had been that the crews did not give the heaters sufficient attention to assure as uniform firing results with coke as with hard coal. Hot-air heaters were much easier to regulate in mild weather than hot-water heaters, because the blower could be shut down and the fire be allowed to burn low, while with the hot-water heaters the heat-carrying medium must always be in circulation and the only way to lower the temperature of the car was by reducing the fire.

WOOD PRESERVATION

A paper on "Wood Preservation" was read by A. L. Kuehn, general superintendent of the American Creosoting Company, Chicago. This paper was published in last week's issue on page 1107.

Mr. Kuehn stated that the brush treatment of timber was not satisfactory unless it was known that the wood was thoroughly dry and free from spores. If improperly seasoned timber were given a brush treatment the moisture and wood-destroying fungi within the timber would be inclosed by the applied material, and this condition was the best for the rapid growth and propagation of the wood-destroying bodies. When questioned as to the most accurate method for determining the amount of preservative applied to timber, Mr. Kuehn said that for seasoned wood the method of weighing before and after treatment was the most accurate. However, the measurement of the preservative in tanks before and after the treating process, as performed at a plant under his observation, checked within one-fourth of 1 per cent.

In reply to a question asked by E. F. Schneider, general manager, Cleveland, Southwestern & Columbus Railway, Mr. Kuehn stated that chestnut wood did not decay as rapidly as many others, but that this wood was being treated. One of his plants had just treated 50,000 chestnut ties. Considerable care was required in treating chestnut wood under the vacuum process, because the wood burst very easily. Mr. Kuehn did not believe it positively economical to treat chestnut track ties unless tie plates were used to protect the wood against rail wear. In other words, it was not a question of timber, so far as preservation was concerned. Beech ties, Mr. Kuehn said, admitted of most successful results under treatment. In France treated beech ties last from 40 to 50 years. In this country, without treating, beech ties had a life of only four or five years, while some ties that had been treated were now as good as new after eight years of service and should last 25 years.

H. A. Nicholl, general manager, Indiana Union Traction Company, inquired regarding the balance in economy between purchasing white oak ties and purchasing treated red oak ties. Mr. Kuehn said that the steam railroads credited white oak ties with a life of from seven to eight years. The Big Four had begun creosoting track ties extensively about seven years ago. At that time white oak ties cost 65 cents to 70 cents apiece and the red oak cost enough less to admit of being treated and still cost not more than white oak. Thus, if the creosoted red oak tie should last no longer than the white oak tie the same economy was obtained. The life of a red oak tie depended on

the amount of preservative material applied and such ties should last from 15 to 20 years, provided they were not injured by rail wear. Since the general application of tie preservative methods the life of the white and red oak ties had increased, while the cost of preservation was practically the same. Roughly, the cost of creosoting a red oak tie was 20 cents. Mr. Kuehn said that if enough additional life could be obtained from a red oak tie to save the cost of renewal then treatment would be worth while as contrasted with the first purchase cost of white oak. If the life of red oak ties were doubled then the first cost would be twice as much as white oak and still the railroad company would save the cost of one tie renewal, which would more than balance the interest cost on the added first investment.

TRAFFIC

W. O. Woodard, traffic manager, Chicago, Lake Shore & South Bend Railway, presented a paper on "Traffic," which will be found in last week's issue of this paper, page 1109. In opening the discussion on this paper F. D. Norviel, general passenger and freight agent, Indiana Union Traction Company, stated that one of the elemental principles in building up traffic was to take good care of all parties, especially the first time they were handled; then the work of traffic solicitation would be greatly reduced. Mr. Norviel mentioned the Indiana Union Traction magazine, which was described in the convention souvenir issue of this paper. He stated that corrected timetables of the local road and connecting roads were published in this magazine. All excursion business was personally solicited and it was the practice to have some member of the traffic department accompany all special parties so that their wants might be fully satisfied. Recently the Indiana Union Traction Company had distributed 3000 maps of the City of Indianapolis to all the teachers in the railroad company's territory. These maps announced a teachers' convention and the service which the railroad company offered to and from Indianapolis. Mr. Norviel closed his remarks by saying that advertising was the life of the railroad business just as it was necessary for the success of any commercial undertaking.

A. D. B. Van Zandt, publicity agent, Detroit United Railway, said that it would be difficult for a road to spend too much money in advertising. He agreed with the previous speaker and others that extensive advertisement of changes in schedules was very necessary. The Detroit lines advertised in about 100 newspapers located in the immediate territory of the different divisions and the advertising space in the cars was used extensively. If a change of schedule was to be made it was fully advertised for a considerable length of time previous to its inauguration. Changes in schedules were made on Tuesday so that the readers of the country papers published at the last of the week would have ample time to see the announcements. Regarding theater service, Mr. Van Zandt said that as the result of continued advertising it was quite generally known throughout the territory that the last outgoing car on each division would wait until the theater had closed. These cars ran about 40 miles out of Detroit in each of four directions. The theaters usually displayed advertising matter in the towns to which this service was given. Mr. Van Zandt said that he had considered the installation of big bulletin boards in all stations on which the theater advertisements could be posted.

W. S. Whitney, general freight and passenger agent, Ohio Electric Railway, had been interested in that part of Mr. Woodard's paper describing the handling of excursion parties in trains up to 11 cars in length. Mr. Whitney said that he had been handicapped when competing with steam roads because the Ohio Electric Railway operated largely with single cars and the steam roads' traffic solicitors would offer to handle a large excursion party on one train.

O. H. Murlin, general freight agent, Dayton & Troy Electric Railway, said that his company had erected racks in each station in which standard sized theater advertisements could easily be inserted. This road took particular care to fully advertise all changes in schedules. During the past summer the Dayton & Troy had begun operating its cars in trains and this brought probably the greatest improvement in traffic conditions. All special business could be handled without extra cars and without deranging schedules. During the fall on the occasion of a celebration this 30-mile road averaged earnings of $100 per mile of track for one day.

E. F. Schneider, general manager, Cleveland, Southwestern & Columbus Railway, said that the best theater advertising which his company did was to run a "theater limited," which always left Cleveland at 11:15 p. m. and ran through to Elyria without stop. This train was very well patronized.

Mr. Murlin said that his company did not carry any advertisements except its own in its passenger cars. Whenever the promotors of a celebration desired a donation the railway company, instead of giving cash, offered to print from 10,000 to 12,000 dodgers and distribute them along the route, thus giving assistance to the celebration and encouraging traffic.

RAILWAY MOTOR GEAR AND PINION TEETH

A paper by T. W. Williams, General Electric Company, on the "Wear of Railway Motor Gear and Pinion Teeth" was next read by the author. This paper was published last week on page 1103. The mechanical officers of several roads at the beginning of the discussion called attention to the great improvement which had been made in gear material during the last few years. One engineer pointed out that the width of the gear face had increased less than 1 in. while the gears now transmit four or five times as much load as in the earlier days. The marked progress in gear construction, one man thought, had been forced upon the manufacturers by the repeated demands of the railways. W. H. Evans believed that one reason why such good success had been obtained with hard gears as compared with soft gears was because the wear of the hard gear did not increase so rapidly after the teeth had begun to lose their original shape. Lubrication of gears in track service, Mr. Evans said, should be carried on in the same way as the lubrication of any other machine. A little lubricant at the proper time and in the proper place was sufficient. He did not believe it was good policy to carry around a large amount of lubricant in the gear cases.

C. E. Sawtelle, Tool Steel Gear & Pinion Company, mentioned the experimental work which his company had done before it had placed hard gears on the market. He stated that the use of a hard pinion with a soft gear added from 25 per cent to 50 per cent to the life of the gear with not much added wear to the pinion, although the abrasion of the softer gear metal formed a grit which increased the wear markedly over that when both gear and pinion were hardened.

H. H. Buckman, Louisville & Southern Indiana Traction Company, stated that it was his practice to use 1 lb. of lubricant per month for each gear. This was a stiff grease and the small amount had been found ample. J. V. Smith, Indian Refining Company, stated that on investigation of the lubricating practice of a great many roads he had found during the last year a wide variation in the methods of lubricating gears and in the stiffness of the lubricant thought best. He would recommend a mixture of grease and sawdust.

When questioned regarding the reduction in costs to be obtained by using hard gears Mr. Sawtelle replied that no general average could be given, but the pinions manufactured by his company should have five times the life of untreated pinions. The price of treated pinions was a little more than double that for untreated pinions, the figures being $5 as compared with $2.10. As yet none of the treated gears had been worn out, so that their life could not definitely be stated. The point to be remembered was that with treated gears and pinions the cost for renewals was greatly reduced. Mr. Buckman called attention to the additional feature in favor of hardened gears, which wore slowly, namely, that the chattering and jarring of the motor parts was greatly reduced and thus the life of the motor was increased.

GENERAL BUSINESS

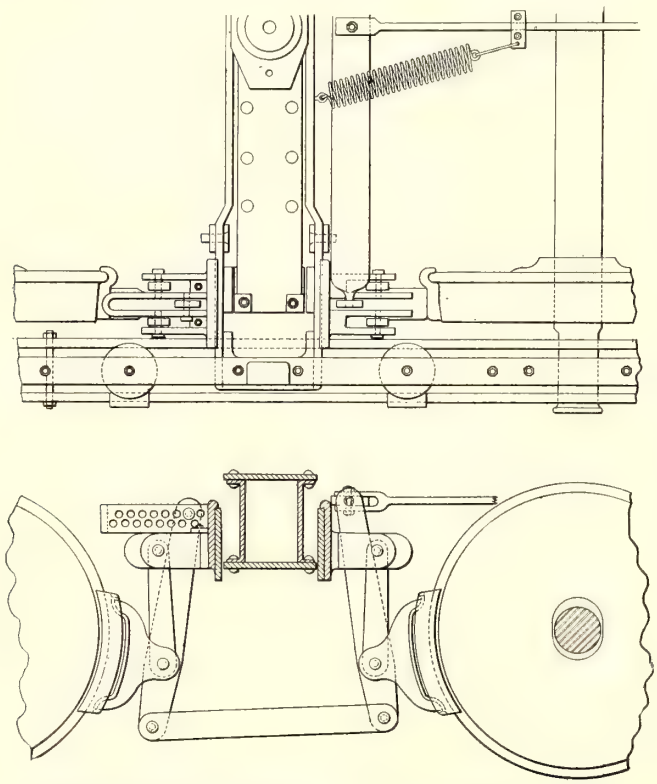
Mr. Buckman, also, speaking as chairman of the standardization committee, stated that the committee had in mind studying

the merits of devices which would prevent the overriding of cars and also looking into the possibilities of standardizing air-brake rigging. The commttee would like to have the ideas of the mechanical departments of the different roads on these two subjects.

Before adjournment President Whysall appointed the following committee on nominations to report at the annual election of the Central Electric Railway Association, which will be held at the Indianapolis meeting on Jan. 19: F. D. Carpenter, general manager, Western Ohio Railroad; J. H. Crall, general passenger and freight agent, Terre Haute, Indianapolis & Eastern Traction Company; W. S. Whitney, general freight and passenger agent, Ohio Electric Railway; F. W. Brown, general freight and passenger agent, Michigan United Railways; M. J. Insull, general manager, Louisville & Northern Railway & Lighting Company.

IMPROVED TRUCK BRAKE RIGGING

The shop forces of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., have rebuilt the brake rigging on eight double-truck cars equipped with St. Louis No. 23-A, M.C.B. type trucks and have introduced several features which are said to improve the braking action and simplify maintenance and adjustment of the parts. The improved rigging does away with radius bars, offset brake levers and heads and is so designed that the slack can be taken up on the road without the use of any tools.



Improved Brake Rigging for M. C. B. Type Trucks

The truck brake rod extends under the center of the car body and is attached by a clevis and pin to the center of a brake beam connecting the top ends of the two live levers. This brake beam is a 1-in. x 4-in. flat bar reduced at the ends to 1¼ in. in diameter. A release spring with one end fastened to the truck transom is clamped to the brake rod. The live levers are made of ⅞-in. x 3-in. bars 28 in. long and the bottom truck connections are made of two bars 2 in. x ⅝ in., bolted together with washers 15/16 in. thick inserted between the bars. Special cast-iron brackets which are bolted to the truck transoms support the brake hangers and serve as guides for the live and dead levers to prevent the side displacement of the levers when the truck is on a curve. A single pin extends through the brake head to connect the links, levers and heads. A slack fork is bolted to the top of each bracket which guides the dead lever. The slack forks are made of forged metal and are provided with 16 pairs of staggered holes. A pin is placed through one pair of these holes to support the upper end of the dead lever, and by moving this pin it is possible to adjust the brakes. This is done by shoving the dead lever away from the transom until the shoes are close to the wheels and then placing the pin through the nearest holes. These slack forks are placed only on the dead-lever side of the truck. The cast-iron brackets which carry the brake hangers and serve as guides for the top ends of the live levers are interchangeable.

Some of the advantages which have been realized since this form of brake rigging has been used in South Bend during the past year are: Ease of adjustment, it being possible to take up the wear on the brake shoes on the street without the use of tools; simplicity of construction, all parts being duplicates for opposite sides of trucks and practically all parts being standard for all four corners of trucks; elimination of radius bars, offset shoe heads and levers; simple and direct release mechanism. A rigging similar in principle has been applied to Brill No. 27-E and the same adjustments to McGuire No. 39 trucks.

CITY ELECTRIC RAILWAYS AND THEIR RELATIONS TO THE PUBLIC

In a luncheon talk before the Chicago Engineers' Club, Nov. 30, Charles V. Weston, president of the South Side Elevated Railroad Company, of Chicago, discussed the relations of the public with surface and elevated electric railways in cities. For comparison he described intramural transportation 25 years ago when slow, dirty horse cars were in use, and contrasted these with the present high-speed, sanitary, well-lighted electric cars in which the same 5-cent piece purchases a ride. Meanwhile the costs of labor, materials, supplies, etc., have risen more than one-third, the lines have been extended for miles into suburban areas, involving longer hauls, and the equipment has grown heavier, necessitating more expensive apparatus throughout the system. In all of this the citizen has been the gainer, being enabled to live at a greater distance from the center of employment amid more pleasing and healthful surroundings, while his time of travel to and fro has been greatly diminished. Indeed, said Mr. Weston, if each of the 10,000,000,000 people who rode on the street car systems of the country during the period 1907 to 1909 has saved 10 minutes each ride at an equivalent wage of 15 cents per hour, the economic saving would be $238,000,000; more than 2½ times the entire income of the companies carrying this traffic. The average haul in Chicago is 6 miles per passenger for the elevated roads, and slightly less for the surface lines. Mr. Weston said that there was nothing that his audience could buy which would return to them so large a value as that which they received for the 5-cent piece spent for city transportation. The city street car ride brought the place of employment of tens of thousands of people close to their homes in the suburbs and outlying sections of the city. Mr. Weston recited the results of the Boston investigation of the division of a 5-cent fare, and declared that approximately the same proportion would hold in any other large city in America.

As proof of the extending influence of electric railways on the distribution of Chicago's population, Mr. Weston cited the assessor's figures for the valuation of property in the Hyde Park South Side section of Chicago during certain years. In the year of the cable car system, 1882, this figure was $7,580,000; in 1890, $16,000,000; in 1900, $26,000,000, and in 1909, $78,611,000. This particular region has always had steam suburban railway service, but it was the coming of the electric lines which contributed to its growth so enormously, as the dates

show. The electric railways are cutting into the steam roads' traffic, for the former, both surface and elevated lines, offer more frequent service at relatively high speeds for short distances, and deliver passengers virtually at the doors of their places of employment.

The elevated railways of Chicago represent an investment of $100,000,000 and the surface lines $107,000,000. Thus the industry locally means a physical property of more than $200,000,000, with its accompanying enormous redistributing power in the salaries of thousands of employees, and in the large amounts spent for maintenance and renewals. This beneficent aspect of electric railways in promoting business prosperity is in addition to their important services in opening up vast suburban areas for habitation by city people, who are served with rapid, comfortable rides at minimum cost. An important fact to be remembered was that the Chicago electric transportation systems paid taxes on $200,000,000 worth of property, which were of direct benefit to the citizens.

Mr. Weston spoke of the sometimes unpleasant attitude in which the public views corporation affairs. Although the risk to investors is hazardous in view of the diminishing returns on capital, caused by the rise of the prices of labor and material, yet it was plain that the public had gained vastly more from modern transportation systems than have the owners of these systems. The solution of this acute situation, he said, lies with the people in the granting of franchises which shall be fair to both themselves and the companies. Modern economists admit the natural monopolistic nature of street railway service, most of them agreeing that such service can be more economically rendered on a non-competing basis, but under legalized control and regulation. Mr. Weston, therefore, advocated the granting of franchises in which the passenger rate should not be stipulated as in the past, but instead the capital invested should be limited to the legitimate costs of the property and should be assured a fair return thereon, the fare being adjusted as the varying conditions of length of haul and density of population require. The return on the investment should be made proportional also to the hazard involved and should be sufficient to attract capital. Where service is demanded in sparsely populated districts, part of the cost of building the lines should be assessed against the region benefited, as is already being done in New York State.

Such a franchise, assuring to investors a reasonable return on their capital, would react not only to render electric railway and public service corporation securities more stable and secure, but would benefit the employees, providing them with more adequate remuneration and working conditions, and, in the end, the general public, through maintaining and operating the property at its highest efficiency, keeping its equipment apace with the art. By placing before the public the exact truth about the cost of operation, its co-operation could be secured in the granting of fair franchises. Mr. Weston does not believe in the municipality sharing the profits of operation, declaring that adequate service for patrons is all that should be expected or asked from public service companies. In closing Mr. Weston said:

"Some day in the not distant future the people of this community will be brought face to face with this question—and you, as citizens, will be asked to assist in solving the problem in a right manner. The rehabilitation ordinances recently passed in this city do not solve the whole problem; they mark only a small step in advance in that they provide for the integrity of the investment, but in all other respects they are much the same as ordinances found elsewhere."

An American consul in Latin-America reports that an English company is about to obtain a concession for the establishment of electric light, power and tramway systems in and about his city. This company also contemplates electrifying a railway which extends about 225 miles. The name of the official to whom correspondence should be sent can be secured under File No. 5799, Bureau of Manufactures, Washington, D. C.

REPORT OF COMMITTEE ON TRAFFIC AND TARIFFS*

BY J. M. CAMPBELL, CHAIRMAN; B. E. WILSON, SECRETARY; C. H. ARMATAGE, H. C. ALLEN, J. W. NUGENT, R. M. COLT, C. R. GOWEN

To date three meetings have been held by this committee, one at Cooperstown, June 29, immediately after the appointment of the committee, one in the hearing room of the Public Service Commission at Albany, Sept. 28, and the last at the Onondaga Hotel, Syracuse, Nov. 26.

At the Cooperstown meeting it was arranged to have a circular sent to all companies operating in that part of New York State which is subject to the jurisdiction of the Public Service Commission, Second District, to ascertain from the different companies their views of the committee. This circular also solicited the co-operation of these companies in the work to be taken up by the committee, the first object of which was to draft plans whereby all companies could attain more uniformity in the tariffs filed by them with the Public Service Commission. Favorable replies were received from a majority of the companies, heartily offering their support in the work outlined by the committee.

At the meeting held in Albany Commissioner M. S. Decker, of the Public Service Commission, was introduced by W. E. Griggs, chief of the tariff bureau, Public Service Commission. Mr. Decker gave many verbal suggestions to the committee on its work. He believed that the only correct or ideal fare tariff was one that would allow the passenger the same basis of fare from crossroads or intermediate stops as is given to passengers from local ticket-selling points. He stated that he did not consider it an injustice to the public to charge an excess fare at the crossroads or intermediate stops provided that the excess fare was shown by a receipt ticket which would be redeemable at any ticket agency. Mr. Decker said there was some feeling against the excess fare arrangement, but he realized its importance in the auditing end of the transportation business. He recommended that a redemption limit of three months or 90 days be placed on the excess fare receipts. Mr. Decker concluded with an assurance to the committee that it would have his assistance in any specific matters which it might wish to take up with him.

The following subjects were then taken up informally by the committee, the idea being to discuss them individually at future meetings:

Interchange with steam roads.

Tariff rulings regarding transportation of corpses, dogs, baggage, children.

School transportation, chartered cars, excursions.

At this second meeting the committee met with considerable difficulty in its work in not being able to determine properly the relation of Chapter 49 of the consolidated laws, an act relating to railways, Section 57, and the companies which they were representing. It was thereupon decided that this section of the law should be referred to the legal committee of the association for interpretation and instruction.

At the meeting held in Syracuse uniform rulings covering the transportation of the following subjects were taken up:

Chartered cars, commutation tickets, school commutation, newspapers, together with several other important subjects involved in building tariffs.

The committee feels that sufficient progress has been made in the work to permit it to prepare and present tentative sample tariffs to the association. It respectfully requests an appropriation of at least $200, to cover the printing of the tariffs and other incidental expenses that are likely to be incurred in the work. It is the intention of the committee to send copies of the tentative tariffs to the various interested companies, the purpose being to solicit criticism and recommendations in perfecting what it has in mind, namely, a so-called sample uniform tariff.

*A report presented at the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, N. Y., Dec. 7, 1910.

SYNOPSIS OF REPORT OF THE COMMITTEE ON WAY MATTERS OF THE AMERICAN ELECTRIC RAILWAY ENGINEERING ASSOCIATION FOR THE YEAR 1909-1910*

BY M. J. FRENCH, ENGINEER MAINTENANCE OF WAY, UTICA & MOHAWK VALLEY RAILWAY

The executive committee of the American Electric Railway Association having recommended certain subjects for consideration by the committee on way matters, each member was assigned a subject on which to prepare a report. These reports were presented, discussed and amended at meetings of the committee to which were invited engineers and specialists in the employ of manufacturers whose products were concerned in the reports.

The preparation of "Specifications for Open-Hearth Steel Rails," assigned to J. M. Larned, engineer of maintenance of way of the Pittsburgh Railways, was the result of exhaustive discussion between the members of the committee, representatives of the steel companies supplying open-hearth rails and representatives of firms making a business of inspecting, analyzing and reporting upon structural materials. That part of the specifications relating to chemical composition was the subject of considerable discussion, the manufacturers wishing to keep the carbon content as low as possible to avoid brittle rails, while committee members wished a higher percentage in order to give harder rails and better wearing qualities. After discussion in the convention it was decided to adopt the percentages given in the table that follows:

	Lower Limit.	Desired Composition.	Upper Limit.
Carbon	0.60 per cent	0.68 per cent	0.75 per cent
Manganese	0.60 per cent	0.80 per cent	0.90 per cent
Silicon (not to exceed)			0.20 per cent
Phosphorus (not to exceed)			0.04 per cent

The following note was appended: An increase of 0.035 per cent carbon above the upper limit of this specification will be permitted for a decrease of each 0.01 per cent of phosphorus below 0.04 per cent. Under this note the consumer can require not more than 0.02 per cent phosphorus and thus raise the desired composition of carbon to 0.75 per cent and the upper limit to 0.82 per cent. It was deemed advisable by the convention to practice moderation and give rails of the above composition a thorough test rather than go to extremes.

Another important feature of the specifications is the adoption of the standard drop-testing machine as recommended by the American Railway Engineering & Maintenance of Way Association, thus joining with that society in standardizing this piece of apparatus. These specifications were referred to the committee on standards with the recommendation that they be adopted as standard practice.

The report on the "Standardization of Girder Rails," submitted by E. O. Ackerman, chairman of the committee, called attention to the unwarranted expense to manufacturers and thus to consumers resulting from the great and ever-increasing number of girder rail sections required to be kept on hand and from the capital invested in the rolls. The report called attention to the correct principles embodied in the design of the sections recommended by the way committees of 1907 and 1909. These rails consist of 137-lb. and 122-lb. 9-in. half-Trilby rails and 122-lb. and 98-lb. 7-in. half-Trilby rails. The report states that: "In these sections a minimum amount of rail movement is secured by placing the web well under the head of the rail, and the groove, which is deep and wide, will permit a large amount of wear from the head of the rail before the wheel flange will come in contact with the lip of the rail and thereby cause an increase of power consumption and rail wear. The rail section being made co-axial with the wheel loading, an equal amount of strain is thrown on each of the two splice bars and thus the life of the mechanical joint is increased."

The discussion of the use of these sections brought out the fact that some of the larger systems were using modified types of these rails designed to reduce the weight where it could best be spared; that is in width of the base and size of the projection forming the half groove. Cuts of these modified rails consisting of 7-in. and 9-in. half-groove girder rails and 7-in. and 9-in. girder guard rails were submitted with the report. The committee on standards, in its report to the 1910 convention, recommended the adoption of the heavy girder rails submitted in the 1909 report as "recommended practice," but at a meeting of the executive committee of the Engineering Association held in New York on Nov. 15, 1910, that committee passed a motion to omit from the letter ballot under which standards and recommended practice are finally determined all reference to girder rails. This leaves open for the new committee on way matters the entire field of girder rail design.

The discussion of the convention brought out the point that there should be a 7-in. girder guard rail and a 7-in. girder tram rail that will fish with the 7-in. half Trilby rails, and also that there should be a 9-in. girder guard rail and a 9-in. girder tram rail that will fish with the 9-in. half-Trilby rails. The guard rails were considered necessary for special work adjoining the new straight rails already recommended, and the tram rails are required to fulfil franchise conditions. If it is possible to design these new rails so that one design of joint plates will fit all of the 7-in. rails and one pair will fit all of the 9-in. rails without requiring combination joints a great expense will be saved in future track construction. The design of these new rails will be undertaken by the new committee on way matters.

A motion was carried requesting the committee on standards to recommend for adoption as standard practice the various T-rails recommended to the 1909 convention. These are the Series A and Series B T-rails of 80 lb., 90 lb. and 100 lb. weight per yard, adopted by the American Railway Association; the 7-in. T-rail designated as Section A in the 1909 report, having 6-in. base, 1 7-32-in. web, head 2¾ in. wide and 1 11-16 in. deep and weighing about 108 lb. per yard; also the 7-in. T-rail designated as Section B in the 1909 report, having 6-in. base, 7-16-in. web, head 2½ in. wide and 1 9-32 in. deep, weighing 80 lb. per yard and being identical with Lorain Steel Company section No. 335 and Pennsylvania Steel Company section No. 277. These recommendations relating to T-rails were later approved by the convention in considering the recommendations of the committee on standards, and the executive committee voted on Nov. 15 to incorporate in the letter ballot the recommendations that these T-rails be adopted as "recommended practice."

A set of rules for determining gage of track and widths of flangeways on curves was presented and recommended for adoption by the committee on standards as standard practice. By these rules the proper gage and flangeway widths may be found to suit all conditions of wheels, wheel bases, truck centers and curve radii.

The perplexing problem of the rail joint was presented in a comprehensive paper written by George Weston, assistant chief engineer, Board of Supervising Engineers, Chicago Traction. Mr. Weston covered the field of experience with regular bolted joints, special riveted and machine-fitted or driven bolts, and cast-welded, thermit-welded and electrically-welded joints. Considerable discussion resulted from this paper, and explanations in greater detail were given by the engineers who have been applying the special forms of joints and welds recently developed. It was deemed inadvisable to recommend any particular type of joint at the present time, as the later types have not been sufficiently tested. The consensus of opinion was that the rail head should be carefully planed at all joints to a perfectly even surface to prevent cupping of the receiving rail. Several engineers explained the machine used for planing the rails.

"Economical Maintenance" was the subject of a paper read by Martin Schreiber, engineer of maintenance of way of the Public Service Railway of Newark, N. J. Mr. Schreiber recommended ample headquarters with proper yard and trackage facilities for handling the materials economically. He also

*A paper presented at the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, N. Y., Dec. 7, 1910.

recommended a series of standard switch pieces and frogs that were referred to the committee on standards with recommendation for adoption as standard practice. Undoubtedly all companies should follow these recommendations in designing special work, as renewals can be made immediately from a few stock pieces kept on hand. As the cost of manufacture would be greatly reduced, the resulting economy to the consumer would be considerable in the cost of special work, minimum storage investment, quicker delivery and easier installation. Standard specifications should be used in purchasing materials, preferably the specifications recommended by the association. Among the other recommendations were the following:

Grind rail joints to obtain a true running surface. Avoid compromise joints where possible. Maintain gravel beds and stone crushing plants for economy and to insure prompt delivery. Treat ties and structural timbers by preservative process. Companies should apply piece-work system to paving and any other work where practicable. Adopt a proper accounting and job order system. Compile accurate engineering records, including physical survey of properties, standard drawings properly indexed and filed. Adopt a standard system of symbols for notebooks.

Recommendation was made that next year's committee consider the compilation of a set of rules for the maintenance of way department. The report was profusely illustrated with drawings and cuts showing equipment for use in economical maintenance.

DISCUSSION ON REPORT OF THE COMMITTEE ON WAY MATTERS OF THE ELECTRIC RAILWAY ENGINEERING ASSOCIATION FOR THE YEAR 1909-1910 *

BY MARTIN SCHREIBER, ENGINEER MAINTENANCE OF WAY, PUBLIC SERVICE RAILWAY, NEWARK, N. J.

A recent editorial in the *Light, Railway & Tramway Journal,* London, Eng., stated that "One of the most interesting reports at the convention of the American Railway Engineering Association, held at Atlantic City, October 10, 1910, was that of the committee on way matters;" and, further, "Our American cousins have not always paid as much attention to track problems as we have in this country, but the proceedings of the Atlantic City convention show a very considerable awakening on the subject." If you will pardon me as a committee member, I do not hesitate to agree that the report did contain valuable data. It also was unique inasmuch as five distinct standards were recommended:

1—Standard T-rail.

2—Standard specification for open-hearth high T and girder rails.

3—Standard rules for gage of tracks and curves.

4—Standard switches.

5—Standard survey signs and symbols.

STANDARDIZATION OF RAILS

For T-rail, the "recommended practice" was simply changed to recommend a "standard," but the committee failed to decide on a standard girder rail. This, however, was not due to questions of underlying principles but rather to details of design, as explained by Mr. Ackerman, chairman. One point was that the depths of groove heretofore favored were 1¼ in. and 1⅜ in. In the light of experience and the advantage of longer life of the deeper grooves, it is now questionable if 1½ in. depth is not to be preferred. In the past engineers were of the opinion that the deep groove would not be adaptable to light vehicular traffic, as there was a possibility that the wheel fillers would become fast in the rail. However, the experience of those operating grooved rail, even of 1½ in. depth, does not seem to verify this contention. The Public Service Railway found that no more complaints were due to grooves of 1½ in. depth than to the 1⅛ in. depth, which was the former standard. I understand the same experience is true of the 1½ in. groove now on trial in Pittsburgh. Others also verify this experience. It appears that with users of the welded joint especially the tendency is toward rails 7 in. high rather than 9 in. high. A 7 in. rail, of course, saves weight, is more suitable and requires less excavation. We are just arriving at a time when it is proper generally to adopt a standard girder rail, excepting, of course, for special conditions. Heretofore the change from old tram and other eccentric sections to the new and much heavier grooved section was too great a step to expect general approval. Now it will be easier to introduce a reasonable section because it is almost universally realized that the heavy rail ultimately results in economy, particularly in view of the increased wheel loading. It is noticeable that the tram section is being abandoned, very few, if any, new sections being rolled. I believe that the tram rail will go. A proper grooved rail should be used wherever the T-rail is not suitable on account of paving conditions. A T-rail is generally adequate wherever a tram rail is good enough. In a way, the elimination of the tram is to be commended, as it is an indirect but substantial step toward minimizing the number of live sections that are in use.

The specifications originally drawn up for the committee by Mr. Larned provided for two classes of rails with chemical constituents, designated as "A" and "B." In "B," which is substantially the manufacturers' standard specification, the carbon was .60 per cent to .75 per cent, while "A" called for carbon varying from .72 per cent to .85 per cent. The chemical composition of "A" is seriously objected to by the manufacturers. It was pointed out that the phosphorus content was not proportionately reduced, which was very essential, to stand any reasonable drop test. Then there was the probable increase in cost if the manufacturers' specification was changed. Besides it was a question just how much carbon over .60 to .75 per cent should be specified. It is now generally conceded by engineers who have given special attention to the subject that a carbon content of .60 per cent to .75 per cent is about right for the heavy wheel loads and fast trains now required on steam railroads. High carbon tends too greatly toward brittleness. Dr. P. H. Dudley, a leading authority on rail matters, substantially verified these statements in a discussion before the New York Railroad Club, in September, 1910. Possibly the carbon content may be advantageously increased for the lighter wheel loads of electric railways. Hence the committee recommended a basic specification with a carbon content of .60 per cent. to .75 per cent. At the same time it was also stipulated for those who desired to increase the carbon above the manufacturers' standard and at possibly a modified price that an increase of .35 per cent carbon above the upper limit of the specification would be permitted for a decrease of one point (.01) per cent of phosphorus below .04 per cent phosphorus.

The proper drop test was also a point of considerable deliberation. On first thought the inexperienced engineer would insist on a more severe drop test for the high carbon rail than would be required for the low carbon rail. This is a mistake, as increasing the carbon, especially in some of the eccentric and unreasonable girder rail sections, makes the rail more susceptible to breaking under the drop. For that reason the drop was specified as 13 ft. to 15 ft. The drop test is more serious with the girder rail than the T-rail or a balanced section, even when shims are used to insure a vertical blow. In unbalanced sections the tendency to bow sideways often produces fracture. One of the difficulties in deciding on a standard specification is to get one that will be suitable for the varying weights and sections which must be met with at present. So another point in standardization of girder rail is the possibility of a better general specification.

SPECIAL WORK

Much has been said recently in support of solid manganese special work. After all, however, solid work seems rather extravagant in view of the present high cost of the manganese, the low salvage return and the fact that only approximately 50 per cent of the pieces receive any wear. Admitting that

*An abstract of a paper presented at the quarterly meeting of the Street Railway Association of the State of New York at Syracuse, N. Y., Dec. 7, 1910.

solid special work will have its field where heavy traffic is handled on short headways, it is, nevertheless, true that if a reliable hardened insert in cheaper cast metal could be devised it would meet with great favor. Iron-bound work with rolled rail and manganese for the principal wearing parts and cast steel with manganese centers often give excellent satisfaction, but their reliability cannot always be guaranteed. They will break when least expected and at the most inopportune times. It is hoped that the future will bring an improvement (possibly with the assistance of vanadium, titanium or some other metal) in a reliable wearing steel casting so that specials could be cast "en bloc" and have a manganese insert; the whole would be obtained at a low cost and be absolutely reliable and satisfactory for ordinary electric railway traffic conditions.

Standard switches, mates and frogs should be adopted. The standards recommended by the way committee and as proposed by the special work manufacturers are good, although improvement could be obtained for the cheaper hardened center work by more liberal dimensions in some cases. While on this subject it may be of interest to state that a few days ago I was particularly anxious to get some tie rod holes in a solid manganese guard rail. After asking several local machine shops, the idea had to be abandoned, as it was not practicable to take the rail to the shop. Then it was suggested that an oxy-acetylene flame might be used. It took about an hour to hire the apparatus and in less than two hours 36 holes were burned through the guard rail. One of the holes was made in 1½ minutes. (Mr. Schreiber showed the delegates one of the cores that was cut out of the rail in making the hole by the oxy-acetylene flame.)

JOINTS

The committee on way matters was fortunate to have received the able progress report on rail joints by Mr. Weston. The discussion of Mr. Lange on the same subject also brought out the great importance of variations in rail temperatures and their effect at the joint. It is true that definite recommendations were not reached in the papers, but the work cannot but appeal to the careful reader, because it is an effort to get at the basic and scientific principles of the performance of the rail joint. These principles must be thoroughly understood before any decided recommendations may be expected.

Just a year ago I brought to the attention of your Association the demand for a joint that would give approximately the life of rail in paved streets, also one that would minimize resistance to the electric current. I said then we must look to improvement in the various weld processes. The last year has seen work along these lines. The Lorain Steel Company has provided an offset at the centre of its bar to give support to the head, especially for weak sections. Likewise the Goldschmidt Thermit Company is using a method whereby the rail ends are held ¾ in. apart to get a better weld for the entire section. Likewise, in Detroit, the cast weld has been used with a water jacket to prevent heating the metal in the rail head. Experience alone will demonstrate just how successful these experiments will be. It suffices to say that it is to the welds and the high-class combination joints that we must look for advancement.

Stress should also be laid on the importance of grinding joints. Liberal grinding is a paying investment. A joint should not be left without having the abutting rail end surfaces at precisely the same elevation. In case of appreciable variation of rail end the top surfaces should be ground well back of the joints. Even with new rail it is almost impossible to keep the rolls in shape so that the rail ends will fish exactly. If you do not want cupped and pounding joints, do not allow them to get started.

In conclusion, I wish to state that the foregoing remarks are not intended to cover the extensive subject at issue. The idea of this paper simply was to mention a few of the points that may not have occurred to others who have read the text of the report of the committee on way matters.

HEARING ON SERVICE IN SUBWAY IN NEW YORK

A hearing was held before Commissioner Eustis of the Public Service Commission of the First District of New York on Nov. 30, 1910, "on the motion of the commission, on the question of improvements in and additions to the regulations, practices and service of the Interborough Rapid Transit Company, in respect to its subway lines." H. A. Butler, assistant counsel, conducted the case for the commission, and James L. Quackenbush, general attorney, and T. L. Waugh, counsel, represented the company.

Mr. Eustis said that the hearing was set on account of renewed complaints about the service on the Broadway branch of the subway. Only a few months ago a hearing was held as a result of which a change in schedules was made and it was supposed that partial relief would be given by the operation of certain local trains to Dyckman Street. That was in the spring. He presumed that during the summer the service was satisfactory, as there were not many travelers then. He asked to hear from complainants regarding the present service on the subway division of the company north of 137th Street.

One of the complainants suggested that the local trains which are operated north only as far as 137th Street should be run to Dyckman Street and switched there for the return trip. Data were then offered as evidence by the complainants to show that the service about which complaint had been entered was inadequate.

One of the complainants said that the extension of the local service to Dyckman Street was so simple a matter that it seemed to him there was no possible argument on the other side. Commissioner Eustis said that at the last hearing the statement was made on behalf of the railroad that if the company ran all of the trains through it could not get them back without upsetting the schedule of the express trains. The commission was going to do all that was possible to improve the service, but it could not go so far as to do anything that would disrupt the present service.

Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, said that the total number of passengers on the Broadway line between the Dyckman Street station and 137th Street, both included, for July, August and September, 1909, was 3,411,332 and that for the same period of 1910 the total was 3,444,385, an increase of less than 0.1 per cent. In order to treat people on both sides of the city alike, trains should be withdrawn from the Broadway division and put on the Lenox division. He suggested that the company take every other local train in the morning between 7:30 a. m. and 9 a. m. and start it from Dyckman Street southbound, and in the afternoon take every other local train at the Brooklyn Bridge between 4:45 p. m. and 6:15 p. m. and run it through to Dyckman Street.

Mr. Hedley explained that the company was renewing the brake equipment on all of its subway cars, and was providing all of the subway equipment with new draft gear. These changes took many cars out of service. During the non-rush hours the company intended to provide a seat for every passenger. The inspectors of the commission took records of the traffic in the subway every day. Whenever the attention of the company was called to the fact that there was a period in the non-rush hours when every passenger was not provided with a seat the company increased its service and would continue to do so whenever the physical condition of the property would permit.

Mr. Eustis said in conclusion that the present orders of the commission required a seat for every passenger outside of the rush hours during periods extending 30 minutes. Every time the commission had checked the records it had been found that the company was not violating the order. It might, however, be necessary for the commission to shorten the half-hour period.

The hearing was then adjourned until 2:30 p. m., Wednesday, Dec. 7, 1910.

TRAINING OF TRANSPORTATION EMPLOYEES*

BY E. E. STRONG, CHIEF INSTRUCTOR, SYRACUSE RAPID TRANSIT RAILWAY.

The increasing interest of railway companies in the training of transportation employees is indicative of the success with which that branch of work has met. Ours is the only business in which success depends upon the efforts of men who have had little or no experience and whose worth in positions of responsibility is unknown to the employer. Steam railroads before appointing a man to a position of trust require him to acquaint himself thoroughly with the duties and responsibilities of that position by serving for a long time in subordinate capacities where advancement depends upon the loyalty and ability which he demonstrates. Electric railways, on the other hand, usually employ unknown men and after a few days' training place them in positions of trust and responsibility identical with those occupied by experienced men who have proved themselves reliable and competent. Indeed, the most remarkable feature of railway work lies in the fact that so large a part of the property is placed in the hands of unknown men upon whose judgment we hestitate to rely, but upon whose work depends the success of operation.

Since we must continue to employ men who are unfamiliar with trainmen's duties improvement over present conditions must come through the channels of careful and efficient instruction. Little is to be gained by increasing the force of inspectors, as this suggests the idea of compelling crews to perform their duties through fear of detection and consequent discipline. That unwilling or forced service is unsatisfactory is nowhere more clearly demonstrated than in railway work, since trainmen are so little under the eyes of officials who feel a live interest in the affairs of the company. In other industries workmen receive orders from their foreman and perform their duties under his direct supervision, while trainmen receive their orders from their superior officers and are soon out of their sight. Whether or not his orders are obeyed may not be known, unless special attention is given to certain men; while this is being done general supervision of the remaining force of men may be temporarily laid aside.

From the nature of the work to be performed it is evident that good results can be effected only by causing each man to feel a personal responsibility for his own work—to feel that he is an agent, so designated by his badge, authorized to do business for a corporation and that he is called upon to exercise such care and judgment as will yield the best result to his company.

The object of instruction is not only to teach employees how to perform duties mechanically, but to teach them the underlying principles, so that slight variations from the ordinary routine will not confuse them. Some time ago a new conductor remarked to me: "I have received a large amount of information and have kept it all in mind, but it is in chaotic condition; when I get it straightened out I'll get along all right." He had been shown detail after detail until his mind could no longer digest what it received. He had attempted to remember all he was told, like one who learns a rule, word for word, without comprehending its meaning. Had each point covered been assimilated through the power of reasoning there would have been no "straightening" to do.

These men should be taught method and system, not mere detail. In teaching method it is necessary to convince them of the superiority of that method over any others they may have observed. Once they are convinced they will accept your methods and you are assured of as good operation when they are out of your sight as when under your observation.

Some operating men object to the use of an instruction car for motormen on the ground that when a break occurs the motorman's duty is to get his car clear and not to make repairs. To teach men how to repair defective equipment is the least important use of an instruction car; its chief object is to demonstrate the effects of proper and improper operation. Occasionally men who have been employed by other companies enter our service and we find that they have been taught to use a certain period of time for "notching up" the controller. This method is entirely insufficient, especially on a system where grades are variable. We may teach a motorman not to run on resistance points or he will overheat the resistance. Any man may be able to recite these words, but the all-important question is: "How much does it mean to him?" Under old methods we found that men who would tell us that slow feeding would heat resistance did not know what resistance was nor where it was located. With an instruction car, on which all equipment is exposed to view, we now run for a short distance on resistance and allow the men to observe for themselves how quickly current produces heat, thus fixing an important fact permanently in their minds. In similar manner all parts of the brake and electrical equipment may be shown to motormen and the use of each part demonstrated.

We believe that a motorman should understand what takes place as he advances the controller; why a circuit-breaker releases; why a fuse melts; why moving the brake handle to one side sets and to the other side releases the brakes. Possibly he may never have occasion to tell what he knows, but his knowledge cannot but make him more careful of equipment, since he knows the effect of each operation. It may seem extremely optimistic to state that men will refrain from misusing equipment because they know that misuse results in damage, but, on the other hand, it would be erroneous to believe that men destroy property intentionally or maliciously.

In training student motormen we have found it advisable to call them together twice each week for a three-hour session, rather than to devote a whole day at a time to this part of their instruction. In this way we cover all parts of the electrical and brake equipment in the different sessions which a student attends during the "breaking-in" period, and still do not crowd so much upon him at any one time as to confuse him. This plan also affords him the opportunity of asking questions regarding observations he makes while on the various lines. It is gratifying to note how much interest students take in this feature of their training and we believe we are fully paid for the effort expended in this way. While a motorman may never make direct use of all this knowledge it forms for him a sort of mental reserve that makes him more competent. Each piece of equipment before being put into service is subjected to test and in this test must stand up under conditions more severe than those met in ordinary service. Is it consistent, then, to put this equipment in charge of a man who is taxed to the limit of his mental strength merely in applying brakes or power? A car may be equipped with modern safety devices and with the best of appliances with which to control it, yet, if this car is operated by a motorman whose mental make-up or whose training is insufficient, the most important element is still wanting.

Recently we have made use of our classroom for conductors also. It had been our custom formerly to place a student on each of the lines under certain conductors who were designated as instructors. After learning all the lines the student presented himself to the chief instructor for final instructions and examination, after which he received his badge. This method proved unsatisfactory for the reason that the instructors varied more or less in methods of performing their duties. The effect was to confuse the student, who, from inexperience, was unable to select or adhere to any one way. The chief instructor went over each point and gave careful attention to register operation, trip sheets, transfers, mileage, accident reports, etc., but the instructions of a few hours were not sufficient to counteract any faulty method that had been practised for several days. Though the student could give evidence of understanding each point at the time, he went back to the methods he had learned first as soon as he took charge of a car.

As the first impression is the most lasting we determined to have that impression correct. At present all student conductors are called together three times during their first week with the company. At the first meeting they are taught the use of schedules, the proper method of making trip reports and the

*A paper presented at the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, N. Y., Dec. 7, 1910.

operation of the register. At the second session careful consideration is given to issuing and accepting transfers and to the use of the different forms upon which conductors are required to make reports. At this time they are also given a talk on the methods of doing their work effectively and quickly, special care being taken to impress upon them the fact that courtesy on the part of employees is one of the most valuable assets of a company. At the third meeting attention is given to the prevention of accidents, to methods of procedure in case of accident, the necessity of securing witnesses and to accident reports.

The student, whether motorman or conductor, after attending sufficient classes to receive the required training, learns the remaining lines and then returns to the instruction department for final instructions, trial trips and an oral examination on the book of rules. If found satisfactory he is given a certificate with which he presents himself to the superintendent or other duly authorized representative of the transportation department and is given a badge and other necessary tools. The written examination on the book of rules is given at the end of 30 days, at which time the men have gained the knowledge from experience to assist them in giving final and intelligent answers to the questions.

It will be noticed that the student is not required to go here and there for instructions, but receives all from the instruction department. This has been deemed advisable, since at the best the "breaking-in" period involves considerable hardship, and if a student is required to go from department to department after he believes his work is completed he becomes discouraged and gains little from what he hears. Moreover, many of these men, feeling a sense of strangeness in first meeting an official, are not in the proper condition of mind to receive or to assimilate instruction.

With our methods students become sufficiently acquainted with the instructors to overcome their timidity and may be led to engage in discussions and to ask questions pertaining to their duties. This opens the way to the most effective method of teaching; namely, that of leading the student from the known to the unknown by asking such questions as will compel him to think with you and to use his own power of reasoning.

The work of the instruction department does not end when a man receives his badge. On the contrary, each new man is followed up daily by traveling instructors until he gives evidence that he has formed the habit of doing his work properly, whereupon inspection becomes less frequent. In this way, any wrong tendencies may be curbed before they become a part of the man's regular method. The instructors endeavor to make the motormen and conductors feel that they are desirous of giving assistance and it is interesting to note the increasing tendency to call upon the instructors for help and advice.

The work as outlined above covers only the line of procedure followed out in the training of new men. In addition to this, we also call all trainmen together two or three times each year for instruction on points of general guidance, such as courteous treatment of the public, prevention of accidents and any special features that may require attention at the time. With a view of urging the employees to the necessity of extreme care in order to avoid accidents, we make use of a chart showing the number of accidents of each class occurring on each of the various lines, the total number of each class, the total number on each line and the grand total of all accidents occurring within the period under consideration.

In order that the motormen and conductors may not neglect to keep themselves familiar with the rules of the company we re-examine them on the book of rules every three years, making use of the same printed forms as are used at the first examination. On the whole, we may say that the results of instruction have been wholesome and gratifying, and that what we need at present to insure a greater measure of success is not a means of compelling trainmen to submit to arbitrary rules, but a means to instil into them the spirit of generous and conscientious co-operation.

ALLOWANCE FOR OBSOLESCENCE UPHELD IN FRANCHISE TAX CASE

A decision was rendered by Justice Randall J. Le Bœuf, of the New York Supreme Court, on Nov. 25, upholding the contention of the Brooklyn Rapid Transit Company that the franchise tax valuation on certain surface subsidiary railways as fixed by the State Tax Commission should be reduced from $1,365,842 to $334,538. The court upholds the reasonableness of an allowance for obsolescence and inadequacy of equipment. The decision says in part:

"If the State Tax Commission's decision is to be construed as laying down the rule that no allowance shall be made for obsolescence or inadequacy of equipment, not yet sustained, but capable of reasonable ascertainment for the future, it does not appear to me to be consistent with the expressed policy of this State. As surely as humanity travels from the cradle to the grave the machinery and equipment of a public service corporation travel toward the scrap pile. The plant and structures depreciate in less degree, but as certainly. This is ordinary depreciation.

"But another form of depreciation in the case of properties herein being valued takes place. The machinery or equipment, while still capable of years of service, becomes inadequate to do the work demanded—not only by the corporation but by the law itself. In the case particularly of electrical machinery the type becomes obsolete by reason of invention, as increasing public demands frequently require in aid of safe and adequate service that the obsolete appliance or equipment give way to renewal.

"Some of these changes are capable of definite ascertainment. Many of them may be provided against for the future by setting aside from gross earnings a reasonable sum to create a reserve against the day when they shall come. This reserve, with the amounts set apart for ordinary depreciation, goes to amortize the capital of the company. Amortization of capital is something of a novelty in the case of public service corporations. Amortization of securities of trustees and money corporations has been known for many years and the principle has been applied by manufacturing corporations. Public service corporations alone were slow to recognize this necessity.

"The wrecks of many of such corporations scattered throughout the State would not to-day be seen if early this principle had been applied to their accounting.

"In the old days, after original paid-in capital and original bond issues had regularly paid their dividends and interest out of earnings and the plant had depreciated or become in whole or in part inadequate or obsolete, it was necessary to issue a new batch of bonds to cover a new plant, while the old plant was actually on the books at practically its original value. Capital remained apparently unimpaired and clamoring for dividends. If the money were actually obtained the bondholders sooner or later owned the road, and upon reorganization were obliged in the interest of the property to eliminate in whole or in part the original stockholders.

"The Public Service Commission law recognizes this amortization principle, and yet the State Tax Commission is insistent that no reasonable basis exists for the creation of an amortization fund.

"If a public-service corporation comes into court and requests that it be permitted to set aside a reasonable amount of its gross earnings for such an amortization fund it is difficult to understand why the court should refuse to consider that request."

Consul William Coffin, of Jerusalem, has transmitted to the Bureau of Manufactures, Washington, D. C., translated copies of the contract and specifications for the tramway concession in Jerusalem and a copy of the original French text of the concession. All these papers are on file in the Bureau of Manufactures and can be obtained by interested American contractors by referring to file No. 5863.

CENTER-VESTIBULE STEEL TRAILERS FOR PITTSBURGH

The Pittsburgh Railways Company is now placing in service a new pay-at-entrance trail car of the novel center-entrance and exit design shown in the accompanying illustrations. Fifty of these cars were ordered of the Standard Steel Car Company some months ago, but, owing to various delays in manufacture, are only now beginning to arrive. The car is of steel up to the letter board with the exception of the floors and seats. The entrance and exit are at the center of the car, so that the seats extend clear around the car, except across the door.

The car seats 62 people and complete with trucks, Peter Smith hot-air heater and all details ready to operate weighs only 22,300 lb., or 360 lb. per passenger. When coupled to one of the railway company's semi-steel pay-at-entrance cars the two-car train furnishes 118 seats. The car is mounted on trucks having wheels only 22 in. in diameter. Thus the floor can be placed 20 in. above the rail and be on a level with the back platform of the ordinary car. This arrangement allows the use of only one step up into the car and facilitates the loading and unloading. The accompanying view of the interior shows the position of the conductor and cash box near the entrance.



Pittsburgh Trailer Operation—Center-Vestibule Trail Car



Pittsburgh Trailer Operation—Car Interior, Showing the Position of the Conductor

Some of the most important dimensions of these trailers are as follows: Length over all, 45 ft.; width over all, 8 ft. 2 in.; step heights, 16 in. and 14-in.; height from the rail to the top of the roof, 10 ft. 6 in.; truck centers, 22 ft. 6 in., and wheel base of truck, 4 ft. 4 in.

HEARING BEFORE INTERSTATE COMMISSION ON STEAM-ELECTRIC INTERCHANGE

The Interstate Commerce Commission on Dec. 1, 1910, gave a hearing at Washington on the petition of the Cincinnati & Columbus Traction Company, which operates an electric railway between Cincinnati and Hillsboro, directed against the Norfolk & Western Railway and the Baltimore & Ohio Southwestern Railroad.

The complainant desired to connect its line with those of the defendant at Hillsboro, with a view to participate with them in the interstate commerce of that section of the State. The steam roads refused to permit the connections to be made on the ground that under the law satisfactory through routes and joint rates already were in operation, and that, inasmuch as the electric railway practically paralleled the lines of the steam railways, to grant it such connections as demanded would merely subdivide an already insignificant interstate business. The Cincinnati & Columbus Traction Company held that the attitude of the steam railroads was untenable and was assumed because the complainant's line was operated by electricity.

HEARING ON SERVICE IN QUEENS COUNTY

A hearing was held before Commissioner Bassett of the Public Service Commission of the First District of New York on Dec. 1, 1910, to inquire into the service furnished by the New York & Queens County Railway. One of the principal causes of complaint is the question of diverting cars from the ferry at the foot of Borden Avenue, Long Island City, over the Queensborough Bridge to New York, and operating a shuttle service from the plaza of the bridge in Long Island City to the ferry. It was explained that it would be physically impossible with the present facilities of the company to establish the reduction in the headway of cars which the complainants had suggested. The company had awarded contracts for 25 cars, but the car builders were behind with their work. Six of the cars had been delivered, six were in transit, and the remaining 13 cars would be shipped by the end of December. Mr. Bassett instructed E. G. Connette, transportation engineer of the commission, to study traffic conditions on the lines of the company and confer with the officers of the company and then report to the commission.



Pittsburg Trailer Operation—View of Motor and Trail Car Illustrating the Respective Places for Boarding and Alighting, Except That the Front Exit of the Motor Car Is Not Shown in Use

ANOTHER SUBWAY PROPOSAL IN NEW YORK

On Dec. 5, 1910, the Interborough Rapid Transit Company submitted a proposition to the Public Service Commission to build and operate extensions to the subway system, Briefly the proposal of the company provides for that portion of the triborough subway from Forty-second Street north with a subway in Lexington Avenue and elevated extensions to Pelham Bay Park and to Woodlawn Cemetery in the Bronx; a subway down Seventh Avenue from Forty-second Street south, continuing under Varick Street and West Broadway; a tunnel to Brooklyn in the neighborhood of Wall Street connecting with the Lafayette Avenue subway which the company proposes to build and also with the Fourth Avenue subway now under construction by the city. The company also proposes to operate the Fourth Avenue subway and to build an elevated extension to Coney Island and a subway extension to Fort Hamilton.

The proposal of the company was addressed to William R. Willcox, chairman of the Public Service Commission of the First District of New York, by Theodore P. Shonts, president of the Interborough Rapid Transit Company. After reviewing the lines which the company proposes to include in its offer the letter from the Interborough Rapid Transit Company continues in part as follows:

"The cost of constructing and equipping the foregoing lines is estimated at $128,000,000. The Interborough Rapid Transit Company hereby offers to build and equip the same for $53,000,000, to be furnished by the city, the city to provide in addition the necessary easements and right-of-way, and the company to supply the funds necessary to defray the additional cost of construction and equipment, which, upon the basis of the above estimate, would amount to $75,000,000. The work will be done as 'extras' under the terms of the rapid transit contract of Feb. 21, 1900, under which the original subway was constructed and is operated, except so far as the terms thereof may be modified by the provisions, except this offer; and the lines when constructed and equipped will be operated by the Interborough Rapid Transit Company as parts of the existing subway system, with a single 5-cent fare and free transfers, upon the following terms:

"1. The net profits from operation, to be arrived at as hereinafter provided, shall be disposed of as follows:

"(a) The city to take all net profits for the first five years from the time of beginning operations on any portion of the new subway extensions;

"(b) The net profits after five years to be equally divided between the city and the Interborough company.

"2. The net profits shall be determined by deducting from the gross revenue of the extensions charges for the following items, in the order named:

"(a) Maintenance of equipment, including an allowance for depreciation;

"(b) Maintenance of way and structures, including an allowance for depreciation;

"(c) Traffic expense and cost of conducting transportation;

"(d) General and administration expenses;

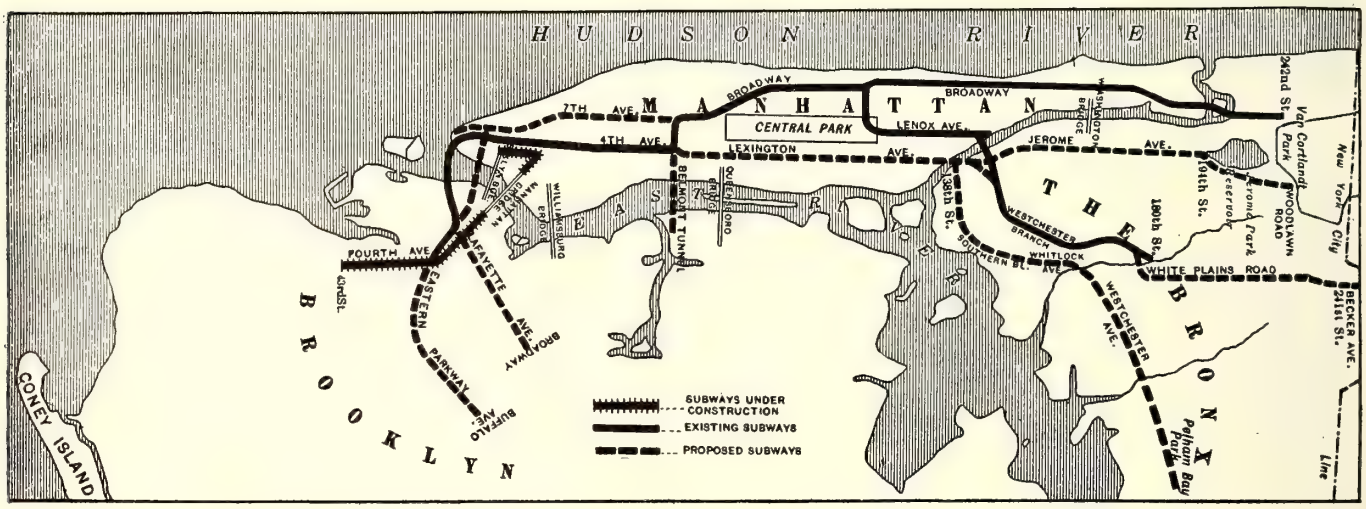
"(e) Taxes, if any;

"(f) The actual annual charges of the company for carrying the cost of equipment and providing a partial sinking fund of ¾ of 1 per cent per annum to meet obsolescence and for carrying that portion of the cost of construction not met by the funds contributed by the city and providing a sinking fund of 1 per cent thereon;

"(g) Interest on bonds issued by the city to defray the cost of construction, plus 1 per centum per annum as a sinking fund.

"3. The gross operating revenue of the new extensions shall be ascertained from the number of tickets sold at the stations along the new extensions, or from the number of tickets deposited in the chopping boxes on the new extensions.

"4. If the gross income in any year, after providing for the charges above mentioned, shall be insufficient to meet the interest and sinking fund upon the construction and equipment bonds issued by the company, the deficit for such period shall be borne by the company, and shall not be a cumulative charge against future earnings.



Present and Proposed Underground Lines in New York Referred to in the Proposition of the Interborough Rapid Transit Company, Submitted on Dec. 5, 1910

"5. If the gross income for any year, after providing for all charges above mentioned, including interest and sinking fund upon bonds issued by the company to defray the additional cost of construction and equipment, shall be insufficient to meet the interest and sinking fund upon the city's bonds, the deficit sustained by the city for such period shall accumulate and be a charge against the future profits before any division thereof shall be effected between the city and the company.

"The city will retain the right, now provided for by law, to take over the extensions at any time after 10 years from the time that any portion thereof may be put into operation, upon paying to the company (a) the amount of its investment in construction over and beyond the $53,000,000 supplied by the city, plus 15 per cent, which sum shall decrease as the term continues, so that at the end of the full term of the contract under which the said extensions may be built as extras no amount will be required to be paid by the city, and (b) the then reasonable value of the equipment.

LETTING OF CONTRACTS

"If this proposition be accepted we are prepared to enter immediately into contracts to carry the same into effect. Each part of the road as completed will be immediately opened for operation.

"We have considered your suggestion that the present sub-

way leases should be so altered that the terms thereof and of all extensions thereto operated by the Interborough Rapid Transit Company should end at the same time. Contract No. 1, under which the Manhattan portion of the subway was built, provides for an original term of 50 years, with the right to renewal for an additional term of 25 years. Contract No. 2, under which the line from the City Hall Park to Flatbush Avenue in Brooklyn was built, provides for an original term of 35 years, with the right to renewal for an additional term of 25 years. We are willing, if it can be legally arranged, that these contracts should be so modified that the original terms thereof and of all extensions built as extras under Contract No. 1 should be fixed at 49 years from the date of the completion of the extensions, and that the privilege of the renewal terms of 25 years should be canceled.

"The company also offers to equip and operate, under a lease for a term equal to the unexpired term of Contract No. 1, under which the original subway was built, the Fourth Avenue subway in Brooklyn, including extensions to Fort Hamilton and Coney Island, when completed, as part of the present subway system, for a 5-cent fare, upon the following terms:

"The gross earnings of the Fourth Avenue division, of which a separate account shall be kept between the city and the company, shall be ascertained from the tickets deposited at the stations upon the division. From the gross earnings thus ascertained shall be deducted: 1. (a) All station expenses; (b) Maintenance of way and structures; (c) Damages for accidents happening on the division.

"2. Other operating costs to be determined according to unit costs on the Interborough system, upon a car mileage basis: (a) Conducting transportation; (b) Maintenance of equipment and depreciation; (c) Cost of power; (d) General and administration expenses; (e) Taxes, if any.

"3. After the payment of the foregoing charges the actual annual charges of the company for carrying the cost of equipment and providing a partial sinking fund of three-fourths of 1 per cent per annum to meet obsolescence.

"4. From the balance of the income then remaining shall be paid interest and sinking fund upon bonds issued by the city to defray the cost of construction upon that part of the road equipped and operated by the Interborough company.

"If the income shall be insufficient to meet the foregoing charges, or any part thereof, the deficit shall be paid annually by the city, but that portion thereof which represents payments made by the city upon bonds issued by the city as hereinbefore provided for shall accumulate and be a charge against future profits before any division thereof shall be effected between the city and the Interborough company.

"5. The net profits remaining after providing for the foregoing charges shall be equally divided between the city and the company.

"The proposition herewith submitted is believed to embrace the following advantages over any other now before the city:

"1. Citizens of Brooklyn, Manhattan, Queens and the Bronx may be transported to any point upon the enlarged subway system for a 5-cent fare.

"2. The extensions proposed can all be completed within a period of five years from the time when the right to begin construction is given.

"3. The plan set forth leaves free for additional extensions, or for such other purposes as the city may determine upon, the funds which will be available in each succeeding year.

"4. The city under the plan proposed would have in operation a harmonious subway system, with a through four-track line upon the east side and a through four-track line upon the west side of Manhattan, with suitable extensions to the Bronx and Brooklyn.

"5. If competition with the Interborough Rapid Transit Company be the prime consideration, it is believed that by the construction of the proposed extensions the city will be in a position to establish an independent competitive line at an earlier date than would otherwise be possible. The west side downtown extension and the east side uptown extension in Manhattan, together with the Bronx and Brooklyn extensions, could be taken over after 10 years from the time when the lines or any part thereof were put into operation.

"The Belmont tunnel, when completed, will represent a total investment of approximately $10,000,000. It will therefore be perceived that the contribution which the Interborough Rapid Transit Company proposes to make from its funds toward the establishment of a well-rounded rapid transit system in this city approximates a total of $107,000,000, against a contribution of $53,000,000 on the part of the city."

William G. McAdoo, president of the Hudson & Manhattan Railroad, in a recent letter to William R. Willcox, chairman of the Public Service Commission, says that if the commission does not make a decision on the offer to operate the proposed tri-borough route on or before Dec. 15, 1910, the offer will be withdrawn. Mr. McAdoo said in part in his letter:

"Our proposal is for the operation, not construction, of the system. If the commission should determine to award contracts immediately, we would respectfully suggest that action be postponed on those sections affected by the changes which will be necessary if our proposition be accepted. These changes will not, on the whole, delay progress of the work.

"We do not want to appear as attempting in any manner to influence the action of your commission in regard to these matters, as we realize that they are the subject of your own discretion and judgment. Our purpose is merely to suggest the wisdom of withholding contracts for these sections until a decision on our proposition can be reached, since the changes in question can probably be effected more economically and with greater advantage in advance of the letting of such contracts than afterward.

"We trust that the commission may find it possible to render a decision on or before Dec. 15, 1910, at which time we shall be obliged to withdraw the offer if nothing shall have been done. We do this because we feel that it is to the interest of the public and of all concerned that prompt action shall be taken."

In a speech which he made at the luncheon of the City Club on Dec. 3, 1910, Mr. McAdoo commended the plans for the tri-borough subway as projected by the Public Service Commission. In the course of his remarks he said:

"I think the plan can be bettered in some respects, but I am frank to say also that you can appoint a hundred bodies or committees of engineers or of citizens and ask them to study the subway problem and submit a plan, submit suggestions and submit specifications and I will guarantee that no two of them will be in accord either as to the route or as to the specifications, or as to anything, but I think that the duly constituted authorities under the law are the people to make that plan.

"Now, I am perfectly frank to say that any intelligent study of the question of competition will convince any intelligent mind that any competition which is destructive of reasonable rates among carriers is unwise, is uneconomic and is something that ought not to be had; but competition, on the other hand, which does not mean destructive rates, but does mean improvement in the service, a competition in quality and quantity and general treatment of the public, is very desirable.

"The construction of the larger dimensioned tunnel means not only better and more economical operation, but it also means better ventilation, it means lower temperature in those tunnels, and it means to every man, woman and child who rides in the cars greater comfort because of the better temperature and better ventilation.

"I believe absolutely that if the City of New York to-day would give to private capital a franchise for 75 years, under which there may be the necessary guarantees for continued use and operation of this property, and you would give to private capital all of the surplus earnings after paying 4 per cent to the city and the sinking fund, then you could get the money with a guarantee to the city, but when you say that after 10 years, if it is a profitable investment, the city reserves the right to take the property, I say you can't do it, and I say no gentleman in this room would put money into a proposition of such a character unless he had such a long term."

On Dec. 5, 1910, Frank J. Sprague gave an interview in which he said that he realized that Mr. McAdoo had him in mind when he referred to certain matters in his City Club speech, particularly in the statement that certain critics of the tri-borough system had said that it would be impossible to find a railroad man to operate the new system under any conditions. Mr. Sprague declared that what he did say was that it would be most unlikely that an operator could be found to assume the task under what has hitherto been set forth as essential, that is, a guarantee of first lien in favor of city interest and sinking fund and the operation of the Brooklyn loop and the Canal Street extension.

According to Mr. Sprague, Mr. McAdoo's proposal for a route as it relates to the three boroughs is so changed that his plan is a selected one, made up of the Manhattan heart of the sections recently bid upon and other new and more valuable routes not forming any part of the original tri-borough system for which bids are now demanded. Mr. Sprague said he was willing to make a bid, under certain conditions, for the operation of the same system which Mr. McAdoo is willing to bid for, or for an alternative route, and to guarantee, under heavy forfeiture, that his proposal will be a much better one, so far as the city is concerned, than Mr. McAdoo's. The conditions which Mr. Sprague lays down are that the city shall abandon its demands, which have hitherto ruled with regard to the Interborough Rapid Transit Company, of a guarantee of the interest and sinking fund against the cost of construction, and permit private capital to have prior lien on the net earnings and state that competitive proposals will be accepted under seal at a specified date.

Commissioner Eustis said to representatives of the Tri-borough League who called on the commissioner recently to urge that contracts be awarded for the construction of the tri-borough system:

"We certainly must consider whether an operator can be secured under fair terms, before deciding upon a route. It may be necessary to readvertise for new bids, as those received on some of the sections were far from satisfactory. On the Canal Street crosstown line, for instance, the bids were so much above the estimate that our engineers are making revised plans."

DISCUSSION OF THE REPORT OF THE COMMITTEE ON EQUIPMENT *

BY W. J. HARVIE, CHIEF ENGINEER, SYRACUSE RAPID TRANSIT COMPANY AND UTICA & MOHAWK VALLEY RAILWAY

There are two items among those which were considered by the committee on equipment at Atlantic City last October to which I wish especially to call your attention.

The first was the matter of satisfying the demand for a reasonable system of units of comparison of car weights. The need for a suitable unit of this kind is generally acknowledged and the committee made considerable progress when it carried the matter far enough to report and make a suggestion. The following are paragraphs from the report:

"The recent growth of interest in the question of car weights has developed a demand for a rational system of units of comparison. The unit most used in discussing car weights is 'pounds per passenger seat.' This is a very convenient and instructive unit of comparison for cars of the same general type, in similar service, and undoubtedly will continue to be used.

"It should always be remembered, however, that this unit may be quite meaningless in comparing cars of dissimilar types. For instance, the statement that a car weighs 2000 lb. per passenger seat conveys an impression of excessively heavy construction; but the further information that half the car is devoted to a baggage compartment calls for quite a different opinion. Again, the statement that a car weighs 550 lb. per passenger seat might lead to expectations of extraordinarily light construction which would be at once dissipated on learning that the car is a 15-bench open one.

"There seems to be a need of a unit of comparison applicable to car bodies of different types, and it is suggested that this unit should be 'pounds per square foot of area.' The area considered should be calculated by multiplying the extreme length of the car, over platform end framing, by the greatest width, excluding steps or running boards.

"It is suggested that weight of trucks should be compared on the basis of 'pounds per ton on center plate,' as it is obvious that trucks must be designed to carry the maximum load. The weight of car plus maximum load is the proper center plate load basis."

The idea here expressed is an excellent one and it is to be hoped that this committee will continue its investigation along this line until it is assured that it has found the right unit.

The second matter might be called the "rational method of reducing car weights." Three general methods are suggested for the reduction in car weights:

(1) By reducing body weights.
(2) By reducing truck weights.
(3) By reducing electrical equipment weights.

A great deal of attention has been given of late to the reduction of body weights, and some progress has been made. But human nature is very apt to go to extremes and we must watch out that we do not get too light a car body. This may safely be left to the committee.

Into the second item, truck weights, railway men have not gone so thoroughly until lately, but it would seem that there is considerable opportunity for development in the manufacture of light trucks. The truck builder can do much to facilitate this improvement and the committee is to be commended for its work in getting the truck builders interested in this matter. The committee states that truck manufacturers find a good deal of their trouble in lightening the design of trucks due to the individuality, if it may be so called, of operating engineers in specifying sizes and types of wheels and axles. It would seem that this matter will regulate itself shortly by the introduction into actual practice of the various standard axles and wheel sections which have been adopted by the American Electric Railway Engineering Association. This result, however, must of necessity be a matter of gradual growth. We, as railway men, as far as is possible on our systems, should gradually adopt these standards.

Regarding the third item, the matter of light electrical equipment, we can, of course, get more horse-power out of present types of motors by providing for higher motor temperatures. It would seem, however, that a very considerable and immediate saving might be made in the use of single end instead of double end equipment. This is, of course, a subject which is somewhat threadbare, but the immediateness and ease of application of this partial remedy is the reason for its mention here. I am glad to note that there is a growing tendency of those who are most vitally interested in continuity of operation toward single end equipment. It is granted, of course, that the double end equipment will be more flexible in operation, and as stated in the report: "The first and foremost necessity in any equipment must be its reliability of performance; second, the cost of operation; and, third, the cost of maintenance."

It appears that the first of these is fulfilled by the single end equipment except in the case of extraordinary interruption of traffic, such as fires and the like; the second condition is fulfilled completely by the single end equipment, as is also the third. Against the emergency cases cited in the first instance must be balanced the cost of carrying around continually an extra ton or more of weight at $110 to $125 per year per car.

Several other methods of reducing the weights of electrical equipment are suggested, but it would seem that the most available one just now is the one to which I have called attention above. The advisability of using two-motor equipment further to reduce weight is, I believe, open to further investigation.

*Abstract of paper presented at the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, N. Y., Dec. 7, 1910.

TRAINING OF TRANSPORTATION EMPLOYEES*

BY W. H. COLLINS, GENERAL MANAGER, FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD.

The topic for this paper was left to my own selection, but there was a provision that it must be the question or subject discussed at the Atlantic City convention which most interested me, and I have, therefore, selected the report of the committee on the training of transportation employees. It would be difficult to find a more important subject for discussion among operating railroad men. This is a question in which we all are vitally interested, and one that comes home to every one of us, no matter to what department we belong or what position we may hold, as each of us knows that the success or failure of the property must ultimately depend upon the transportation department.

The report states that the committee devoted its work principally, during the last year, to the consideration of two subjects, which seemed to it to be especially important at this time. These subjects are:

1. The most effective method of educating new men "during the breaking-in period" to render them sufficiently familiar with the duties they will be called upon to perform to warrant their being intrusted with the operating of cars.

2. Ways and means from an operating standpoint to render employment on electric railways more inviting to a higher class of men, and to induce efficient men to remain.

The report of the committee is based upon the assumption that the applicants have been properly selected in accordance with the recommendation as outlined in the reports of previous committees.

I agree with the committee that more time and attention should be given to the instruction of the student in the mechanism of the car which will be placed in his hands for operation. On the large systems, especially the large city systems, where schools of instruction are in vogue, this matter is undoubtedly given the attention which it deserves, but on the medium size or smaller properties too little attention is the rule rather than the exception. Where there is no school of instruction, or where no skeleton car is used, it is the usual custom to have the student motorman work in the shop or pit to obtain the necessary information regarding the mechanism of the car. Have you ever noticed how much attention is paid by the shop or car-house men to see that the student is properly instructed? It has been my observation that, as a rule, the shop men and depot men are not much interested in educating motormen, but are more interested in trying to get the student to do as much of their own work as possible. I have often found a student learning the detail operation of motors, controllers and brakes while busily engaged in cleaning bearings, or perhaps tracing the flow of current in the work of removing grease from gears and pinions, with a little diversion now and then in the way of cleaning out the pit. Usually a week or 10 days is the time allotted the student in the shop or barn, in which he is supposed to learn all about the operation of mechanism of the car, and for which he is either allowed no pay at all or about one-half pay.

I think most of us can imagine in what a confused condition the mind of the student must be after passing through this experience and how ill fitted he is to cope with some minor difficulty which may arise in the operation of his car, which may be the cause of a serious tie-up in traffic that could easily have been avoided if the motorman had been properly trained. I believe that where there is no school of instruction, or where no instructor is provided, the student should be placed in the shop or depot in direct charge of the foreman and should be left there a sufficient length of time to become perfectly familiar with the mechanism of the car. I also believe that he should be paid regular wages while he is serving this time, and the responsibility for his proper instruction should be placed upon the foreman in charge, and he should not be permitted to take charge of a car until O. K.'d by the foreman or master mechanic.

The report of the committee with respect to the conductors course would seem to cover the situation quite fully.

The recommendation of the committee with respect to further instruction after completion of the student's course is good, but it appears to me that right here is the crucial point of the process through which the student is passing. He is now to be instructed by the superintendent or other responsible official on points covering his general work. Up to this time it appears to him to have been very much of a one-sided affair; the company first demanding proper references, the filing of an application blank, assurance of willingness on his part to obey all rules, agreement to assume all risks by reason of his employment, breaking in for a period of two weeks or more without pay, serving time in the depot or shop with little or no pay before he can qualify for the position. Now, I believe, the time has arrived when the superintendent or examining official should begin his real missionary work. After properly instructing the student with reference to his duties toward the public, the importance of promptness in reporting for work, the necessity for cheerful obedience in carrying out all orders from superior officers, he should outline the policy of the company with respect to the treatment of its employees. He should make the student understand that the policy of the company is to give every man a square deal. Make him feel that loyalty is the first requisite and that, in return, the company will be interested in him and will desire to have him become a permanent part of its organization. Such a declaration on the part of the company, through the medium of its superintendent or examining official, cannot but have its effect on the applicant, provided he has been properly selected. He begins to look at things in a different light, as he has now obtained his information regarding the policy of the company at first hand, and he begins to feel that the company is interested in his welfare.

After a certain period of probation the student should be subjected to a written examination based on the book of rules, and should be required to pass it satisfactorily. These examinations should be taken in the proper manner under the eye of the superintendent or examiner appointed for that purpose, and the examination papers should be properly signed by the examiner and filed. To my mind they constitute a record of exceeding importance and may be of great value to the company in a case of a serious accident, besides having been of great benefit to the employee.

I believe great strides have been made during the past few years in the selection and training of transportation employees. I do not believe, however, that we have kept pace in this respect with the rapid changes which have taken place during the evolution of the electric railway business, but we are gaining ground. We are now conscious of the fact that we are engaged in real railroading and that it requires men of different caliber, and that something more is required in the training of them than under former conditions. We realize, more than ever before, that the positions occupied by transportation employees are important, and that there is a dignity and responsibility attached to them; and this thought we must impress upon the mind of the employee. He should be made to feel and understand that we consider his position a responsible and dignified one, and that that very fact is the reason why so much time and thought are expended in his selection and training. Make him feel that the position and wages received compare favorably with those of the machinist and other craftsmen; that the work is clean; that the conditions under which he labors are favorable compared with many other vocations, and that he should enter this business with the idea of making it his life work.

I am a great believer in "follow-up" work, and think that it should continue for some time; in fact, it should never be entirely relaxed. It can be taken up along educational lines, which, I believe, is one of the best means of reaching and maintaining high efficiency among employees.

*Abstract of paper read before the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, N. Y., Dec. 7, 1910.

REPORT OF THE COMMITTEE ON THE MEANING OF THE WORD "CENTER-BEARING" IN THE NEW YORK STATE RAILROAD LAW*

BY W. H. COLLINS (CHAIRMAN), M. J. FRENCH AND B. E. TILTON.

Your committee appointed at the annual meeting of the association held at Cooperstown on June 27 and 28, 1910, for the purpose of conferring with the Public Service Commission as to the proper interpretation of Section 192, formerly Section 109, of the Railroad Law of this State relating to the use of center-bearing rails, begs leave to report as follows:

After due consideration by the committee and informal report to the executive committee of the association on Aug. 9, 1910, at the City of Albany, N. Y., your committee was further authorized and directed by the executive committee to petition the Public Service Commission of this State for its aid in procuring the repeal or substantial modification of said Section 192.

Under date of Sept. 3, 1910, your committee presented to the Public Service Commission, Second District, the following petition:

"To the Public Service Commission, Second District, State of New York, Albany, N. Y.

"The petition of the undersigned respectfully shows that they are members of and compose a committee duly appointed by the Street Railway Association of the State of New York, in regular convention, assembled at Cooperstown, N. Y., on June 27 and 28, 1910, and that said committee was then and there duly authorized and directed to confer with members of this commission as to the proper interpretation of Section 192, formerly Section 109, of the Railroad Law of this State, relating to the use of center-bearing rails.

"That your petitioners were, after due consideration of the matters involved, on Aug. 9, 1910, at the City of Albany, N. Y., further authorized and directed, by the executive committee of said association and on behalf of said association, to petition the said Public Service Commissions of this State for their aid in procuring the repeal or substantial modification of said Section 192.

"In compliance therewith we beg to suggest as reasons for asking the repeal of said section or its substantial modification the fact that under said section, as it now reads, no choice or discretion as to the kind of rail to be used in streets of any incorporated city or village of this State is vested either in the local authority in said cities or villages or in the Public Service Commissions of this State, but it is, by said section, made mandatory upon all street surface railroad corporations to lay therein 'such grooved or other rail of such shape and so laid as to permit the paving stones to come in close contact with the projection which serves to guide the flange of the car wheel.'

"Your petitioners believe that a fair construction of said section absolutely eliminates the use in such streets of, among others the T-rail, which is now conceded by railroad authorities to be the best design for rail sections, as well as one of the safest and most practicable rails that can be laid, and compels the use of a grooved rail; a rail which it is difficult to keep in line under heavy loads, thus lessening the safety and convenience of passengers, and the use of which rail imposes upon the companies a serious and heavy burden in the matter of keeping such rails free and clear from ice and snow.

"Your petitioners therefore pray the aid of this commission, by suggestion or otherwise, toward the repeal or substantial modification of said section, to the end that either the local authorities of such cities or incorporated villages or the Public Service Commission of the proper district, or both, may have proper and sufficient power, authority and discretion in the premises.

"Respectfully submitted this 3d day of September, 1910.

[Signed]

"W. H. Collins, *Chairman;* M. J. French, B. E. Tilton."

As a result of this petition a conference was held at Albany on Dec. 5, 1910, with Chairman Stevens, of the Public Service Commission, Second District, at which time the whole subject was thoroughly discussed. The commission appreciates that Section 192, as it now stands, is ambiguous and suggests that the association draft a bill repealing Section 192, and enacting in its place a section substantially as follows:

"No rails for the use of any railroad shall hereafter be laid in any street, highway or other public place used for vehicular traffic except they are of a type which has been approved by the Public Service Commission of the district in which said rails are to be laid as proper for use under the conditions prevailing at such place. The Public Service Commissions shall make and publish from time to time orders in which they shall approve of types of rail for use in such places."

The commission suggests, if such a bill is drafted, that it be submitted to the Public Service Commissions of both districts before being presented to the Legislature. Your committee recommends, therefore, that the association appoint a committee to draft such a bill.

*Report presented at the quarterly meeting of the Street Railway Association of the State of New York held at Syracuse, Dec. 7, 1910.

QUARTERLY MEETING OF THE STREET RAILWAY ASSOCIATION OF THE STATE OF NEW YORK

The first quarterly meeting of the year of the Street Railway Association of the State of New York was held Dec. 6 and 7 at the Hotel Onondaga, Syracuse. It began with an informal banquet at the hotel on the evening of Dec. 6.

THE BANQUET

About 75 persons were present at the banquet. After the coffee President Pardee read a letter from C. Loomis Allen expressing regret at being unable to be present at the meeting. President Pardee also stated that two other prominent members of the association would not be able to be in attendance: W. H. Collins, Fonda, who had just sailed for Europe on a short vacation trip, and Capt. J. W. Hinkley, Jr., Poughkeepsie, who was detained by illness. At the suggestion of President Pardee a silent toast was drunk to Messrs. Allen, Collins and Hinkley.

Mr. Pardee then referred to the history of the association, which was founded in 1883, and expressed his high appreciation of the honor accorded him at the June meeting in his election as president of the association. He also referred to the recent legislative inquiry in which the affairs of the association had been subjected to the closest scrutiny and to the fact that at the close of this inquiry the association was shown fairly and squarely to the people of the State as standing, and as having stood for many years, for all that was right.

President Pardee then introduced the first speaker, who was Walter W. Magee, Corporation Counsel of Syracuse. Mr. Magee said that he spoke in behalf of the Mayor of the city, who was detained from the banquet by illness. He welcomed the delegates to the city and hoped that they would hold their meetings often in Syracuse.

The next speaker was J. Stanley Moore, publicity agent of the Beebe Syndicate lines. Mr. Moore mentioned the advantages which interurban electric railways bring both to the city and country. He said that the introduction of these railways is often opposed by the merchants in the villages under the impression that an interurban railway will make shopping more easy in the cities and thus decrease their own business. Mr. Moore said that this was not the case. While the business of the country merchant might change somewhat in character its volume was larger, not smaller, after the interurban railway was built.

Mr. Moore was followed by W. J. Harvie, chief engineer, Syracuse Rapid Transit Company, who spoke for the Engineering Association, and then by Allen C. Fobes, ex-Mayor of Syracuse. Mr. Fobes referred to the cordial relations which had always existed between the public and municipal governments of Syracuse on the one hand and the railways of the city on the other.

John E. Duffy, superintendent, Syracuse Rapid Transit Com-

pany, the next speaker, expressed the hope that all the delegates would find the meeting profitable and instructive. Mr. Duffy was followed by Harold C. Clark, who spoke for the Chamber of Commerce of Syracuse. The final speaker was J. Harry Stedman, who was recalled several times to tell more good stories.

WEDNESDAY MORNING SESSION

President Pardee called the meeting to order at 10:30 a. m. Secretary Reel announced that he had received letters of regret from J. C. Calisch, L. S. Storrs, W. C. Wood and others.

President Pardee then called for the report of the committee appointed to confer with the Public Service Commission relative to the meaning of the word "centerbearing" as it appears in the railroad law. The report was read by M. J. French, Utica & Mohawk Valley Railway. It is published elsewhere in this issue.

MEANING OF THE WORD CENTERBEARING

E. S. Fassett, United Traction Company, Albany, thought there were advantages in having the question of type of rail to be used decided by the local authorities and engineers in conference with the company. The object sought when the committee was appointed was to remove the ambiguity as to the term "centerbearing" as used in the law, not to initiate legislation. He doubted the advisability of the association presenting a bill to the Legislature. This was not its purpose, which was primarily the discussion of technical subjects.

Mr. French said that the idea of the committee was to work toward standardization in rails. At present T-rails were in use in some places and girder rails in others. The Public Service Commission had admitted that the present law was ambiguous and that it contradicted itself in several places. It might in the future be construed as requiring girder rails, although this had not been the interpretation placed upon it in the past. He thought that the section should be put in intelligible form.

Mr. Fassett said that it was clear what the section meant, both from its history and its terminology. It meant the centerbearing rail used in the old horse-car days, consisting of a central tread and a flange on each side. Such a rail was now obsolete and no longer rolled. It had proved a great obstruction to vehicular travel.

E F. Peck, Schenectady Railway, said that there had been some controversy in Schenectady in regard to the meaning of the word, and he moved that the report should be referred to the executive committee for approval and action. The motion was carried unanimously.

REPORT OF THE COMMITTEE ON TRAFFIC AND TARIFF

The report of the committee on traffic and tariff was then read by B. E. Wilson, New York State Railways. This report is published elsewhere in this issue.

Joseph K. Choate, Otsego & Herkimer Railroad, moved that the report be adopted, that the committee be given the thanks of the association and be continued, and that the appropriation requested be made.

J. M. Campbell, Buffalo, Lockport & Rochester Railway, chairman of the committee, said there was a question whether interurban railways were railroads under the railroad law. He had a case involving excess fare and the Public Service Commission did not make a definite ruling as to the responsibility of an interurban line, if any, under the clause in the railroad law in regard to this subject. He had made a rearrangement, however, so that the fares charged now were in accordance with the law, although the company might not be subject to the statute. Under the rearranged rates not more than 3 cents a mile, including excess fare, was charged. Under section 66 of the railroad law a penalty was provided if a steam railroad refused to check baggage. It was a question whether interurban railways were subject to this law.

Mr. Fassett said that the only authority that could decide those questions was the Public Service Commission. If the acts as now in force applied to interurban roads some changes should be made so that the law would conform more nearly to the methods of interurban roads.

C. R. Barnes, electric railroad inspector of the Public Service Commission, Second District, said that while he was not a lawyer, he thought that the classification was between steam railroads and street railroads, and that interurban lines were classified as street railroads.

Mr. Choate said that the committee had done good work and should go into the subject further. The American Railway Association drew a distinction between lines operated by steam and those operated by electricity. Many electric lines did the same character of business as steam railroads. The trunk line association had adopted a different course and was now willing to admit electric railways which interchanged business with steam railroads. When the committee continued its work further and prepared sample tariffs the various questions would be made clearer.

Mr. Wilson said that the committee had various difficulties in its way. The committee did not like to prepare regulations on points that might be covered by the law.

Mr. Choate thought that the question would be settled by the conditions prevailing on each road; that is to say, whether or not the road was prepared to carry baggage.

It was then decided by vote to make the appropriation requested and continue the committee.

REPORT OF THE COMMITTEE ON STANDARD FRANCHISES

In the absence of C. Loomis Allen a report of the committee on standard franchises was presented by Mr. Fassett. The committee, Mr. Fassett said, had held one meeting. As the importance of a standard form of franchise had been suggested by Commissioner John N. Carlisle, of the Public Service Commission, Second District, in his talk at the last annual meeting of the association, the committee thought it would be well to discuss the subject with him and learn his ideas. The committee, therefore, had a meeting with Mr. Carlisle and it was agreed that Ledyard P. Hale, counsel for the commission, should prepare a tentative franchise. This, when prepared, is to be submitted to the committee and the subject will then be considered further. If possible an acceptable standard form will be worked out.

REPORT OF COMMITTEE ON NEW SCHEDULE OF ANNUAL DUES

The next subject was the report of the committee on a new schedule of annual dues. H. M. Beardsley, Elmira, read the report, which recommended the following dues for member companies:

Roads with income up to $50,000 per annum	$10
Roads with income between $50,000 and $100,000 per annum	25
Roads with income between $100,000 and $300,000 per annum	100
Roads with income between $300,000 and $500,000 per annum	150
Roads with income between $500,000 and $1,000,000 per annum	200
Roads with income over $1,000,000	300

President Pardee stated that these rates were a reduction from those at present in force in the case of all except the smallest companies. The association now has about $7,200 surplus in its treasury. There was no reason why it should have so much. It had been accumulating this surplus at the rate of about $1,000 a year. With the present membership it is estimated that the new schedule will bring in about $4,000 a year. The expenses of the association are about $5,000 a year, so that with the present membership there should be no necessity for changing the dues for from five to six years. After that a change could be made if necessary. Upon motion the new schedule of dues was adopted.

SHOP ACCOUNTING AND A SYSTEM FOR HANDLING SCRAP MATERIALS

The next subject discussed was shop accounting and a system for handling scrap materials.

W. O. Ingle, New York State Railways, said that the report of the joint committee on shop accounting should prove of value in calling attention to the importance of keeping detail records. The various subdivisions would be useful when comparisons of costs were wanted. The subdivision of maintenance of equipment by classes was good, but it would seem more valuable when it was possible, as on a small system, to go into further detail and keep the costs of each individual car. On the larger systems he feared the subdivision would prove too cumbersome. However, it was something which should be

considered and he was sure that it would prove very interesting if accurately kept. If the subdivisions as suggested were to be adopted Mr. Ingle asked if it would not be better to go into further detail in the electrical equipment other than types of motors, showing, for instance, the various individual costs of armature repairs, controller repairs, armature and field coils, pinions, gears and commutators. The same suggestion applied to trucks. Under the subdivision of cars no subdivision was made of the different trucks, nor did any attention seem to be called thereto. In one of the divisions of various types of cars there might be two or three styles or makes of trucks, and it would seem just as important to keep this detail information in order that comparisons of costs of the various types could be furnished to the master mechanic.

It was difficult to keep a true record by various types of cars of brake shoes, which are interchangeable in some cases, and of some of the minor fittings. It was difficult in a good many cases to get the employee to note all these minor items. Mr. Ingle thought that, on this account, where there were a good many types of cars the comparative costs would be more or less inaccurate.

Mr. Ingle also suggested that detail costs of the various fenders were as important as some of the other items. On a road where there was not a very large amount of rolling stock, and it was possible to keep the individual cost of maintaining each car, this would be a very good record. In his company job orders were issued to show the individual costs of painting, and also of overhauling cars

The subdivisions of maintenance of buildings and structures as recommended give enough detail as to the kind of building. Mr. Ingle suggested, however, that under each subdivision the detail cost of each individual building be shown. This could be kept easily and it was very important to have on record. This suggestion also applied to maintenance of power plant equipment, which could be subdivided by types.

Regarding the subdivisions of maintenance of way expense accounting, Mr. Ingle added that the committee had no suggestions to make on standard classification. He thought, however, that the job order system of dividing a city road according to the various streets, allotting to each individual street a job number, designating the track and line on that street was very valuable, especially as the years passed. In the case of an interurban road the division could be made into sections. This gave the engineers of maintenance of way a detail record of the maintenance of the property by accounts and streets, enabling them to make comparisons of the various construction and operating costs. Mr. Ingle's company had followed this system for some years, and he believed that other companies represented were using the same system with just as good results. If a job order was issued at the beginning of each year for each street, it was easy to follow the individual costs and a permanent record was made. In all the accounts it had been found valuable to divide also the labor and material. A monthly report was issued showing the amounts expended on the various jobs for the month and the cumulative period.

One of the most interesting parts of the committee's report was that pertaining to the system for handling scrap material. This and the forms were very good, Mr. Ingle thought. Too often accurate records were not kept of the scrap collected from the various jobs. This should be done daily, weekly or monthly as it was possible in the various departments, instead of being allowed to accumulate until convenient or there was a large enough amount to dispose of. If the scrap was collected regularly and sent to the storeroom or yard, proper credits could be made to the various jobs. To watch the scrap pile was very important on a large road, and it would seem that a systematic record and adoption of some forms like the samples submitted by the committee would do a good deal to eliminate this arbitrary distribution and make a permanent record all the way through.

J. M. Joel, Oneida Railway, said that the method for shop accounting as described in the paper presented at the joint session of the Engineering and Accountants' Associations at Atlantic City in October, was a model for simplicity. The adoption of that or a system similar thereto (depending upon the requirements of those in charge) would permit detailed information which would result in considerable economy to be furnished. The same principles as those embodied in the method described by the committee underlay the job order system installed on the Syracuse Rapid Transit, Utica & Mohawk Valley and Oneida Railway properties on Jan. 1, 1910. This system was an elaboration of that outlined by the joint committee. For its essential elements indebtedness was acknowledged to the New York State Railways at Rochester.

Under the shop accounting system in effect on these properties job numbers were given to all cars shopped, with the exception of those on which the cost of repairs would not exceed $5.00. Items of this character were charged to a so-called standing job number covering a maintenance account, which was carried throughout the year.

Mr. Joel described the system. The chief engineer forwarded to the assistant engineer an authorization for the performance of a certain job prepared in the form of a memorandum in triplicate. This read, "Please do the following work; charge labor and material to job No. ————." A description was given of the work ordered. This memorandum was retained by the assistant engineer, a copy was forwarded to the foreman under whose charge the work was to be done, and the remaining copy was sent to the job order clerk in the auditor's office. Upon the return of the memorandum by the foreman, together with a detailed description of the work done, which was retained as a department record, the assistant engineer's copy was forwarded to the auditor's office, accompanied by a certificate of completion for filing purposes. The job was then considered closed and no further charges were made against this job number.

Mr. Joel said that a car sent to the shop for repairs to cost in excess of $5.00 was represented by what was known as a special job number, and in the event of a general overhaul the letters A, B, C, D, E, F, G and H were affixed to the number. These letters denoted, in the order named, repairs to body, trucks, air equipment, electrical equipment, strip and trim, preparatory work, paint and varnish and cleaning brass. The job number and account charged were shown on the requisition under which the material was drawn from the storeroom. After notation of the number of the bin from which the required material had been drawn, the requisition was passed to the job order clerk, by whom the job number and account charged was verified. He, in turn, forwarded the requisition to the storeroom clerk, who entered the price and extension, making the proper credit upon the stock sheet. He then assembled all the requisitions received that day and posted the total by accounts on his distribution sheet. Requisitions were then forwarded to the auditor's office, where the clerk in charge of these records verified the total as noted by the storeroom record clerk, sorted the requisitions according to job numbers and posted daily in his record under the various job headings.

Aside from the name and date, employees were required to show upon their daily time slip, Mr. Joel said, simply the job number or numbers and amount of time they were engaged upon each job. These were verified by the job order clerk and the number of the account to be charged was posted by him.

A monthly report was prepared and copies were forwarded to those interested. This showed, Mr. Joel stated, the cost of labor performed and the material used on the various shop job orders during the month and cumulative period, together with a detail of expenditures by accounts in accordance with the classification and information as to the cost of maintenance for each of the various types of cars, as described in the method presented by the committee.

With the exception of pieces of special work and railroad crossings, all track was divided into as many sections as were found necessary by the engineers. To each section a number was given. Each piece of special work or crossing with steam and street railroads was furnished with a separate job number regardless of the section in which it was located.

Mr. Joel said that upon advice from the department which did the work it was the duty of the job order clerk to give the job a number, enter with a brief description, note the account or accounts to be charged, and notify the heads of those departments that might be called upon to share in this work, who would also refer to this job number in requisitions for material and slips covering labor performed.

Each track foreman prepared a sheet covering the work of the men in his gang. These sheets were sent daily to the timekeeper, who posted the time and forwarded the sheets to the engineer's office for approval. From there the sheets were sent to the job order clerk at the shop, by whom the postings were verified and forwarded to the auditor's office. The same system was used with regard to overhead work.

A monthly report covering maintenance of track and overhead structures, as well as additions and betterments thereto (for the month and cumulative period), was prepared. Copies were furnished to the officials under whose jurisdiction the work was done, who were familiar with the jobs represented by the numbers shown.

Mr. Joel concluded that this information had proved to be extremely valuable in the determination of costs, not only of the jobs performed but also of those proposed. It should be of value for comparative purposes and tended to effect economical operation in the mechanical and electrical departments as well as the department of ways and structures.

F. E. Belleville, Schenectady Railway, said that the question as to the form of the subdivision of accounts would not admit of much general discussion. This matter was one that was governed largely by local conditions, inasmuch as the amount of information necessary to be furnished as a guide to economical maintenance and operation depended largely upon the desires of the heads of the various departments interested. A subdivision which would entirely satisfy one engineer would not answer the requirements of another. A system, to be useful, should be simple but comprehensive, and all unnecessary compilation of figures should be avoided. A too elaborate system would be confusing and, by its own complexity, would destroy the object for which it was intended. A uniform system of subdivision of shop accounts would be very desirable, as it would permit the various roads to make comparisons of costs and maintenance of different types of equipment

Mr. Belleville added that the primary accounts covering maintenance of way and structures apparently furnished sufficient information in themselves, and no subdivision was recommended by the committee.

The classification of accounts promulgated by the Public Service Commission in the State of New York covered, to a large extent, the subdivision of accounts recommended for operation of electric railway power plants. For example Mr. Belleville referred to the classification adopted as standard by the American Electric Railway Accountants' Association, which has the account "maintenance of power plant equipment." In the Public Service Commission classification this expense is covered by the following accounts:

Repairs of furnaces, boilers and accessories.
Repairs of steam engines.
Repairs of hydraulic power plant.
Repairs of gas power equipment.
Repairs of power plant electrical equipment.
Repairs of miscellaneous power plant equipment.

Under the account "power plant employees" the Public Service Commission classification provided for a subdivision of labor similar to that embodied in the committee report as follows:

(a) Power plant superintendence and care.
(b) Boiler-room labor.
(c) Producer labor.
(d) Engine labor.
(e) Electrical labor.

Therefore the question, Mr. Belleville said, was simply what additional information was desirable in connection with the maintenance of equipment.

It was stated by Mr. Belleville that the shop practice of the Schenectady Railway resembled in many respects the system outlined in the report of the joint committee, the forms in use being slightly different and not so numerous. All employees in the shop were required to fill out a daily time ticket showing car number, description of work, and time on each particular item. These time tickets were approved by the foreman or assistant, and forwarded to the timekeeper, who entered them on the payroll sheets and prepared a statement of distribution. Material was drawn from the storeroom only upon a regular order signed by the foreman or assistant.

For ordinary repairs of a general nature no shop order system was in use at present on the Schenectady Railway. When a car was received in the shop for painting, annual overhauling, or any special work, an estimate of the cost of such work was prepared and forwarded to the general manager for his approval. Upon approval the work order was issued by the accounting department. The shop order showed a description of work to be done, together with the estimated cost and proper distribution. When the work was completed the work order was dated and signed by the master mechanic or other person in charge and returned to the accounting department. Work performed for any other department or foreign company was also covered by these work orders.

Mr. Belleville said that heavy scrap material, such as rails, special work, plates, etc., was sent, when collected, to the storage yard. Copper and brass were kept in bins under lock and key, under the supervision of the head of the department. Sales were made when, in the judgment of the purchasing agent, the best prices could be obtained. Care was taken to separate the various classes of scrap so as to avoid low returns on mixed scrap. Upon the sale of any scrap material the storekeeper furnished the accounting department, through the purchasing agent, with a statement of scrap sent out and all other necessary information. The proper accounts were then credited with the proceeds of the sales

W. C. Austin, auditor, Otsego & Herkimer Railroad, considered that detail records of the kind described might be very desirable on a large road but that they were hardly practicable on small roads.

W. J. Harvie, chief engineer, Syracuse Rapid Transit Company, said that there were two principal reasons for the use of the job order system. The first was to enable the management to know the amount of money which had been spent and where it had been spent, so as to be able to determine whether similar expenditure next year would be advisable. The second reason was to learn whether the results being secured were economical. Any job-order system was desirable in so far as it accomplished these results. Any system also should be so arranged that a part of it could be omitted if necesary; that is to say, so that only as much of it need be used as was desirable.

Mr. French, Utica, said that properly to credit scrap material required, among other things, a closed yard, with one man in complete charge of the yard and scales. It was impossible in any other way to know exactly the material taken in and taken out. Thus a "90-lb." rail might by wear be reduced to weigh only 84 lb. per yard and should be charged in and out only at that weight. Again, material taken from scrap was often used over again, and the scrap account should be properly credited with this material.

J. M. Campbell, Buffalo, Lockport & Rochester Railway, asked Mr. French whether he waited until a carload of scrap accumulated before crediting it or whether he credited it at the time it was passed to scrap. Mr. French replied that he followed the latter course.

H. M. Beardsley, Elmira, said that he had used the job-order system for seven years and found it very useful.

H. M. Butler, purchasing agent, New York State Railways, Rochester, said that on that road all scrap was weighed in and weighed out and these two records were compared.

E. F. Peck, Schenectady, said that a number of years ago the Schenectady Railway engaged an expert to prepare for its use a system of shop orders. An elaborate system, with

cards and orders of a great variety of colors, was introduced, but the system was so complicated and burdensome that it had been discontinued.

Martin Schreiber, engineer maintenance of way, Public Service Railway, Newark, N. J., said that the job order system was very good if the reports were made promptly, but it could easily be carried too far and into too great detail. Then it became burdensome. It was far more important to know the total cost than the detail cost. Thus, unless one was acquainted with the local conditions under which street paving was laid the detailed cost of pavement construction was not very useful; but the total cost was very necessary.

Mr. French thought that the way engineer ought not to have to be concerned with the accounting details of the way accounts, but that they should be handled entirely by the accounting department.

P. J. Honold, purchasing agent, Syracuse Rapid Transit Company, said that the best way to give an account or job order proper accounting credit for scrap was to do so at the time the material was taken off the car. His company had a contract for the sale of its scrap iron, on a sliding scale, based upon the weekly quotations in the *Iron Age* for bessemer pig. It has a similar scale for the sale of its scrap copper and brass, based on the quotations for lake copper. Owing to fluctuations in price, there is some difference between the prices of the same material when charged in and when charged out, but the aggregate amount of credit or debit from these changes in price has not been large.

President Pardee referred to the recent hearings before the Interstate Commerce Commission on the proposed change in freight rates and to the testimony offered by one witness for the shippers that the steam railroads could save a large sum of money every year by the application in railroad work of methods used by manufacturing companies. Mr. Pardee understood that the saving claimed to be possible was principally in shop accounting and methods of handling scrap material, and while the testimony at Washington related only to the steam railroads, it emphasized the importance of the subject they had been considering.

W. J. Harvie, Syracuse, thought that the distribution of the charges could best be made by the department making the expenditure and not by the auditing department. The clerical work for carrying out the accounting for the job-order system on the three roads with which he was connected, namely, the Syracuse Rapid Transit Company, the Utica & Mohawk Valley Railway, and the Oneida Railway, cost in the aggregate about $150 a month. He thought this money well spent.

TRAINING OF TRANSPORTATION EMPLOYEES

A paper by W. H. Collins, Fonda, Johnstown & Gloversville Railroad, was read, in the absence of Mr. Collins on account of sickness, by C. Gordon Reel, secretary of the association. This paper is published elsewhere.

E. E. Strong, chief instructor, Syracuse Rapid Transit Railway, opened the discussion. Mr. Strong's paper is published elsewhere in this issue.

T. C. Cherry, Utica & Mohawk Valley Railway, suggested that applicants should be sent to the claim agent for instruction in reference to claims and accidents before beginning work. He said that it was pitiable to see a new conductor on a car trying to understand and meet the requests of passengers for transfers. The follow-up systems were weak. During the period of two weeks an attempt was made to crowd in all the information that a new employee needed to have. A great many roads would do well to employ regularly "follow-up" conductors and motormen for new employees.

Mr. Cherry said that upon the introduction recently of a new system of transfers it was decided that the best explanation of the changes could be made to the employees by the use of a stereopticon. The men were gathered in a dark room and instructors pointed out the changes as the photographs of the new transfers were reproduced. This method had been found to be a great success.

W. C. Callaghan, New York State Railways, Rochester, thought that the best foundation methods of instruction had not yet been evolved. It would help to keep men if they learned that their positions were as honorable as those of a bank clerk or a salesman in a store. Work should be done with the old men in order to prevent them from spreading adverse reports about the service.

J. E. Duffy, Syracuse Rapid Transit Railway, said that the papers of Mr. Collins and Mr. Strong brought out the importance of teaching the men that the employment was honorable. Many new men left the service because some old employees expressed dissatisfaction with the conditions of employment. The problem of keeping good men was very serious in a city with diversified industries. The probationary period was the discouraging feature. Though the employment was a healthful one, steady work and wages could not be promised at first. It was discouraging to a new employee with a family to wait from a year to a year and a half for a steady run. He did not know how to settle the problem unless some provision was made for the man and his family during the period of probation. Men in a regular instruction department were the best to impress the duties of the work upon new employees. It was essential to have employees trained carefully and properly, but it was difficult for the smaller roads to provide courses of instruction that would accomplish this end.

Charles H. Smith, United Traction Company of Albany, said that about 25 per cent of the transportation employees left the service each year. He thought that the companies asked too much of the new men. The men were obliged to spend three weeks without pay in learning their duties, providing uniforms at a cost of about $30 apiece, and were then placed on the extra list and reported three times a day without any certainty of getting work. Dissatisfied men in the service were not doing good for themselves or for the companies.

Mr. Callaghan asked whether the questions used in Syracuse were in printed form and were used in all cases or whether they were varied for different men.

Mr. Strong said that all the questions were in printed form and that some of them were so worded that they could be answered by "yes" or "no," while for others the rules had to be repeated.

Mr. Duffy said that a booklet of instructions had been prepared recently for the Syracuse motormen. Copies are given to the student motormen with copies of the rule book.

John H. Cain, Buffalo, Lockport & Rochester Railway, said that he had not had the same difficulty on the interurban line as on a street railway. He made it an invariable rule to employ experienced men and in this way secured much better results. The applicant was accepted on his record with other lines and was sent out with an experienced motorman to learn the road. He thought that very few interurban lines paid applicants for employment for that work. Better results would be secured, he believed, if all student trainmen were paid a fixed wage.

C. H. Armatage, Schenectady Railway, said that about two years ago the company started the plan of paying students $15 for 21 days' work and it has led to good results. The efficiency of motormen had been increased at least 100 per cent.

John H. Pardee, the president, asked that copies of the booklet of instructions and written examination blanks of the Syracuse company be mailed to each company in the association.

Adjournment was then taken for lunch, which was served in the Hotel Onondaga.

AFTERNOON SESSION

When the afternoon session was called to order E. F. Peck, Schenectady Railway, said that the New York telephone companies had been making propositions for the joint use of poles in every city. Under the forms of contracts offered, the telephone companies would become automatically in time joint owners with railways of the poles involved. He suggested that a committee be appointed to prepare a standard form of contract for use in these cases.

Mr. Barnes, Public Service Commission, Second District, said that the commission would call a conference of representatives of electric light, telephone and railway companies to consider this subject.

Mr. Choate said that there were a good many cases in which it would not be wise to arrange for a joint use of poles. He suggested that a majority of the committee be electrical engineers and that the committee report to the executive committee of the association. The executive committee could then appoint a committee to attend the proposed conference to be called by the commission.

A resolution embodying these suggestions was passed.

ACTION ON INSURANCE

E. J. Cook, New York State Railways, Rochester, said that he desired to offer a resolution on the subject of insurance and moved its passage. The resolution was as follows:

"Resolved, That the Street Railway Association of the State of New York appoint Henry N. Staats its insurance expert, with authority to employ such assistants as may be necessary to advise the members of the association or such of them as may desire to avail themselves of his services on all matters relating to fire insurance, including forms of policies, appraisals of property, schedule of rates, the construction and improvement of property, with a view to the lessening of hazard by fire and the adjustment of losses consequent upon fire, and to represent member companies upon request before inspection and rating bureaus or other bodies having to do with fire insurance. And:

"The expense of the insurance expert to be paid by such member companies of this association as may elect to employ him, and this item of expense be based on the gross receipts as shown in the last annual statement of each of said companies.

"BASIS FOR PAYMENT

"The companies having gross receipts of $500,000 or less will pay $50 per year, payable quarterly, plus railway fare.

"The companies having more than $500,000 gross receipts will pay $10 on each $100,000 of gross receipts, payable quarterly, plus railway fare."

Mr. Cook, in speaking of the resolution, said that he thought all of the companies, particularly some of the smaller companies, would be interested in participating in the arrangement. His experience had led him to value highly the expert services of Mr. Staats and the passage of the resolution would enable the companies generally to avail themselves of the same opportunity.

Mr. Choate said that the subject of insurance was one with which the smaller companies particularly had had the greatest difficulty. The smaller companies did not know how to proceed systematically so as to obtain a reduction in rates.

Mr. Fassett said that the passage of the resolution entailed no expense or obligation upon the association. It was the duty of the association to do anything that it could to give the smaller companies the benefit of experience of this kind. With a full understanding of the plan, he seconded the motion for the passage of the resolution.

Mr. Pardee called Mr. Choate to the chair, and, speaking from the floor, said that he considered the subject of insurance last year. It was possible to employ an expert in almost all lines of business who was not employed by anyone else; but, excepting Mr. Staats, he did not know of a single insurance expert in the country that was not paid by the other side.

M. Badgero, Syracuse & Suburban Railroad, asked a question about the expense, and Mr. Cook said that it was the idea that the total work to be done could be carried out upon the basis of payment provided in the resolution. The plan would enable Mr. Staats to get on the ground and give advice. Inspection or sprinkling plans could be prepared in his office.

The resolution offered by Mr. Cook was then passed.

Mr. Staats expressed his appreciation of the action of the association. He said that with the permission of President Arthur W. Brady, of the American Electric Railway Association, and of Henry J. Davies, secretary of the Cleveland Railway, he would read the remarks made by Mr. Davies on his report as chairman of the committee on insurance, presented at the Atlantic City convention in October. Mr. Davies spoke as follows:

"As I presume most of you know, the old-line or stock insurance companies have been, for two years at least, planning or suggesting the appointment, from among their own representatives, of a central rating and inspection bureau, as they call it, in the interest, they say, of the traction companies. Your insurance committee has welcomed the appointment of such a committee or bureau, has endeavored to get in touch and in conference with committees that have been appointed by the insurance companies, upon that subject, with what success the correspondence I have read indicates. There is not yet an inspection bureau to which we can go with questions as to construction or as to rates of insurance, except the local bureau in each city or community.

"If such a bureau were appointed or established by the stock companies, it would act for the stock companies. They say they are our friends, and they are; just as the dealers in cars are our friends; just as the dealers in rails and supplies are our friends. And we are their friends; in the same way that we are friends of the car builders, the rail makers and the supply dealers. They cannot afford not to be our friends. We cannot afford not to be their friends. But we do not want them to conduct both sides of the negotiation. We ought to have our own representatives, to meet their representatives, on any question that may come up between any member of the association and the insurance companies. We ought to have a representative to raise questions, without waiting for them to come up. We can meet them to better advantage if we have our own expert.

"That expert ought to be a man of experience and of high character, of course. He ought to have no financial interests in any insurance company organized for profit. He ought not to receive commissions, directly or indirectly, nor any compensation, in any way, from any insurance company. His compensation ought to come from the traction companies, every cent of it. And his work ought to be for them, and for them only.

"The establishment of such a bureau or committee as the stock companies have proposed for the past two years would be of advantage to the traction companies, I admit. It should be of advantage to them if only because it will teach the stock companies the desirability of traction risks. Street railway companies had a bad reputation among insurance companies for many years. They had many losses by fire. A street railway fire was apt to be a very disastrous fire. But our reputation with the insurance companies was worse than we deserved. Bad as our experience had been, it did not justify the rates that were charged. Rates have been vastly reduced since that time; but even then, five years ago, statistics gathered from more than 400 companies indicated that the cost to the insurance companies of fires in traction properties was about 30 per cent only of the premium paid; it comes nearer to being 100 per cent now, not because losses have been greater but because rates have been reduced, by reason of the work of this committee and this association.

"Such a bureau would be helpful to the traction companies, but it will be more helpful to us if we may have representation upon it, so that we may have the knowledge that the insurance companies will gather by way of statistics and otherwise, as to the traction companies' properties, as to fire losses on traction properties and as to rates for the insurance of street railway properties.

"If we cannot have a representative as a member of that central bureau, then we ought to have an expert as well qualified as the members of that bureau, to represent us before it, and to educate the insurance companies upon the subject of our risks.

"Rates have been reduced, as I said before, greatly reduced, but they are still too high on many properties. They have

been reduced partly because the properties have been improved. Street railway properties are better protected than they were five years ago; they are better risks; they are less hazardous, but there is still room for improvement. There ought to be fewer fires than there are. Our properties ought to be so well protected that a $5,000 fire in a car house would be a disgrace to any manager—a scandal; and, after a few years more of education in construction and protection of buildings, I should be willing to see it made a crime. There should be no $5,000 fires. If there were no such fires as that rates would be very low. I hope you will so improve and protect your risks that some day the chairman of your insurance committee may appear before you at one of your conventions and say to you. 'there has not been a single fire in a traction property in the past year, keep up the good work'; and, at the same time, say to our friends, the able and affable agents and other representatives of the insurance companies, 'there has not been a single fire in a traction property within a year. But bring down your high rates.'

"I want you to put yourselves in such a position that you can substantially dictate your rates. I want you to know what insurance costs. You can do that through your own inspection bureau, or your own insurance expert, better than through any bureau established by the insurance companies.

"I do not know what the total value of the burnable properties of the traction companies represented in this association is, but surely it is many millions.

"Our committee estimated in one of its reports that the capitalization of the traction companies was $4,000,000,000, and that from 15 per cent to 25 per cent of that capitalization represented physical property that should be insured. Twenty-five thousand dollars is a very small fraction of 1 per cent not of the value of the burnable property, but of the premiums that are paid upon the properties insured. This amount would increase your dues. I don't care if it doubles them; the service and the results will be cheap at the price. You have all profited by the work of this committee, and by the work of the individual companies that have been active in this insurance agitation, and that have borne the expense of it. You will profit in the future by the work of the committee, and by the work of this expert, should he be appointed or employed; and you should each pay a part of its cost. And you should not be niggardly in your appropriation. The expense of such a bureau of engineers and trained inspectors as should be established might well be more than $25,000. You will save a great many times that amount."

REPORT OF WAY COMMITTEE

Martin Schreiber, Public Service Railway, discussed the report of the way committee of the American Electric Railway Engineering Association, presented at the Atlantic City convention. An abstract of the discussion of Mr. Schreiber is published elsewhere.

Supplementing his written remarks, Mr. Schreiber said that analysis of the ingot often did not show a correct analysis of the rail. A modification of the drop test had been suggested. Another test was a test for carbon. A scleroscope had been invented to determine the hardness of the rail. When dropped this would rebound a little on a soft piece or more on a hard piece. By comparison of the heights of the rebound the degree of hardness could be determined. Rail would often fail by segregation of the carbon. There might be a variation of as much as 10 points between the head and flange on analysis. In the future still further tests would probably be developed.

M. J. French, Utica & Mohawk Valley Railway, discussed the maintenance of way report. The synopsis of Mr. French is published elsewhere. Mr. French, supplementing his written discussion, said that the American Railway Association 100-lb. T-rails, types A and B, did not exactly fit all conditions encountered by electric railways. He was therefore going to speak a few words in favor of the A. S. C. E. section. He had failed to find that any of the steel companies had rolled American Railway Association standard sections for electric lines, unless such sections had been bought for steam roads with electrified mileage. Some electric roads had been built entirely with A. S. C. E. type of rail. He thought that the association should recommend that the American Electric Railway Association include the A. S. C. E. sections among its T-rails.

Mr. French suggested that the only way in which the steel companies could be induced to roll the heavy 7-in. T-rail was to give orders for 3,000 tons. The rails could be rolled if the companies would pool their orders. It was the duty of the association to start a movement in this direction.

W. J. Harvie, Utica & Mohawk Valley Railway, discussed the report of the equipment committee at the Atlantic City convention. His remarks appear elsewhere in this issue. Referring then to the report of the way committee he said that when the subject of "economical maintenance" had been originally suggested it had been referred to several committees. The association hoped that each year a few definite suggestions would be secured to reduce the cost of operation. Several of the committees had had to eliminate this subject because of inability to get satisfactory results. The way committee had made a number of valuable suggestions along these lines, however, last year, and this coming year even better results were expected because it as yet had received only two assignments. One was to draw up a set of rules for the government of the way department. The other was the necessary shop facilities for the way department. Mr. Harvie added that he was glad that Mr. French had brought up the subject of the A. S. C. E. standard. He suggested that Mr. French write to the committee on standards of the American Electric Railway Engineering Association. He said that if any executive official whose signature was asked on a letter ballot approved any proposition without satisfying himself, by investigation, either personally or through his engineering representative, that the proposition was sound, the value of the method was absolutely destroyed.

Mr. Schreiber thought that the suggestion that the standardization committee consider the A. S. C. E. rail section was a very timely one.

COMMITTEE ON EQUIPMENT REPORT

J. P. Barnes, Oneida Railway, discussed the report of the committee on equipment presented at the Atlantic City convention. He said:

"In reading the report of the committee on equipment the strongest impression gained is, perhaps, of the remarkable completeness and clarity of that portion of the report which deals with car-body design. The importance of securing the maximum degree of lightness, compatible with strength and stiffness of the car-body, can scarcely be overestimated. This feature has a direct and important bearing on the economy of operation of the car which, however, will be balanced to some extent by the probable higher first cost and possible increased maintenance cost of the lighter car-body.

"The committee favors the comparison of car weights on a basis of pounds per square foot rather than pounds per passenger seat. In the comparison cited by the committee between cars of similar type, viz.: a 44-passenger and a 60-passenger semi-convertible, the comparisons by the two methods differ by only 3.6 per cent. Here, then, the comparison on the basis of pounds per passenger seat gives nearly the same results as does that by pounds per square foot, while the earning capacity and ability to care for traffic will depend much more nearly on the seating capacity than on the number of square feet of car floor. In comparing open cars with box cars the pounds per square foot would, undoubtedly, give a better idea of the relative massiveness of the two cars than would the pounds per passenger seat, but the choice of a car as between

open and closed type would be governed far more by service conditions than by consideration of power consumption or cost to operate. It would seem, then, that the passenger seat, which is the basis of so much operating data as seat-miles, etc., would give quite as fair results in comparison of cars of the same or nearly the same general type and would at the same time avoid the introduction of two units of comparison with the resulting tendency to confusion.

"The committee's report develops a strong case for the two-motor as opposed to the four-motor equipment without, however, touching on the decreased maintenance cost of the two-motor equipment, resulting from the number of bearings, commutators, clearances, etc., to be inspected and cared for.

"Passing to the matter of a gage for mounting both steel and chilled wheels, it would seem that a gage designed to bear on the wheel contour at the gage line only would be better adapted for all-around work than is the gage proposed which follows the entire contour of the fire section. A gage designed to bear on the gage line only may be used with equal facility on old and new wheels, even those with thick flanges and, moreover, may be used as a check gage by the car inspector, thus doing away with the necessity for two styles of gages.

"Under gears and pinions the committee emphasizes the desirability of high-grade or special treated steel for gears and pinions. As an instance of the superior life of such gears and pinions, it is interesting to note the performance of two pairs of specially treated gears and pinions on 40 horsepower motors in suburban service, double end equipment. After running nearly 80,000 miles (79,750 exactly) the gears showed an average wear at the pitch line of .020 in., while the pinions showed .070 in wear. This is total wear on both sides of the teeth and is taken from measurements on four teeth of each gear and pinion. The life of ordinary untreated gears in this service is about 165,000 miles, and of pinion about 25,000 miles. These pinions have then made about three times the usual life in this service and are only about one-third worn out, while the gears have made nearly one-half the usual life and are about one-tenth worn out.

"In considering the wear of gears and pinions too much importance can hardly be attached to the matter of bearing wear and consequent recession from proper meshing of the gear and pinion teeth. This affects not only the life of the gears and pinions, but also the noise attending their operation. It is a practical impossibility to re-mesh gears and pinions that have worn very far under conditions of too much play because of the resultant noisy operation. Thus the relieving of badly worn bearings often practically necessitates the scrapping of gears and pinions that are not, strictly speaking, worn out. Again, if a pinion is worn out under conditions of extreme bearing play, the gear tooth is likely to be so far deformed that a new pinion will not mesh with it without producing extremely noisy operation. From these considerations, it appears that the choice of bearing metals and lubrication for motor bearings is of the utmost importance in order that the best results may be obtained with gears and pinions of whatever type. It is interesting to note the marked superiority of the modern types of motors in this respect. With identical materials, both bearing and lubricating, with identical methods of installation and inspection and in the same service the average life of gears with modern types of motor is 440 per cent that with the older types."

The Atlantic City reports were also discussed briefly by E. P. Roundey, Syracuse Rapid Transit Railway; R. P. Leavitt, Albany & Southern Railroad, and F. A. Bagg, Fonda, Johnstown & Gloversville Railroad.

President Pardee announced the appointment of the following committee to consider the subject of the joint use of poles, in accordance with the resolution offered by Mr. Peck: W. J. Harvie, Utica & Mohawk Valley Railway; B. Penoyer, Schenectady Railway; C. S. Stanton, Otsego & Herkimer Railroad; C. L. Cadle, New York State Railways, Rochester; R. P. Leavitt, Albany & Southern Railroad.

The meeting adjourned at 3:30 p. m.

GEORGE WESTINGHOUSE ON STANDARDS FOR RAILWAY ELECTRIFICATION

In his presidential address read at the annual meeting of the American Society of Mechanical Engineers in New York City on Dec. 6 George Westinghouse referred again to the necessity of adopting some standards for the essential requirements of future electrification of railways. He prefaced his remarks by saying that his address before the joint meeting of the American Society of Mechanical Engineers and the British Institute of Mechanical Engineers, held in London last July, had been misinterpreted in some quarters as specifically recommending the adoption of one particular system. He had recommended merely a uniform supply of electricity, uniform location for the working conductors and uniform control apparatus. Continuing he said: "The selection of a system embodying these fundamental requirements would leave to manufacturers and inventors the same latitude for development and improvement in the construction of railway electrical machinery as has always existed with reference to steam-operated railways, where the fundamental requirements were: A standard gage of track, standard couplings of cars and standard braking and signaling apparatus. To appreciate this observation one has only to contrast the locomotive of 20 years ago with the mammoth Mallet compound locomotives which are now being introduced, or the freight car of 10 tons capacity with the modern steel cars of 50 tons capacity. I cannot impress too strongly the great importance of bringing about such an early decision in regard to the standards to be adopted in the electrification of railways as will insure to the traveling public the benefit of this method of transportation at the earliest possible moment and on an advantageous basis to the railways, which will be required, even under the most favorable circumstances, to expend vast sums of money in changing from steam to electric operation.

ANNUAL MEETING OF PENNSYLVANIA ASSOCIATION

The annual meeting of the Pennsylvania Street Railway Association was held in Harrisburg, Pa., on Dec. 1, 1910. Fifteen of 44 companies which are members of the association were represented. Two new companies joined the association in 1910. The establishment of an employment bureau and the introduction of a card index system for technical men seeking employment at the headquarters of the association were considered. The executive committee of the association has been authorized to follow legislation affecting electric railways at the coming session of the Pennsylvania Legislature. Following the meeting, the delegates were entertained at luncheon at the Harrisburg Club

The following officers were elected at the meeting: President, Charles O. Kruger, president of the Philadelphia Rapid Transit Company; vice-president, E. H. Davis, general manager of the Williamsport Passenger Railway; treasurer, W. H. Lanius, president of the Hanover & McSherrystown Street Railway; secretary, H. M. Stine, Harrisburg, re-elected. The following executive committee was appointed by President Kruger: Frank B. Musser, president of the Central Pennsylvania Traction Company; H. R. Fehr, president of the Northampton Traction Company; Walter A. Rigg, general manager of the United Traction Company, Reading, and R. P. Stevens, president of the Lehigh Valley Transit Company, of Allentown.

According to a consular report, Zahleh, which has a population of 35,000 and is 30 miles distant from Beirut, Syria, is negotiating with several individuals who desire to establish an electric railway, lighting and telephone system in that city. Under the terms of the concession, 1⅞ miles of track must be built at once but authority is given to build 5½ miles in all. The concession will serve for 60 years. It is proposed to take power from a new hydroelectric plant. American manufacturers who are interested should apply to the Bureau of Manufactures, Washington, D. C., regarding the concessionaires.

News of Electric Railways

Program of Annual Meeting of Central Electric Accounting Conference

The following program has been announced for the annual meeting of the Central Electric Accounting Conference, which is to be held at the office of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, on Dec. 10, 1910:

MORNING SESSION, 10:30 A. M.

President's annual address.
Report of executive committee.
Report of secretary-treasurer.
Report of committee on uniform comparative statements. S. C. Rogers, chairman.
Paper, "Shop Accounts," by A. J. Lamb, Toledo Railways & Light Company.
Adjourn for lunch. The members of the conference will be the guests at luncheon of the Mahoning & Shenango Railway & Light Company.

AFTERNOON SESSION, 2:30 P. M.

Illustrated paper, "Stores Accounts," by A. F. Elkins, auditor, Columbus, Delaware & Marion Railway.
New business.
Election of officers.
Adjournment.

Cleveland Traction Situation

The trial period of eight months provided by the Tayler grant for the operation of the Cleveland (Ohio) Railway at a 3-cent fare plus 1 cent for a transfer was completed on Nov. 30, 1910. As the interest fund is approximately $550,000, or about $50,000 more than the amount provided in the beginning, the present rate of fare will be continued for at least three months.

J. J. Stanley, president of the Cleveland Railway, stated on Dec. 2, 1910, that the company had accomplished largely what was expected of it in the way of returns when the Tayler grant was accepted, considering the facilities. This, however, has not induced people to purchase the stock, which has been on the market for months. Mr. Stanley is of the opinion that bonds would not sell much more readily, nor does he believe that an increase in the rate of fare would improve the demand for the securities. People want a larger return on their money than 6 per cent when they invest in stock of this kind. Only 40 or 50 shares of stock of the company changed hands a day on the exchange, whereas with a corporation like the Cleveland Railway the transactions should be between 400 and 500 shares a day under normal conditions. The stock declined to 95⅛ on Dec. 1, 1910, following the expiration of the trial period.

Mr. Stanley has been working to devise means to purchase additional cars and Mayor Baehr and Street Railway Commissioner Dahl have also been considering the matter, but they have as yet been unable to suggest any means to secure the necessary funds. The Mayor has instructed Mr. Dahl to inform the company that some way must be found to finance the purchase of cars. The maintenance and renewal fund and the interest fund show a surplus, but neither can be used for the purchase of equipment. The operating fund has shown deficits for September, 1910, and October, 1910, or since the wages of the motormen and conductors were advanced. Each fund must care for the obligations of its own department. As matters stand all surpluses in the maintenance account will have to be applied to redeem funds borrowed for that account.

It is said that an effort will be made at the coming session of the Legislature to give cities the right to own street railways and subways.

A movement has been started in Cleveland to erect a monument to the memory of the late Judge R. W. Tayler, the fund to be secured by popular subscription.

On the evening of Dec. 5, 1910, a resolution was adopted by the City Council instructing the street railway committee to investigate the street railway situation with a view to securing better service. Several councilmen intimated that pressure has been brought to bear on the public to create sentiment for a new grant. Councilmen wanted it understood that it was not the purpose of the investigation to overthrow the Tayler grant.

Previous to the meeting of the Council the directors of the Cleveland Railway discussed plans for financing improvements and purchasing additional cars. Nothing regarding the conference was made public. The directors declared a quarterly dividend of 1½ per cent, payable Jan. 3, 1911.

Indictment Returned Against Offenders During Columbus Strike

In its report, filed on Dec. 2, 1910, the grand jury at Columbus, Ohio, returned indictments against Alfred N. Strader, David Davis and Thomas Cranmer, on the charge of dynamiting street cars during the recent strike of the employees of the Columbus Railway & Light Company. Strader is charged with placing dynamite on the tracks of the company for pay. Davis is accused of having dynamite in his possession for illegal purposes. Morris Cranmer, who was the financial secretary of the local street railway men's union, is accused of paying Strader to place the dynamite on the tracks. Cranmer was held to the grand jury on bond of $5,000. Davis and Cranmer are also charged in the indictments with aiding Strader to escape.

The trial of Gerald O'Leary, alias George W. Brady, was continued last week. He is accused of firing shots which wounded two women and a girl. On Nov. 29, 1910, O'Leary took the stand and denied that he fired a shot during the strike. The defense rested its case on Nov. 30, 1910, but Mayor Marshall was called in rebuttal on Dec. 1, 1910.

In its final report on the strike the grand jury criticised the policemen who refused to obey the orders of the Chief of Police and the Mayor to ride on the cars and protect passengers and crews, and censured the officials of the company for not using vigorous measures at the outset to suppress lawlessness.

New York Railroad Club Reunion.—The fourth annual Christmas entertainment and social reunion of the New York Railroad Club will be held at 29 West Thirty-ninth Street, New York, N. Y., on Friday evening, Dec. 16, 1910, after a brief business session. The program will include a vaudeville entertainment and supper.

Meeting of Executive Committee of Manufacturers' Association.—A meeting of the executive committee of the American Electric Railway Manufacturers' Association to elect officers for the coming year was announced for 10:30 a. m. on Friday, Dec. 9, 1910, at the headquarters of the American Electric Railway Association, 29 West Thirty-ninth Street, New York, N. Y.

Settlement Proposal in Toledo.—Mayor Whitlock, of Toledo, proposes to prepare a proposition to be presented to the Toledo Railways & Light Company which will embody a basis of settlement of franchise renewals. The draft will, however, be approved by the City Council before it is transmitted to the company. It is stated that a plan will be suggested for fixing the value of the property under the schedule reported by the company's engineers some time ago. The administration will select a spokesman and the company will be asked to appoint some one to represent it in the negotiations.

Franchise Ordinances to Relieve Congestion in Pittsburgh.—Five ordinances granting exclusive franchises for 50 years to subsidiary companies of the Pittsburgh (Pa.) Railways for 11 streets in the business district of Pittsburgh have been introduced in the Select Council of that city. By using the streets specified in the ordinances the rerouting proposed by Edward M. Bigelow, former Director of Public Works of Pittsburgh, in his report to the Mayor on street railway congestion and the changes advised by Emil Swenson in his report to the Railroad Commission of Pennsylvania could in general be carried into effect. The grants are asked in the names of the Second Avenue Passenger

Railway, Central Passenger Railway, Pittsburgh & West End Railway and the Ft. Pitt Street Passenger Railway.

Unfair Criticism.—In an interview with Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., published in the Newark *News* recently, Mr. McCarter was quoted as follows in regard to the unfair criticism of public service corporations by the public: "The more I think of it the more I am convinced that criticism of public utility corporations is prompted not so much by poor service, malice or a lack of appreciation as it is by a failure to understand the complexities and difficulties of their work. Perfection itself would have its critics. But I hold fast to the belief that the public as a whole is fair. I am satisfied that when the public hears both sides of a question its decisions are usually just, and that whether it is dealing with a man or a corporation it will always stand firmly for 'a square deal.'"

New Jersey Liability Act Does Not Apply to Street Railways.—Justice Minturn, of the Supreme Court of New Jersey, has decided that street railways of New Jersey are not included in the provisions of the act of 1909 extending the liability of railroads for injuries or death resulting from the negligence of any person having charge or control of any signal, switch, locomotive engine or train on a railroad. His decision was based upon a demurrer interposed by the Public Service Railway in an action for damages. The opinion of the court deals solely with the construction to be placed upon the act of 1909, with respect to its application to street railways. In the syllabus of his opinion Justice Minturn says: "The popular and generally accepted meaning will be applied to the construction of an act of the Legislature in the absence of legislative intent to the contrary. The public policy of the State, as evidenced by a consistent course of legislation on a given subject matter, may be invoked to assist in ascertaining the legislative intent."

Railway Affairs in Detroit.—When the ordinance by Chairman Ellis of the committee on public utilities came before the Detroit Council for consideration on Nov. 29, 1910, Alderman Koenig offered an amendment which provided that the Detroit United Railway should furnish 2-minute service on Jefferson Avenue east of the Fairview car house to the city limits, instead of a 6-minute schedule, as fixed in the original ordinance. Mr. Ellis objected to taking up such an amendment just before voting on the measure. He said that he would move that the whole matter be referred back to the committee rather than have the ordinance changed without careful consideration. The Council acted on his suggestion and the measure is again in the hands of the committee. An ordinance to prohibit passengers from standing in the front vestibule of street cars was referred to the committee on ordinances. A number of officials of the Detroit United Railway and others visited Toledo, Ohio, on Dec. 1, 1910, but they made no statement regarding the significance of the conference which was held at the Boody House, Toledo.

Power Station Improvements in Worcester.—Prof. Harold B. Smith, of the Massachusetts Institute of Technology, Boston, Mass., has submitted to the Mayor of Worcester a report on the power system of the Worcester (Mass.) Consolidated Street Railway based on a study made by him at the instance of the committee on street railways of the City Council of Worcester. In his report Professor Smith referred as follows to the work now being carried out by the company to meet its power requirements: "The Worcester Consolidated Street Railway has apparently found it advisable to delay the development of a suitable power plant until recently. Such a plant is now being built, and in my opinion the improvement of the service which is needed will come with the placing in commission of the first 5500-kw generator at Millbury and the substation at Madison Square. The present condition of work at Millbury justifies the expression of decided doubt if the company will have this first large unit of that plant in regular service by Jan. 1, 1911. With this unit in service, the reliability of the power supply will be greatly increased, as the present loads can ordinarily be carried on this new unit, leaving the Fremont Street plant for reserve for emergency." The plans of the company for increasing its power supply were described in the ELECTRIC RAILWAY JOURNAL of Sept. 10, 1910, page 406.

Financial and Corporate

New York Stock and Money Market

Dec. 6, 1910.

It has been a week of liquidation and declining prices in the Wall Street market. The effort to uphold the market artificially has failed on account of the heavy selling pressure or has been abandoned. There certainly is a disposition to let prices sag and willingness to sell rather than to buy. The volume of transactions has increased, a feature that has marked all the declining markets recently.

There has been practically no improvement in the bond market, although the money market continues remarkably easy. Quotations to-day were: Call, 2⅛@3¼ per cent; 90 days, 4 per cent.

Other Markets

Until this morning tractions have been very dull in the Philadelphia market during the past week. To-day a fairly good buying demand for both Rapid Transit and Union Traction was developed, due, no doubt, to reports that were current that refinancing agreements had been reached.

In the Chicago market there continues to be fair activity for the various issues of Chicago Railways certificates. Series 2 has been particularly active, but sellers have been more insistent than buyers and prices have declined two points within the week.

In the Boston market there has been only light trading in traction securities during the week. Massachusetts Electric shares have been the most active and both the preferred and common have recorded moderate declines.

The Baltimore market as usual has shown no movement in traction securities except in the bonds of the United Railways. These have continued to sell at former prices.

Quotations of various traction securities as compared with last week follow:

	Nov. 29.	Dec. 6.
American Railways Company	a43	a43
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a90	a88
Boston Elevated Railway	127½	127½
Boston & Suburban Electric Companies	*16½	a16
Boston & Suburban Electric Companies (preferred)	a72	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a40	a39½
Brooklyn Rapid Transit Company	76⅜	73⅜
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	82⅝	82⅛
Capital Traction Company, Washington	a128	*128
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a92	a90½
Chicago Railways, ptcptg., ctf. 2	a25½	a23
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a6½	a6¼
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	a54½	a53¼
General Electric Company	a155⅞	a149½
Georgia Railway & Electric Company (common)	*118	a117½
Georgia Railway & Electric Company (preferred)	*88	a88
Interborough-Metropolitan Company (common)	19⅝	19
Interborough-Metropolitan Company (preferred)	53¾	53⅜
Interborough-Metropolitan Company (4½s)	80	79½
Kansas City Railway & Light Company (common)	a21¼	21¼
Kansas City Railway & Light Company (preferred)	a75	75
Manhattan Railway	140	138
Massachusetts Electric Company (common)	a19½	a18
Massachusetts Electric Companies (preferred)	86	a83
Metropolitan West Side, Chicago (common)	21	*21
Metropolitan West Side, Chicago (preferred)	*68	65
Metropolitan Street Railway, New York	19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	61½	62
Northwestern Elevated Railroad (common)	a22	*22
Northwestern Elevated Railroad (preferred)	a60	*60
Philadelphia Company, Pittsburg (common)	a45	*44¼
Philadelphia Company, Pittsburg (preferred)	a42	a42
Philadelphia Rapid Transit Company	a18½	a18¾
Philadelphia Traction Company	*82	a83
Public Service Corporation, 5 per cent col. notes	a95	*95
Public Service Corporation, ctfs	a101	*101
Seattle Electric Company (common)	a107¼	107¼
Seattle Electric Company (preferred)	*103	a102
South Side Elevated Railroad (Chicago)	*65	a65
Third Avenue Railroad, New York	10⅝	11¼
Toledo Railways & Light Company	a8	7
Twin City Rapid Transit, Minneapolis (common)	a109½	108½
Union Traction Company, Philadelphia	a43½	a44
United Rys. & Electric Company, Baltimore	a14½	*14½
United Rys. Inv. Co. (common)	*14¾	*14¾
United Rys. Inv. Co. (preferred)	*57	52
Washington Ry. & Electric Company (common)	a33½	*33½
Washington Ry. & Electric Company (preferred)	a87½	*87½
West End Street Railway, Boston (common)	a90½	a89½
West End Street Railway, Boston (preferred)	*100½	*100½
Westinghouse Elec. & Mfg. Co	69	65½
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	124

a Asked. *Last sale.

Atlantic Shore Line Railway, Sanford, Maine.—The property of the Atlantic Shore Line Railway was sold under foreclosure on Dec. 1, 1910, for $115,000 to the reorganization committee which is acting in behalf of the holders of the 4 per cent refunding bonds of the company dated 1906, the second mortgage 6 per cent bonds dated 1909, and the first preferred stock of the company.

Charlotte Electric Railway, Light & Power Company, Charlotte, N. C.—The property of the Charlotte Electric Railway, Light & Power Company, which was purchased recently by the Southern Power Company, will be transferred by that company to the Piedmont Traction Company, which is owned by the same interests, and will be used as the keystone for a network of electric railways between the cities and towns of the Piedmont section of the Carolinas, extending from Anderson, S. C., on the southwest, to Durham, N. C., on the northeast, passing through Greenville, Spartanburg and other South Carolina cities and towns and Charlotte, Gastonia, Concord, Salisbury, Greensboro, High Point and Durham and intermediate places.

Chicago (Ill.) Consolidated Traction Company.—The property of the Chicago Consolidated Traction Company was sold under foreclosure on Nov. 30, 1910, to Andrew Cooke, representing the reorganization committee of the bondholders, for $1,425,000. The underlying mortgages of the company are to be replaced by blanket securities of the Chicago Railways, and the entire system of the Consolidated Traction Company is to be rehabilitated. Of the original $6,750,000 of the bonds of the Chicago Consolidated Traction Company approximately 95 per cent have been acquired by the Chicago Railways. Purchase money bonds to the amount of $6,000,000 have been authorized. They are dated Jan. 1, 1911, and mature Feb. 1, 1927, but are redeemable at par and interest at any interest date. From 1911 to 1915, inclusive, the issue will bear interest at 4 per cent, thereafter at 5 per cent, payable semi-annually. Of this authorized issue $4,073,000 are to be deposited with the depositary and the remaining $1,927,000 are to be issuable from time to time in payment of any claims originating or connected in any way with the taking over of the Consolidated Traction System or for any other purpose except the payment of operating expenses, dividends or interest charges of the Chicago Railways. Adjustment income bonds to the amount of $2,500,000 have been authorized. They are dated Jan. 1, 1911, and mature Feb. 1, 1927, and bear interest at 4 per cent, payable annually or semi-annually, but only out of net earnings of the Chicago Railways. Interest is non-cumulative on this issue.

Frederick (Md.) Railway.—The Frederick Railway has applied to the Public Utilities Commission of Maryland for authority to issue an additional $40,000 of preferred stock to pay for a majority of the shares of the stock of the Frederick Gas & Electric Company.

Hoosick Falls (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized the Hoosick Falls Railroad to issue its common capital stock to the amount of $100,000 to acquire all of the property, rights and franchises formerly belonging to the Bennington & North Adams Street Railway in New York State. The New York, New Haven & Hartford Railroad, which controls the property, has been authorized to acquire and hold the capital stock of the Hoosick Falls Railroad.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—Harry J. Milligan, receiver for the Indianapolis, Crawfordsville & Western Traction Company, reports the earnings of the company for October as follows: Gross receipts, $16,268; operating expenses, $11,550; net earnings, $4,717. The balance on hand on Oct. 1, 1910, was $13,557, and the balance on hand Nov. 1, 1910, was $16,554.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The Newport News & Old Point Railway & Electric Company has purchased $606,000 of its general mortgage bonds through the Maryland Trust Company, trustee. The total authorized issue of these bonds is $4,000,000, and of this amount $2,300,000 has been issued. Of the total amount issued $698,000, including the $606,000 recently purchased, has been retired, leaving outstanding $1,602,000. The remainder of the issue is held by the trustee to retire underlying bonds and bonds of constituent companies.

Philadelphia (Pa.) Rapid Transit Company.—A meeting of the directors of the Philadelphia Rapid Transit Company was called for Dec. 7, 1910, to consider the suggestion of E. T. Stotesbury, of Drexel & Company, that the company surrender its equity in its Market Street elevated line in return for the guarantee by the Union Traction Company of a loan for $10,000,000.

Portland Railway, Light & Power Company, Portland, Ore.—The stockholders of the Portland Railway, Light & Power Company have approved the plan to retire the preferred stock by redemption at 105, and to give the common stockholders the privilege of exchanging their present holdings for new stock. The result will be that, instead of the company having $15,000,000 of capital stock divided into $5,000,000 of preferred and $10,000,000 of common, the capital stock will be $25,000,000, of which $16,250,000 will be paid in. As a further result the company will receive $1,000,000 in cash.

Public Service Corporation of New Jersey, Newark, N. J.—Horatio G. Lloyd, of Drexel & Company, Philadelphia, Pa., and J. Horace Harding, of Charles D. Barney & Company, New York, N. Y., have been elected directors of the Public Service Corporation of New Jersey to fill vacancies in the board.

Scranton (Pa.) Railway.—The Scranton Railway has filed for record a mortgage covering its property given in favor of the Equitable Trust Company as trustee to secure an issue of $1,000,000 of 5 per cent bonds dated Nov. 1, 1910, and due Nov. 1, 1920, but subject to call at any interest period at 102 and accrued interest. The bonds were authorized by the directors of the company on Oct. 26, 1910, and a block of them has already been offered for subscription by Bioren & Company, Philadelphia, Pa.

Third Avenue Railroad, New York, N. Y.—The Public Service Commission of the First District of New York has denied the formal request of Herbert J. Bickford, of counsel for the Third Avenue Railroad, to the commission to reconsider all the facts and conclusions in connection with the application to the commission to reorganize the company and to abrogate, modify or change its order so as to grant the relief requested by the petition of the committee of bondholders and the Third Avenue Railway. An abstract of the grounds on which the application for a rehearing was based was published in the Electric Railway Journal of Oct. 29, 1910, page 909.

West End Street Railway, Boston, Mass.—The Railroad Commission of Massachusetts has ordered that the 1049 shares of common stock of the West End Street Railway authorized by the commission on Sept. 15, 1910, and remaining unsubscribed by stockholders of the West End Street Railway entitled to take them shall be offered for sale at public auction in Boston to the highest bidder at not less than par, to be paid in cash.

Dividends Declared

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Continental Passenger Railway, Philadelphia, Pa., $3 per share.

Duluth-Superior Traction Company, quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

Indianapolis (Ind.) Street Railway, 3 per cent.

Massachusetts Electric Companies, Boston, Mass., $2 per share, preferred.

Norfolk Railway & Light Company, Norfolk, Va., 2½ per cent.

Northern Ohio Traction & Light Company, quarterly, ¾ of 1 per cent.

South Side Elevated Railroad, Chicago, Ill., quarterly, ½ of 1 per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Washington Railway & Electric Company, Washington, D. C., 2½ per cent, preferred; 1 per cent, common.

Traffic and Transportation

Final Order for Joint Rates on New York Street Railways

At a meeting of the Public Service Commission of the First District of New York held on Dec. 1, 1910, the following order was adopted denying the application of the receivers of the Metropolitan Street Railway for an extension of time from Dec. 5, 1910, to Jan. 1, 1911, to establish a joint rate with the Central Park, North & East River Railroad for the transportation of passengers as provided in the order of the commission dated Aug. 2, 1910:

"Adrian H. Joline and Douglas Robinson, as receivers of the Metropolitan Street Railway, having made application in writing, dated Nov. 29, 1910, for a further extension of time in respect to the matters hereinafter mentioned, and, in the judgment of the commission, sufficient reason therefor not having been made to appear, it is

"Ordered: That the application of said Adrian H. Joline and Douglas Robinson as receivers of the Metropolitan Street Railway for an extension of time to establish and thereafter maintain in operation through routes for the transportation of passengers and to establish and put in force a joint rate of fare, in accordance with the order duly made in the above entitled matter on Aug. 2, 1910, which time was extended by orders duly made in the above entitled matter on Sept. 1, 1910, and Nov. 7, 1910, be, and the same hereby is, in all respects denied."

In the opinion announcing the decision the commission says:

"The commission originally on Aug. 11, 1908, directed the receivers of the Metropolitan Street Railway and the Central Park, North & East River Railroad to establish through routes and joint fares, which they failed to do. The commission thereupon instituted a case to ascertain proper joint rates and on Oct. 30, 1908, ordered that the two companies should establish through routes and joint rates by Nov. 22, 1908. Thereafter the receivers of the Metropolitan Street Railway secured a writ of certiorari and the matter has since been in the courts.

"Following certain amendments to the Public Service Commissions law by the Legislature of 1910, the commission on Aug. 2, 1910, ordered the receivers of the Metropolitan Street Railway and the Central Park, North & East River Railroad to establish through routes and joint fares on or before Sept. 1, 1910. Thereafter the time by which the companies were to establish joint rates and the time by which the commission was to be notified were extended to Nov. 1, 1910.

"The commission was advised by the receivers of the Metropolitan Street Railway on Oct. 21, 1910, that it would arrange for the establishment not on Nov. 1, 1910, but on Dec. 15, 1910, of a certain system of through routes and joint rates with the Central Park, North & East River Railroad and later the latter company notified the commission to the same effect. The commission after consideration of the matter modified its order which required that the joint rates established by the company should go into effect by Nov. 1, 1910, by extending the time to Dec. 5.

"The receivers of the Metropolitan Street Railway now ask that this time be extended to Jan. 1, 1911, giving as the reason therefor that sufficient time is necessary to instruct conductors properly in regard to the joint rate ticket procedure as well as to facilitate the proposition from an accounting standpoint. It would appear that the receivers of the Metropolitan Street Railway have had all the time reasonably necessary to instruct conductors properly or to facilitate accounting and that there has therefore been presented to the commission no adequate reason requiring postponement of the effective date of the joint rates. Any temporary inconvenience that may be caused to the receivers of the Metropolitan Street Railway is much more than counterbalanced by the inconveniences that have been endured by the traveling public and it is unfair that the commission should be asked to allow any further extension of time.

"The commission accordingly denies the application for an extension of time and calls the attention of the receivers of the Metropolitan Street Railway and the Central Park, North & East River Railroad to the fact that the commission has fixed Dec. 5 as the date when such joint rates shall go into effect and will avail itself of the remedies provided for by the Public Service Commissions law to see that this is complied with."

The offer of Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, made with the consent of the bondholders' reorganization committee, to establish a modified transfer system between the Fifty-ninth Street line of the Central Park, North & East River Railroad and the north and south lines of the Metropolitan Street Railway was referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 5, 1910, page 971.

The Metropolitan Street Railway did not comply with the final order of the commission on Dec. 5, 1910. On Dec. 3, 1910, the company wrote to the commission stating that it would be physically impossible to comply with the order on the date mentioned. No transfers had been printed and many other reasons were cited as to why the company could not meet the requirements of the order. It was expected that a meeting of the commission would be called within a few days to consider the situation.

Reduction in Fare to Revere Beach

The Railroad Commission of Massachusetts has dismissed the petition of the Selectmen of Revere in regard to fares and service on the Boston Elevated Railway and the Boston & Northern Street Railway to the Revere Beach reservation, which would in effect have afforded the petitioners a 5-cent fare from all parts of the Boston Elevated Railway to Revere Beach. In dismissing the petition the commission said:

"The petition recites that certain changes in the rates of fare are reasonable and expedient in order to promote the convenience and accommodation of the public, and requests the board to require the Boston Elevated Railway and the Boston & Northern Street Railway to make an arrangement so that passengers upon their cars may be transported between Orient Heights and the Revere Beach reservation for a fare uniform with that charged by the said companies for transportation to the same point over other lines of track; or that the Boston & Northern Street Railway be required to operate cars on those tracks, and that transfers be given by each company whereby passengers upon the cars of either of said companies may be transported from the various parts of Boston, Chelsea and Revere at a rate of fare uniform with that charged for transportation to said reservation over other lines of track.

"In discussing a similar situation in Malden in an order issued on March 7, 1907, the board used this language:

"'The same conditions exist at nearly all other points where interurban railways connect with the system of the Boston Elevated Railway. The peculiar privileges granted to that company under special laws include the right to insist upon a 5-cent fare from every passenger, a right that stands in the way of any arrangement for a joint fare to be shared with other companies. The board has no authority to suggest that the Boston Elevated Railway relinquish a part of the fare to which it is entitled by law, and it cannot rightfully ask the Boston & Northern Street Railway to furnish service without compensation; nor has it any jurisdiction over extensions of railway lines or changes in the control or ownership of lines.'

"The board finds that no action is open upon this complaint which will afford the petitioners the facilities they desire and the petition is therefore dismissed."

New Wage Agreement on the Illinois Traction System

The Illinois Traction System, Peoria, Ill., and the Brotherhood of Interurban Trainmen, on Nov. 21, 1910, signed a new wage agreement which indicates the friendly relations between the employees and the company. The essentials of the new agreement follow:

"Both parties agree to confer on all cases. The company reserves the right to hire and discharge men for cause without interference from the brotherhood. A merit and demerit mark system will immediately be installed and the marks shall be used as a basis for discharge. A board of inquiry consisting of two superintendents, three trainmasters and the chairman of each of the five lodges shall hear all charges against trainmen and the trainmen shall have

the right to appear before this board in their own behalf. Appeal from a decision of this board can be had to the general superintendent and from him to the vice-president executive. Any trainman who has been dismissed and later held innocent of the charges which caused dismissal shall have his record corrected and shall be paid for lost time. Trains consisting of two cars handling passengers will be manned with a crew of three trainmen. Trains of two cars carrying passengers not doing station work shall have such crews as the superintendent may decide to be necessary. Usual provisions as to seniority, runs, etc., will obtain.

"Wages shall be based on a nine-hour day, and a run of 225 miles completed in less than this time will be counted as one day. Extra runs are to be paid for on a nine-hour-day basis. Beginning Dec. 1 the men on the hourly basis will receive a 10 per cent increase and at the expiration of six months from Dec. 1, 1910, a further 10 per cent increase. Men on the mileage basis will receive an increase of 15 per cent on Dec. 1, 1910, and 5 per cent additional increase after six months. After six months from Dec. 1, 1910, when the contract goes into effect, all motormen and conductors will receive a flat rate of 30 cents per hour. A new class is to be added to the trainmen, to be known as brakemen, through which grade all men must pass before being promoted to motorman or conductor. Standard examinations must be passed before a man is promoted from this class. The compensation will be 23 cents per hour. Usual provisions for uniforms, passes, association business, etc., form a part of the contract. It is agreed that the brotherhood shall not cause a sympathetic strike for any outside cause or grievance. A board of arbitration consisting of three members will settle all differences and if an agreement cannot be reached a new board is to be appointed within 10 days and arbitration is to continue until the differences are settled. No strikes are to be called for any cause."

The new contract will run until Dec. 1, 1913.

Compulsory Interchange of Street Railway Traffic Considered

The Railroad Commission of Massachusetts, as noted in the Electric Railway Journal of Nov. 26, 1910, page 1068, is considering the subject of making it obligatory for street railways to receive and convey over their lines traffic offered by connecting street railways and will report its findings to the Legislature in 1911. G. C. Travis, counsel for the Boston Elevated Railway, has filed with the commission a brief in opposition to the suggestion The Boston Elevated Railway submits that it is not advisable or in the public interest to enact any legislation making it compulsory for street railways to receive and convey over their tracks traffic or cars tendered by connecting street railways. The company maintains that there is no public demand for it; that the legislation is unnecessary; that there are practical equipment difficulities; that there are difficulties of operation, and that it would force an entrance into the field of freight traffic. Counsel for the company says that legislation to compel such conveyance of traffic is unnecessary because if the traffic is feasible and remunerative no street railway will refuse it, and if it is not no company should be compelled to take it. It is against the public interest that any public service corporation should be compelled to transact business at a loss. The company says:

"Compulsory interchange of cars should not be considered with reference to the Boston Elevated Railway alone. Conditions which may by great painstaking make such interchangeable possible in the city might under some conditions arising in the country be extremely burdensome and perhaps ruinous to a small company, for large expenditures had to be made upon the Boston Elevated Railway for strengthening bridges, clearing curves, etc., for one line alone. Had some company desired to run upon the lines of a small rural electric railway large, heavy, high-speed cars, which might be suited to the interurban railway, but very little suited to the conditions of the small railway, it might be that with a compulsory law the small railway would be called upon to make investments in money for this purpose alone far beyond its means or reasonable power to grant."

Counsel argues that street railways in general in Massachusetts have been chartered to do a passenger business. Investors have not contemplated a possible compulsory requirement that they should go into the freight business. Attempts have been made to draw an analogy between steam railroads and street railways. The conditions are in no sense alike. The requirement that steam railroads should interchange cars to avoid breaking bulk for through freight and the further requirement that they should do so in connection with certain interurban railroads operated by trolley have no bearing upon the Massachusetts situation.

Changes in Routes in Washington.—The Capital Traction Company, Washington, D. C., recently posted placards in its cars giving in detail changes in the routes of several lines operated by the company which were made on Dec. 5, 1910.

Rates on Illinois Traction System.—A very slight increase has been made recently in the passenger rates on the Illinois Traction System. The one-way rates are now based on about 2 cents per mile and the round trips are approximately 180 per cent of the one-way rates.

Freight Rights Approved in Massachusetts.—The Railroad Commission of Massachusetts has approved the grant which the Berkshire Street Railway, Pittsfield, Mass., secured on Aug. 22, 1910, from the Selectmen of Egremont to act as a common carrier of newspapers, baggage, express and freight in Egremont.

Safety Gates in Leavenworth.—The Kansas City-Western Railway has equipped one of its cars which is operated regularly in Leavenworth with safety gates, and has announced that if the car equipped with the gates proves satisfactory in service all of the company's cars which are operated in Leavenworth will be equipped with gates.

Enforcing Car Rules in Toronto.—On Dec. 1, 1910, the Toronto (Ont.) Railway commenced to enforce the rules against smoking and spitting on its cars and the rule against passengers riding on the rear platforms of cars. The regulations of the company were authorized and approved by the Ontario Railway & Municipal Board and provide a penalty of $10 for each infraction of the rules.

Service in Rochester.—The Council of Rochester, N. Y., has referred to its railroad committee the resolution of Alderman Small to instruct the Corporation Counsel of the city to file a formal complaint in behalf of the city with the Public Service Commission of the Second District of New York about the service furnished by the New York State Railways, Rochester Lines, on its Genesee Street, Jefferson Avenue and Plymouth Avenue lines.

Hearing on Joint Rates in New York.—The Public Service Commission of the First District of New York ordered a hearing on Dec. 8, 1910, to determine whether the Central Park, North & East River Railroad, which operates the Fifty-ninth Street crosstown line and the South Shore Traction Company should be required to establish joint rates between the Fifty-ninth Street line and the shuttle service maintained by the South Shore Traction Company over the Queensborough Bridge.

Rules of the Road in New Haven.—A code of rules governing the use of the streets in New Haven, Conn., by vehicles and cars was adopted by the Board of Aldermen on Nov. 14, 1910, and went into effect Nov. 29, 1910. Under it the police have charge of the movement of traffic at all congested corners. Vehicles are prohibited from passing any "standing street railway car from which passengers are being received or discharged so as to interfere unreasonably in any way with such passengers."

Assignment of Runs in Philadelphia.—On Nov. 30, 1910, the Philadelphia (Pa.) Rapid Transit Company posted in all its car houses notices announcing the assignment of runs for conductors and motormen in fulfilment of the ruling made on Nov. 8, 1910, by the board of arbitration which was appointed to consider this matter. The decision of the arbitrators was included as part of the article "Arbitration in Philadelphia on Loyal Men," which was published in the Electric Railway Journal of Nov. 12, 1910, page 992.

Five-Cent Fare on Nine-Mile Road Opposed.—Speaking before the Hyde Park Business Men's Association recently, Representative Roger Wolcott, of Milton, said that if the matter comes up in the Legislature of Massachusetts he will oppose a 5-cent fare on the Old Colony Street Railway from

Hyde Park to Boston. He said that his reason for opposing it is that he wants to be fair to the company as well as to the public and it would be unfair to compel the company to carry passengers nine miles for 5 cents.

School Fares on the Boston & Northern Street Railway.—Robert Goff, vice-president and general manager of the Boston & Northern Street Railway, Boston, Mass., has proposed to Mayor James E. Rich, of Lynn, that an agreement be entered into with the company under which pupils at the evening high school in Lynn shall pay full fare pending a decree by the Supreme Court in regard to the contention by the Boston & Northern Railway that Chapter 520 of the Acts of 1908, which provides for half fares for pupils of high schools, is not constitutional. All money paid by pupils in excess of the one-half rate would be refunded to them.

All-Night Service in Boston Subway.—The Boston (Mass.) Elevated Railway has decided to open the Tremont Street subway for all-night service, effective Dec. 10, 1910. William A. Bancroft, president of the company, said in a letter to Mayor Fitzgerald, of Boston: "Our executive committee, after careful consideration and study of the question, has voted, notwithstanding the very large expense involved, to open the subway for night cars, beginning on the night of Dec. 10. We have concluded for the present, at least, not only to open the subway, but to maintain the existing service on the surface, so as practically to double the existing service during the night."

Conference in Indiana Between Commission and Interurban Representatives.—After investigating the causes of recent accidents on electric railways in Indiana the Railroad Commission of Indiana conferred on Nov. 29, 1910, with the representatives of various interurban railways in that State. The conference was not a public one, and was in a way preliminary to the meeting of the representatives of the electric railways with the Governor which has been called for Dec. 13, 1910. The Railroad Commission has made recommendations to certain electric railways in the State regarding operation and has asked the companies to reply by Dec. 10, 1910. These replies will, perhaps, cover much of the ground of the conference on Dec. 13, 1910.

Signs on Cleanliness in Interurban Cars.—George H. Whysall, general manager of the Columbus, Marion & Bucyrus Railway, Delaware, Ohio, has had posted "sanitary" signs at each end of both compartments of its interurban cars. The posted signs are 21 in. wide by 11 in. high and are printed in black and white. A copy of the anti-spitting order of the State Board of Health is introduced with the following announcement regarding cleanliness: "Cleanliness is necessary to health in cars as well as in homes. This car is chemically disinfected and cleaned every night and the management respectfully invites your co-operation in keeping the seats and the floor clean. Spitting on the floor is contrary to the laws of health and of the State. Cuspidors are provided in the smoking compartment."

Key Route to Fill Its Oakland Pier.—One of the largest municipal harbor projects undertaken on the Pacific Coast is that of Oakland, Cal., which has just received the sanction of the War Department. It consists of the development of what is known as the Key Route Basin on the east shore of San Francisco Bay, extending between the Oakland route of the Southern Pacific Company and the pier of the Key Route on the San Francisco, Oakland & San José Railroad. The plans, which were made by F. C. Turner, city engineer of Oakland, provide for the construction of a seawall along the new bulkhead line, the dredging of a channel, the filling of the space landward from the seawall and the building of piers. Under the terms of the agreement, the San Francisco, Oakland & San José Railroad will have to fill in about 500 acres, in addition to filling in its electric railway pier, about 15,000 feet long. The work is to be started immediately.

Chicago & Milwaukee Electric Railroad Issues New Timetable.—The Chicago & Milwaukee Electric Railroad, Chicago, Ill., "the scenic route of the beautiful north shore," has issued a 16-page timetable of standard size, illustrated with half-tone views of the roadway, equipment and offices, and with full-page map showing the interurban lines between Chicago, Waukegan, Milwaukee, Sheboygan, Oconomowoc and other points tributary to Milwaukee. The new folder includes a statement of the operating organization of the road, a description and timetable of the fast limited trains operated between Milwaukee and Chicago, complete timetable of all passenger trains, information regarding commutation rates, chartered-car rates, café and parlor-car accommodations and rates, an announcement of the United States express service operated over the line, a directory of the ticket offices and waiting rooms in the cities reached, a directory of the universities and colleges located on the line, and general miscellaneous facts on points of interest, steamship and railroad connections, etc. This timetable has been prepared under the supervision of E. H. Vivian, traffic manager and claim agent of the company. E. E. Downs is general manager of the Chicago & Milwaukee Electric Railroad.

Application for Rehearing of Rensselaer Fare Case.—The United Traction Company, Albany, N. Y., has applied to the Public Service Commission of the Second District of New York for a rehearing of the case in which the commission ruled that the company is entitled to charge only 5 cents fare between Albany and Rensselaer, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 3, 1910, page 1127. The company has also requested the commission to suspend the enforcement of the decision until a rehearing has been held. The company maintains that it is authorized by contract to charge 6 cents fare between Albany and Rensselaer; that neither the Legislature nor the commission has authority to deprive it of this contract right, and that the decision and order of the commission are confiscatory and will reduce the receipts below the operating expenses. In regard to the effect of the reduction in fares on its earnings the company says in the petition for a rehearing: "Upward of $120,000 is invested in the railroad property operated by the respondent in Rensselaer, exclusive of the respondent's equipment, and its capital stock is $120,000, on which no dividend has been paid except in 1909 and 1910, when a 4 per cent dividend was paid thereon, and which could not have been paid except by the collection of 6 cents per passenger transported by it between Rensselaer and Albany, and if said act of the Legislature is enforced and the respondent prohibited from charging or collecting more than 5 cents per passenger carried by it between said cities and has to pay the bridge toll therefrom it will not be able to make its operating expenses."

Service Between Newark and New York.—From 1895 to 1898 the Consolidated Traction Company, which is now controlled by the Public Service Railway, carried passengers from Newark, N. J., to New York and return for a 25-cent fare. This charge included ferriage over the Hudson River. In 1898 the fare was changed to 10 cents one way without transfers and 12 cents with transfer privileges in Newark. This rate remained in force until 1909. Between 1898 and 1909, however, the number of through passengers between Newark and New York became very small and most of the riding on the line between the two cities was from points in Newark to points in Hudson County or vice versa. On account of this condition and the fact that the Pennsylvania Railroad at the instance of the Interstate Commerce Commission discontinued selling ferry tickets good between Jersey City and New York at a special rate, the Public Service Railway put into effect a 10-cent fare between Essex County and Hudson County with transfer privilege at either end. As there was no public demand for a through ticket to New York at the old rate, none was offered for sale. A member of the Board of Works of Newark forwarded a letter of complaint about the service between Newark and New York to the Public Utility Commission before communicating his desires or intentions to the company. When the subject was brought to the attention of Thomas N. McCarter, president of the Public Service Railway, he ordered the 25-cent rate restored. Instead of selling through tickets, however, the company will continue its 10-cent rate between Newark and Jersey City and through passengers upon presenting identification slips at the Exchange Place terminal in Jersey City will be sold two ferry tickets for 5 cents, the rate at which the Pennsylvania Railroad sells tickets in lots of 10 or more. So far as the traveling public is concerned the change will make very little difference, as the number of passengers who ride from Newark through to New York is very small compared with the total number of passengers who patronize the line for only part of the distance between Newark and Jersey City.

Personal Mention

Mr. L. Cox has resigned as superintendent of the Oklahoma Union Traction Company, Tulsa, Okla.

Mr. H. A. Benedict, electrical and mechanical engineer of the United Traction Company of Albany, has resigned, as of Jan. 1, 1911, to become assistant general manager of the Public Service Railway, Newark, N. J.

Mr. A. R. Myers, who has been electrical engineer of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., will hereafter have charge of the maintenance of the rolling stock of the company in addition to the duties which he has performed heretofore.

Mr. Samuel S. Watkins has resigned from the testing bureau of the Brooklyn (N. Y.) Rapid Transit Company to become connected with Mr. Lewis B. Stillwell in the work of equipping the Hoosac Tunnel of the Boston & Maine Railroad with electricity.

Mr. Roy Edinger has been appointed superintendent of power and equipment of the Warren & Jamestown Street Railway and the Warren Street Railway, Warren, Pa. Mr. Edinger was formerly master mechanic of the Ft. Wayne & Springfield Railway, Decatur, Ind.

Mr. R. M. Hemming, formerly assistant superintendent and electrical engineer of the Ohio & Southern Traction Company, Columbus, Ohio, has been appointed general manager of the company. Mr. Hemming became connected with the Ohio & Southern Traction Company in 1906 when construction work was undertaken. In 1899 he had charge of the municipal power plant at Columbus, Ohio. In 1900 he entered the contracting business and carried this work on for two or three years. Later he became electrical engineer of the Buckeye Steel Castings Company.

Mr. J. H. Harvey, secretary to Mr. J. M. Egan, president of the Metropolitan Street Railway, Kansas City, Mo., has been appointed superintendent of employment of the company. Mr. Harvey was born at Marshall, Mo., on Aug. 23, 1884. He was educated in the Woodlawn and Bryant schools, Kansas City, Mo., and was graduated from the Central High School, Kansas City, with the class of 1902. Mr. Harvey first entered the employ of the Kansas City *World*, but in April, 1903, he became connected with the Metropolitan Street Railway as a timekeeper. He was soon promoted to general timekeeper and later was made chief timekeeper for the entire system under Mr. J. A. Harder, then auditor of the company, but now the comptroller. Subsequently he was appointed secretary to Mr. Egan. Mr. Harvey is studying law at the Kansas City School of Law, and will graduate with the class of 1911.

Mr. H. J. Horne, assistant general manager of the Chicago, Burlington & Quincy Railroad's lines west of the Missouri River, has been appointed assistant to Mr. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad. Mr. Horne will have charge of the operation of the steam lines of the New York, New Haven & Hartford Railroad and will do practically the same work that was done by Mr. John F. Stevens, formerly vice-president of the company. The last official of the New York, New Haven & Hartford Railroad to have the title of assistant to the president was Mr. H. A. Fabian, who later became manager of purchases and supplies. Upon Mr. Fabian's appointment to the latter position Mr. E. G. Buckland, vice-president of the company, assumed some of the duties performed by Mr. Fabian. Mr. Horne will, it is understood, assume some of Mr. Buckland's present duties so far as they concern the operation of the steam lines.

Mr. John C. Thompson took formal charge of the Trenton (N. J.) Street Railway on Dec. 1, 1910, as general superintendent. Mr. Peter E. Hurley, the retiring general manager, will remain with the company until Jan. 1, 1911, so that Mr. Thompson may become better acquainted with the city and the railway property. Mr. Thompson entered the employ of the United Traction Company, Troy, N. Y., as a conductor in 1892, and after a few years was made an inspector. In 1900 he was appointed assistant superintendent of the Troy Division of the United Traction Company under Mr. Charles H. Smith, superintendent, and continued in this capacity until the property was taken over by the Delaware & Hudson Company. Mr. Thompson then became superintendent of the Troy division, succeeding Mr. Smith, who was made general superintendent of the company. Mr. Thompson continued as superintendent of the Troy division of the United Traction Company until he was appointed general superintendent of the Trenton Street Railway. As previously announced in the Electric Railway Journal, Mr. Hurley, who retires as general manager of the company, will become connected with the Filbertine Paving Company.

Mr. George P. Richardson has resigned as master mechanic of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to become master mechanic of the Berkshire Street Railway, Pittsfield, Mass. Mr. Richardson was born in Gardiner, Me., and was educated in the public schools of Westbrook, Me. He served four years with S. D. Warren & Company, Cumberland Mills, Me., learning the trade of machinist. Mr. Richardson entered railway work in May, 1897, with the Boston (Mass.) Elevated Railway. In May, 1899, he resigned from the Boston Elevated Railway to accept a position on repair work with the Exeter, Hampton & Amesbury Street Railway, Exeter, N. H. A year later he was appointed foreman of repairs with the Exeter, Hampton & Amesbury Street Railway and continued in that position until April, 1903, when he accepted a similar position with the Newton (Mass.) Street Railway. In February, 1905, Mr. Richardson was transferred to the Auburndale station of the Middlesex & Boston Street Railway in charge of all repairs there and continued in this capacity until November, 1909, when he accepted the position of master mechanic of the Buffalo & Lake Erie Traction Company, which operates 68 miles of electric railway between Buffalo, N. Y., and Erie, Pa.

Mr. Charles W. Ford, who has resigned as general superintendent of the Oklahoma Railway, Oklahoma City, Okla., entered the electric field in 1892 with the Thomson-Houston Company on construction in the Southern States. In 1893 he was made superintendent of a lighting and ice plant in Northern Alabama, but resigned from this position in 1894 to engage in the electrical contracting business. Desiring to enter the railway field, Mr. Ford became connected with the New Orleans Traction Company, which was electrifying the horse car lines in New Orleans. He remained with this company during 1895 and a part of 1896. Mr. Ford next accepted a position with the Galveston (Tex.) City Railway and continued with this company in several different positions until Jan. 1, 1900, when he became manager of a light plant in Central Texas. He returned to the Galveston City Railway on Jan. 1, 1901, as superintendent and remained with the company until October, 1902, when he became connected with the Metropolitan Railway, Oklahoma City, Okla., as superintendent of construction and operation. When the Oklahoma City Railway succeeded the Metropolitan Railway Mr. Ford retained his position and was engaged more extensively in construction and in conducting the operation. The Oklahoma Railway was finally organized to succeed the Oklahoma City Railway, and Mr. Ford was made general superintendent in charge of operation and construction, and he continued in this capacity until Jan. 1, 1910, when he was relieved of construction and placed in charge of operation. Mr. Ford retired from the company as superintendent on Nov. 15, 1910.

OBITUARY

J. C. Bound, superintendent of the Dallas & Harvey's Lake division of the Wilkes-Barre (Pa.) Railway, is dead. Mr. Bound was at one time connected with the Atchison, Topeka & Santa Fé Railway, and was formerly assistant to the general manager of the Delaware, Lackawanna & Western Railroad.

Julius E. French, chairman of the board of directors of the Railway Steel Spring Company, is dead. He was a director in the American Locomotive Automobile Company, the American Locomotive Company, the Chicago-Cleveland Roofing Company, the Congress Hotel Company, the Locomotive Security Company, the Standard Coupler Company, the United States Life Insurance Company and the Natural Gas Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Elgin Belt Railway, Elgin, Ill.**—Incorporated in Illinois to build an electric railway to connect Elgin and Desplaines. Capital stock, $25,000. Incorporators: Phillip Fuller, Joseph Newman, M. C. Eppenstein, J. M. Blackburn and C. F. Terhune, all of Elgin.

Lafourche Valley & Gulf Railway, Donaldsonville, La.—Incorporated in Louisiana to build a 90-mile railway from Donaldsonville to Leesville on the west bank of Bayou Lafourche. The track will be built with 80-lb. rails. Gasoline motor cars will be operated. Freight and express matter will be handled as well as passengers. Construction will begin within a few months. Capital stock, $1,500,000. Headquarters: Donaldsonville. Directors: F. M. Welch, president; J. Numa Colomb, vice-president; Charles Maurin, secretary and treasurer; Clarence C. Barton, Sr., E. P. Munson, J. T. Badaux, John Marks and S. A. Le Blanc. [E. R. J., Nov. 26, '10.]

***Madison County Railway, Stackhouse, N. C.**—Chartered in North Carolina to build a 10-mile electric railway to connect Stackhouse and Allenstand. Capital stock, $50,000. E. B. McMillan is one of the incorporators.

***International Traction Railways, Buffalo, N. Y.**—Incorporated in New York as an auxiliary of the International Railway to build an electric railway in Abbott Road, Buffalo, between Cazenovia Street and the southerly city line. Capital stock, $100,000. Directors: Morris Cohn, Jr., Niagara Falls; Robert L. Fryer, O. P. Letchworth, Buffalo; Thomas E. Mitten, Chicago; Edmund B. Osler, Toronto, and Nelson Robinson, New York.

***Western Central Railway, Ottawa, Ont.**—Incorporated in Ontario to build electric lines between Toronto and London, with branches to Stratford, Woodstock and Windsor, connecting with ferries to be operated across the Detroit River.

Gogebic & Iron County Railway & Light Company, Ashland, Wis.—Application for a charter has been made in Wisconsin by this company to build an interurban system and develop water power in northern Wisconsin. Capital stock, $100,000.

FRANCHISES

Birmingham, Ala.—The Tidewater Development Company has received a franchise from the City Council to build an electric railway through Birmingham. The contract for the work has been let and construction will begin in the spring. J. M. Dewberry, Birmingham, president.

***Phoenix, Ariz.**—Charles Goldman and H. H. Stone have asked the Board of Supervisors for a 25-year franchise to build an electric railway in Phoenix and extend it to Mesa.

Fresno, Cal.—S. N. Griffith has asked the City Council for a 25-year franchise to build an electric railway over certain streets in Fresno. [E. R. J., Nov. 26, '10.]

***San Rafael, Cal.**—George D. Shearer has received a 49-year franchise from the Council to build an electric railway in San Rafael. The terms of the franchise state that work must be begun within four months and be completed in two years.

Joliet, Ill.—The Illinois Traction System, Peoria, has received a franchise from the Council to build an electric railway through Joliet. This extension will connect Joliet and Morris, a distance of 25 miles.

Pekin, Ill.—The Pekin & Petersburg Interurban Railway has asked the City Council for a franchise to build an electric railway through Pekin. It will connect Pekin and St. Petersburg. J. E. Melick is interested. [E. R. J., Nov. 26, '10.]

Hammond, Ind.—The Eastern Illinois Railway has received a six months' extension of its franchise to complete its track laying in West Hammond.

Webster City, Ia.—The Fort Dodge, Des Moines & Southern Railway will ask the City Council for a franchise to build an electric railway through Webster City. J. L. Blake, manager.

Springfield, Mo.—The Springfield & Western Railroad has asked the Greene County Court for permission to build an electric railway on Nichols Street, in Springfield, and to cross other roads in the county. This projected railway will connect Springfield, Carthage and Joplin, via Bennetts, Plano, Halltown, Paris Springs, Miller, Red Oak and Avilla. At Carthage it will connect with the Southwest Missouri Electric Railways line and run into Joplin. H. D. Mackay, Springfield, president. [E. R. J., Sept. 24, '10.]

Hattiesburg, Miss.—W. S. F. Tatum and W. O. Tatum have received a 25-year franchise from the Council to build an electric railway in Hattiesburg. It is understood that the company will build a belt line around Hattiesburg as soon as possible and leave the short runs for the present company. [E. R. J., Dec. 3, '10.]

Middletown, Ohio.—The Ohio Electric Railway, Cincinnati, has asked the City Council for a franchise to build an electric railway in Middletown. This company has received a franchise from the commissioners of Allen County to build one mile of double track through Lima to reach the new plant of the Gram Motor Truck Company.

Pittsburgh, Pa.—The Pittsburgh Railways has applied to the Select Council for four franchises in the name of four companies, the Second Avenue Passenger Railway, the Central Passenger Railway, Pittsburgh & West End Railway and the Ft. Pitts Street Passenger Railway, to build electric railways over eleven of the business streets of Pittsburgh.

New Cumberland, W. Va.—The Pittsburgh, Steubenville & Wheeling Railway has asked the County Court of Hancock County for franchises to build an electric railway over and along the public roads between Hancock and Brooke Counties. W. H. Hildebrand, Pittsburgh, is interested. [E. R. J., Oct. 22, '10.]

Whitewater, Wis.—The Badger Railway & Light Company, Milwaukee, has received a franchise to build an electric railway through Heart Prairie, Elkhorn and Springfield to Geneva. Gustav Pickhardt, Milwaukee, secretary. [E. R. J., Nov. 26, '10.]

TRACK AND ROADWAY

Grandview Street Railway, Birmingham, Ala.—This company has awarded the contract for ties to E. W. Jordan Contracting Company. It will begin work on Dec. 15 on its proposed four-mile electric railway between Birmingham and Grandview. Capital stock authorized, $200,000. Bonds authorized, $100,000. Power will be obtained from the Birmingham Railway, Light & Power Company. Milner & Browne, engineers. [E. R. J., Nov. 26, '10.]

British Columbia Electric Railway, Ltd., Vancouver, B. C.—A petition has been presented to this company asking it to extend its Victoria Road line along Westminster Road to Boundary Road in South Vancouver, B. C. It is expected to begin work at once on the extension of the company's line along Park Drive from Venables to Hastings Street in Vancouver.

Oakland & Antioch Railway, Oakland, Cal.—This company has begun the construction of its extension between Bay Point and Lafayette. Tracks are being laid near Bay Point.

Ocean Shore Railway, San Francisco, Cal.—This company plans to replace the wooden bridges at Sickles Avenue and De Wolf Street and San José Avenue and Regent Street with steel structures.

Southern Pacific Company, San Francisco, Cal.—Representatives of the Southern Pacific Company in New York have denied the statement contained in special newspaper dispatches to the East from Los Angeles that the company proposes in the near future to equip its line between Los Angeles and Bakersfield with electricity. This line is 170 miles long.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—This company is considering plans to extend its line from Broad Street down Center Street to the city wharves and to extend the Turpin Hill line and make a loop to intersect with Fifteenth Street and take in Harrisonville. The Summerville and Monte Sano lines are also to be extended.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—This company has purchased 1000 tons of rails from the Tennessee Coal, Iron & Railway Company, Birmingham, Ala. This line runs from Fairburn to Union City and College Park. W. T. Roberts, Fairburn, president.

Denverside Connecting Railway, East St. Louis, Ill.—This company reports that this proposed railway will be operated by steam. [E. R. J., Nov. 26, '10.]

***Chesterton, Ind.**—It is stated that C. H. Geist, Philadelphia, will finance a company to build an electric railway to connect Chesterton and Whiting via Gary, Dune Park, Miller, Ætna, Buffington and Indian Harbor.

Mesaba Electric Railway, Duluth, Minn.—The Duluth Engineering Company, which has the contract for the construction of this proposed 36-mile railway, has begun the surveys. The line will connect Gilbert and Hibbing via Chisholm, Buhl, Virginia and Ebelethe. Oscar Mitchell, president. [E. R. J., Nov. 19, '10.]

St. Paul Railway Promotion Company, St. Paul, Minn.—This company has completed surveys between St. Paul and Mankato. The railway will connect St. Paul, Mankato, Eagle Lake, Faribault, Northfield and other Southern Minnesota cities. W. L. Sontag, 810 Metropolitan Building, St. Paul, general manager. [E. R. J., Oct. 22, '10.]

***Butler, Mo.**—S. W. Dooley, A. H. Culver and associates are said to be interested in a plan to build an electric railway through Butler.

Jefferson City Bridge Company, Jefferson City, Mo.—Waddell & Harrington, Kansas City, are the contractors for building this proposed electric railway, which will cover the entire city and connect with the Chicago & Alton Railroad and the Missouri, Kansas & Texas Railroad north of the Mississippi River. C. W. Thomas, Jefferson City, is interested. [E. R. J., Oct. 8, '10.]

Hannibal & Northern Missouri Railroad, Palmyra, Mo.—This company is reported to be grading near Bethel, Mo. This proposed 100-mile electric railway will connect Hannibal, Palmyra, Bethel, Sue City, La Plata and Philadelphia. J. W. Latimer, Galesburg, secretary. [E. R. J., July 17, '10.]

***Omaha & Western Iowa Traction Company, Omaha, Neb.**—This company is in the market for equipment to build 90 miles of electric railway between Sioux City, Ia., and Omaha, Neb. Headquarters, 3901 North Eighteenth Street, Omaha, Neb.

New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J.—This company has completed and placed in operation its 1½-mile extension from Highwood to Tenefly.

Easton & Washington Traction Company, Washington, N. J.—M. P. McGrath has been awarded the contract by this company to build an extension of its railway from Port Murray to Hackettstown, N. J. It is expected to begin work shortly.

Elmira Water, Light & Railway Company, Elmira, N. Y.—The Public Service Commission of the Second District has granted the petition from this company for authority to extend its line on Pennsylvania Avenue in Elmira to the southerly city line, thence along the route on Pennsylvania Avenue to Southport Corners in Southport.

Hudson Valley Railway, Glens Falls, N. Y.—This company has certified to the Secretary of State that it proposes to extend its line in Saratoga Springs from Lincoln Avenue to the North River Railway on East Avenue and Spring Avenue in Saratoga Springs.

***Shaker Heights Land Company, Cleveland, Ohio.**—This company is considering plans for building an electric railway across the Shaker Lakes Park connecting with the Cleveland Railway at Coventry Road. Henry J. Davis, secretary.

Pittsburgh & East Liverpool Electric Railway, East Liverpool, Ohio.—Interest has again been revived in the building of this proposed 25-mile electric railway to connect Beaver Falls, Columbiana, Palestine, Darlington, Leetonia, Waterford and East Palestine. J. M. Reed, Pittsburgh, president. [E. R. J., June 26, '09.]

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—It is said that this company is making plans to extend its line in the spring. It has provided for a bond issue of $200,000.

Oklahoma City & Fort Smith Traction Company, Oklahoma City, Okla.—It is reported that this company will receive bids Jan. 1 for building its proposed 200-mile electric railway to connect Oklahoma City, Okla., and Fort Smith, Ark., via Shawnee, Henrietta and Muskogee, Okla. A 300-ft. bridge will be required across the South Canadian River, besides several small bridges. Officers: V. L. Bath, president; M. P. Mowery, vice-president; G. L. Woods, secretary; John Wild, treasurer, and Joseph Kreis, Oklahoma City, general manager and chief engineer. [E. R. J., Jan. 29, '10.]

Toronto & Eastern Railway, Toronto, Ont.—This company has completed surveys and will begin construction within a few months on its 100-mile electric railway to connect Toronto, Whitby, Oshawa, Brownsville, Lindsay, Port Hope, Uxbridge and Peterboro. R. H. Rothray, Toronto, superintendent. [E. R. J., Apr. 30, '10.]

Dallas (Ore.) Street Railway.—Frank P. Phillips has been awarded the contract to build this railway in Dallas. The ties will be laid in cement and the rails will be 90 lb. The line will be built for freight and passenger traffic and it will eventually be extended into the country. E. W. Thomas is interested. [E. R. J., March 26, '10.]

Lancaster & York Furnace Street Railway, Lancaster, Pa.—This company contemplates erecting a bridge over the Susquehanna River at Pequea.

Allegheny & Northwestern Railroad, Philadelphia, Pa.—John Schaffner, Butler, has been awarded the contract for grading a large section of line between Evans City and Harmarville. Grading has been begun near Evans City. This proposed 21-mile railway will connect Callery, Mars, Valencia and Bakerstown, and at Evans City with the Pittsburgh, Harmony, Butler & New Castle Railway and at Mars with the Pittsburgh & Butler Railways and the proposed Rochester & Mars Street Railway. J. G. McPherson, president. [E. R. J., Nov. 26, '10.]

Pittsburgh, Steubenville & Wheeling Railway, Pittsburgh, Pa.—This company has completed the surveys between Pittsburgh and Wheeling for the route for its proposed electric railway to connect Pittsburgh, Pa., and Wheeling, W. Va. W. E. Hilderbrand, Pittsburgh, is interested. [E. R. J., Oct. 22, '10.]

Washington & Claysville Street Railway, Washington, Pa.—This company, which is a subsidiary to the Pittsburgh Railways, expects to extend its line from the present terminus on West Chestnut Street down the Gordon Valley to Hayes Avenue. William Pickett & Company will begin work soon as most of the grading has been completed.

York & Glen Rock Railway, York, Pa.—Surveys have nearly been completed for this proposed 11½-mile electric railway to connect York, Glen Rock, Paradise and Loganville. Contracts have not yet been awarded. The Tennes Company, Magee Building, Pittsburgh, is interested. [E. R. J., Nov. 19, '10.]

***Rapid City, S. D.**—It is stated that an eastern syndicate has under consideration the building of an electric railway to connect Rapid City, Vale, Belle Fourche, Spearfish, Deadwood, Lead, Sturgis and back to Rapid City.

Bristol, Tenn.—The Bristol Board of Trade is considering the construction of an electric railway between Bristol and Kingsport. Samuel King is interested. [E. R. J., Nov. 26, '10.]

Corpus Christi & Interurban Railway, Corpus Christi, Tex.—Plans are being made by this company to extend its line from Corpus Christi to the Epworth League Grounds. V. S. Heinly, Corpus Christi, secretary.

Galveston-Houston Electric Railway, Galveston, Tex.—This company has laid and ballasted about 35 miles of track on its proposed 50-mile railway to connect Galveston and Houston. It is expected to have the line in operation in the spring. [E. R. J., Oct. 29, '10.]

Bay Shore Rapid Transit Company, La Porte, Tex.—It is said that this company expects soon to purchase steel and equipment for its proposed electric railway to connect La Porte and Houston via San Jacinto. O. L. Allen is interested. [E. R. J., Dec. 3, '10.]

Texas City Traction Company, Texas City, Tex.—This company is in the market for 300 tons of 40-lb. relaying rails for building its proposed five-mile electric railway in Texas

City from Bay Shore to Texas City Heights. Fordyce Ridley, Galveston, president. [E. R. J., Dec. 3, '10.]

Spokane, Portland & Northern Railway, Spokane, Wash.—It is said that this company, recently incorporated, will begin construction of its line between Spokane and Davenport about Jan. 1. The line will extend from Spokane to the international boundary near Nighthawk via Bridgeport and Duffin's Ferry. A. M. Dewey, Spokane, is interested. [E. R. J., Nov. 5, '10.]

SHOPS AND BUILDINGS

St. Joseph Valley Traction Company, Elkhart, Ind.—This company will build a depot at Ellis and has awarded the contract for building its new car house, 36 ft. x 36 ft., in Angola.

Syracuse (N. Y.) Rapid Transit Company.—This company is considering plans for building an addition to its terminal station in Syracuse, to cost about $100,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company will move its car house at Cuyahoga Falls to a point just south of Akron, and the South Main Street car house in Akron will be moved to the same place.

Portland Railway, Light & Power Company, Portland, Ore.—This company expects to build a new warehouse and clubroom for its line department. It will also build a new car house with a capacity of 36 cars in the Piedmont district; also new consolidated shops for repairs and construction work. F. I. Fuller, vice-president.

Virginia Railway & Power Company, Richmond, Va.—This company will build a blacksmith shop at Richmond. The structure will be one story, of brick, concrete and steel construction. It is estimated that the cost will be $4000.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company, Pittsburgh, for one 1000-kw and two 600-kw motor generator sets and three 475-kva and six 300-kva oil-insulated self-cooled transformers.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company is now extending its high-tension lines from the Bluffs about 4 miles east of East St. Louis, 4 miles farther east to a point near the old city limits of Belleville, where it will construct a new brick substation to contain 1000 kw in rotary converters. It is expected to have this substation in operation shortly after the first of the year. C. F. Hewitt, superintendent.

Tri-City Railway, Davenport, Ia., has purchased from the Westinghouse Electric & Manufacturing Company a 1000-kw motor-generator set, the motor end of which is a 2-phase, 4600-volt, 60-cycle a.c. machine, and the d.c. end a 600-volt railway generator.

Frederick (Md.) Railway.—This company will install a 750-hp engine in its power house at Middleton. O. B. Coblentz, chief engineer.

Portland Railway, Light & Power Company, Portland, Ore.—This company expects to build a new substation in the Mount Tabor district. It also expects to purchase three 3300-kw, 60-cycle generators for the Estacado power development now in course of construction. The company also has plans for the construction of a substation at East Sixtieth Street and Stark Street in Portland. The building will be 36 ft. x 40 ft., one story and of brick construction. It is expected to expend $40,000 for rotary generators and other electricity-making machinery to be installed at this new substation. F. I. Fuller, vice-president.

Holmesburg, Tacony & Frankford Electric Railway, Tacony, Pa.—This company has awarded the contract to Charles McCaul Company for the construction of an addition to its boiler house in Tacony. Henry Glazier, superintendent.

Galveston-Houston Electric Railway, Galveston, Tex.—This company has begun the construction of its power house near Webster.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company is installing two 14,000-kw and two 7500-kw Curtis turbo-generator sets in its Commerce Street station, which already had an existing equipment of 20,000 kw. Other important additions to the boiler and auxiliary equipment are being made at this plant.

Manufactures & Supplies

ROLLING STOCK

Tri-City Railway, Davenport, Ia., has placed an order with the Cincinnati Car Company for eight double-truck city cars.

Pennsylvania Railroad, New York, N. Y., is reported to be receiving bids for 80 electric cars, to be used on a subsidiary line.

Chas. P. Glover Realty Company, Atlanta, Ga., is considering the purchase of a gasoline motor car to carry more than 12 passengers.

Wilmington & Philadelphia Traction Company, Wilmington, Del., in accordance with a resolution adopted by the directors of the company on Dec. 2, 1910, will purchase 10 double-truck semi-convertible cars.

Detroit (Mich.) United Railway advises that it is planning to convert 20 double-truck open cars to closed pay-as-you-enter cars and that the work will be done in the G. C. Kuhlman Car Company's shops at Cleveland.

Northern Ohio Traction & Light Company, Akron, Ohio, reported in the ELECTRIC RAILWAY JOURNAL as considering the purchase of several cars, is receiving bids for eight interurban cars, 10 semi-convertible cars and seven double-truck city cars.

Pittsburgh (Pa.) Railways has ordered 50 steel cars from the Pressed Steel Car Company. The new cars will be practically the same as the steel cars of series 4000, now in operation, with the exception that a number of minor improvements on that type have been made. The cars will be 46 ft. 8 in. long, and each will have a seating capacity of 56 passengers. One improvement over the original 4000 type cars will be the use of steel posts to add strength. The rear platform will be made longer and the two rear doors will be widened to permit of the easier entrance and exit of passengers. Rattan will be used on the longitudinal seats.

Illinois Traction System, Peoria, Ill., has placed an order with the Browning Engineering Company for an electrically operated wrecking crane. This equipment will weigh 130,000 lb., and will have capacity for lifting 30 tons. It has also placed an order with the same company for one 17-ton lifting capacity locomotive crane, electrically operated, to work at 48 ft. radius, intended for unloading coal from submerged storage bins and for general loading work. Both cranes are to be mounted on double trucks arranged for interurban and city track operation. They have 33-in. rolled steel M.C.B. wheels. Each crane is self-propelling, and is arranged so that the gears can be disconnected from the driving axles and the cranes be hauled in freight-train service. They are equipped with Westinghouse automatic and straight-air brakes.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., noted in the ELECTRIC RAILWAY JOURNAL of Oct. 15, 1910, as having ordered six single-truck cars from the Jewett Car Company, has specified the following details for these cars:

Seating capacity.....28	Underframe .....wood
Weight (car body only), 8000 lb.	Car trimmings.....bronze
	Couplers .....Jewett
Length of body.....20 ft.	Curtain fixtures....C. S. Co.
Over vestibule.....30 ft.	Curtain material....Pantasote
Width over sills...7 ft. ½ in.	Hand brakes...Jewett geared
Over posts at belt.....8 ft.	Heaters .....Consolidated
Sill to trolley base.....9 ft.	Headlights .....incandescent
Height from top of rail to sills.....2 ft. 5 in.	Sanders.....foot sander
	Seats .....longitudinal
Body .....wood	Seating material.....rattan
Interior trim.....cherry	

TRADE NOTES

Rail Joint Company, New York, N. Y., has its general offices to the Cameron Building, 185 M Avenue, New York.

Brady Brass Company, Jersey City, N. J., will erec tory on the north side of Fourteenth Stree Street and Henderson Street, Jersey Cit the necessary plans are completed.

S. A. Staege has resigned as sales engineer with the Buffalo office of the Allis-Chalmers Company, and has opened a consulting engineering office in the Smith Building, Watertown, N. Y.

Cornell S. Hawley, vice-president and general manager of the Consolidated Car Heating Company, has also been elected treasurer of the company to succeed Frederic Pruyn, who resigned to go into other business.

Grip Nut Company, Chicago, Ill., has appointed Thomas P. Swan Northwestern representative, with headquarters at 315 Minnesota Street, St. Paul, Minn. Mr. Swan was at one time connected with the mechanical department of the Great Northern Railroad.

Toledo-Massillon Bridge Company, Toledo, Ohio, has changed its name to the Toledo Bridge & Crane Company, in order more fully to cover its complete line of hand and electric cranes and hoists, coal and ore handling machinery, and grab-bucket machinery.

H. W. Johns-Manville Company, New York, N. Y., has removed its offices, now located at 85 Shelden Street, Houghton, Mich., to more commodious and convenient quarters at 96 Shelden Street. As in the past, S. T. Harris, who has been associated with the company for a number of years, will be in charge of the offices at the new address.

R. D. Nuttall Company, Pittsburgh, Pa., which has had a good many case-hardened gears and pinions in service for some time, has announced now that experience has shown that the case-hardened gears perform well under severe conditions. The company will hereafter make case-hardened gears and pinions a part of its regular lines.

Adams-Bagnall Electric Company, Cleveland, Ohio, has purchased the business of the Jandus Electric Company, Cleveland, and will continue the manufacture of Jandus products. The Adams-Bagnall Electric Company has associated with it the former management of both the commercial and engineering departments of the Jandus Electric Company.

McKeen Motor Car Company, Omaha, Neb., has delivered a 70-ft. motor car and 31-ft. trailer car to the Chicago-Great Western Railroad. The company has also delivered a 55-ft. motor car to the Woodstock & Sycamore Traction Company. This is the second car of this design operated by that company, the first car having been in service since last July.

Massachusetts Chemical Company, Walpole, Mass., manufacturer of liquid electrical insulation, tapes and splicing compounds, is moving into the extensive additions to its plant at Walpole, Mass., which comprise a new four-story manufacturing building, a four-story reclaiming building and a new power plant, together aggregating about three acres of floor space.

Midvale Steel Company, Midvale, Pa., has awarded the contract for the construction of a wheel plant at Nicetown, Pa., to W. W. Lindsay & Company, Philadelphia. The plant will be a one-story building, of steel and corrugated iron, 82 x 170 ft. The contracts for the mechanical equipment have not yet been placed. Work is to be started at once and completed this winter. The cost of the plant will be about $17,000.

H. M. Byllesby & Company, Chicago, Ill.—The second annual convention of the managers and department heads of this company and its affiliated companies will be held at the Congress Hotel, Chicago, January 17-20, inclusive. The company operates and manages a considerable number of electric, gas and street railway properties in the West and South. Since the first convention, held last year several properties have been added to the list, and the former attendance of 200 will be largely increased. At a recent meeting of a committee of managers preliminary arrangements were made for a four-days' program to be devoted technical and professional subjects.

ter Smith Heater Company, Detroit, Mich., has equipped of the cars of the Metropolitan West Side Elevated ad, Chicago, Ill., with its No. 1-P, forced-ventilation, car heaters. On Monday, Nov. 28, a demonstration de of the installation before a number of represen- elevated and surface railways of Chicago. Fifth Avenue terminal station and was ain line and the Douglas Park branch of the Metropolitan West Side Elevated Railroad. Very satisfactory and efficient tests were made during the trip. The car on which this system is installed will be operated in regular service during the winter months.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports that the trial Westinghouse hand-operated, unit-switch control equipment installed last April for the Fort Wayne & Wabash Valley Traction Company has proven so successful that an additional order for the same apparatus has now been placed. A similar result followed the initial installation of this control on the Mahoning & Shenango Valley Railway & Light Company and the Fairmont & Clarksburg Traction Company. Among those placing recent orders with the company for HL control equipments are these roads: Ohio Electric Company, Illinois Traction System, Peoria Railway & Terminal Company, Winona Interurban Railway, Indiana Union Traction Company, Alton, Jacksonville & Peoria Railway.

ADVERTISING LITERATURE

MacGovern, Archer & Company, New York, N. Y., have issued several circulars calling attention to direct-current dynamos and motors in voltages ranging from 110 to 250, which they have in stock for immediate shipment.

Western Electric Company, New York, N. Y., has issued bulletin No. 1116, describing and listing magneto telephone sets and accessories. It contains 40 pages and is profusely illustrated with photographs. Several pages are devoted to the design and construction of wall desk sets, and the No. 1317 type wall set is fully described.

Crouse-Hinds Company, Syracuse, N. Y., has issued an 80-page catalog of switchboard panels and cabinets. Details of construction are described, and lists of prices of individual and assembled parts are presented. Panels and cabinets are listed separately and together. The catalog, which is 9 in. x 12 in., is profusely illustrated. It is printed in two colors on heavy coated white paper.

Speer Carbon Company, St. Marys, Pa., has issued a booklet which is quite a departure from the usual carbon brush catalog. In addition to the description of the standard brushes, data and curves are presented on specific resistances, co-efficients of friction at certain temperatures and pressure and the normal current densities. The conditions under which the data were obtained are also given in detail. The booklet contains views of a portion of the company's well-equipped testing laboratory.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued circular No. 1188, describing a line of Westinghouse alternating-current slip-ring motors, designed especially for cranes, hoists and elevators. Reference is also made to suitable controlling devices and brakes. The company has also issued its part catalogues Nos. 6141 and 6143. No. 6141 lists parts for Westinghouse type 306 interpole railway motor for direct-current circuits. No. 6143 lists standard metallic brushes for a.c. and d.c. circuits.

Robert W. Hunt & Company, Chicago, Ill., have published a small pamphlet on the inspection of rails for street and interurban railways. It is designed to give the purchaser of rails some idea of the value of inspection through all the stages of manufacture by trained and reliable engineers. The pamphlet includes a reprint of the specifications for open-hearth rails proposed by the committee on way matters of the Engineering Association, the standard specifications for open-hearth rails recommended by the Lorain Steel Company and used with slight modifications by the Pennsylvania Steel Company, and a brief description of the process of rolling girder and high T-rails. A list of nearly 100 steam and electric railway companies which are clients of R. W. Hunt & Company is printed in the back of the pamphlet.

NEW PUBLICATION

Compendium of Applied Electricity. David McKay, Philadelphia, 1910. Price in cloth binding, 25 cents; in leather binding, 50 cents.

This vest-pocket booklet, while rather crudely illustrated, contains many data which are of value both to the engineer and shopman. A considerable portion is devoted to railway motors and their appurtenances. There is included a dictionary of electrical terms and phrases.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, DECEMBER 17, 1910 No. 25

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, DECEMBER 17, 1910.

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The Orderly Arrangement of Portable Shop Equipment

Most railways recognize the wisdom of keeping such emergency equipments as fire pails, hose reels and extinguishers in assigned places by using colored lamps, by painting red the adjacent building parts and by keeping the vicinity clear of obstructions. This commendable practice could well be extended to other items which are required either for emergencies or in the course of regular work. There is no valid reason why jacks and pinch bars, for instance, should not have their proper storage area indicated by a painted wall order reading "Keep Jacks and Pinch Bars Here." In like manner cabinets could be placed on the walls for wrenches, files and other tools which are not given out to individuals by the storekeeper for a formal receipt. It will also be found desirable to have metal screen lockers for the temporary storage of newly finished parts in those shops where the clearance between the machine tools and the walls is great enough to permit their installation. It is obvious that the men will save a great deal of time and do their work more freely wherever the orderly arrangement of equipment prevails.

Publicity for a Michigan Company

The Michigan United Railways has set a commendable example of publicity in its pamphlet report for the fiscal year ended April 30, 1910. This company showed gross earnings and income for that year of $1,248,889. It operates about 225 miles of track, part of which is new construction. The fourth annual report contains a general discussion in reference to the property and earnings and detailed classifications of the principal improvements made by the company during the year in the cities reached by the system and on the interurban lines. It also gives a number of tables of details that many companies fail to present. The classifications of revenues and expenses are those adopted by the American Electric Railway Accountants' Association and the Interstate Commerce Commission. Full details are given, not only for the general operating expense accounts, but also for the various primary accounts. A statement relating to the funded debt shows the amount of accrued interest for the year and the proportions charged to income and to construction accounts. There are also various statements showing the total revenues and expenses by divisions of the system and by months. Totals of car miles and car hours are set forth by divisions and the average unit earnings of the system as a whole are given. The total number of passengers carried is shown by divisions and divided into cash and ticket passengers and transfer and pass traffic. What has been done by this company can be done with equal facility and advantage by the large electric railways of the country which now withhold the details of the results of operations.

Discussion on Schedules in Rapid Transit Service

During the discussions now going on in New York about the several rapid transit propositions before the public it has been only natural perhaps that questions relating to transportation subjects should have been discussed in the daily newspapers. Thus the puzzled correspondent of one metropolitan daily asked recently why the surface lines in Manhattan should protest so strongly against a universal transfer system when both bidders for the new rapid transit line have agreed, if their propositions are accepted, to carry passengers from Brooklyn to the outer confines of Bronx Borough for 5 cents! A more intelligent discussion has arisen in another paper over the question whether the "carrying capacity" of the present subway would be increased by running the trains faster or slower. At first the correspondents jumped to the conclusion that the more rapidly the trains were run the larger the number of passengers which could be carried. But later the point was made clear that with the same time interval between the trains an equal number of cars would pass a given point in a given time, irrespective of the speed at which the trains were run.

The Relation of Braking Efficiency to Headway

This is practically as far as this discussion went, but a few additional comments may be pertinent. The express tracks of the subway are divided into a number of sections or blocks, and at the entrance to each are placed a block signal and an automatic stop device. These signals and stops are designed so that a train is always separated from a following train by at least one block. The lengths of these blocks are determined by the distances required to bring trains to a stop from the highest speed at which the trains are run, taking into consideration the effects of grades and curves, and allowing a reasonable factor of safety. Any increase in the maximum speed of the trains would require an increase in the distance allowed for stopping the trains from the higher speed and would involve a lengthening of the blocks and an entire rearrangement of the signal system. If braking efficiency was uniform at all speeds the safe braking distance in feet to be allowed for a train to come to a stop would bear a constant ratio to the maximum speed, in miles per hour, at the instant the brakes were applied. But braking is not so efficient at high speeds as at low speeds, so that the safe braking distance for the higher speed would be greater proportionately than the increase in speed. Hence it would be necessary to lengthen the blocks in greater proportion than the speed was increased, and the time in seconds required to run through a block at full speed would be longer for the high speed than for the low speed. The time required to run through a block at full speed is the measure of minimum headway of trains, and if this time is increased by lengthening the blocks in greater proportion the minimum interval between trains likewise must be increased, with the result that the "carrying capacity" of the line would be decreased. A higher maximum speed, of course, would reduce the running time between stations, but it would not increase the carrying capacity of the road. Where the stations are near together the length of the station stop becomes an important factor of the headway on which trains can be run. This is the case in the New York subway, where the time which a train has to spend in the stations to receive and discharge passengers becomes the controlling factor of the headway, particularly during the rush hours.

TRANSFORMER INSTALLATION

The increasing use of higher transmission voltages in general power distribution renders it important to install transformer equipment according to the best practice no less than to exercise greater care than before in the selection of such apparatus. Not a few operating companies fail to take full advantage of progress in transformer design and improved methods of manufacture by specifying exact duplicates of old apparatus rather than electrically equivalent units. There is a positive difference in mechanical details, proportions, strength and shape of materials used in old and new transformers, and usually some slight differences in electrical characteristics. The specifying of duplicates is usually on the ground of common repair parts, symmetry of appearance and interchangeability. Since repairs likely to be required on new transformer units of modern manufacture are so slight as to be almost negligible, the question of spare parts is of little importance, and if the installation is well designed the new equivalent unit is entirely interchangeable with the old. Selection on the basis of electrical equivalence enables the operating company to take full advantage of new manufacturing processes tending to reduce the cost of equipment and to enjoy improvements in design leading toward better regulation, more sustained high efficiency and superior cooling arrangements.

Improved methods of shipping transformers have largely done away with the necessity of drying out the windings at the place of installation. The increased amount of money tied up in larger transformer units, however, necessitates periodical inspection and testing of the oil to guard against the accumulation of water, with cleaning of windings, terminals, pressure blocks and outlet bushings. The cleaning of coils can usually be well carried out by the use of a forced stream of oil against the windings and through the ventilating ducts. Although the efficiency of large transformer units is remarkably near 100 per cent, the total volume of heat dissipated at full load requires the best conditions of ventilation in substations, and it is significant that both air-cooled and water-cooled transformers will almost always operate at heavier loads for the same temperature rise in the winter as compared with the summer. In transformer houses containing no revolving machinery there is often a tendency to erect too small a building and one without adequate provision for air circulation. The practice of drying out transformer oil by the insertion of resistance grids has frequently led to overheating when the installation was placed in regular service, usually through the damaging of the oil and formation of deposits. To dry the oil by passing it through broken, unslaked lime and cheesecloth gives better results in cases where the equipment cannot be shipped to the plant ready for operation.

Failure to test the polarity of transformers to be operated in parallel frequently leads to heavy overloading or a short circuit severe enough to damage the windings. The simplicity with which polarity and ratio tests can be made leaves no excuse for their omission. Usually the simple plan of connecting the primaries in series and short-circuiting the corresponding secondary coils while a current is passing through the former coils in series answers all purposes. With transformers of like ratios and capacity parallel operation will be satisfactory when the voltage drop across the individual units is the same, but if the capacity differs the voltage drop across the larger unit must be multiplied by the ratio of the larger to the

smaller unit before making the comparisons. When the primaries are connected in series and the secondaries also practically no current flows in the latter if the polarity is wrong. It is worth noting that under short-circuiting conditions a force of a few pounds repulsion between primary and secondary coils may rise to well over a ton and produce distortions of winding of a most serious character. Regular records of temperature, voltage variation, resistance and loads are well worth the trouble required to make them if they keep an expensive installation in good condition.

LIVENING UP THE RATE HEARINGS

The railway rate hearings before the Interstate Commerce Commission had become a little tedious and needed a touch of variety to liven up things a bit. It is tiresome to listen to reiteration of the cycle of increased wages and increased rates, when the tune of lower costs and lower rates would be more welcome to the ear.

When Mr. Brandeis stated that, by introducing methods of efficiency, he could save the railways $365,000,000 a year he took the lawyer's privilege of painting his case in vivid hues. One wonders why he has so long buried this talent. We have been running amuck in this country on the subject of conservation of natural resources, and yet Mr. Brandeis gravely testifies that he can save a sum compared with which all other potential savings fade as the dew before the sun. The amount with which he toys so playfully is 5 per cent on $7,300,000,000. It is one-third of the total compensation paid to the steam railway employees of the country for the year ended June 30, 1908 It is nearly one-sixth of the operating revenues and is over one-fifth of the operating expenses of the steam carriers for that year.

We are well aware that remarkable economies have been effected in manufacturing plants by the introduction of efficiency methods, but Mr. Brandeis loses sight of the differences between the manufacturing and the railway business. The shop of the railway to which the so-called efficiency methods are supposed by Mr. Brandeis to be applicable is only an insignificant part of the plant and business of a transportation company. The proportions which the number of employees, the capital invested and the value of work done in the shop bear to the total force, investment and revenue of the railway plant are slight.

The manufacturer produces commodities; the railway produces a service. The manufacturer restricts or increases his output with the demand; the railway must operate its trains on a schedule which does not permit much flexibility. A large manufacturer may take his orders and then manufacture his goods with his costs and profits computed pretty accurately in advance; the railway must plan its service pretty much on the possible maximum demand and if its cars have to be run empty it has no recourse. The manufacturer has another chance to market his unsold goods; the railway service, once rendered, is gone forever. The manufacturer has a compact plant, possibly located in one building; the railway plant is in isolated centers, scattered along hundreds or thousands of miles of track. The manufacturer has a highly developed organization that works at high pressure; the railway, providing a service instead of a commodity, must submit to a terrible loss in efficiency through the necessary waste of time of station employees and trainmen. Part of the time of station agents between trains is wasted, and the trainmen, when not actually engaged in active duty while on a train, waste time. Their idleness may be compared with that of the police and firemen of a great city.

The pity of it is that light, fantastic touches of the kind afforded by the argument of Mr. Brandeis delay the proceedings and delay the relief needed by the railways. That may be the object of such grotesque representations.

THE DEVELOPMENT OF FARE BOXES

It is within the memory of men not yet old that the "bobtail" horse cars of many street railways were equipped with fare boxes and passengers paid promptly after they entered or else braved the suspicious backward glances of the driver on the front platform. The front doors were provided with a change-making slide, and in some of the most palatial cars an inclined slot along each side of the car permitted a passenger to deposit a nickel without pushing his way to the front of the car. The nickel would then roll slowly into the till at the front end. When the size of the cars and the number of passengers carried became so large that one man could no longer keep track of the fares from the front platform conductors were employed on the back platform and the fare boxes disappeared. With the introduction of the modern prepayment car the fare box was again revived. From a simple money till with glass sides for the inspection of coins as they dropped from shelf to shelf, the fare boxes of to-day have been developed into complex pieces of mechanism, some of them performing the functions of coin separation and counting, automatic registration and even change making.

The first fare boxes were an economical expedient designed to enable one man to operate a car and at the same time supervise the collection of fares. While some modern fare boxes relieve the conductor of practically all effort and responsibility in the latter duty, they do not and probably never will permit taking the second member of the car crew off the rear platform. The justification for their use is the decreased labor and liability of error in turning in and checking the receipts of each conductor. It is a matter of opinion whether some of the refinements which have been introduced by ambitious inventors are necessary or even desirable from the standpoint of the railway company or the traveling public. The more complicated such a device is the more likely it is to get out of order and the greater is the first cost and weight.

The diversity of types of fare boxes now in use is often the cause of confusion on the part of passengers and of consequent delays in boarding. In New York City three or four different patterns are being tried on different lines, and the passenger who does not happen to have a nickel in change has no means of knowing whether he should drop in a quarter and get his change from the box or ask the conductor for change and then drop in a nickel. Until a standard type of fare box comes into general use the operation of cars equipped with fare boxes would be greatly facilitated and many disputes over payment of fares would be avoided if large and easily read signs were placed on the platform telling just what to do in paying a fare. The public has become accustomed to the prepayment plan in all the cities where is has been introduced, but the fare box is an even more perplexing innovation and requires just as much or perhaps more explanatory publicity for its successful application.

AUTOMATIC BLOCK SIGNALS AND TRAIN STOPS ON SINGLE-TRACK INTERURBAN LINE OF THE WASHINGTON WATER POWER COMPANY

The Washington Water Power Company has recently completed the installation of automatic block signals and train stops protecting 20.9 miles of single-track interurban railway between Spokane, Medical Lake and Cheney, Wash. Before contracting for this installation of signals R. A. Willson, general superintendent of railways of the Washington Water Power Company, made a careful investigation of several signal systems in use on electric railways and personally inspected many installations in the Eastern States. As a result of this investigation a contract for a complete alternating-current signal system with continuous track-circuit control was awarded to the General Railway Signal Company, Rochester, N. Y., which designed the layout of the signals and furnished and installed all of the apparatus required. The signal mechanisms, relays, transformers and reactance bonds used are of the same general type as those furnished by the General Railway Signal Company for the signaling on the electric division of the New York Central & Hudson River Railroad, the Long Island Railroad and the New York, New Haven & Hartford Railroad. In addition each home signal is fitted with an automatic stop-arm, which will be described later.

The location of the signals and sidings is shown in Fig. 1. Medical Lake is 12.3 miles southwest of Spokane, and a branch 8.6 miles long leaves the main line at Cheney Junction and extends to Cheney, which is south of Medical Lake. Between Cheney Junction and Spokane, a distance of 7 miles, the single-track is used by northbound and southbound cars of both the Medical Lake and Cheney divisions. The installation of signals includes 24 home signals and five distant signals, which are installed at curves and other places where the view of the home signals is obstructed. In the section between Spokane and Cheney Junction there are three intermediate sidings and the line is divided into six blocks controlled by 14 track sections. Between Cheney Junction and Medical Lake there are two intermediate sidings and three blocks controlled by five track sections. The three blocks between Cheney Junction and Cheney are controlled by four track sections. The tracks at Cheney Junction are not protected with interlocking switches and signals and the automatic block signal protection is not carried through the junction.

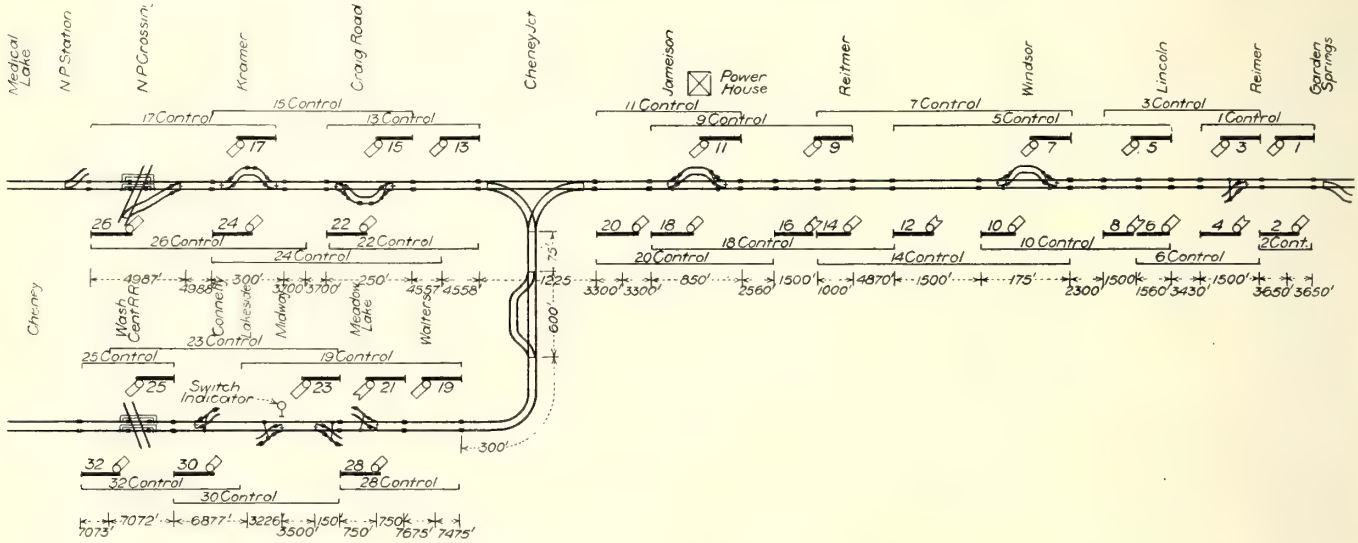


Fig. 1—Washington Water Power Company Signals—Location Plan of Signals and Sidings

SIGNAL CURRENT SUPPLY

A substation is located at Jameison, which is the approximate center of the line. Here 66,000-volt, three-phase, 60-cycle alternating current is taken from the transmission lines and converted by means of motor-generators to 600-volt direct current for the operation of the cars. Current for the operation of the signal system, including all track circuits, signal motors, signal lamps and relays, is obtained from one phase of the 66,000-volt transmission line by means of a step-down transformer which delivers single-phase current at 2200 volts and 60 cycles to the signal switchboard. Each signal transmission line is protected with automatic oil-insulated circuit-breakers equipped with I. T. E. time-limit relays and alarm bells. Measuring instruments for each line are mounted on the switchboard. From the substation, the signal transmission lines extend

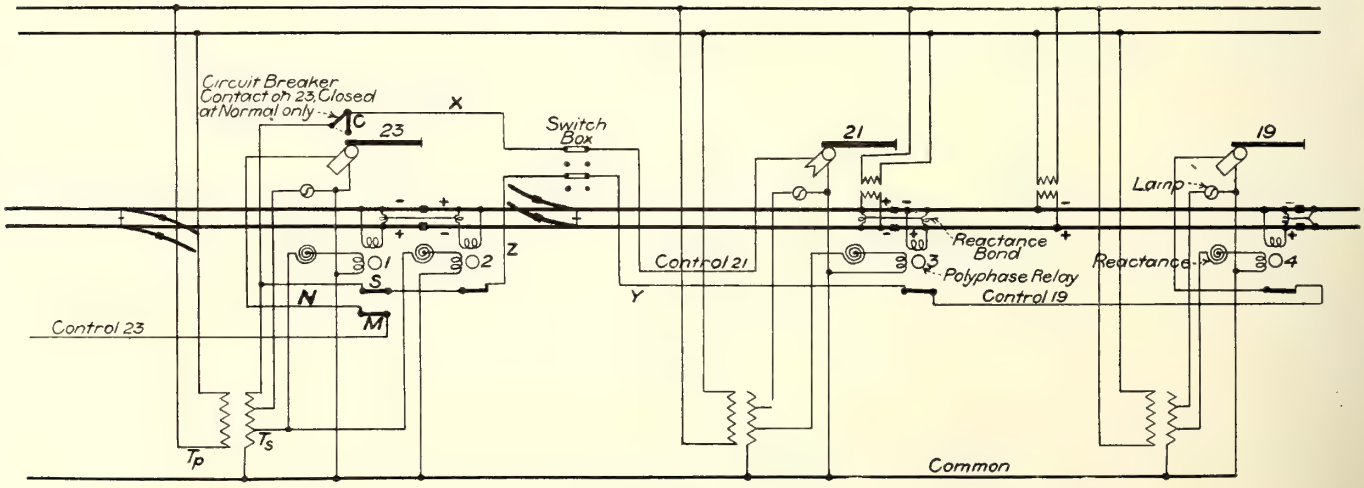


Fig. 2—Washington Water Power Company Signals—Typical Circuit Diagram

toward Spokane and Medical Lake; the latter is tapped at Cheney Junction for the supply of the Cheney branch. These lines consist of two No. 10 hard-drawn copper weatherproof wires strung under the transmission lines on the same poles. The two No. 10 wires have sufficient capacity to carry the maximum load; that is, the simultaneous starting of all signal apparatus fed therefrom will produce a drop in voltage of less than 10 per cent at the end of the line. The signal transmission lines are protected against lightning by installing high-tension lightning arresters at intervals of about ½ mile. At each signal or track-feed location signal transformers are mounted on stub poles to step down the voltage as required.

TRACK CIRCUITS

A typical circuit for the control and operation of the signals for one block is shown at Fig. 2. At each signal location the track rails have insulated joints inserted in them to prevent the flow of the alternating current used for the track circuits beyond the limits of the block. A path for the flow of the return propulsion current is provided by reactance bonds installed at the cut sections. The method of supplying current to the track sections is dependent on the length of the section. Sections which are 4000 ft. or less in length are supplied from one end, while sections that are over 4000 ft. in length are supplied from the approximate center of their lengths. In order to provide protection against failures of the insulated rail joints what is known as "opposition of polarity" is provided in adjacent track sections; that is, a phase relation of 180 deg. is produced by alternate reversal of the connections of the transformer track secondaries to the rails. Grid resistances are connected in series with the transformer track secondaries and the track connections, so as to limit the flow of current when the track rails are short-circuited by a car in the block. Depending on the length and resistance of the track sections fed, current at 1½ volts, 5 volts or 8 volts is taken from taps on the secondary windings of the transformers for feeding the track circuits. The voltage of the track-circuit current is adjusted in every case so as to provide an ample margin over the drop in each track section plus the 0.4 volt required for the operation of the track relays at the ends of each block. The two track rails are connected to one winding of a polyphase track relay, which will be described later, and current normally flows continuously through this relay unless the continuity of the track is broken or a car is in the block and a short-circuit is formed through the wheels and axles.

The reactance bonds which are installed at each cut section permit direct current to flow through them without appreciable loss, but effectively prevent the flow of alternating signal current. Each bond consists of an insulated copper conductor of large carrying capacity wound around an iron core and immersed in oil in an iron case which is set down in the ballast between the ties. The ends of the winding are connected to the two track rails on the same side of the insulated joints. A similar bond is inserted between the two rails of the adjoining section of track and the two bonds are then connected together by a tap from the center of the winding of each. The coils, which are wound around iron cores, afford high reactance to interrupt the passage of alternating current, but have a low ohmic resistance and do not retard the flow of the return propulsion current. As a difference in the flow of return propulsion current through the two halves of a bond, due to a difference in the resistance of the track rails, would tend to magnetize the iron core and reduce the reactance, an adjustable air-gap is provided in the magnetic circuit of the bond by means of which any "unbalancing" may be corrected. The track circuits are carried around all intersecting tracks and at each siding they extend in on the switch rails beyond the fouling point, so that a car on a siding which is not completely clear of the main line would short-circuit the track relays as effectually as if the car stood on the main-line track. The track rails are 60-lb. A. S. C. E. section and the lengths of the blocks vary from 175 ft. to 15,150 ft.



Fig. 3—Washington Water Power Company Signals—Transformer, Grid Resistance, Relay and Reactance Bonds

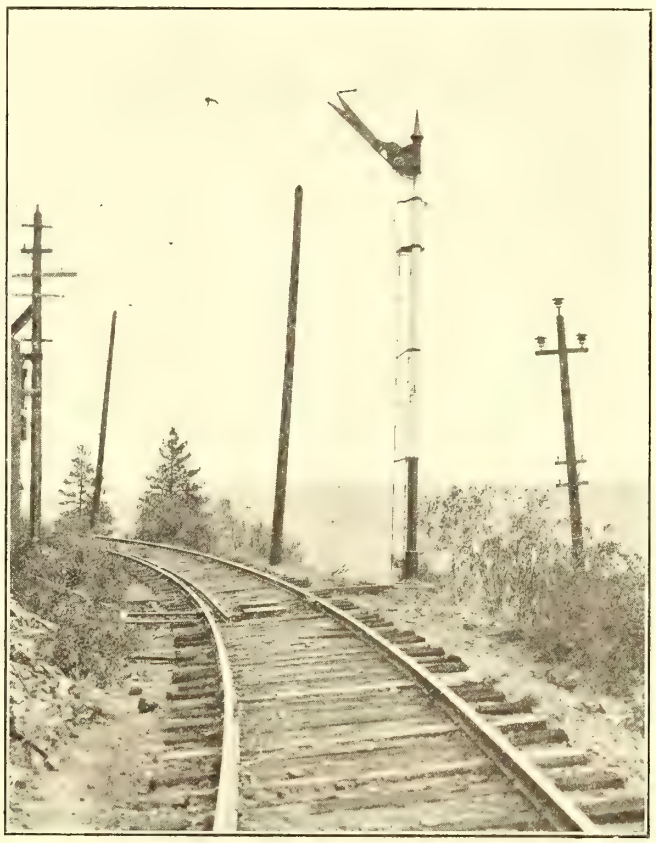


Fig. 4—Washington Water Power Company Signals—Distant Signal No. 4 on Sharp Curve West of Reinier

TRANSFORMERS

The same type of transformer is used at track-feed locations and at signal locations. It is oil cooled and has independent

secondary windings for the track circuit and the signal motor, signal lamp and relay circuit. The 2200-volt primary is protected with fuses inclosed in porcelain containers which are mounted on the back of the cross-arm supporting the transformer case on the stub pole. Each of the secondary windings is protected with a fuse and lightning arrester, which are mounted in the bottom of the relay box. The secondary for the track circuits is provided with three taps giving, respectively, 1½ volts, 5 volts and 8 volts, and the signal secondary has a 220-volt tap for the signal motor, a 55-volt tap for the signal lamps and a 28-volt tap for the relay local windings. All taps are connected to a terminal board for convenience in connecting to the exterior circuits. The transformer coils are impregnated with insulating compound by the vacuum process. A copper shield is inserted between the primary and secondary windings and is connected to ground through the transformer case so as to protect the windings in case of breakdown of the insulation due to lightning or other causes.

RELAYS

The relays used for controlling the operation of the signals are of so-called polyphase type. Motion is imparted to a horizontal swinging bar carrying the contacts by the revolution of the rotor of a small two-phase induction motor having two sets of stationary windings. One winding is in series across the track rails, and receives its energy through the track circuit which is fed from a transformer located at a distance. The other winding is supplied with current from the signal secondary of a local transformer with a sufficient reactance inserted in series to produce a phase displacement of approximately 90 deg. By the use of two-phase relays with independent local and track-circuit windings economical operation of long track-circuit sections is secured. This arrangement provides for the supply of the major portion of the operating energy from a local source with low loss, and requires that only a small amount of the energy shall be supplied through the track circuit where the losses are high. The efficiency of this type of relay is shown by the fact that in this installation some relays are operating on continuous track sections more than 15,000 ft. long with only fair conditions of ballast and track leakage. This length of continuous track section has never before been equaled or even approached in signal work.

The shaft of the rotor carries on the rear end a small pinion which engages with a segmental gear mounted on a shaft extending through to the front of the relay, where it is connected by a crank to a horizontal swinging bar carrying the contacts. When both windings of the relay are energized by current of the proper phase relation, the rotor revolves and raises the segmental gear, thus closing the front contacts on the swinging bar. If either the track-circuit winding or the local transformer winding is short-circuited the motor loses its torque and the unbalanced weight of the segmental gear causes the relay to open by gravity. In case of broken insulation in a rail joint, current of opposite phase would be applied to the track winding of the relay of the adjoining track section on account of the "opposition of polarity" connection previously mentioned. This would tend to cause the rotor to revolve in the opposite direction and would thereby prevent false operation of the relay. The standard relays are provided with four front and four back contacts, but only one or two of the front contacts on each relay are used for the simple signal circuits required for this installation. Friction of the moving parts is reduced to the minimum by the use of ball bearings throughout. The contacts rub through the last 1/16 in. of their travel, thereby insuring strong self-cleaning action on the surfaces.

SIGNALS

The signal mechanisms, which are the General Railway Signal Company's Model 2-A, are self-contained units inclosed in waterproof iron boxes which are clamped near the top of the tubular steel signal masts. They are designed to give indications in two positions in the upper left-hand quadrant. The arm of a home signal indicates "stop" when in the horizontal position and "proceed" when extended upward at an angle of 45 deg. from the horizontal. The upper left-hand quadrant was used instead of the upper right-hand quadrant in order to simplify the attachment of the automatic stop arms and to provide a better view of the signal arms, which would have been obstructed by the trolley span-wire poles if the right-hand quadrant had been employed. Standard three-light spectacle castings and semaphore blades are used. The home signal blades have square ends and the distant signal blades have notched ends.

The signal is operated by a small series-wound, commutating, alternating-current 60-cycle, 220-volt motor designed to give sparkless commutation. This type of motor has high starting torque, high efficiency and requires only a small amount of current, both in starting and when running. The low current consumption is a valuable characteristic on account of the distance through which current is supplied from the transformer. It will be seen from Fig. 2 that each signal receives current from the transformer located at the next home signal in advance directly through the control wire without the use of an auxiliary relay. The length of these motor-operating circuits varies from 350 ft. to nearly 7 miles, and No. 10 copper is used both for the control and common wires. In the longest block the signal motor operates successfully with a circuit having a total line resistance of nearly 74 ohms.

The signal motor shaft is geared directly to the spectacle casting shaft. Mounted above the motor in the signal case is a rotating circuit-breaker which is geared to the spectacle casting shaft by segmental gears. It has 12 individually adjustable contacts for the control of as many separate circuits. On the end of the motor armature shaft is a small centrifugal governor which has contacts in series with the motor. At the beginning of the clearing movement these governor contacts are shunted by the circuit-breaker. Just before the signal arm reaches the proceed position the speed control becomes effective and prevents the motor from running too fast and carrying the signal arm past its proper position after the circuit-breaker opens. At

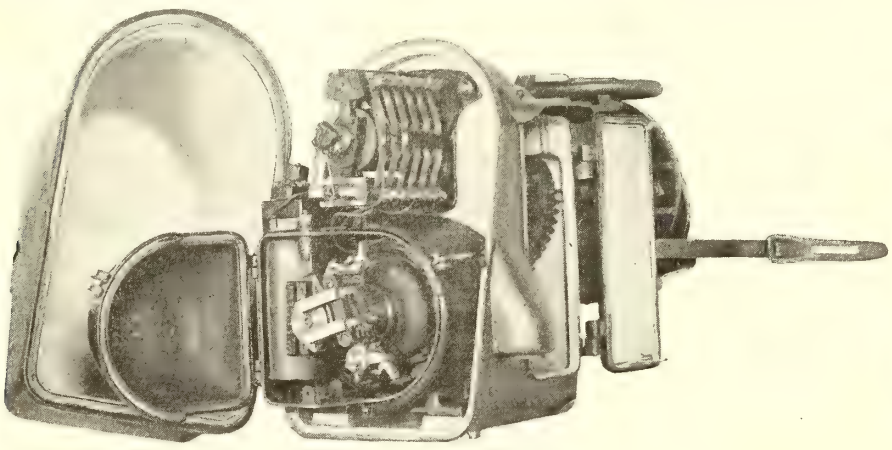


Fig. 5—Signal Mechanism, Case Open

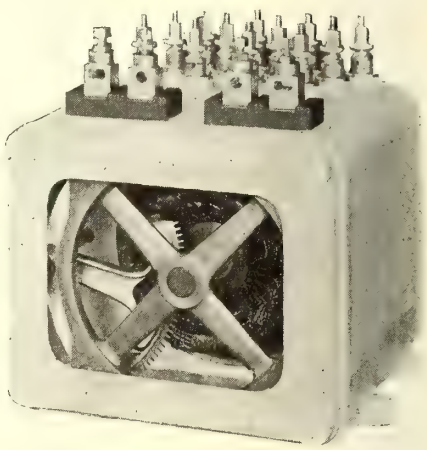


Fig. 6—Polyphase Relay

the end of the clearing movement the circuit-breaker cuts into the motor circuit sufficient reactance to prevent further movement of the arm, but enough voltage is retained in the motor circuit to hold the signal arm in its proper position. When the motor circuit is broken by the track relay or by failure of any of the line wires the signal arm returns to the horizontal or "stop" position by gravity.

The signal mechanism is simple in construction and fast and accurate in operation. The direct gearing of the motor to the semaphore operating shaft and the holding of the signal in the clear position by the motor render the use of a slot or dashpot unnecessary.

LOCATION AND OPERATION OF SIGNALS

From an inspection of Fig. 1 it will be seen that at each through siding are placed two home signals controlling movements in opposite directions. In general, these signals are placed close to the entrance switches and not at exactly the same point on opposite sides of the track. Between sidings the home signals for opposite directions are not located at the same point in all cases, although at one or two locations, as for example, Nos. 2 and 3, and Nos. 23 and 28, the signals are placed opposite each other.

The signal circuits are arranged with overlap control so that when a car enters a block not only do the signal at the entrance and the signal controlling movements in the opposite direction at the exit end both assume the stop position, but the next home signal in the rear and any intermediate distant signals remain in the stop position until the car has passed out of



Fig. 7—Washington Water Power Company Signals—Home Signal and Automatic Stop Arm in Stop Position

the next block ahead of that which it is entering, or if the overlap control is less than a full block, that portion of the second block which is designed for the overlap control. Thus a car passing signal 23 and moving toward signal 25 sets signals 23 and 30 at stop and holds signals 21 and 19 in the rear at stop. Signal 19 does not clear until the car has passed the point of overlap control, which in this instance is the transformer located at the center of the track section between signals 23 and 30. Signals 23 and 21 will not clear until the car has passed the transformer at the center of the track circuit between signals 25 and 32. The extent of the track circuit control for each signal is clearly indicated in Fig. 1, it being understood in studying this diagram that every signal assumes the stop position as soon as a car enters that portion of the track by which the signal is governed; that the signal remains in the stop position as long as the car is in that section of track; that it is immaterial as to which direction the car is moving when it enters the section of track by which the signal is governed, and that all op-



Fig. 8—Washington Water Power Company Signals—Home Signal and Automatic Stop Arm in Proceed Position

posing signals within the limits of control of a given signal are set or held at stop so long as the car is on that portion of the track which governs both the controlling signal and the opposing signal. It will be seen, therefore, that a car is always protected from following movements by at least two home signals in the rear and is likewise protected against opposing movements by at least one home signal in advance. A stop signal will always be set for one or the other of two approaching cars one block away from the more advanced of the two cars. The extension of the control for the signals governing the movements in one direction to a point beyond the location of the opposing signals eliminates any possibility of opposing cars both receiving stop signals due to their simultaneous entrance into their respective governing sections.

Referring to Fig. 2, if a car has just passed signal 23 it would short-circuit the track winding of relay 1, causing contacts M and S to open. Signal 23 is held at proceed by current flowing through control wire 23, contact M, wire N, signal motor to common wire. When contact M is opened this circuit is broken, and as the signal motor is no longer energized the semaphore arm falls to the stop position by gravity. The movement of the arm of home signal 23 opens a contact on the circuit-breaker C, which is geared to the arm. This opens the motor circuit of distant signal 21, which is from transformer T_8 through circuit-breaker C, wire X, switchbox, control 21, motor, to common wire. Distant signal 21 therefore remains in the caution position, while home signal 23 is at "stop." The opening of contact S on relay 1 breaks the motor circuit of signal 19, which is from transformer T_8 through contact S of relay 1, contact on relay 2, switchbox, wire Y, contact on relay 3,

control wire 19, contact on relay 4, signal motor to common wire.

Signal 19 would have been set at "stop" by the opening of the contact on relay 4 when the car passed signal 19, and it would have been held successively at stop by the opening of the contacts on relay 3 and relay 2 as the car had advanced to signal 23. The opening of a contact (not shown) on relay 2 when the car passed signal 21 would set signal 21 at "caution," and the opening of the circuit-breaker *C* on signal 23 would hold distant signal 21 in the caution position after the car had passed out of the track section by which signal 21 is directly governed and until the car had passed beyond the controlling point of signal 23.

As soon as the car passes out of the block, relay 1 picks up and closes contacts *S* and *M*. This restores the motor circuit of signal 19, causing the arm to move to "proceed," and as soon as home signal 23 closes contact *C* on the circuit-breaker distant signal 21 also clears. Signal 30, which is the opposing signal at the exit end of the block, is also controlled by a contact (not shown) on relay 1, and it is evident, therefore, that the entrance of the car into the block would also cause signal 30 to assume the stop position against opposing cars.



Fig. 9—Automatic Stop Tube

AUTOMATIC TRAIN STOP

The automatic train-stop device mentioned earlier is attached to each home signal mast. It consists of a pivoted metal arm projecting out over the track at such a height when in a horizontal position as just to clear the roofs of the cars. The stop arm is mechanically connected to and moves up and down in unison with the signal arm. Projecting above the roof of each motor car is a glass tube sealed at the top and connected to the train air-brake system by a pipe at the bottom. When the signal and automatic stop arm are in a horizontal position the glass tube on any car which passes the signal would be broken off and the air in the brake pipe would be released. This would automatically set the brakes with semi-service application and they could not be released until a new tube was substituted. In the event of failure of the signal and stop arm to clear, due to disarrangement of apparatus or circuits, means are provided for raising the stop arm by hand so as to permit a car to pass. It is only necessary to insert a key in an emergency release lock near the base of the pole, by means of which the stop arm may be raised by hand. The key cannot be removed until the emergency release is restored and again locked in its normal position. Each motor car is supplied with two extra glass tubes and the train crews are held strictly accountable for all breakages. This forms a most efficient check against careless or intentional over-running of signals.

The signals have been in operation only a short time, but they have proved very satisfactory. R. A. Willson, general superintendent of railways, states that it has not been found that the trainmen are any less careful in obeying the written orders of the train dispatchers since the block signals were put in use. If anything, the men are more careful, for the rules require that if a train crew find a signal set against them they must report immediately to the train dispatcher and receive an order before they are allowed to pass the signal. All train dispatching on the interurban lines of the Washington Water Power Company is done by telephone. During the first week in December considerable trouble was experienced with the telephone line, but the train crews were able to maintain schedules and operate with perfect safety, using the block signals as their only guide. All interurban trainmen are picked from among the oldest in the employ of the company. None of the men on this division were familiar with block signaling and considerable time and effort was spent in instructing them in the operation of trains with signal protection. They have all been thoroughly examined on the rules relating to the signals.

The Cheney-Medical Lake line is now being operated on a winter schedule, but it has not been found necessary to change the time card which was in effect last winter before the signals were installed. During the winter months it is seldom necessary to operate trains in more than one section, but when extra trains have been put out on the line no difficulty has been experienced in handling them. The lengths of the blocks at the ends of the line are such that it requires about five minutes for a car to run through them, and this makes it necessary for a second section always to run from five to six minutes behind the first section. The first section thereafter does not delay or interfere with the second section following.

The regular meeting points are at Windsor siding, Jameison siding and Cheney Junction. The home signals at these points are overlapped on one end for a distance varying between 750 ft. and 3000 ft. At the meeting point at Windsor a westbound train in passing signal 5 at Lincoln would set at "stop" home signal 10 at the west end of Windsor siding and would also set at "caution" distant signal 12, which is 1710 ft. west of Windsor siding. If the motorman of an eastbound train found distant signal 12 at "caution" he would know that the westbound train which he was to meet had passed signal 5 at Lincoln. He would then proceed to home signal 10, prepared to stop and if he reached the siding ahead of the westbound train he would lock through the home signal, run in on the siding and clear up signal 7, which had been set from the block in the rear of Windsor. This would permit the westbound train to proceed through on the main line. The meeting points are arranged so that the first train to arrive takes the siding. This arrangement has proved very satisfactory. The train crews which have these regular meets help one another in getting through and practically no time is lost. Up to the present time the train dispatchers have had no trouble in handling trains and they have not had to change any of the regular meeting places.

Telephone jack boxes are located at each home signal so that the train crews can get into communication with the dispatcher immediately on arriving at a signal which is set against them and obtain orders to proceed or wait, as may be necessary. The company feels that the system which has been installed provides every possible protection against collisions, and it does not anticipate any trouble in the operation of trains during the busy season in the summer.

For the information from which the above description was prepared this paper is indebted in a large part to R. A. Willson, general superintendent of railways, Washington Water Power Company.

JOINT MEETING IN NEW YORK ON OVERHEAD CONSTRUCTION

The subject of standard specifications for overhead crossings of steam railroads with power, telephone and telegraph wires was discussed at a joint committee meeting which was held on Wednesday, Dec. 14, in the offices of the National Electric Light Association in New York. The meeting was the second within three weeks, and it is planned to have a third at an early date before a report is made to the National Electric Light Association. The committee is composed of Farley Osgood, of the Public Service Corporation of New Jersey, chairman and member of the Lighting Association; Robert Coombs, of the Pennsylvania Railroad, acting for the Maintenance of Way Association; Prof. A. S. Richey, of Worcester Polytechnic Institute, acting for the American Electric Railway Engineering Association, and Fred Rhodes, of the American Telephone & Telegraph Company, acting for the National Electric Light Association.

PRESIDENT HOUSE, OF BALTIMORE, DETAILS REASONS AGAINST ENTERING CARS BY THE FRONT DOOR

Last October the City Council of Baltimore passed an ordinance requiring cars to stop on the near side of all streets for the purpose of taking on and letting off passengers. This ordinance became effective on Nov. 25. Prior to this change it had been the practice of the United Railways & Electric Company of Baltimore to stop on the far side of all streets other than rapid transit intersections, where the near-side stop was made. This practice resulted in some confusion, so that the uniform near-side stop ordinance was framed with a view to simplifying matters. Recently, however, the press has been clamoring for the front-door entrance, to which the company is opposed. Passengers are permitted to alight from the front platform, but they are obliged to board from the rear.

In order to make clear to its patrons the just reasons for this rule, William A. House, president of the company, gave out the following interview, which was published in the Dec. 9 issue of the Baltimore *Evening Sun*:

"The practical operation of a street railway system is one that involves many problems which are naturally not appreciated by the public. How to handle large crowds in the rush hours in the congested districts of large cities is one of the problems that are giving street railway operators much concern. Experts are practically unanimous in agreeing that entrance and exit by both doors is not satisfactory. If this company felt that it could improve its service to the public in any way by permitting this it would not hesitate voluntarily to do so. It must be obvious to anyone that the prosperity of the company depends upon the celerity, safety and comfort with which it handles its patrons.

"If, therefore, as practical operators, we felt that these ends could be accomplished by permitting front-door entrance we should not hesitate to adopt it; but if such a regulation should be put in force we have no hesitancy in saying, and now place ourselves on record as predicting, that it would be bound to result in a largely increased number of injuries and fatal accidents and would not add as much to the comfort of the traveling public as many people seem to think.

"One thing that is not appreciated is that the rapid transit system of Baltimore materially differs from that of other cities, each city having problems peculiar to itself, and what may be feasible upon one system is not feasible upon another.

"Briefly summarized, this company does not deem it safe or expedient to permit the boarding of cars at the front platform for the following reasons, among others:

"1. The liability of serious or fatal accidents to passengers falling when boarding the front platform of a moving car is greatly increased. This is admitted even by the operators of roads upon which this practice prevails; and especially is there liability to accidents at curves, such as Baltimore and Calvert Streets and hundreds of other points upon the system where cars are not only moving forward, but have a radial motion as well.

"2. The boarding and alighting of passengers at the front platform would create confusion and congestion at a point where the conductor would have little control, resulting in delay. In order to overcome this very condition that formerly existed when all passengers left the car by the rear platform, the company inaugurated a rule providing for exit by the front. This congestion would be greatly increased by reason of the fact that there would be four distinct movements of passengers; that is, in and out at the front platform and in and out at the rear. The discomfort of those occupying the car would also be greatly added to, because the door would be open to allow passengers to leave by the front platform and would have to remain open for those persons boarding the car at this point, whereas, under the present rule, the motorman can close the door as soon as passengers have alighted. This would mean that the door would necessarily be kept open probably twice as long as under the present regulation.

"3. It is a recognized fact that the trend of movement in all public conveyances is to enter at one place and leave at another. This practice is strictly followed by steam railroads in their stations in all large cities, and on elevated railways and ferries throughout the country in the handling of large numbers of people. It is also reflected in the traffic law recently adopted in this and other cities, which regulates the movement of vehicular traffic in fixed directions so as to prevent congestion and accident. It is equally true and applicable in the handling of street car traffic, which has been demonstrated since the rule permitting passengers to leave by the front platform was made effective; that is, the loading and unloading of street car traffic is made easier and quicker by this regulation.

"While the company is always ready to adopt the views of its patrons when practicable and it can be done with safety, it should be borne in mind that *safety* is the first consideration of railroading. The company should be permitted to surround the operation of its system with such safeguards as will, in its judgment, insure the greatest protection to its patrons.

"4. Stopping cars on the near side of streets is now required by city ordinance. To permit passengers to board by the front platform would mean that the rear platform would seldom be used, with the result that the loading and discharging of passengers would take place at the front end, beyond the control of the conductor.

"5. One of the main features of the pay-as-you-enter car, which is now being generally adopted throughout the country, is that it permits entrance by the rear only. The Pennsylvania Avenue line was equipped with this type of car in January last, and the company has recently placed an order for additional equipment of this type, which it proposes to place in service on another line. To permit ingress on some cars by the front door and prohibit it on others would at once result in endless confusion to patrons, as well as friction with motormen, due to the absence of uniformity in operation, when attempts were made to board pay-as-you-enter cars at the front end.

"For the reasons above stated, it is felt that the inauguration of such a departure from present methods would result in many serious and fatal accidents, which otherwise would not occur, as well as serious discomfort and delay to patrons.

"No doubt it will be claimed by some that the company's chief reason for opposing the plan proposed is the loss of fares that would result. It is frankly admitted that loss in this respect would ensue, but the governing reason for protesting against any departure from present methods is the humanitarian one; that is, it is better that there should be occasional inconvenience than the danger of accident.

"On a large system in a nearby city where entrance by the front door is permitted, much against the judgment of the company's officials, it is stated that 50 per cent of the accidents which result in loss of limb are caused by people attempting to board cars at the front platform. These accidents would not have occurred had the front doors been used for egress only.

"Since 1893 five ordinances have been passed affecting stops. An equal number of times have people been educated to the new change thus brought about and an equal number of times have they been required to unlearn and acquire a new habit. Any more changes cannot be helpful, but will prove demoralizing and dangerous. The step proposed is, in our judgment, a backward one and not in accordance with modern practice and safe and sane railroading."

OKLAHOMA PAY-AS-YOU-ENTER CARS

The ELECTRIC RAILWAY JOURNAL for Dec. 10, 1910, contained a detailed illustrated description of 10 center-vestibule steel cars built for the Oklahoma Railway Company. These prepayment cars are successfully operated under the pay-as-you-enter principle and have been licensed for this purpose by the Pay-as-You-Enter Car Corporation. The success of these cars is of special interest because this is another installation of the pay-as-you-enter methods for center-entrance and center-exit cars and shows the great flexibility of this design. The first installation was made at Montreal.

SYRACUSE INSTRUCTION BOOK

The Syracuse Rapid Transit Railway Company has recently prepared an instruction book which gives in convenient and simple form all the information which its motormen should have concerning the electrical equipment and air brakes used in Syracuse. The greater part of the booklet necessarily deals with a detailed reference to the general electrical equipment, such as the trolley, circuit-breaker and fuse, controller, resistance, car wiring, motors, lightning arresters and kicking coils. Most of these parts are illustrated. In addition, the portion on electrical equipment contains some important paragraphs on the steps which should be taken in case of troubles, such as repeated blowing of the circuit-breaker, dead cars, locked wheels, flooded rails, etc.

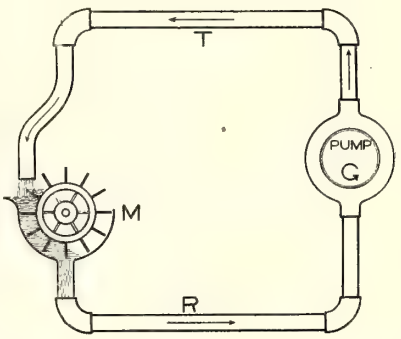


Fig. 1—Diagram of Water Power

Considerable attention is given also to the air-brake equipment. Definitions and illustrations are given of the principal parts, such as the air compressor, reservoir, motorman's brake valve, brake cylinder, governor, gage, switch and fuse. The difference between automatic and straight air brakes is also defined. The following information is included with reference to the use of the brakes:

"In the operation of air brakes of any type the main principle to be observed is that the greatest braking pressure should be exerted at the beginning of a stop and gradually decreased as the stop is approached, until only sufficient pressure remains when the stop is reached to hold the car. The brakes should never be applied gradually and the pressure increased as the stopping point is approached. The reason for exerting the highest pressure first is that a quicker stop can be made in this manner, and there is less danger of sliding wheels and wasting air. With the car wheels turning at a high rate of speed a very high brake pressure may be applied to them without skidding, whereas if they were turning slowly the same amount of pressure would stop them at once. Therefore, the brake pressure should be highest when the car speed is highest and should be decreased as the car speed decreases. To illustrate this point, if a grindstone be turned at a high speed and a man press a block of wood against the surface with all his strength he will not be able to stop the wheel at once, while if the wheel is turning slowly he can stop it immediately by using the same amount of force.

"When stopping on a slippery rail, apply the brakes more lightly than for an ordinary stop and allow a greater distance in which to bring the car to a standstill.

"If the wheels slide after the air is applied, release the brakes and allow the wheels to begin to turn, then apply the air again more lightly.

"Air should never be released and applied again except when wheels are sliding. Enough air should be taken at the first application to make the stop. If more air is needed go directly from lap position to service application position without releasing any of the air already in the cylinder. The shortest, quickest and easiest stop is obtained by taking all the air required on the first application."

The portion on air-brake instruction also contains an air-brake leverage diagram and air piping scheme. This is followed by a series of instructions relating to miscellaneous matters, like fenders, heaters, sanding, etc. There are no cut-and-dried questions and answers so that the student will pay more attention to understanding the instructions than to memorizing them.

ILLUSTRATED HYDRAULIC ANALOGY TO EXPLAIN THE ELECTRICAL EQUIPMENT

The flow of water through pipes connected in series, parallel and series-parallel always offers an effective analogy to the action of an electric current flowing through like circuits. The Syracuse company has applied this comparison to good advantage, as will appear from the accompanying illustrations and text, which form a part of the general instructions on electrical equipment:

"To understand the principle of electric motors and their control we may compare electrical power to water power. In the imaginary case in the diagram, Fig. 1, *G* is a water pump, *M* is a water-wheel, *T* and *R* are delivery and return pipes.

"For the sake of comparison we will say that water is pumped by the pump *G* through pipe *T* to a distant point where it drives the water-wheel *M*. Discharging from this it returns to pipe *R* to the pump to be used over again. Of course, a system of this kind is not practicable, but it serves to illustrate the electric current used in electric car operation. In the case of the electric power the source of supply corresponding to the pump *G* is the generator at the power station. The pipe *T* is the trolley wire or third-rail, the water-wheel *M* is the motor on the car and the pipe *R* is the rail.

"A motor operates by magnetic force set up within it by current passing through its windings. The current in passing through the windings or through any electrical conductor will heat that conductor to a greater or less extent.

"If a water-wheel were standing still and the full volume of water was suddenly allowed to act upon it the effect would be a violent strain upon its parts, probably resulting in breakage. This is the same effect which would be caused if the full force of the electric current was turned on a motor suddenly. It would cause a severe strain on the motor, resulting in great damage to it. For this reason it is necessary to use protective devices and controlling appliances consisting of circuit-breakers, fuses, controllers and resistance.

"The speed of a car is governed not only by the rheostat or resistance, but by the manner in which the motors are connected. The methods of connecting motors are commonly known as series and parallel. This can be best understood by comparing again with the water-wheel.

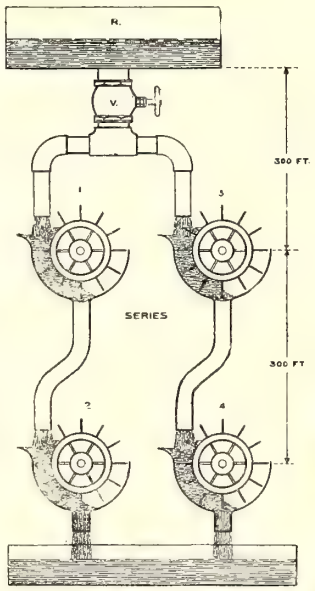


Fig. 2—Water-Wheels in Series-Parallel

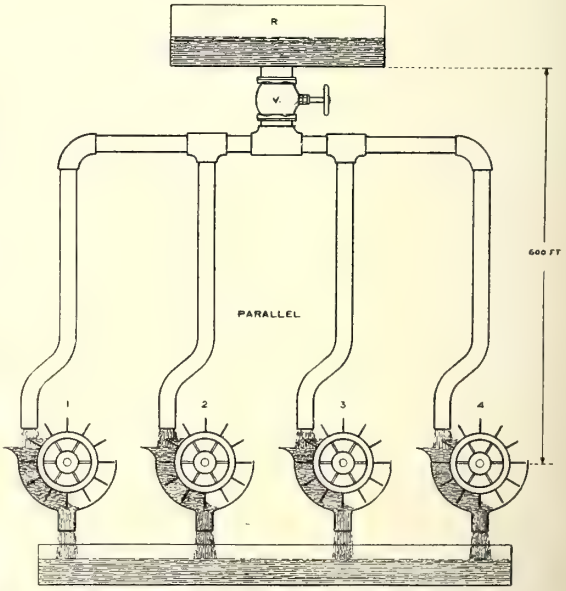


Fig. 3—Water-Wheels Grouped in Full Parallel

"In Fig. 2 *R* is a reservoir or supply of water which is connected by means of pipes to the water-wheels Nos. 1, 2, 3 and 4, as shown. With this combination the water after turning No. 1 wheel is collected and passes on, turning No. 2 wheel before it is discharged. When wheels are connected one after another in this manner they are said to be connected in series. Fig. 2 shows the manner in which four water-wheels may be connected, corresponding to the connections of a four-motor car when it is running in series-parallel. A two-motor car would be similar to the water-wheels if Nos. 3 and 4 wheels were taken away.

"If the four wheels are connected as shown in Fig. 3 they are connected in the same manner as the motors on a four-motor car when they are all in parallel. With a two-motor car the connection would be similar to the water-wheels if Nos. 3 and 4 wheels were taken away. To carry the comparison further: If the reservoir in Fig. 2 were 300 ft. above No. 1 wheel and the No. 1 wheel were 300 ft. above the No. 2 wheel, the No. 1 wheel would receive the pressure of a 300-ft. column of water and the No. 2 wheel would also receive the pressure of a 300-ft. column of water. Thus, as the reservoir is 600 ft. above No. 2 wheel, each wheel receives half of the total water pressure. In the same manner when two electric motors are running in series each receives half of the total pressure and if the trolley wire carries 600 volts each motor will receive 300 volts.

"The same line of reasoning holds good with the water-wheels connected as shown in Fig. 3, in which the reservoir is 600 ft. above the wheels; each wheel will receive the pressure of 600 ft. of water. Similarly if the motors on a car are connected in parallel and the pressure of the current in the trolley is 600 volts, each motor will receive the full pressure of 600 volts.

"If a by-pass pipe were arranged to carry the water past No. 1 and No. 3 wheels in Fig. 2, we should have wheels Nos. 2 and 4 working under full head of 600 ft. of water. This is exactly the condition we obtain when No. 1 and No. 3 motors are cut out on a car. No. 2 and No. 4 motors are then operated alone under full pressure, or 600 volts. In the same way if No. 2 and No. 4 motors were cut out No. 1 and No. 3 would be operating alone under full pressure, or 600 volts.

"If the pressure of 300 ft. or 600 ft. of water mentioned in the above paragraph were suddenly applied to the water-wheels they would be damaged, while if the pressure were applied slowly by gradually opening the valve, the wheels would start slowly and would not be injured. This is similar to the manner in which the controller governs the application of current to motors. The notching up of the controller slowly applies the power gradually and without injury to the motors, while feeding too rapidly applies the current strongly and injures the motors."

WHAT IS THE MATTER WITH BUSINESS?

An article published in *American Industries* for December on the subject "What Is the Matter with Business?" written by Henry Harrison Lewis sums up as follows the hundreds of answers received from members of the National Association of Manufacturers giving their views on what is needed to help business:

"Less legislative interference with business.

"Less political activity.

"A speedy and equitable settlement of the railway rate question.

"More conservatism in business.

"More national and individual confidence.

"Take the tariff out of politics.

"Give equal opportunities to all workmen by making the 'closed shop' illegal.

"Reform of the currency and banking systems.

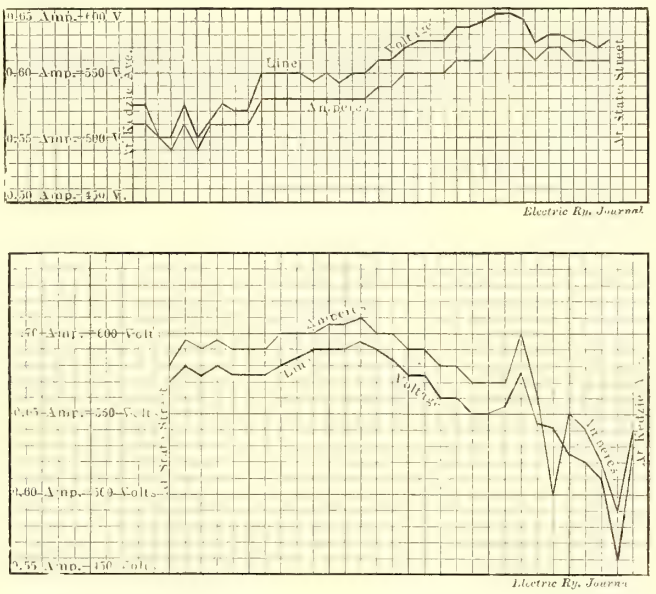
"Prompt decisions in the important industrial questions now before the United States Supreme Court.

"More attention to foreign trade and rehabilitation of the merchant marine."

TANTALUM LAMPS ON CHICAGO RAILWAYS CARS

The Chicago Railways Company, after a series of comprehensive investigations, has installed tantalum lamps in nearly 1000 large pay-as-you-enter cars. The investigations have shown an average saving of not less than 5 cents per car day on the generous basis of 1800 hours of illumination per car year. This now means a saving of $18,000 a year, and fully $35,000 a year will be saved when tantalum lamps have been installed in the 2000 cars finally to be operated by the company. The higher cost of tantalum lamps over carbon lamps, including interest, is found to be balanced at the end of the first year by the longer life of the metal-filament lamps, and the saving is shown in reduced power consumption. This is a particularly important feature for a company which purchases power, as does the Chicago Railways Company, and pays a premium on peak loads, since in the winter months the lighting of the cars during the evening rush greatly increases the maximum current demand for the system.

The investigation of tantalum lamps was started in September, 1909, and in this work two men were engaged all the time



Tantalum Lamp Test—Typical Current and Voltage Records

and eight men part of the time; but even during the first few months of the test period the saving in energy was more than sufficient to pay for the cost of obtaining full records of lamp performance.

CONDITIONS OF TESTS

The objects of the test were to determine (1) renewals per car month, (2) energy economy, (3) correct voltage rating of lamp for the service and, in general, the adaptability of tantalum lamps to street-car service. The methods followed in obtaining the data and the detail results of some of the tests are of particular interest as indicating the thorough way in which the work was executed.

To obtain comparative data on various makes of lamps, from three to six cars on the Van Buren Street line were fitted with each kind of lamp to be tested. The length of the run of the Van Buren Street cars on which the lamps were tested is 4 miles and for the major part of this distance the track is in excellent condition. Some of the cars were equipped with Buckeye lamps, others with Colonial and still others with Bryan-Marsh lamps. Similar observations were made for all the lamps installed. The performance of each lamp was watched very closely over periods varying from two to six months, the entire testing work occupying a year.

Lamp tests were made in new and rebuilt double-truck pay-as-you-enter cars, each about 50 ft. long. These cars were in regular service. Each car uses 27 lamps, of which 7 are of 32 cp and 20 of 16 cp. The lamps are arranged as follows:

Nine sockets under each deck rail, three sockets spaced evenly along the center of the upper deck, one socket over the conductor's position on each end, one socket in the sign box at each end and one socket in each headlight. The 18 side lamps and the two sign lamps make four circuits of five lamps each across line voltage. The three lamps in the upper deck are connected in series with the forward headlight lamp and the conductor's lamp on the rear platform. When the direction of running is reversed the latter lamps are cut out and their duplicates on the opposite platform are lighted. Lamps of 16 cp are used for side and sign lights. The center, platform and headlight lamps are 32 cp.

HOW OBSERVATIONS WERE MADE

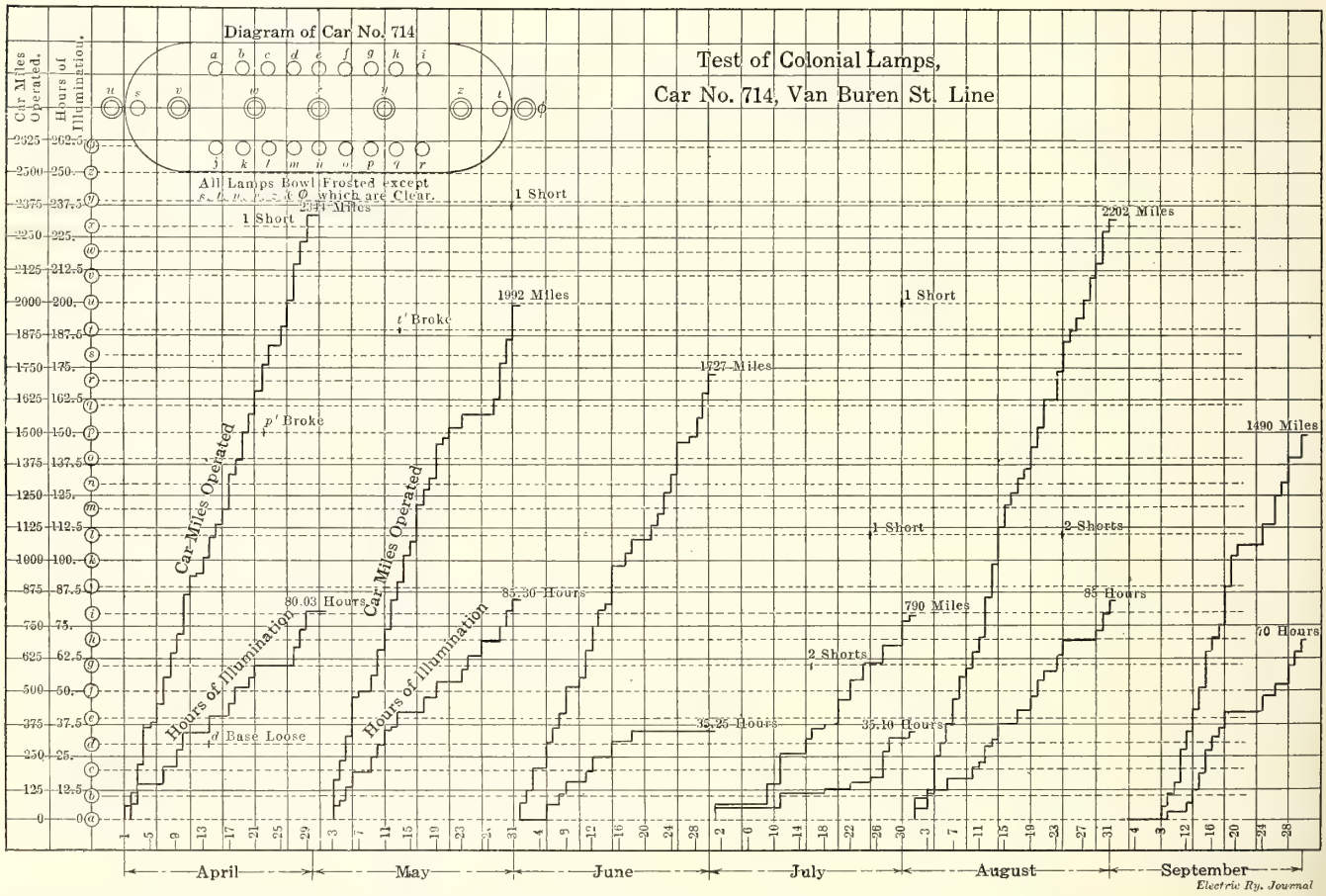
To determine the lamp renewals per month for lamps of each manufacture and for each car, a system of records was devised which showed each day the condition of every lamp under observation. Records also were made in graphical form. The lamp observers made records of the following data: Daily car mileage, daily hours of illumination, date of each lamp renewal, position in car of each lamp renewed and the cause of failure, whether it might be from a short-circuit filament, loose bulb, broken bulb or missing lamp. At intervals of two months careful measurements of the voltage and the lamp load were made for each car. Good instruments were installed on the car and continuous readings were taken of pressure and current during a full round trip. These readings gave a record of the actual consumption of the lamps, from which the individual wattage of an average lamp could closely be determined.

GRAPHICAL RECORDS OF LAMP PERFORMANCE

One of the graphical record sheets, covering the performance of each lamp burned on one car during a test period of six months, is reproduced. Such record charts were made for each car carrying lamps under test. The original size of one of these charts is 21 in. x 14 in. The data as obtained were copied on tracing paper, so that blue prints could be taken for binding in loose-leaf form.

Reference to the graphical record of lamp performance will show the completeness of the data entered thereon. The horizontal scale indicates days of the month from April 1 to Sept. 30, inclusive. The record chart has two vertical scales; one scale shows the mileage of the car and a parallel scale shows the hours of illumination on the car. With these scales curves representing car mileage and hours of illumination for each day are plotted. To save space the curves are started at zero on the first of each month.

In addition to the curves just described 27 lines are drawn across each chart on which to record the renewal dates of the lamps. A key letter is given to each lamp position in a car, as indicated on the diagram, and the 27 lines are lettered similarly. Thus each one of the 27 horizontal lines extending across the chart represents one lamp position in the car. During the test period any change in the condition of any lamp was noted on the horizontal representing that lamp position and the note was made over the proper date, according to the horizontal scale of the chart.



Tantalum Lamp Test—Diagram Showing Method of Charting Car Miles, Illumination Hours and Lamp Failures

With the data thus shown on the chart, it is easily possible to find the number of lamp renewals necessary at each socket during the test period, learn the date on which each new lamp was put in and ascertain by references to the mileage and illumination curves the number of miles that the car had traveled and the hours that the lamp had burned up to the time of renewal. These graphical records, one for each car on which tantalum lamps were installed for testing, have been bound in loose-leaf book form and so give a complete record of the original data obtained. The particular chart shown is that of car 714, which had few lamp failures. Hence few notes were required on the horizontal lamp lines.

The results from observations of each kind of lamp installed on several cars were assembled as shown in Table I. This is a summary of the first tests made on Buckeye lamps. There were 20 16-cp and 7 32-cp lamps, all with clear glass bulbs.

The columns of data entered in Table I are obtained as follows:

Column 1, car numbers.

Column 2, beginning and ending dates of the test period.

Column 3, miles operated by a car during the test period.

Column 4, total hours that lamps burned during test period.

Column 5, number of 32-cp lamps of original installation which were still burning at the end of the test period.

TABLE I.—RECORD OF BUCKEYE TANTALUM LAMPS, CHICAGO RAILWAYS

Lamps installed per car: 18 16-cp sides, 2 16-cp sign, 3 32-cp centers, 2 32-cp clear bulb platform, 2 32-cp clear bulb headlights. Total, 20 16-cp lamps and 7 32-cp lamps.

Car No.	Dates	Miles Operated	Hours Illuminated	Renewals of 32-cp Lamps: O. K.	During Test	Per Year	Per Cent	Renewals of 16-cp Lamps: O. K.	During Test	Per Year	Per cent
316	Sept. 20, 1909	9,524	814	0	28	62	886	6	27	60	300
	Dec. 20, 1909	....	...	..	..	..	...	..	..	..	...
316	Dec. 20, 1909	7,249	494	5	2	7	100	4	16	58	290
	Feb. 20, 1910	....	...	..	..	..	...	..	..	..	...
315	Dec. 1, 1909	9,046	640	1	9	25	357	9	18	50	250
	Feb. 28, 1910	....	...	..	..	..	...	..	..	..	...
353	Dec. 1, 1909	8,697	680	4	6	16	229	12	11	29	145
	Feb. 28, 1910	....	...	..	..	..	...	..	..	..	...
Totals and averages		8,629	657	10	45	120	439	31	72	197	246
		8,629	657	All sizes combined.					117	320	296

NOTES.—Lamps renewed after one short-circuit. Renewals per car month, yearly average basis, $320 \div (4 \times 12) = 6.67$. Car 316—Night service; clear bulbs; 16 cp, 118 volts; 32 cp, 110 volts; replaced after one short-circuit. Car 316—Second period; clear bulbs; 16 cp, 118 volts; 32 cp, 120 volts; changed after two short-circuits. Car 315—Lamps, 120 volts, side and center, bowl frosted; side and sign, 12½ cp, changed after two short-circuits. Car 353—Lamps, 120 volts, side and center, bowl frosted; side and sign, 16 cp; changed after two short-circuits.

Column 6, number of 32-cp lamps which were needed for renewals during the test period.

Column 7, number of 32-cp lamps that would be needed for renewals if test period had been one year, assuming 1800 hours of burning during the year. Column 7 is found by multiplying Column 6 by 1800 and dividing the result by Column 4.

Column 8 is the percentage of renewals per year per socket in the 32-cp lamp series. It is found by dividing Column 7 by seven, there being seven lamps in the 32-cp series.

Column 9 shows the number of 16-cp lights out of the 20 on the car that came through the test period without renewal.

Column 10 shows the number of 16-cp lights used for renewal purposes.

Column 11 shows the number of 16-cp lights that would be needed for renewals in the car on a yearly basis.

Column 12 shows the number of renewals per year for 16-cp lamps.

In this test it is important to note that the lamps in Car 316 were renewed as soon as the filament had one short-circuit, although with the tantalum lamp this did not reduce the candle-power. No allowance was made for the two lamps of the seven in the 32-cp circuit which did not burn on account of the switchback arrangement for double-end operation. Because the tests recorded in Table I were the first made, because the voltage of the lamps was not exactly suited for the service, and because the lamps in Car 316 were replaced after one short-circuit, the results are not so good as were later found.

Attention is called to the footnotes showing the changes in the kinds of lamps during the course of this test. It was found that the 12½-cp lamps did not give sufficient illumination. It is interesting to note that during the tests shown in Table I two 16-cp lamps burned a total of 1308 hours each. One of these lamps had one short-circuit and the other a loose bulb at the end of the test period.

It is stated that the 1800 hours allowed as the illumination required during the year is a generous figure, according to the records kept during the year of testing. It will also be noted in analyzing the data given in this and the following tables that wherever any adjustment in calculation has been made the life of the lamps has been favored. The renewals per car month, which is the desired figure, on a yearly average basis for the test periods indicated in Table I were 6.67 lamps.

Voltage and mileage curves taken over the routes in both

TABLE II.—ENERGY CONSUMPTION OF BUCKEYE TANTALUM LAMPS, CHICAGO RAILWAYS, TESTS MADE AT END OF PERIODS AS NOTED BELOW.

Car No. 316—First Period: Energy consumption at the car, Dec. 24, 1909. Readings taken over the entire route.

	5 32-cp Circuit: Volts.	Amps.	Kw.	10 16-cp Circuit: Volts.	Amps.	Kw.	Total kw per Car. Lamp Circuits.	Remarks.
Maximum	596	.620	.370	595	.710	.422	1.214	All lamps clear bulbs.
Minimum	500	.540.	.270	460	.590	.271	.812	16 cp — 118 volts.
Average	555	.586	.325	562	.677	.380	1.085	32 cp — 120 volts.

Car No. 316—Second Period: Energy consumption at the car, Feb. 1910. Readings taken over the entire route.

	5 32-cp Circuit: Volts.	Amps.	Kw.	5 16-cp Circuit: Volts.	Amps.	Kw.	Total kw per Car. Lamp Circuits.	Remarks.
Maximum	585	.640	.374	575	.320	.184	1.110	All lamps clear bulbs.
Minimum	465	.540	.251	265	.190.	.050	.451	16 cp — 118 volts.
Average	537	.602	.323	543	.299	.163	.975	32 cp — 120 volts.

Car No. 315—Energy consumption at the car, February, 1910. Readings taken over the entire route.

	5 32-cp Circuit: Volts.	Amps.	Kw.	5 12½-cp Circuit: Volts.	Amps.	Kw.	Total kw per Car. Lamp Circuits.	Remarks.
Maximum	570	.650	.370	560	.295	.165	1.030	All lamps 120 volts.
Minimum	405	.500	.203	460	.190	.088	.555	Side and center bowl frosted.
Average	532	.620	.330	531	.221	.117	.798	Side and sign lamps 12½ cp.

Car No. 353—Energy consumption at the car, February, 1910. Readings taken over the entire route.

	5 32-cp Circuit: Volts.	Amps.	Kw.	5 16-cp Circuit: Volts.	Amps.	Kw.	Total kw per Car. Lamp Circuits.	Remarks.
Maximum	560	.660	.370	560	.305	.171	1.054	All lamps 120 volts.
Minimum	445	.560	.249	435	.240	.104	.665	Side and center lamps bowl frosted.
Average	518	.616	.319	515	.284	.146	.903	

TABLE III.—SIX MONTHS' TEST, APRIL 1 TO SEPT. 30, 1910, OF 115-VOLT "COLONIAL" LAMPS

Lamps installed per car: 18 16-cp sides, 2 16-cp sign, 3 32-cp center, 2 32-cp platform. 2 32-cp headlight.

Car No.	Miles Operated	Hours Illuminated	Renewals of 32-cp Lamps: O. K.	During Test	Per Year	Per Cent	Renewals of 16-cp Lamps: O. K.	During Test	Per Year	Per Cent	Remarks
705	8,941	377	3	11	53	757	17	1	19	95	All lamps Cl. Br.
711	11,366	435	2	6	25	357	18	2	8	40	All lamps Cl. Br.
704	9,429	382	3	7	33	472	16	6	28	140	S. & C. lamps Br. Fr.
714	10,545	391	7	0	..	...	18	2	9	45	S. & C. lamps Br. Fr.
716	11,125	454	7	0	..	...	16	4	16	80	S. & C. lamps Br. Fr.
731	10,253	417	4	4	17.	243			13	65	S. & C. lacquered
All	a10,276	a409	..	b28	b123	a293	..	b21	b92	a77	
All	a10,276	a409	..	Both kinds of lamps				b49	b216	x133	

NOTES.—a = average; b = total; x = obtained by dividing 216 by (6 x 27). Lamps renewed after three short-circuits. Renewals per car month, yearly average basis, 216 ÷ (6 x 12) = 3.00. Of above renewals, two 30-cp and five 16-cp were stolen from cars. Same lamps used for centers and headlights, being pear-shaped 32-cp.

directions were made. Two curves are shown on page 1190; one indicates the volt-amperes on the 32-cp, 5-lamp circuit, and the other is for a 10-lamp 16-cp sidelight circuit. Table II shows the energy consumption of the Buckeye tantalum lamps at the car, as measured at the end of each two-month test period. These readings are the average of a considerable number of instantaneous readings.

Table III shows the results of a six months' test with "Colonial" 115-volt lamps installed on six different cars. The renewals per month as determined from the data of this table were only three, in comparison with 6.67 for the tests shown in Table I. The principal reasons for this considerable reduction in the number of renewals per month were the use of a lamp with more suitable voltage rating and the renewing of lamps only after the filaments had short-circuited three times, rather than renewing them after one and two short-circuits, as was done in the tests covered by Table I.

STANDARD LAMP

After extensive testing of the lamps noted in the accompanying table and several other makes, a standard 115-volt lamp rated at 35 watts for 16 cp and 70 watts for 32 cp was installed on nearly 1000 of the large new cars of the Chicago Railways. These lamps were manufactured by the Bryan-Marsh Lamp Company, and since their installation they have had special attention so that the engineering department might learn more regarding the comparative performance of carbon and tantalum lamps when installed on a large number of cars. Stock ledgers containing accounts with each car house are used to record the disposition of each lamp purchased by the company.

The renewals per month required by the burned-out, broken or stolen lamps and covering a large number of cars equipped with Bryan-Marsh lamps of 16 cp and 32 cp are given as follows:

Period	Renewals per car per month	Car months
May 23 to Aug. 1, inclusive.....	2.18	558
Aug. 1 to Aug. 31, inclusive.....	1.72	644
Sept. 1 to Sept. 30, inclusive....	1.91	644
Oct. 1 to Oct. 31, inclusive.....	2.59	689

During the period covered by the foregoing statement of renewals per month the company had 826 cars equipped. Attention is called to the increased renewals per month for the period from Oct. 1 to Oct. 31. This increase was caused by experimenting with a type of lamp having a special winding. These windings failed rapidly during October.

As already stated, careful attention was paid to determining the energy consumption for the different types of lamps under actual running conditions. On an 1800-hour basis, using four circuits of five 16-cp lamps and one circuit of five 32-cp lamps, the tantalum lamps compared with carbon lamps of like candlepower show an energy saving of 1726 kw-hours per car at the switchboard, or practically 1 kw per car lower in demand during the lamp-burning period. Comparing the energy demand from a car burning 25 16-cp tantalum lamps with a like equipment of carbon lamps, an energy saving of 1301 kw-hours on the basis of 1800 hours' lamp-burning during the year is shown at the switchboard. During a test of 600 car months the renewals with carbon lamps were found to be 4.269 per car month and with tantalum lamps 2.21 per car month.

FT. DODGE, DES MOINES & SOUTHERN RAILROAD STUDYING ELECTRIFICATION

The engineers of the Ft. Dodge, Des Moines & Southern Railroad, in conjunction with the engineering departments of the General Electric Company and the Westinghouse Electric & Manufacturing Company, are making studies of the possibilities of electrification on a 1200-volt to 1800-volt basis. This road is 84 miles in length and handles a large freight traffic by steam locomotives. Homer Loring, Boston, receiver for the company, states that plans and estimates are being prepared for consideration, including a possible change of the freight handling from steam to electricity. No decision has as yet been reached, however, as to the final policy regarding electrification.

DISCUSSION BY RAILWAY COMMISSIONERS ON RATES AND VALUATION

In the issues of the Electric Railway Journal for Nov. 26, and Dec. 3, 1910, abstracts were published of the reports of various committees presented at the convention of the National Association of Railway Commissioners at Washington, D. C., from Nov. 15 to 17. At this meeting the delegates voted that the reports of the committees on rates and rate making and on railroad taxes and plans for ascertaining the fair value of railroad property should be discussed together. An abstract of the discussion on these subjects follow:

Milo R. Maltbie, New York Public Service Commission for the First District, said in discussing the report that there may be various kinds of value, but to say that there was a market value for one thing and a market value for another brought up the purpose of that valuation. It seemed to him that it was necessary to know the purpose of valuation in determining what the fair value of the property is. If the State was going to condemn property of a corporation under the process of condemnation there would be one value, and certainly, under the decisions of the United States Supreme Court, in a determination of the fair value of the property for rate-making purposes there would be a different thing; and in a determination of the fair value of the property for bargain and sale between a man who wished to sell or who was willing to sell and a man who was willing to buy there would be an entirely different thing, because the Supreme Court had definitely stated that there are factors which may determine the value of property for bargain and sale which are not factors for determining the fair value of property for rate-making purposes.

J. C. Lawrence, Railroad Commission of Washington, said that the term "market value" was used in contradistinction to "physical value." The question went ultimately to that of the fair value of the railroad property, as indicated in the decision of the Supreme Court of the United States, in which it was held that the railways were entitled to a reasonable return upon the fair value of the property they were using in conducting transportation.

The "value of the service of the shipper" theory could only apply, Mr. Lawrence said, when the conditions of transportation were such that the carriers could not obtain a reasonable return on the particular commodity involved. Having found the value of the property, as a whole, and having divided that property so as to find what proportion of that value represented the use of that property for State purposes, there was shown the capital on which the company was entitled to a reasonable return for the conduct of its State business, the amount on which it was entitled to have a reasonable earning, as determined by the Supreme Court of the United States and by common sense and fairness of every man. To that reasonable return should be added all the cost of operating chargeable to State traffic. That would necessitate dividing the operating expenses applicable to State traffic and interstate traffic, and to that adding the reasonable contingencies. A railroad was entitled to a fair return, not only this year and next year, but during the period of its history, if it was exercising good judgment in the conduct of its transportation business. Such contingencies should be allowed as reasonable business men would insist upon having to guard them against contingencies of the future, ordinary and extraordinary, that might arise.

It was assumed in Washington that 7 per cent would be a reasonable return. Six per cent was the legal rate in that State, Mr. Lawrence said. Bonds sold at a much lower rate. But there was a hazard in going out into a new country and engaging in enterprises like that, and the commission did not want to erect any obstacle to railway construction. The question of efficient service was of more importance than the question of the rates to be paid. First was the question of efficiency, and second was the question of the rate. The "cost of service" theory could be applied to a schedule of rates on which the company was entitled to earn the return, but when it came to

the making of particular rates there was only one method, and that was virtually the method that had been pursued by the traffic department of the railroads—the application of common sense to the particular conditions under which the traffic moved.

Mr. Lawrence added that if some rates must, from the very exigencies of the transit business, be less reasonably remunerative some other rates must contribute to the burden that ought otherwise to have been borne by those rates; so that the rates of some commodities could not be made with reference to the cost of service. There must be that adjustment. The commission went into a very careful analysis of the cost of movement, State and interstate, in all the conditions under which substantially all of the commodities of that State moved, and included about 150 commodities in the investigation. It was found that it cost to move less-than-carload freight within the State substantially four times as much per ton per mile as it did to move less-than-carload freight on an interstate movement. The State haul was a short haul, and it had two terminal charges.

Halford Erickson, Wisconsin Railroad Commission, said that in Wisconsin the property of the railroads was valued for both rate-making and taxation purposes. In this State the rates of transportation made by the commission were largely made on the cost of the service to the carrier when this cost was made up on the operating expenses, including reasonable returns on the investment. While as a member of the committee on rates and rate making he agreed to its report, he did so more for the purposes of discussion than because the report as a whole represented his views in the matter. Personally, he did not attach the greatest of importance to the "value of the service" and other analogous theories of rate making. On the other hand, he regarded the "cost of the service" as of the greatest importance in this work. He was further inclined to hold that the methods suggested in the report for making reasonable rates fell short of adequately meeting the purposes for which they were intended. The law provided that the rates charged by public utilities should be reasonable, but it contained little that threw much if any light upon what this word "reasonable" really meant in this connection. The courts had gone somewhat further than this. In cases where adequate data had been furnished to them they had often held, in substance, that rates in order to be reasonable under normal conditions should yield revenues high enough to cover operating expenses, including fair returns on a fair value of the property used and useful in serving the public. This was also in the main the position of most of the commissions, whether expressed or not. The question of the cost of the service seemed to be inseparably connected with the question as to what constituted reasonable rates. The one was in a sense dependent upon the other. Public rate making should consist of an interpretation of these two terms. The "cost of the service," both in law and in fact, appeared to be the fundamental basis for rates. But in actual practice these principles did not seem to be regularly adhered to. The carriers or those who represented them, together with many, if not all, commissions, held that rates should be based on the "value of the service" and on "what the traffic can bear." There were some, however, who held that in the main the rates as a whole should be based on the "cost of the service," but that in adjusting the rates or costs between the various classes and commodities the value of these articles, the risks and other factors of this nature should be taken into consideration.

In order to determine the "cost of the service" it was necessary in time to value the roads and to determine the rate of the interest and profit to which they were entitled on this value, Mr. Erickson said. The processes involved were neither so costly nor so complicated as was sometimes supposed. When the valuation had once been made it was not hard to keep up. Nor would such valuations result in constant fluctuations in the rates, as was sometimes claimed. That public utilities should be, and, in the end, must be, so valued would seem to be so obvious as to admit of but little in the way of doubt. That this valuation should be fair and that the returns allowed thereon for interest and profits should be reasonable was also clear. The public needed good service and adequate facilities in every way. Such service was costly, and this cost must be covered by the earnings. The railroad service must also be almost continually extended, and such extensions required new capital as well as business capacity. These could not be secured unless the returns were adequate. In the long run it was to the best interests of all concerned that the valuations placed on railroad property and the returns allowed thereon should be such as to attract both the necessary capital and the necessary business ability.

Milo R. Maltbie, New York Public Service Commission, First District, said the report upon valuation of railroad property used a term which seemed to him to be a very unfortunate one, the term "market value." The term that had ordinarily been used was "fair value." If the market value of the property was determined by the net income and if, on the other hand, the rates were determined by the market value of the property, the effect was to proceed in a circle.

On the other hand, Mr. Maltbie said, the market value of the property reflected not only the value of the physical property, but the value of the franchise. In the State of New York the commissioners were not allowed now to approve capitalization for franchise, except as cash may be paid to a legitimate local or State authority. To attempt to say that market value shall be the basis of rate making would introduce certain factors which should not be introduced. The report referred to a road which had been built into a country where the lumber was about to be exhausted and the value of the property therefore decreased. Depreciation ought to take into consideration not merely the question of age and wear and tear, but obsolescence, inadequacy, changed economic conditions, which would, perhaps, make a railroad unnecessary in a certain locality.

Mr. Maltbie added that the method of computing the value of the property had come up in a number of cases before the New York commission, and after considerable advising with leading engineers, not only in New York City, but in other cities, the plan recommended was to determine as one factor the scrap value. The committee suggested that discount should not be considered in determining the fair value of the property. That seemed to Mr. Maltbie to contain an economic fallacy. Assuming that a piece of property, a farm, was to be sold, was the cash value determined by the credit of the prospective purchaser? One man may have to give a larger note than another in order to purchase it, but did that indicate the farm was worth more? It seemed to him value was not determined by the credit of the farmer. It was determined by what the cash value of the farm would be. If the farmer had to discount his note it did not mean the value of the farm had gone up.

If 5 per cent bonds were issued to buy a piece of property they might have to be sold at a small discount. Four per cent bonds would require a larger discount, and yet, Mr. Maltbie asked, would the conclusion be proper that because of the larger discount on a 4 per cent bond the value of the property had gone up?

Mr. Lawrence, of Washington, said it was immaterial in one sense whether the term discount or brokerage was used. If bonds were sold at par, it cost something to market them. The amount of discount claimed by some roads was enormous. In Washington a reasonable allowance was made for such discount as would be encountered if there were a legitimate investment in the capital stock of the railroads. There was almost no investment in the capital stock of railroads in the State of Washington; they were built practically entirely from the proceeds of the sale of bonds.

After the conclusion of the discussion the association voted that the reports of the committees on railroad taxes and plans for ascertaining the fair value of railroad property and on rates and rate making be received and printed.

SOME ACCOUNTING FEATURES OF THE CLEVELAND RAILWAY COMPANY'S FRANCHISE

At the convention of the American Street & Interurban Railway Accountants' Association in Atlantic City on Oct. 10-14 a paper was presented by Henry J. Davies, secretary of the Cleveland Railway Company, on the subject "Some Accounting Features of the Cleveland Railway Company's Franchise." After the presentation of the paper Mr. Davies, upon returning to Cleveland, found several errors in the base tables and therefore compiled new tables which will be published with the paper in full in the proceedings of the convention.

As the earlier figures containing the errors were published in connection with the abstract of the paper contained in the issue of the Electric Railway Journal for Oct. 15, 1910, Mr. Davies has requested that the corrected tables, which show the operations of the Cleveland Railway System for the month of August in the years 1906 to 1910, inclusive, and for the period of six months ending Aug. 31 in the same years, be republished. They are therefore published herewith.

In the new tables a slightly different arrangement is made from that followed in the tables published originally. The information, however, is the same.

By reference to the statements of the operations for the month of August it will be observed that the number of revenue passengers shows comparatively little increase from 1906 to 1909, but a very large increase in 1910. The total number of transfers collected fluctuated considerably. It was larger in August, 1907, than in the corresponding month of the previous year, but was smaller in 1908 than in either of the two preceding years. In 1909 the total was less than in August, 1907, but greater than in August, 1906 and 1908. The total in August, 1910, was larger than in any other of the months in which the returns were given and equaled 36.09 per cent of the number of revenue passengers. The total numbers of revenue car-miles fluctuated materially, both in passenger and in the other revenue car results.

Passenger earnings for August, 1908, were lower than those for any other months reported. This is due to the operation of the property by Mayor Johnson under a 3-cent fare and restricted service arrangement. Passenger earnings for August, 1909, were almost the same as in August, 1907. The total

OPERATIONS OF THE CLEVELAND RAILWAY SYSTEM

AMOUNTS

August	1906	1907	1908	1909	1910
Revenue passengers	11,058,499	11,723,872	12,391,090	12,697,763	15,597,858
Transfers collected	4,622,896	5,051,079	4,488,954	4,764,927	5,628,496
Total rides	15,681,395	16,774,951	16,880,044	17,462,690	21,226,354
Transfers—per cent of revenue passengers	41.80	43.08	36.23	37.53	36.09
Passenger car-miles	2 079,016	2,221,416	1,849,454	2,101,874	2,389,191
Other revenue car-miles	18,290	21,169	20,536	24,961	26,961
Total revenue car-miles	2,097,306	2,242,585	1,869,990	2,126,835	2,416,152
Passenger earnings	$523,954.23	$553,393.82	$409,261.99	$554,178.57	$536,400.9
Gross earnings from operation	$536,257.56	$566,005.00	$419,083.75	$571,942.55	$554,055.04
Operating expenses.					
Operation of power plant	$27,717.63	$34,219.84	$28,885.97	$33,917.38	$40,641.94
Operation of cars	125.931.23	135,648.95	134,203.14	144,853.27	195,077.49
General expenses	48,195.23	40,344.73	29,334.01	36,823.72	44,704.96
Total	$201,844.09	$210,213.52	$192,423.12	$215,594.37	$280,424.39
Maintenance (reserve)	143,400.58	142,845.91	93,872.30	112,228.67	144,969.12
Total operating expenses	$345,244.67	$353,059.43	$286,295.42	$327,823.04	$425,393.51
Taxes	21,351.08	23,585.49	22,525.03	25,921.96	29,367.76
Expenses and taxes	$366,595.75	$376,644.92	$308,820.45	$353,745.00	$454,761.27
Interest on bonds and floating debt	$39,296.82	$40,091.67	$40,046.67	$38,589.22	$38,126.99
Wages of motormen and conductors	$104,204.95	$113,836.95	$96,658.42	$115,939.00	$158,380.65

PER CAR-MILE

August	1906	1907	1908	1909	1910
Per passenger car-mile.					
Fares	5.319	5.278	6.7	6.04	6.529
Transfers collected	2.224	2.274	2.43	2.27	2.356
Total rides	7.543	7.552	9.13	8.32	8.885
Passenger earnings	25.20 cts.	24.91 cts.	22.13 cts.	26.37 cts.	22.45 cts.
Per revenue car-mile.					
Gross earnings from operation	25.57 cts.	25.24 cts.	22.41 cts.	26.89 cts.	22.93cts.
Operating expenses.					
Operation of power plant	1.32	1.52	1.54	1.59	1.68
Operation of cars	6.00	6.05	7.19	6.82	8.08
General expense	2.30	1.80	1.56	1.73	1.85
Total	9.62	9.37	10.29	10.14	11.61
Maintenance (reserve)	6.84	6.37	5.02	5.27	6.00
Total operating expenses	16.46	15.74	15.31	15.41	17.61
Taxes	1.02	1.05	1.20	1.23	1.22
Expenses and taxes	17.48	16.79	16.51	16.64	18.83
Interest on bonds and floating debt	1.87	1.79	2.14	1.81	1.58
Wages of motormen and conductors	4.97	5.08	5.17	5.45	6.56

CENTS PER REVENUE PASSENGER

August	1906	1907	1908	1909	1910
Passenger earnings	4.73	4.72	3.30	4.36	3.46
Gross earnings from operation	4.85	4.83	3.38	4.50	3.57
Operating expenses.					
Operation of power plant	.25	.29	.23	.27	.26
Operation of cars	1.14	1.16	1.08	1.14	1.26
General expense	.44	.34	.24	.29	.29
Total	1.83	1.79	1.55	1.70	1.81
Maintenance (reserve)	1.29	1.22	.76	.88	.93
Total operating expenses	3.12	3.01	2.31	2.58	2.74
Taxes	.19	.20	.18	.20	.19
Expenses and taxes	3.31	3.21	2.49	2.78	2.93
Interest on bonds and floating debt	.36	.34	.32	.30	.24
Wages of motormen and conductors	.94	.97	.78	.91	1.02

passenger revenue for August, 1910, notwithstanding the increase of over 4,500,000 revenue passengers, as compared with August, 1906, showed a gain of less than $12,500 in this period. The total operating expenses, including the maintenance reserve, were at their largest point in August, 1910. They were at their lowest point in August, 1908. In the former month they reached 76.8 per cent of the gross earnings from operation and in the latter month they were 68.3 per cent.

PERCENTAGE OF CHANGES

The following figures show the percentages of change in the six months ended Aug. 31, 1910, as compared with the corresponding period for 1906:

The increase in number of revenue passengers in 1910 over 1906 was nearly 40 per cent, while the increase in passenger car-miles was but 12.1 per cent, and the increase in passenger earnings but 1 per cent.

The number of revenue passengers per car-mile increased in the four years 24.62 per cent, while the passenger earnings per car-mile decreased 9.89 per cent.

While the amount of passenger earnings increased, as stated, 1 per cent, and the passenger earnings per car-mile decreased 9.89 per cent, the passenger earnings per revenue passenger decreased 27.54 per cent.

Wages of conductors and motormen increased 36.32 per cent in amount and 21.4 per cent per car-mile and decreased 2.1 per cent per revenue passenger.

The number of passengers per car-mile, including transfers and cash fares, in 1906 was 7.348 (or 7348 per 1000 car-miles, if it is preferred not to divide a passenger); in 1910, 8.819, an increase of 20 per cent. That is to say, the company was carrying 20 per cent more people per car-mile in 1910 than in 1906, indicating either extravagant service in 1906 or inadequate service in 1910. There was no material difference in size of cars.

The corresponding figures for August are as follows:

	Per Cent
Increase in revenue passengers	41.05
Increase in passenger car-miles	14.92
Increase in passengers per car-mile	22.74
Increase in number of rides per car-mile	17.79
Increase in amount of passenger earnings	2.37
Decrease in passenger earnings per car-mile	10.91
Decrease in passenger earnings per passenger	26.85
Increase in amount of platform wages	52.00
Increase in platform wages per car-mile	31.99
Increase in platform wages per revenue passenger	8.51

OPERATIONS OF THE CLEVELAND RAILWAY SYSTEM

AMOUNTS

Six Months Ended August 31	1906	1907	1908	1909	1910
Revenue passengers	62,334,042	67,435,302	67,163,189	72,970,140	87,059,441
Transfers collected	24,009,806	27,260,725	20,149,324	25,467,137	29,108,231
Total rides	86,343,848	94,696,027	87,312,513	98,437,277	116,167,672
Per cent transfers to revenue-passengers	38.52	40.42	30.00	34.90	33.43
Passenger car-miles	11,750,147	12,537,126	11,376,560	12,075,277	13,171,598
Other revenue car-miles	90,954	95,997	97,863	105,685	125,076
Total revenue miles	11,841,101	12,633,123	11,474,423	12,180,962	13,296,674
Passenger earnings	$2,944,934.49	$3,013,865.42	$2,502,722.71	$3,177,236.38	$2,974,460.26
Gross earnings from operation	$3,011,574.74	$3,080,751.72	$2,570,717.05	$3,255,194.94	$3,065,887.90
Operating Expenses.					
Operation of power plant	$177,138.00	$178,516.94	$217,304.05	$210,653.55	$236,496.09
Operation of cars	722,059.77	780,309 62	778,805.23	846,340.61	1,010,827.45
General expense	223,923.44	238,066.32	178,813.30	223,789.22	259,499.92
Total	$1,123,121.21	$1,196,892.88	$1,174,922.58	$1,280,783.38	$1,506,823.46
Maintenance (reserve)	829,490.83	804,791.74	573,721.15	633,223.32	672,447.04
Total operating expenses	$1,952,612.04	$2,001,684.62	$1,748,643.73	$1,914,006.70	$2,179,270.50
Taxes	126,052.51	130,362.85	135,316.62	151,435.65	169,713.49
Expenses and taxes	$2,078,664.55	$2,132,047.47	$1,883,960.35	$2,065,442.35	$2,348,983.99
Interest on bonds and floating debt	$234,338.90	$241,056.26	$233,432.74	$232,765.65	$222,921.18
Wages of conductors and motormen	$591,738.05	$644,773.07	$599,000.03	$661,268.98	$806,673.55

PER CAR-MILE.

Six Months Ended August 31	1906	1907	1908	1909	1910
Per passenger car-mile.					
Fares	5.304	5.379	5.904	6.043	6.609
Transfers collected	2.044	2.174	1.771	2.109	2.210
Total rides	7.348	7.553	7.675	8.152	8.819
Passenger earnings	25.06 cts.	24.04 cts.	22.00 cts.	26.31 cts.	22.58 cts
Per revenue car-mile.					
Gross earnings from operation	25.43 cts.	24.39 cts.	22.40 cts.	26.72 cts.	23.06 cts.
Operating expenses.					
Operation of power plant	1.50	1.41	1.89	1.73	1.78
Operation of cars	6.10	6.18	6.79	6.95	7.60
General expense	1.89	1.88	1.56	1.84	1.95
Total	9.49	9.47	10.24	10.52	11.33
Maintenance (reserve)	7.	6.37	5.	5.20	5.06
Total operating expenses	16.49	15.84	15.24	15.72	16.39
Taxes	1.06	1.03	1.18	1.24	1.28
Expenses and taxes	17.55	16.87	16.42	16.96	17.67
Interest on bonds and floating debt	1.98	1.91	2.03	1.91	1.68
Wages of conductors and motormen	5.	5.10	5.22	5.43	6.07

CENTS PER REVENUE PASSENGER

Six Months Ended August 31	1906	1907	1908	1909	1910
Passenger earnings	4.72	4.47	3.73	4.35	3.42
Gross earnings from operation	4.83	4.57	3.83	4.46	3.52
Operating expenses.					
Operation of power plant	.28	.26	.32	.29	.27
Operation of cars	1.16	1.16	1.16	1.16	1.16
General expense	.36	.35	.27	.31	.29
Total	1.80	1.77	1.75	1.76	1.72
Maintenance (reserve)	1.33	1.20	.85	.86	.77
Total operating expenses	3.13	2.97	2.60	2.62	2.49
Taxes	.20	.19	.20	.21	.20
Expenses and taxes	3.33	3.16	2.80	2.83	2.69
Interest on bonds and floating debt	.38	.36	.35	.32	.26
Wages of conductors and motormen	.95	.96	.89	.91	.93

FREIGHT AND EXPRESS TRAFFIC DISCUSSED IN NEW ENGLAND

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Nov. 30, with President Hile in the chair. Electric express and freight service was the topic discussed, with special reference to New England possibilities. The first speaker was C. V. Wood, vice-president of the Electric Express Company and traffic manager of the New England Investment & Security Company, Springfield, Mass. He was followed by George H. Dunford, general express and freight agent, Old Colony Street Railway, Brockton, Mass., and C. T. Battey, manager of the electric express department of the Union Street Railway, New Bedford, Mass.

Mr. Wood stated that the possibilities of electric express service are almost unlimited, and that cheap and prompt transportation is the keystone in the commercial arch. Nothing else has had such influence in the progress of states and nations. A transportation agent should not be allowed to perform only a part of his logical duty. The United States Department of Agriculture has estimated that in twelve products 43,000,000 tons valued at $73,000,000 were hauled by team in a year an average distance of from 7 to 10 miles between the point of production and the shipping point. Here is a great source of waste, and a saving of even 10 per cent would be most impressive. Passenger traffic is no longer sufficient for electric railways. The extension of lines across country has imposed new duties upon the companies. Mr. Wood said that some towns had met the Electric Express Company with open arms, while others had exhibited opposition which was distinctly hurtful to the communities which ought to be enjoying such service. The company operates in the Berkshire, Springfield and Providence-Attleboro districts, and is extending the service as fast as practicable. Southbridge is a Worcester town, but on account of the attitude of Worcester toward electric express service the larger share of Southbridge trade is with the City of Springfield, which is much farther away. An express car runs daily between Springfield and Southbridge with 20,000 lb. of Springfield goods on board, and in many of the rural districts served by the company a haul of 10 miles by team is saved by the electric express facilities. The company has 17 box and 7 flat cars, and 3 electric locomotives, and last year it operated 155,000 car miles in express service. The charges are slightly higher than the regular freight rates. Mr. Wood also described the work of the "trolley farming special" which was run over the central Massachusetts lines in the spring of the present year and said that good results have come out of this undertaking. He concluded with a brief discussion of the importance of uniformity of methods in trolley express extensions and touched upon the need of cutting down the cost of terminal labor. He inclined toward the straight haul with warehouse receipt and delivery. The cost of terminal handling varies from 7 cents to 40 cents per ton, according to local conditions.

Mr. Dunford reviewed his early experiences in the express business in central New York, where quick service and convenient schedules enabled the company to compete successfully with four old-line express companies, four steam roads and four steam packets on the Erie Canal, in addition to the overland team expresses. The Utica & Mohawk Valley Railway Company started this service in a very small way and had an express and a commodity rate. The express rate provided for pick-up and delivery by teams and the commodity rate provided for delivery at destination only. The first three months' receipts showed a deficit, but by constant soliciting and advertising and superior service the business was put on a paying basis in one year and has since grown steadily. After three years the electric express department was handling 90 per cent of the business in the territory.

In 1906 Mr. Dunford joined the staff of the Old Colony Street Railway and spent three months studying the conditions. He found that in the southern part of Massachusetts the facilities between Providence, R. I., and points on the company's lines were very poor. A service was first installed between Providence and Taunton and it became popular at once with the merchants. A circular letter was used, traveling salesmen were sent to cover the territory and two round trips daily were started, as the bulk of the business was perishable freight. Later, merchants in Taunton sent their buyers to Providence in the early morning, and prompt shipments were made back in time for the forenoon trade. This enabled the local merchants to carry a smaller stock, and an afternoon car provided for replenishing short stocks before the end of the day. The service has been extended and to-day the company operates between 38 cities and towns and has nine cars in regular service with three extra cars. [The company is now engaged in designing express cars of light weight without sacrifice of strength.—Eds.] A three-rate proposition is used, "A," "B" and "C." The "A" rate is for express service and provides for the collection and delivery by teams of all express matter, as with the old-line companies. The "B" rate provides for delivery at one end only. "C" provides a freight service which does not include team service at either end. These rates are governed by the official classification and class rates. The collection and delivery work is done by local expresses on a commission basis.

At Taunton the company has a concrete warehouse, 120 ft. x 40 ft., with facilities for car service on one side and team service on the other. Four cars and eight teams can be handled at once. At Brockton the company has a wooden warehouse built on practically the same plan. The capacity of both terminals permits handling 120 tons of freight per day. In the smaller towns the company has warehouses, and in the country districts platforms and buildings near the track, which are provided with portable runways which enable the crews to truck direct from the car to the building. New business is being created from the farmers, truck gardeners and milk producers. Long trips by wagon of many hours' night work are avoided and by the use of cars with open bulkheads in the summer season berries are kept cool in transit and from 2 cents to 6 cents more per quart are received for such shipments by electric express. Open-bulkhead cars are also used for live-stock shipments. A saving of from 12 hours to 24 hours is made on shipments of horses from livery stables, nine horses per car being the allowance. Each car has a portable runway. Foundry products are also handled successfully. Mr. Dunford closed with a short discussion of the benefits of electric express service to the farmer, particularly with reference to the elimination of team service on the highways.

Mr. Battey reviewed the electric express development of the New Bedford & Onset Street Railway, which started in 1902 under special legislative sanction. Previous to the establishment of this service it was necessary to team products 1½ miles to the freight station in Fairhaven, with a resulting freight train service often taking three or four days to reach the point of destination. There was no local delivery in the towns reached by the company. About 90 per cent of the business is sidewalk delivery. The ease of communication has enabled New Bedford merchants to compete successfully with Boston houses, and in the construction of summer residences in the Buzzards Bay district New Bedford contractors underbid Boston competitors. Conductors of express cars receive orders for goods from anyone on the line. These are assembled by telephonic advices at the urban end of the run and are shipped in a few hours to the purchaser. The rates charged cover the entire service. This service has tended to increase passenger receipts and to divert shopping patronage from Boston to New Bedford.

The success of the New Bedford & Onset service encouraged the Dartmouth & Westport Railway in 1903 to open a similar service between New Bedford and Fall River, with a schedule of three round trips daily. This schedule has since been increased to six round trips. The franchise forbids picking up or delivering goods on the sidewalks within either city. A notable stimulation in trade between New Bedford and Fall River has resulted from the establishment of electric express service. Large shipments of textiles are handled and goods which for-

merly occupied two days in transit now pass in as many hours. Dealers doing business in both cities who have a large sale of certain kinds of goods in one city and a small sale in the other ship in carload lots to the city where the larger sale exists and send the smaller quantities to the other city by electric express, thus saving much time and expense. Four round trips are made daily between Fall River and Providence and one daily between New Bedford and Providence, the latter being express without local stops in the run of 33 miles. The business of this line is in direct competition with a steamboat service between Providence and Fall River, and although the express rates are about 2 cents per 100 lb. higher than the water rates and the terminal facilities in each city have not been sufficiently large to handle the business properly, the traffic has increased 150 per cent since the first year of operation. The steamboat company has a freight solicitor on the road all of the time. The objections raised by public officials in the beginning have all been dissipated by experience. No objection has been raised to the use of express cars in the streets. Immigrants from Portugal landing at New Bedford are distributed throughout southeastern Massachusetts by trolley, and electric express is used to transport their baggage.

Mr. Battey stated that the percentage of loss and damage on goods carried by electric express is very small on account of the elimination of transferring in transit and the further point that the cars are loaded and unloaded by the crew, who must of necessity be careful men of good judgment. Mr. Battey gave it as his opinion that the present plan of handling electric express traffic by daylight will ultimately give way to night service, when the conditions are favorable to fast running, with no obstructions by passenger cars and no delays in waiting for passenger traffic. By this method goods can be shipped late in the afternoon for arrival at destination early the next morning and longer hauls can be made. As a result of electric express service a large part of the buying formerly done by New Bedford and Fall River merchants in Boston is now done in Providence. The merchants can do business on a smaller amount of capital on account of the facilities which allow them to replenish their stocks more quickly. Eight double-truck cars are now in service on the New Bedford express lines, with modern freight houses. Those in New Bedford and Fall River have over 5000 sq. ft. of floor area for freight purposes in each case, with track space for 10 cars, the total investment being about $130,000.

DISCUSSION

H. B. Potter, Boston Elevated Railway, emphasized the advantages of a flexible schedule in electric express service and pointed out the benefits of being freed from the necessity of running cars on short and fixed headways. He considered that the solicitation of patronage is an important phase of such work and trained business experts are needed to secure the traffic.

E. E. Potter, Stone & Webster, Boston, formerly manager of the New Bedford lines and later manager of the Seattle Electric Company, stated that the New Bedford management tried in the early days to avoid every dollar of investment in freight business, as it desired to build up the service on the minimum possible capital. He thought that the striking increase in population of New Bedford since the last census might be in part due to the benefits of electric express service. He described the handling of freight on the Seattle lines, emphasizing the character of the business as from warehouse to warehouse, with no picking up en route. Loaded freight cars were electrically hauled from the steamship docks and railroad terminals to industrial plants located off the railroad, with great benefit to the manufacturers. Cars of 60,000-lb. capacity were hauled loaded on 13 per cent grades in Seattle. This business amounted to about $10,000 per month, and was largely within the city. Mr. Potter spoke of the benefits of night service and of the economy with which such traffic can be handled when the system, crowded with traffic in the day time, is relatively free. He considered soliciting a good thing where the backers of the enterprise will put up the necessary money. In New Bedford soliciting was done in the early days, but a satisfied customer is the best solicitor. In closing Mr. Potter said that the co-operation of the transcontinental railroads had been a decided help in Seattle and that the co-operation of the railroads would affect local trolley express conditions in Massachusetts to a large extent. He felt that the field in New England is as yet scarcely touched.

Matthew C. Brush, assistant to the vice-president, Boston Elevated Railway, and recently general manager of the Buffalo & Lake Erie Traction Company, emphasized the difficulties of handling interstate electric freight service under the supervision of the Interstate Commerce Commission and of the two State commissions of New York and Pennsylvania. Regulation tended to run to excess under such conditions, notably in connection with the filing of tariffs, methods of doing business, etc. He pointed out the importance of terminal location and arrangement and urged the closest study of labor costs in electric express service. The terminal must be convenient for shippers and consignees and also such as to facilitate entrance to and egress from cars. He favored handling the business on the basis of transportation on the company's lines from warehouse to warehouse only. On the Buffalo & Lake Erie lines reliability and promptness of service were the telling points which made competition possible. The rates were about halfway between steam and express rates. A prohibitive rate was made on the fourth, fifth and sixth classes of commodities, which were too bulky and heavy for profitable transportation. The real revenue came from the package express business. On this a minimum rate of 25 cents was obtained. The operation of through cars and the reduction of handling to the minimum make for successful trolley express business. The best service justifies the retention of relatively high rates.

ANNUAL MEETING OF EXECUTIVE COMMITTEE MANUFACTURERS' ASSOCIATION

The annual meeting of the executive committee of the American Electric Railway Manufacturers' Association was held Friday, Dec. 9, in New York in the rooms of the American Electric Railway Association.

The committee passed upon the final reports of the several committees which had in charge the details of the exhibit and other arrangements at the recent Atlantic City convention.

The report of the secretary and treasurer showed a satisfactory cash balance on hand, and the report of the auditors indicated that the books of the association were properly kept and in satisfactory order.

The annual election of officers resulted as follows: President, C. C. Castle, manager railroad department, U. S. Metal & Manufacturing Company; vice-president in charge of entertainment, W. L. Conwell, Westinghouse Electric & Manufacturing Company; vice-president in charge of finance, C. S. Hawley, vice-president and general manager, Consolidated Car Heating Company; vice-president in charge of exhibits, K. D. Hequembourg, general sales agent, Walker & Bennett Manufacturing Company; vice-president in charge of relations with parent association, Henry C. Evans, Lorain Steel Company; secretary and treasurer, George Keegan, 165 Broadway, New York. The arrangements for the annual dinner, which is to be given at the Hotel Astor, in New York City, during the midwinter meeting of the American Electric Railway Association, were placed in charge of Mr. Conwell, vice-president in charge of entertainment.

A committee was appointed to consider the question of establishing a headquarters office for the association. This committee will report at the next meeting of the executive committee, which will occur in New York City on Jan. 27, 1911.

Plans are at present being considered for the electrification of a portion of the North Western Railway in the environs of St. Petersburg, Russia. It is proposed to build a power station for the development of the water-power of the Wolchow, and the scheme comprises the construction of a high-voltage line for the transmission of the electric current for other purposes.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The third annual meeting of the Central Electric Accounting Conference was held at the office of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, on Dec. 10, 1910.

The meeting was called to order by the president, W. H. Forse, Jr., Indiana Union Traction Company, at 10:30 a. m. In the absence of L. T. Hixson, the secretary-treasurer, E. D. Gault, auditor of the Mahoning & Shenango Railway & Light Company, was selected to act as secretary of the meeting.

ADDRESS OF MR. FORSE

W. H. Forse, Jr., then made the annual address of the president, as follows:

"Time rings down the curtain on another year of activity for our association, a year in which much has been accomplished. In reviewing the work of this period I am impressed with one fact above others and that is the willingness of our members to contribute their time and energies to increase the value of the meetings. We owe much to the members who have served on committees and to those who have prepared the papers for discussion. On behalf of the conference I extend hearty thanks to all who have thus bent their shoulders to the wheel.

"During the year we held meetings at Dayton, Ft. Wayne, Detroit and Chicago. Interesting, instructive papers have been read and discussed, and if we were to give our idea of the value of the meetings we should probably enthusiastically indorse the sentiment of one member who said that he usually gets several new ideas at each meeting, any one of which would be well worth the time and expense required for attendance. Special mention should be made of the splendid work accomplished by the committee on uniform comparative statements. This committee has undertaken a work of some magnitude and deserves to be commended for the careful manner in which researches are being made prior to making recommendations.

"One feature of the year's work has been the publication of pamphlets containing the papers read at the meetings, which can thus be permanently preserved for reference purposes. In addition to the printing of these papers an alphabetical list of items of expense in the operation of electric railways has been compiled, attractively bound and distributed free of cost to our members. This has been favorably commented upon. In addition to supplying our own members we have sold copies, at a profit, to non-member companies all over the country, and orders are still being received by the secretary.

"We have agreeably combined business with pleasure in some of our meetings. This was especially true at the Chicago meeting, when our genial host, Mr. Thompson, took us to Milwaukee in a special car. Mention should also be made of the pleasant steamer trip in June from Toledo to Detroit, when President Swift, of the American Street & Interurban Railway Accountants' Association, was present and favored us with a speech.

"It has been the policy of our association to keep in close touch with the larger organization, which is now known as the American Electric Railway Accountants' Association. I trust that this policy will be continued. Each organization can benefit from the interchange of ideas, and we are engaged in a common purpose.

"The future of our association looks bright. In closing my administration and turning over the keys of office to my successor, I would commend certain things to his and your consideration.

"I wish to propose as an unwritten law or a common custom of this association that an executive officer of the association shall serve one term and no more. This should, in my opinion, be the general rule of all bodies of this character, where the members are equally competent to fill any position in the gift of the assembly. I believe that such a practice will keep our association live and vigorous for many years to come. Every member will feel that he has an equal opportunity to give his best services to the association, and the rotation of service will continually infuse new ideas into the governing group known as the executive committee.

"The question of affiliation with the Central Electric Railway Association was carefully considered and thoroughly discussed at our Ft. Wayne meeting, but it was decided to take no action. The constitution and by-laws of the Central Electric Railway Association would require amendment in order to permit all of our members to come in under such a merger. Two members of our executive committee and several other members would be excluded unless such amendment were made, and it has, therefore, been decided to continue the present independent organization.

"The Central Electric Accounting Conference has made splendid progress during the short period of its existence, and I predict a continuation of this onward march. The accounting methods of our companies have been improved by the work accomplished at these meetings, but there is still much to do. I hope that as an organization we will continue to strive for the highest efficiency in electric railway accounting."

Norman McD. Crawford, president of the Mahoning & Shenango Railway & Light Company, welcomed the conference to Youngstown and to the courtesies of the company. President Forse appointed committees as follows: Resolutions, J. D. Maynes, E. L. Kasemeier, A. F. Elkins; nominations, E. D. Gault, A. J. Lamb and O. I. Davis.

A report of the committee on uniform comparative statements was then presented by S. C. Rogers, chairman; E. L. Kasemeier and C. E. Thompson. An abstract of this report follows:

REPORT OF THE COMMITTEE ON UNIFORM COMPARATIVE STATEMENTS

"Since the report of this committee submitted at your September meeting W. B. Wright, having severed his connection as auditor of the Indianapolis & Cincinnati Traction Company, resigned as chairman of this committee, which is very much to be regretted, not only by the other members of the committee, but also by the conference. Mr. Wright's known interest in this work of preparing a uniform comparative statement, his large experience and analytical mind made him peculiarly adapted to this work.

"His withdrawal from the committee, the appointment of another member in his place and the selection of a chairman have taken some time. Your new committee, in taking up this very important task, has had time to consider the subject only in a general sense, and more particularly as to the difficulties involved in preparing a form of comparative statement of operating and financial conditions that may be adopted as standard.

"For a number of years the classification of accounts adopted as standard by the American Street and Interurban Railway Accountants' Association was used quite extensively by electric railway companies, modified in a great many instances to meet the views of executive officers and to suit local conditions. It was not, however, until the Interstate Commerce Commission and several of the State commissions prescribed a classification of accounts that must be followed by companies coming under their immediate jurisdiction that the railway companies within the various States came to use the same classification of accounts, which goes to show that there must be compelling power to make effectual any form of comparative statement that may be adopted as standard by this conference.

"It is not simply a question of harmonizing the views of individual auditors represented in the conference membership, because we all know that the executive officers of the several companies which we represent are even more particular as to the nature of the information concerning operating and financial conditions and the manner in which it is shown on the monthly statements presented to them than they are as to the classification of accounts. Each executive operating official wants just such information as to operating and financial conditions as he can make use of and he wants it shown in the manner best understood by him.

"The first question that arises in the mind of the auditor just entering upon his duties is, 'What do the president, executive

committee and general manager want to know concerning the operating and financial condition of the corporation, and how should the information be shown?' When that is determined he will so plan his work and that of his assistants as to produce such information in the form desired. The auditor should, in addition, present to the executive officers such information as he considers essential whether required or not; he should not, however, present statistical information which is not put to practical use by the executive officers.

"What is essential from the viewpoint not only of the executive officers, but also of the auditor, and how these essentials shall be shown, is in brief the task committed to this committee.

"How to get in close touch with the needs and requirements of each of the railway companies represented in this conference and to harmonize all these factors, evolving therefrom a form of comparative statement for satisfactory use by each of our member companies, is a question this committee would like to present for discussion at this meeting, feeling that a free expression of individual views along this line will assist materially in this work.

"It might be an easy matter to lay out a comparative form of statement which might meet the views and needs of the members of the committee, but how about the executive operating officer, who because of the nature of his position with the company must use the information to the end that the business of the company may be economically and efficiently managed?

"Some one may suggest a plan whereby this committee may be able to obtain the views of the executive officers and operating officials of the railway companies on what they consider essentials in a comparative statement showing operating and financial conditions.

"In recording the actual facts concerning the operation and finances of a railway corporation, and in furnishing such information to the president, executive committee or general manager of the company, the auditor adopts those methods that he considers best suited to the local conditions, and that furnish the information desired by his executive officers.

"If this committee could get at a reason why a certain form of statement was used and why the executive officers want that information in just such a way, it would materially assist in this work. We bring this matter before you hoping that the members will express their individual views freely as to how to get this information into the hands of the committee, that in the end a form of comparative statement may be evolved that will give the auditor what he wants to show concerning the facts of operation and financial transactions recorded and also furnish to the executive officers of the several railway companies represented what they want to know and in a form that is of value and that will be used."

Following the presentation of the report of the committee a discussion took place which showed that it was necessary that the needs and wishes of executive and operating officials be taken into consideration. A number of the auditors present had prepared, at the request of the executive officers, statistical statements which were not put to any use. In most of these instances the reports were prepared for special purposes and the accounting departments continued to furnish them from day to day or week to week or month to month, learning subsequently that the information was no longer needed.

As a result of this discussion it was decided to address letters to the principal executive officials of the various member companies asking them to state their desires by letter as to the character of the information wanted in relation to the operating and financial conditions. This was done with the idea of getting the definite views of the various individual operating officers and with the feeling that only in this way could the accounting officers formulate a comparative statement of operating and financial conditions that might be adopted subsequently as standard. Among those who took part in the discussion on this subject were Mr. Crawford, Mr. Maynes, Mr. Kasemeier, Mr. Elkins and others.

The report of the executive committee was then presented by Mr. Elkins. The report commended the address of President Forse and also referred to the publication of the alphabetical list of items of expense in connection with the standard classification of accounts. The report, in part, was as follows:

"One important point which might be mentioned is the alphabetical list of items of expense in connection with the classification of accounts adopted by the American Electric Railway Accountants' Association. Your conference decided to have the items of expense printed and distributed to member companies as well as non-member companies at a small expense to them, and the result has been more than expected, as from 50 circular letters which were sent out by the secretary 69 copies were sold. The secretary reports that he has sent out 50 additional circular letters. The conference has never done anything better to justify its existence and work than the preparation of these pamphlets. We have had numerous letters of commendation and much good sentiment expressed in favor of the conference, and your executive committee recommends that this good work be kept up and that the alphabetical items of expense be reissued from time to time as demands justify.

"Your secretary is not with us to-day, but he reports ample funds on hand to care for the needs of the conference, and, therefore, we are in excellent financial condition."

A. J. Lamb, chief clerk of the Toledo Railways & Light Company, then read a paper on the subject of "Shop Accounts." An abstract of this paper follows.

MR. LAMB'S PAPER ON "SHOP ACCOUNTS"

"The primary object of a system of shop accounting is to furnish detail information as to the cost of work done at the shops. Some classes of work are done time after time; if definite records of the cost of such work are kept an average cost will be established in time and the knowledge thus acquired will make economies possible. A proper method of accounting will also determine the efficiency of different material and supplies, and, properly carried out, will determine at what time the cost of maintenance of equipment became so large that it should be discarded and new equipment purchased.

"The secondary object is to permit the comparison of work done at one shop with the results obtained at another. In order that these comparisons may be of value it is necessary that the method of figuring these costs be uniform.

"There are three elements of cost to be considered: labor, material and expense.

"It is unusual in street railway shop accounting to apportion in detail the overhead expense, which leaves it necessary to treat of labor and material only. Labor cost can be obtained without great effort.

"Each employee should be required to fill out daily a time ticket giving the car number, order number, description or classification of all work for the day. This ticket should be checked by the foreman and O. K.'d by him before it is turned over to the timekeeper. The timekeeper should summarize these tickets each day and check them with the payroll. Many shops are now using time clocks, and some require the employee to register his ticket at the time clock whenever he finishes a piece of work and again as soon as the foreman assigns him to another job.

"Material should be drawn from the storeroom only upon a regular storeroom requisition, properly approved by the foreman of the department where material is to be used. This order should not be filled by the storekeeper unless properly approved with the car number, classification, shop or manufacturing order number. Where material has been drawn and not used on the order or car number for which it was intended it should be returned to the storeroom and properly credited to that account.

"The shop order system gives a good record, is simple and should be used for work done by all departments. In the car shops it is used for car painting, repairing cars damaged by collision, annual overhauling, and for any special work on cars. Permanent shop order numbers may be used for the daily minor repairs. Work performed in the car shops for any other department should also be recorded on shop orders.

"Labor and material used on work of this description should be directly charged against each particular shop order number, which in turn is closed into the proper account. When a car is received in the shops it should be tagged with a card showing the work necessary to be done thereupon. A shop order in duplicate, with a serial number, should be issued immediately. The original, after being approved by the manager, should be forwarded to the auditing department, and the duplicate returned to the shops. This card should call for an estimate divided between labor and material for each division of the work. The charges against the shop order are made weekly on the reverse side of the card. When the order is completed a notification showing the completion of the work should be sent to the accounting department by the mechanical department.

"The advantages of the shop order system in a large company are apparent. It enables the manager to analyze his cost, and, by giving each job a permanent individuality, presents an excellent basis for comparison. It locates responsibility for the cost of each particular job and furnishes a basis for estimate of work yet to be done.

"In the plan of a large shop not enough care seems to be given in some designs to the logical location of the storeroom, with the result that the employees walk considerable distances for their supplies. Under these circumstances there is a great loss of labor time by both the messengers and their co-workers who are in need of the material to finish the job. We have a storeroom messenger; an annunciator is located in the storeroom and each department is numbered; the messenger answers the bell, gives the foreman of the department, where called, a requisition to fill out and returns for the material. The paint shop has a series of numbers for different material used, and on the order reports so many gallons of No. 2 or No. 3 or whatever material or quantity is used. The master mechanic has another card giving the labor and material used on cars for repairs and keeps it on file for future reference.

"The men's time is kept by the clock system, allowing 10 hours a day and a half hour for dinner.

"When the purchasing agent receives the bills he sends the original and duplicate to the storekeeper, who in turn checks them and returns to the purchasing agent. If the goods are not received, the storekeeper keeps the bills until the goods arrive and are checked.

"The storekeeper keeps an invoice file where he can refer back to any order at any time. As we have barns located in different parts of the city the storekeeper sets Monday, Wednesday and Friday on which the different depots can fill requisitions for the time intervening. This does away with confusion and the unnecessary time of going to and from the storeroom. Work train mileage, as well as labor, is charged to account No. 29 for storeroom supplies, unless some particular item is hauled for the shop, and then it is charged to account No. 9.

"The scrap is piled in separate heaps, according to material. When enough accumulates the purchasing agent disposes of it if the market is favorable for its disposal and gives the proper departments credit for the revenue derived."

Among those who took part in the discussion of Mr. Lamb's paper were Mr. Kasemeier, Mr. Young, Mr. Maynes and Mr. Werth, of the Mahoning & Shenango company.

At 12:30 o'clock the conference adjourned and went to the banquet room of the Young Men's Christian Association, where lunch was served. After the lunch Mr. Forse spoke on behalf of the conference and the following on behalf of the Mahoning & Shenango Railway & Light Company: Mr. Crawford, president; Mr. Randall, assistant to the president, and Mr. Rogers, treasurer. The conference was welcomed by M. J. Megown, secretary of the Youngstown Chamber of Commerce, and Edmund McDonald, Jr., secretary of the Young Men's Christian Association.

At the afternoon session A. F. Elkins discussed the subject of "Stores Accounting." He distributed the forms which he described. An abstract of the discussion of Mr. Elkins follows.

DISCUSSION ON "STORES ACCOUNTING," BY A. F. ELKINS

"You will all acknowledge that the storeroom has been a secondary consideration in the operation of electric railways in the past. Very little attention has been paid to it and great leaks have occurred by reason of this inattention. It has been given to the accountants to formulate a system of accounts for storeroom accounting. While they have no direct jurisdiction over the storekeeper aside from the accounting features, they must necessarily keep in very close touch with him. Mr. Forse, in his book on 'Electric Railway Auditing and Accounting,' brings that in very forcibly. If you have not a copy of that book I would recommend that you get it. He covers that field thoroughly.

"One of the few open questions to-day is the question of the authority of the auditor over the storekeeper. I find that most storekeepers are under the superintendent of motive power, master mechanic or some other operating head, and that the auditor has jurisdiction only through the accounting features. Our general manager, in an argument with me, said that the auditor should not have jurisdiction over the storekeeper because he was too far removed from the accounting department. He did not give any thought to the distance the agents along the line are removed.

"The requisition for supplies is made out either to the purchasing agent or the general manager and is signed by the head of the department and approved by the general manager, and then turned over to the purchasing agent. The requisition blanks are in book form and copies are numbered the same as the original blanks.

"The first copy of the official order is sent to the concern from which the material is purchased. The second copy is the purchasing agent's copy and is retained and filed with the requisition for supplies. The third is the storekeeper's copy. It is sent directly to the storekeeper and is retained by him to be checked directly against the invoice. The fourth is the auditor's copy.

"The material notification sheet is filled out, signed and sent to the storekeeper by the official who receives the material. This gives the storekeeper a complete record of every piece of material purchased on the system. Every invoice pertaining to the operation of the property must go through the books of the storekeeper, and so far as possible every invoice be charged to a material and supplies account and so audited through the auditing department.

"In the distribution of material we use a form called the requisition for supplies to the storekeeper. At the end of the day the master mechanic must fill out a requisition covering any small items that have been given on memorandum receipts. The storekeeper has the record and at the end of the day or the close of the week he fixes the price on the material and it is recorded. The form used for this purpose by the Scioto Valley Traction Company is not used by us. I want to commend it especially to the conference. It embraces a record of the storeroom for the day. The storekeeper there reports the transactions and forwards a signed copy to the auditor, who recapitulates his figures every day; and at the close of the month he has his storekeeper's report. Each sheet is numbered, the storekeeper keeps a copy and the record is complete. Some systems have a blank sheet, as we have, on which the storekeeper keeps his record. For instance, under any specific account he puts all of the material furnished and at the end of the month he has all of his material and the cost of that material. He takes these at different periods and enters them on his records. Importance is attached by some electric railways to loose-leaf devices for stock records. There is much to commend this system. However, I believe that a permanent book record is best.

"After the blank-sheet record has been compiled the storekeeper enters the material in the debit side of his book. At the close of the month he makes out a report to me. By this method the general manager can take the same report for the same month of the previous year and tell just exactly whether he is using more or less material, and what kind and why. This report is signed by the storekeeper and approved by the

superintendent of motive power, and the original is sent to the auditor and a copy to the general manager, and a copy retained by the storekeeper. This report is not made out until the books are closed by the storekeeper for the month. After the reports are made out the storekeeper has what might be called a perpetual inventory.

"I do not know of any more simple system than that we are using. I have tried to eliminate every feature from the system that would necessitate the employment of extra help and we have a system by which we can get results without going a long way around."

After the presentation of the paper a discussion took place which brought out various recommendations for improvements.

The subject of increase in membership of the conference was discussed. The president was authorized to appoint a membership committee of not less than three.

The committee on resolutions, composed of Messrs. Maynes, Kasemeier and Elkins, then made its report. The thanks of the conference were given to the Mahoning & Shenango Railway & Light Company for its hospitality. The committee advised that an honorary membership be created and W. B. Wright and M. W. Glover made honorary members. Mr. Glover was the first president of the conference and is now secretary of the Mobile Light & Railroad Company. The report was adopted.

The nominating committee then made its report, and the following officers were elected:

President, S. C. Rogers, treasurer, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; vice-president, C. E. Thompson, auditor, Chicago & Milwaukee Electric Railroad, Chicago, Ill.; secretary-treasurer, A. F. Elkins, auditor, Columbus, Delaware & Marion Railway, Columbus, Ohio; executive committee: A. J. Lamb, chief clerk, Toledo (Ohio) Railways & Light Company; F. K. Young, auditor, Scioto Valley Traction Company, Columbus, Ohio; E. L. Kasemeier, auditor, Ohio Electric Railway, Springfield, Ohio.

The conference was invited by the Ohio Electric Railway to hold its next meeting at Springfield, Ohio. This will be submitted to members for vote by mail.

ILLINOIS COMMISSION CALLS CONFERENCE TO DISCUSS INTERURBAN OPERATING METHODS

Orville F. Berry, chairman of the Railroad and Warehouse Commission of the State of Illinois, has issued the following bulletin to all electric railway managers in Illinois.

"The very rapid growth of interurban railroads, and both passenger and freight traffic thereon during the last few years, has made them a very important factor in transportation, differing in many respects from the steam road; and the manner of operating them successfully and safely is one of the present important problems for solution. This commission is desirous of assisting in every way possible in the proper solution of this question and to bring about a system of operating that will be safe to the public and profitable to the roads.

"To that end you are most earnestly requested to be present yourself, and to bring such of your operating force as you may deem best, at a meeting of interurban managers and operating officers to be held in the rooms of the Railroad and Warehouse Commission in Springfield Tuesday, Dec. 20, 1910, at 10 a. m., for the purpose of an informal discussion of this or any other subject that may properly be brought before the meeting."

It is understood that increased safety of operation is to be the subject under discussion.

The record of passenger train performances on the various steam railroads in New York State for October, 1910, just issued by the Public Service Commission, Second District, shows that during the month 63,648 passenger trains were run. In October, 1908, there were run 57,712 trains; in October, 1909, there were run 56,230 trains. Eighty-two per cent of all trains were on time at the divisional termini.

CONFERENCE ON INTERURBAN OPERATION BETWEEN RAILWAY AND INDIANA STATE OFFICIALS

A conference between representatives of interurban railways and State officials of Indiana was held in the State House at Indianapolis, Ind., on Tuesday, Dec. 13, to discuss the subject of operation and proposed improvements. The meeting was attended by Governor Marshall of Indiana, at whose request it was called. Including the officials of interurban railways, 40 people were present.

Governor Marshall said that the meeting was called in order that he might have definite information regarding the present law and the interurban business situation and because of the fact that unless full information regarding existing conditions is given the accidents which had occurred recently might lead to the passage of drastic statutes by the next Assembly. Although he desired to have additional safeguards provided for travelers, he would not pretend to say that the excitement which followed the recent accidents was justified. The Governor's clerk then read the report of the Railroad Commission of Indiana in relation to recent accidents.

Governor Marshall asked if there was any reason why a law should not be enacted making the violation of orders which resulted in loss of life a criminal offense.

Arthur W. Brady, president Indiana Union Traction Company, knew of no reason why steam and electric roads should not be on a parity in that respect.

Governor Marshall then called attention to the subject of obstructions to sight along interurban rights-of-way and said that the safety of operation would be increased if the obstructions were removed. He expressed the belief, to which the attorneys present agreed, that laws could be passed to enable the interurban roads to condemn obstructing property.

Senator Barrett said that the Ft. Wayne & Wabash Valley Traction Company had tried to condemn obstructions to sight at the point at which the Kingsland wreck took place, but that previous to this accident the company was unsuccessful.

Governor Marshall described the legislation of 1907 which provided that the Railroad Commission should investigate accidents, report to him and make recommendations designed to prevent a recurrence of them.

William J. Wood, chairman of the commission, said that the Supreme Court had not passed upon the legality of this legislation but that the railroads had met the requirements of the commission. On account of an imperfect statute, the commission had refrained from any mandatory action on this subject.

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, stated for the roads that it was his understanding that it was proper for the commission to investigate accidents and make recommendations. If the roads did not follow the recommendations of the commission, the courts could then decide whether the orders were enforceable.

Governor Marshall spoke of four companies that had had accidents and of the recommendations of the commission which followed. From the testimony before the commission, the Governor formed the opinion that the roads thought that length of service for employees was not a guarantee of efficiency. While most men learned by experience, others never learned. He thought that while a road might expect that long service would make a man more competent, length of employment was not a prime factor in the efficiency of a motorman.

The Governor called attention to a rule book containing 95 printed pages, issued by a local road. He asked the managers if the grade of men employed could learn those rules thoroughly enough during three weeks' instruction to use them at critical times.

Mr. Brady said that the roads employed high grade men of ability and trustworthiness. The length of the period of instruction varied with the men and the rules were not complicated. Referring to a recent investigation of accidents and to testimony that a motorman did not know the rules, Mr.

Brady said that the methods of investigation might have been so embarrassing to the witness that a confused and ill-advised reply was given.

Charles L. Henry said that an unsatisfactory man might slip through in spite of the best system of preliminary investigation. He knew of no accidents that had happened in Indiana because of lack of knowledge of the rules by trainmen.

Another speaker called attention to the Kingsland accident, saying that the man responsible had operated the opposing train for 60 days and was therefore familiar with the entire situation.

Commissioner Wood referred to an investigation by the commission which tended to show the poor service of motormen, who had been found reading newspapers and talking while the car was running and not often looking at their watches and time tables.

A discussion of the recommendation that motorman have a train service experience of one year before handling a car followed. The companies objected to the recommendation because this experience was not a guarantee of efficiency and because of the difficulty of getting men.

Mr. Brady said that the hazards of the service had not caused a loss of employees.

Charles L. Henry said that his company had not lost any employees on account of the wages paid by automobile manufacturers or any feeling of danger which had arisen.

In reference to the suggestion that motormen have a railroad experience of one year, Mr. Brady read the section relating to this subject in the reply of the Indiana Union Traction Company to the letter of the Railroad Commission. The reply is published on page 1203.

Governor Marshall asked if Mr. Brady contended that each road should choose its own men independently, or should the State establish a grade of efficiency?

Mr. Brady said that the roads would not object to the establishment of such a grade and they would observe it if it were shown that the recommendations of the State would improve efficiency.

Governor Marshall asked if the railroads knew of any way in which the State could establish a grade of efficiency of men and make a rule that could be adopted generally for the State.

Mr. Brady said that it would not be advisable to adopt the plan unless the State had some real way of determining the character of a man. If there was a real way, the plan should be put into effect.

Governor Marshall said that, even eliminating the humanitarian consideration, he knew that no management would wilfully employ inefficient men for trainmen and knowingly assome liabilities. He referred to existing legislation which prohibited the employment by steam roads of flagmen without one year's experience in railroading. He thought that it was characteristic in railroading as in life not to pay attention to causes until trouble resulted.

Mr. Brady discussed forcibly the comparative safety of travel on steam and electric trains. He called attention to the figures on this subject in the first part of his letter, reproduced in the following pages. He said that these figures required recognition. Mr. Brady held that the character of interurban trainmen was as high as or higher than that of steam railroad trainmen.

Governor Marshall replied that he took little stock in figures because they might have been determined from different premises. He called attention to the public excitement which followed recent accidents and asked if anything could be done or should be done to make the people feel easier. Accidents could not be prevented, but he was anxious to lessen them.

Mr. Brady spoke, he thought, for every road when he said that each one was determined to surround operation with every safeguard. Additional safeguards would be accepted willingly, but the roads should not be compelled to put a train in charge of a man long in the service when it was thought that the train would be safer with a man who had been in the service a shorter time. The Indiana Union Traction Company would be glad to report to the commission regarding the selection of men if the commission wished to investigate the subject.

Commissioner Wood said that the selection of men was of the greatest importance and the roads should assume the responsibility therefor.

T. C. Reynolds, general manager, Kokomo, Marion & Western Traction Company, described the system of instruction on his line. A man was employed first on the city system and was advanced afterward to the extra interurban list, finally reaching a regular interurban run. If the commission should require an experience of one year for trainmen, 50 per cent would be added to the operating expenses because a student would have to be carried on a car.

Commissioner Wood interpreted the suggested one-year-in-train-service rule to mean work on an interurban train in any capacity or on a steam train. He thought that even if the rule was hard and fast the roads could get plenty of men.

Mr. Murdock, Chicago, South Bend & Northern Indiana Railway and Evansville & Southern Indiana Traction Company, disapproved the employment of steam railroad men, who sometimes regarded the interurban railways as toys.

C. E. Morgan, general manager, Indianapolis, Crawfordsville & Western Traction Company, disapproved the promotion of conductors to the position of motormen. His experience of 11 years had shown him that conductors did not make the best motormen. The only serious accidents which had occurred were caused by motormen who had been promoted from the position of conductor. One railway manager objected to the one-year rule because it would require the employment of tramp steam railroad men.

Charles L. Henry read his answer to the commission regarding the recommendation that motormen should not assist in handling baggage. The reply was similar to that of the Indiana Union Traction Company shown in the following pages.

Mr. Brady read the reply of the Indiana Union Traction Company to the recommendation in reference to block signals. This is contained in the full reply of the company reprinted in the following pages. The company had 111 miles equipped with dispatchers' signals. Mr. Brady believed that they added to the safety of the lines and was ready to extend them on the order of the commission.

In a discussion which followed regarding the merits of dispatchers' signals various points were brought out which may be summarized as follows: Until recently the large signal companies had paid little attention to interurban roads. The manual block system suggested in the report of the commission was too expensive to operate, requiring a man at each block station. Present dispatchers' signals were good as aids to safety but did not provide full protection. The roads hoped for something better and within their means.

Commissioner Wood said that he would be satisfied if the roads would install signals similar to those of the Indiana Union Traction Company.

Governor Marshall said that if these signals were satisfactory now and, on the approval of the commission, the roads were ordered to install them at an assumed cost of $200 per mile, and after a year they were found practically obsolete, it would not be fair to the roads to order their replacement with improved signals.

Commissioner Wood summed up the recommendations of the commission as follows: Employ men as motormen with not less than one year's experience. Do not give motormen other duties. Put in block signals. The discussion was confusing because no distinction was made by some of the speakers at the meeting between block signals and dispatchers' signals.

A. A. Shane, general manager, Indianapolis, Columbus & Southern Traction Company, asked if the commission would recommend the adoption of one system of signals. Commissioner Wood replied that it would. Mr. Shane said that if that course was to be followed much more time should be allowed for deliberation and investigation. Signaling was to come and

the signals adopted should overcome the weakness of men. Dispatchers' signals did not do this. In order to determine efficiency, Mr. Shane had contracted for the installation of one block of signals. The interurban roads were investigating the subject through the committee on signaling, of which Mr. Shane was chairman, and it had been found that numerous improvements were almost ready for installation.

C. N. Wilcoxon, general manager, Chicago, Lake Shore & South Bend Railway, regretted to express the opinion that the commission should not recommend one system alone. A system satisfactory for use on the Indiana Union Traction Company lines would not be satisfactory on his road because of single-phase operation. He thought that dispatchers' signals did not accomplish what the commission wanted. They were not block signals. He did not object to any particular manufacturer of signals but wished improvement.

Governor Marshall summed up the discussion and said that he had called the conference to get light in order to determine means of making travel safer and to avoid, in a fair way, additional drastic or foolish legislation which would surely follow if the railroads were not amenable to reason.

Commissioner Wood, replying to a question by Mr. McReynolds, said that on the Kokomo, Marion & Western Traction Company lines trains were operated hourly over 27 miles of track and a signal system would not be needed.

Senator Barrett expressed the thanks and appreciation of the railway representatives because the Governor had accorded them a public hearing and free discussion.

Governor Marshall thought it would be disclosed that the temper of the roads and the commission would be such that the improvements would be made if possible in any way, and that legislation was not needed to bring this about.

LETTER OF INDIANA UNION TRACTION COMPANY

Following is the letter sent by the Indiana Union Traction Company to the commission:

"The Indiana Union Traction Company submits the following response to the recommendations contained in your report to it dated Nov. 21, 1910, in relation to the accident north of Tipton on Sept. 24, 1910.

"This company, by way of preface, calls your attention to the fact that among the 60,451,000 passengers carried by it and its predecessors during the period from June 27, 1899, when the Union Traction Company of Indiana was first organized, down to and including Aug. 31, 1910, a period of 11 years, only two fatalities occurred through neglect of either company or employees. During the same period 80,756,000 city passengers were carried without fatality. The deaths among interurban passengers of the company for the period stated average one to 30,225,500 and among all passengers one to 70,603,500. During the period from 1900 to 1908 (the latter year being the latest for which the figures are accessible in the annual reports of the Interstate Commerce Commission) the average fatalities among passengers transported by carriers reporting to that commission varied annually from a maximum of one death to 1,375,856 passengers in 1905 to a minimum of one death to 2,335,983 passengers in 1908, or an average for the period of one death to every 1,837,974 passengers carried.

"This company does not claim that these figures bear directly upon the facts of the particular accident involved in your report, but it does claim that such figures conclusively demonstrate the safety in high degree of the methods of operation hitherto employed on the lines of this company. It follows that changes of an important character in such methods should be made or required only on a clear showing that the safety of the traveling public will be enhanced thereby.

"The following responses are in the numbered order of your recommendations:

"1. (a) Your recommendation that applicants for positions as motormen or conductors should not be employed until their former records have been carefully investigated and all letters of references and recommendations have been carefully considered conforms to this company's past and present practice, which it will continue to follow.

"(b) Your recommendation that no motorman should be hereafter employed unless he has had at least one year's experience in train service embodies the principle that, other things being equal, experience should increase the reliability, qualifications and value of a trainman. Such principle this company has always recognized and followed, and will continue to follow. This company will further adopt and follow, so far as may be practicable, your specific recommendation. This company does not believe, however, that the highly important and responsible position of motorman should be filled solely with regard to length of service. Cases have arisen, and are certain to arise again, where one man having an extended experience in train service would be a less competent and reliable motorman than another man of much less experience. For instance, an excellent conductor of long experience might not be as good a motorman as another man of comparatively short experience. In all such cases, where the rule you recommend cannot be followed without the selection of a less competent man and the rejection of a more competent man, this company, being directly charged with responsibility for the safe carriage of many hundreds of thousands of passengers each month, cannot undertake to adhere rigidly to the rule referred to.

"Your attention is called to the fact that the motorman at fault in the accident here involved was one of extended experience, to whom the rule recommended would have no application.

"Your attention is also called to the practical impossibility of adhering strictly at all times and under all circumstances to the rule recommended. Interurban companies have no extensive switching yards where employees may obtain actual experience in a certain kind of train service. They have no place where one man by watching and helping another trainman may obtain experience for a long period, as in the case of a fireman on a steam locomotive. In the limited space of the modern interurban passenger car are compactly placed a motorman's cab, baggage and express compartment, smokers' compartment and ladies' compartment, the functions of which in the case of a steam railroad require an entire train of locomotives and cars. To keep a man for an extended period on one of these interurban passenger cars where employees cannot be kept at a distance from one another as they can on a steam railroad train, for the purpose of learning the duties of trainmen by observation and the performance of such duties as can be incidentally imposed on him, would be an unwise and unsafe course. Such a man cannot be constantly engaged in work, and when not so engaged would be a source of distraction to and interference with other trainmen.

"A practice so filled with hazard should not be followed; moreover, training and experience obtained in this way would not be valuable. Furthermore, interurban companies could not rely with safety beyond a very limited extent upon securing for motormen men with one year's experience in steam railroad service. The experience of interurban companies varies, but this company has found that by reason of the difference in the two classes of service and the difference in the kinds of equipment handled steam railroad service sometimes serves to disqualify, rather than qualify, a man for interurban service. Some lessons which a steam railroad man has learned must be unlearned in interurban service. If, therefore, a rule should be adopted the practical effect of which was to compel the interurban companies to resort to men having one year's experience in steam railroad train service, the actual result would be the employment in many instances of men less efficient than those who might be selected from other fields.

"(c) Your recommendation that motormen shall not be required to assist in caring for baggage or express this company cannot accede to. The duties imposed on motormen in this connection require attention only when the car is at a standstill and not while the car is in motion. By far the greatest part of all baggage and express handled is taken on or let off at a few

stations, at the principal of which baggagemen are employed, so that comparatively little attention is required even at these points on the part of the motorman.

"The case of the motorman is entirely different from that of the locomotive engineer. Even while his car is in operation the motorman has none of the complicated duties to perform which require the constant attention of the engineer, as, for instance, attention to water and steam gages, lubrication, coal and water supply, etc. When the car is stopped the motorman has ordinarily no duties to perform with respect to the equipment of the car, while the engineer is required at such times, as well as others, to give his attention to the intricate machinery in his charge. The difference between the two is that the engineer is responsible at all times for the operation of a moving power plant, while in the case of the motorman the power is furnished to his car ready for use from a central power plant operated by experts.

"The adoption of the rule recommended would compel this company to impose the entire handling of baggage and express on the conductor alone—a task calling him away from the care of passengers and often beyond his physical ability, requiring the co-operation of both motorman and conductor as now—or to place on each of its cars carrying baggage or express an additional man, whose sole duty would be the handling of these articles. It is obvious that the expense of this last course would prohibit its adoption for the great majority of cars on which baggage and express are now carried, since on many of these cars the amount of baggage carried is very small, and such baggage is carried entirely for the accommodation of passengers, for whom it is generally important, and frequently essential, that the baggage be transported on the same car that carries the owner. This would compel the company to confine the carriage of baggage to a small number of cars to the great inconvenience of the traveling public and in violation of the act of March 8, 1907, as heretofore construed by you.

"The commission will bear in mind that the interurban companies of the State prior to the passage of the act referred to limited the carrying of baggage in all reasonable ways, feeling that with their limited baggage compartments the carriage of baggage was a burden and not a benefit to them. It was only after the commission had indicated to the interurban companies its view that the act referred to, which requires the carriage of 150 lb. of free baggage per passenger, with very low rates for excess weight, applied to interurban companies and had suggested the prosecution of interurban companies for violation of the act that the interurban companies changed their practice and adopted the view of the commission in that respect.

"This company would hesitate long before placing a baggageman on its cars unless the amount of baggage to be carried should be such as to engross his time completely from the beginning to the end of his run, so that he could not distract or interfere with the trainmen. An idle employee on an interurban car is a menace to safe operation.

"(d) Your recommendation that separate compartments be provided for motormen this company will comply with. It is and has been the practice of this company to exclude all persons, except those having duties to perform there, from the compartment of the car occupied by the motorman; and in the case of those cars in which the motorman is placed in a large compartment adapted also to the carriage of baggage and express it is and has been the rule of the company to exclude all passengers therefrom, except when absolutely necessary to accommodate passengers on special occasions. This rule we will now modify so that passengers will be excluded at all times from such compartment, although at times of heaviest travel, as, for instance, during the State fair, when our facilities are taxed to their full capacity, this modification will greatly inconvenience the traveling public.

"(e) Your recommendation that in case of a passenger trailer or other additional passenger car attached to a passenger motor car a third man shall be employed to work under the direction of the conductor this company will comply with, this according with our past and present practice.

"2. Your recommendation that this company proceed to install block signals this company is ready to comply with as soon as a satisfactory signal can be secured at an expense within the financial ability of the company to install and operate. From the conference held with the commission last week and from your report to one of the interurban companies we understand that the type of signal system now in use on the lines of this company between Indianapolis and Muncie and between Anderson and Wabash has the approval of the commission, and we are willing to extend this system over any of the lines of the company on which the commission desires that it be installed.

"We call attention, however, to the fact that at this time a number of signal systems are being presented for consideration, and that one or more of these may prove better than any practicable system now in use.

"We shall diligently pursue this subject, and shall be pleased to present, if possible, plans and blueprints to you by the time limited in your recommendation as modified, viz., Feb. 1, 1911.

"3. Your recommendation that this company shall enforce 'the double-order system of dispatching' on its lines this company is ready to comply with under a rule to be approved by the commission. We understand that the system now in use is what is known by railroad men as the 'double-order system,' but that the commission by the term means the system which requires both motorman and conductor to read back the order to the dispatcher. The commission will recognize the fact that the adoption of this rule is a departure from the method of dispatching which has heretofore been in such successful operation on the lines of this company, and approved by the commission, and no accident has been caused by any failure in the dispatching system used. It is, therefore, important that in the displacement of the present single-order system by the double-order system it be done only under a reasonable and well-considered rule.

"We suggest that an early conference be held between the commission and representatives of the interurban railroad companies to formulate a proper rule so that the same may be made effective by Jan. 1.

"4. Your recommendation that obstructions to sight at curves where sight is badly obstructed be removed, and that until this be done slow-speed signals should be posted at such curves limiting the rate of speed to not more than 15 m.p.h., this company will comply with. We suggest, however, that the better practice would be to so limit the speed at such points as to permit the car to be stopped within half the range of vision of the motorman.

"In this connection we call attention to the fact that this company's policy has been, and still is, where possible, to remove such obstructions and that this has been done in many instances.

"5. Your recommendation that division superintendents and trainmasters—by which we understand is meant those in immediate charge of trainmen—should not be burdened with other duties than those pertaining to train operation, which we understand to be those usually devolving upon the transportation department, this company will gladly conform to, in accord with its present practice. The commission will observe that the organization required by the mileage of this company's lines has hitherto compelled the adoption of the principle referred to, but that in the case of many small lines operating only a few cars, where the superintendent must necessarily have charge of rolling stock, roadbed and overhead construction, as well as all other property of the company, such a rule cannot be followed.

"6. Your recommendation that this company shall carefully consider and report to the commission the expediency of establishing a committee on safety this company will gladly comply with."

Hugh McCloskey, president of the New Orleans Railway & Light Company, is taking a very active interest in endeavoring to secure the selection of New Orleans for the World's Panama Exposition. This question is to be brought up before Congress at the present session.

STREET RAILWAY RIOT IN TORONTO

A riot of considerable proportions directed against the local railway company occurred in Toronto, Dec. 7, following a mass meeting called by the Mayor and City Council to protest against some new prepayment cars put into service by the Toronto Railway Company and the enforcement of "no smoking" rules on the cars. A mob composed of people who had been at the meeting listening to the inflammatory speeches there, reinforced by others in the streets, threw stones and other missiles at every car that operated on Yonge Street for over an hour. Two constables, one conductor and five citizens were injured and a number of cars damaged by broken windows before the police could stop the riot.

The trouble seems to have been due partly to the hostile attitude of the Mayor and other local authorities toward the railway company, partly to politics because of the approaching election, partly to the delays in boarding cars because of short platforms, and partly to the cold weather, which made any delays in boarding disagreeable to passengers.

The Toronto Railway Company has had under consideration for a good many months the installation of prepayment cars on its system. On Nov. 26 the company announced through the press that the system would be first started on the Yonge Street line, the most important street in the city. Fifteen cars were equipped with fare boxes and put in service. On Nov. 29 the company announced that on Dec. 1 all the cars would be operated on the prepayment system and where they were not equipped with fare boxes the conductors would collect fares with the present type of fare box. Simultaneously the company announced that passengers would not be allowed to stand or smoke on the rear platform, but would be obliged to step inside the car.

The new rules involved such a great change in the habits of the people that it led to many delays, and a public meeting to protest against the change was called for Dec. 7, with Mayor Geary in the chair. The Mayor's speech was particularly strong against the company. According to the reports in the press he said in part: "If we were not thoroughly law-abiding, I may say docile, there would have been breaches of the peace already. The great danger is that an exasperated people may be disposed toward breaches of the peace which all of us would rather not see committed."

The Comptroller of the city is reported as saying: "Toronto will never have a proper kind of car service until it owns and operates a car service for itself. We are going to ask the Legislature to change the law which gives such power to a private company."

Other speakers urged that the city should operate the railway as a municipal enterprise upon the expiration of its franchise. Following this meeting the riot already described occurred.

At a hearing held Dec. 9 by the Ontario Railway and Municipal Board to consider the subject it was decided that the front doors of the trailers should be open to allow the exit of passengers. The company also announced that it had decided to allow conductors to exercise their own judgment about allowing passengers to use the rear doors of the cars for exit when the cars were crowded.

Corporation Counsel Drayton asked that the system should be suspended during the Christmas shopping season, but the request was not granted. A number of witnesses testified in regard to the difficulties in boarding cars and the discomfort caused by the inclement weather. The counsel for the railway company claimed that a large part of the difficulty had arisen because the question had been used at the City Hall as a matter of politics, while at the office of the company it was treated as a matter of business. He believed that if a fair trial were given the system would prove advantageous to the public.

As a result of the hearing the board declined to revoke its permission allowing the company to use the cars, but adjourned the hearing until Dec. 19 to give the company time to collect statistics showing the adaptability of the new system to Toronto conditions.

Thomas W. Casey, general manager of the Pay-as-You-Enter-Car-Corporation, New York, on being interviewed, said that while the Toronto cars had been licensed by his Canadian company, he attributed the trouble largely to the fact that the platforms were not designed according to the specifications of his company and that they were shorter than experience had shown to be desirable. It was Mr. Casey's opinion that if the cars had been designed with longer platforms the trouble would have been avoided.

NATIONAL CIVIC FEDERATION COMMITTEE DISCUSSES STRIKE PREVENTION

On Tuesday, Dec. 13, a meeting of a sub-committee of the National Civic Federation was held in New York to discuss means of preventing strikes by the employees of public service corporations. The chairman of the committee, Seth Low, ex-Mayor of New York and president of the federation, discussed the Erdman act, which provides for arbitration of labor troubles on interstate railroads. Under this act the chairman of the Interstate Commerce Commission, or the Commissioner of Labor, can offer his services whenever a controversy arises between a railroad and its employees. The Canadian arbitration act has a coercive provision that no strike or lock-out shall take place without 30 days' notice. Mr. Low said that both acts had proved very successful. Continuing, he said that strikes of employees of public service corporations were especially undesirable because of the injury to the public. He then read a draft of a proposed arbitration act which could be submitted to the annual conference of the federation after amendment by the sub-committee. If approved by the main body, this proposal could in turn be offered to the Legislature of the State of New York for passage as a law.

The principal feature of Mr. Low's suggestion was that before striking employees of public service corporations must file in writing a statement of grievances both with their employers and with the State Board of Mediation and Arbitration, and that in like manner corporations must give proper notice of a lock-out; that immediately on receipt of such statements the board should offer its good offices; that the Governor of the State could appoint an investigating committee of three, on petition of one of the parties in dispute or of any five citizens of the State, or on his own initiative. The arbitration committee might be composed of members of the regular board or of men especially familiar with the matter in dispute.

William C. Rogers, a member of the State Board of Arbitration, explained that the present arbitration law covered practically all the points brought up by Mr. Low, with the exception of the written advance notice of grievances. Several labor leaders present said that they would not encourage for a moment the passage of any law which tied the hands of the workingmen as to when and how they should have the right to strike. They had no objection to arbitration, but it was their experience that it was much harder to get the employers to submit to arbitration than the workmen.

After further discussion it was decided to examine more closely the present arbitration law of New York State with a view of incorporating in the same some amendment along the lines suggested by Mr. Low. This subject will be discussed at another meeting of the sub-committee before the annual conference of the National Civic Federation to be held Jan. 12 to 14 inclusive in New York. It is likely that the parent body will be asked to appoint a committee to study the possibility of unifying arbitration laws throughout the country.

During August, 1910, 14 persons were killed and 414 persons were injured on the electric railways in Pennsylvania. In August, 1909, the killed numbered 19 and 577 were injured.

HEARING ON SERVICE IN SUBWAY IN NEW YORK

The hearing on service in the subway in New York was continued before Commissioner Eustis, of the Public Service Commission of the First District of New York, on Dec. 7, 1910. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, said that records were kept of the ticket sales at the subway stations, but that the tickets deposited in the chopping boxes were not counted regularly. Mr. Hedley repeated the statement which he made at the hearing on Nov. 30, 1910, that the increase in passengers on the Broadway line between the Dyckman Street station and 137th Street, both included, for July, August and September, 1910, was less than 0.1 per cent over the corresponding period in 1909.

E. G. Connette, transportation engineer of the commission, submitted a tabulation of the inspection which was made under his supervision of the north and south bound service on the Broadway division on Nov. 15, 1910, showing the number of trains, cars, seats and passengers, southbound, past the Dyckman, 157th Street and 137th Street stations, from 6:30 a. m. to 9:30 a. m. and northbound past the same stations from 4:30 p. m. to 7:30 p. m. This statement showed that some southbound trains were overloaded south of the 157th Street station and the 137th Street station. It also showed some trains overloaded northbound at 137th Street station and at 157th Street station. He also submitted a blueprint showing a comparison of the traffic from inspections made on March 23, Sept. 19 and Nov. 15, 1910. Mr. Connette also said that there had been an increase in patronage of 23 per cent north of 137th Street on the five local trains that are run to Dyckman Street during the evening rush hours. He then explained his records in detail. Delays in train movement at 103d Street and between 103d Street and Ninety-sixth Street southbound were caused by the necessity of fitting the southbound express trains on the Broadway branch into a predetermined schedule in order to balance the traffic south of Ninety-sixth Street. The only way this could be eliminated would be to run all of the express trains to Ninety-sixth Street local in order to maintain an even headway and to fit them into the schedule in their proper places when they reach Ninety-sixth Street. It would, perhaps, tend to improve conditions to provide 15-minute periods or 20-minute periods instead of 30-minute periods during the non-rush hours in which the company should be required to furnish seats at least equal to the number of passengers.

The details of the service furnished on Sunday, Nov. 27, were then discussed. On this date there were 25 half hours in which the order of the commission had been violated. Mr. Hedley could not at the time recall the special circumstance that was responsible for the conditions on the day mentioned.

Commissioner Eustis said that he would recommend that this violation of the order of the commission go to counsel for prosecution, but told James L. Quackenbush, of counsel for the company, that he would give the company an opportunity to study the traffic returns of Nov. 27. The hearing was adjourned until Dec. 13, 1910.

Subsequently Mr. Hedley addressed a letter to the commission in which he explained that the violations of the order of the commission between noon and midnight on Nov. 27 were due to accidents to the drawbars of two express trains and to an express train which had to be taken out of service because it could not make the schedule. In the letter to the commission Mr. Hedley said:

"It is the intention of this company to obey Order 1211, but there are times when unavoidable failures occur to the equipment of the company or otherwise that prevent the company from actually getting trains over the road to accommodate every person with a seat."

In a second letter to the commission Mr. Hedley said, referring to the count of Nov. 27:

"A check taken on a previous Sunday showed sufficient service during the hours mentioned, and we have added five specials to the regular Sunday schedule. The matter of sufficient service will receive the proper attention and another check will be taken Sunday, Dec. 11."

The commission has directed its counsel to proceed against the company in the Supreme Court for violation of the order of the commission in regard to service in the subway.

Mr. Hedley issued a statement on Dec. 11, 1910, in which he referred, in part, as follows to the improvements which are being carried out in the subway:

"We have within the last 19 months ordered 325 new steel cars with center side doors, and reconstructed 469 of the old cars, providing them with center side doors, and installed on each car a new system of passing the signal to the motorman by means of a flashlight, so as to save a few seconds at each station for the train. We are installing the most up-to-date brake development, known as the electro-pneumatic brake, which will, when completed, stop a 10-car train running at a speed of 40 m.p.h. on a level track in a distance of 365 ft.

"This is the first train-retarding system anywhere in the world to accomplish these results for heavy train movement. We are improving and changing our signal system so that the greatest possible number of trains and cars may be operated.

"We are lengthening the local platforms so that six cars per train may be operated instead of five and 10 cars on the express tracks instead of eight. Each of these 10-car trains is being equipped with motors equal to 3200 hp, or more than twice the horse-power used on the large steam locomotives on the Pennsylvania system. We are increasing our power house and its appurtenances to furnish power for this increased load. Increasing the length of the station platforms is a hazardous engineering undertaking, necessitating the blasting of rock immediately adjoining the railroad tracks. To accomplish this work with reasonable safety necessitates trains stopping at times before the blasts are shot off, and stopping of trains for the erection of timbers, supports and girders, and the operation of trains past these points under a slow speed.

"The above-related improvements will cost nearly $10,000,000. They indicate the company's desire to relieve, if possible, the indecent congestion of passengers in the subway during the rush hours."

INVENTORS' GUILD

During the last year an organization of inventors has been incorporated with headquarters in New York City for the following purpose, as outlined in the constitution of the society:

"The object of the guild is to advance the application of the useful arts and sciences, to further the interests and secure full acknowledgment and protection for the rights of inventors, to foster social relations among those who have made notable advances in the application of the useful arts and sciences."

The membership of the Inventors' Guild is limited to 50. A member must be formally proposed by a member of the guild, must be personally known to five members of the guild, must pass the membership committee and board of governors, and finally must be voted upon by the whole membership, four per cent of the votes cast being sufficient to reject a candidate. The object of such discrimination is to include among the members of the guild men who not only have made inventions, but who have achieved some measure of success in connection therewith, and who will therefore be capable of exerting some influence; and also that no one shall be admitted who will not be congenial to practically the entire membership.

The officers of the Inventors' Guild are as follows Ralph D. Mershon, president; Chas. W. Hunt, first vice-president; Chas. S. Bradley, second vice-president; Thomas Robins, secretary, and Henry L. Doherty, treasurer. At present the guild has 29 members, including the following: Bion J. Arnold, Dr. L. H. Baeckeland, Thomas A. Edison, Stephen D. Field, James Gayley, Peter Cooper Hewitt, Prof. Michael I. Pupin, Dr. F. Schniewind, C. H. Smoot, Prof. Carl Thomas and B. F. Wood.

COMMUNICATION

THE ADVANTAGES OF STORAGE BATTERY CARS

Boston, Dec. 12, 1910.

TO THE EDITORS:

I read with much interest your comment in the ELECTRIC RAILWAY JOURNAL of Dec. 10 on the design and advantages and disadvantages of the storage battery car as we have it today. It has occurred to me that its greatest advantage has been overlooked by you, in that by its use the load factor of any existing plant will be greatly increased.

Its use, as you say, will be confined to lines where the traffic is light or irregular. In any street railway system the charging of such cars can take place when the load on the plant is low. The installation of such cars will also reduce the peak load of many plants, giving a greater operating economy.

WARREN B. HOPKINS.

FINAL DECISION IN THIRD AVENUE REORGANIZATION

After a rehearing, an opinion has been issued by the New York Public Service Commission for the First District denying the request for a change in the order disapproving the plan for reorganization of the Third Avenue Railroad System. An abstract of the order in which the commission disapproved the plan was published in the issue of the ELECTRIC RAILWAY JOURNAL of Aug. 13, 1910, page 262.

In its latest opinion, dated Dec. 5, 1910, the commission says:

"The commission has carefully considered the grounds specified in the application for rehearing as reasons for a change in its order as well as the additional proof presented. Some of these specifications of error indicate that in the opinion of the applicants the commission has in its conclusions erred as to the law either in the interpretation of the statutes of the State or in the application of those statutes to the application of the petitioners, and in some cases it is stated that constitutional rights of the petitioners have been infringed. Many of these specifications of error indicate that in the opinion of the applicants the commission has in its conclusions erred as to the effect, the weight or the existence of evidence. In other instances the position of the commission is not fully or correctly stated.

"In view of the very extended discussion in the former opinion of the commission, it does not seem necessary to refer to these specifications in detail or to say more than that after careful examination the commission sees no reason for changing upon such grounds its determination."

In referring to the value of the property to be acquired by the new company and for which securities proposed to be issued are the important subject of investigation, the commission mentions a specification of errors in figures. It says, however, that "if these claims were to be granted, the decision of the commission now sought to be abrogated would not be affected; for property worth not more than $35,000,000 or $40,000,000, against which there are nearly $18,000,000 of liabilities, leaving net, say, $17,000,000 to $20,000,000 of property, does not justify the issuance of $55,000,000 of securities, even though $8,000,000 to $10,000,000 of these securities be used for improvements and other necessary expenses.

"The additional proof as to receipts and expenditures for the year ending June 30, 1910, and as to an increase of receipts in July and August, 1910, over the same months in 1909 does not in any substantial way contradict the conclusions stated in the opinion of the commission; it confirms them.

"The commission, not having before it complete figures for the entire year of 1909-1910, estimated from partial figures that the income applicable to the investment would be about $1,900,000 to $1,945,000. The figures for that year now introduced at the rehearing show a surplus of $2,432,348, which is increased to $2,532,348 by arbitrarily deducting from the operating expenses of the Yonkers Railroad as officially reported the sum of $100,000 expended in rehabilitating certain stretches of track. While such expenditure to repair past neglect was abnormal, it may also be said that the very low cost of maintaining the new cars in use on other roads of the system makes their operating expenses at present abnormal in the opposite direction. Taking the figures as stated without the adjustment suggested, there is

a surplus of		$2,432,348
from which take the following items:		
Compensation of receiver for conduct of the properties, July 1 to Dec. 31, 1909	$37,500	
Depreciation, as in previous opinion	500,000	
Other reserves, same	30,000	567,500
Final net		$1,864,848

"With the $100,000 item deducted from operating expenses, the gross income applicable to the properties would be $1,964,848.

"The operating ratio from the figures shown at the rehearing was 60.5, which is, as the commission anticipated, unusually low, the net results being practically the amount estimated by the commission.

"As to the annual increase in receipts, the evidence now introduced tends to show, disregarding first the collateral items of income from different sources which do not vary much from year to year, that the receipts from passengers were (1910) $7,504,646, as against (1909) $6,844,144, an increase of $660,502, or about 9.6 per cent, and that the car miles operated in 1910 were less than in the year 1909 upon the Third Avenue, the Dry Dock, the Forty-second Street and the Union, which were the main lines of the company, and were greater only on the Southern Boulevard, the Westchester and the Yonkers, where the percentage of increase in receipts was the greatest. In view of the fact that new and larger cars and the pay-as-you-enter system of collecting fares would in any case be expected largely to increase the returns after July 1, 1909, when they were introduced, and would of itself cause an increase until the fall of 1910, it does not seem that the 9 per cent increase furnishes any ground for assuming that the 5 per cent annual increase estimated by the commission from past experience, where circumstances were from year to year substantially the same, is not enough. The comparison of July and August, 1909, with July and August, 1910, as introduced at the rehearing shows an increase of 11.8 per cent in July and of 5.3 per cent in August."

The commission reaffirms the position regarding capitalization stated in the earlier decision, as follows: "'The commission believes that the amount of capital represented by bonds should not be in excess of the amount upon which there is definite certainty that interest may be earned. It would obviously be unwise and useless to approve a plan which might easily mean another foreclosure and reorganization in a few years. This is the second time within 10 years that the Third Avenue company has been in the hands of a receiver. It is time that a conservative plan were adopted and upon such sound principles that another cataclysm will not be necessary. The commission believes this policy to be sound.'"

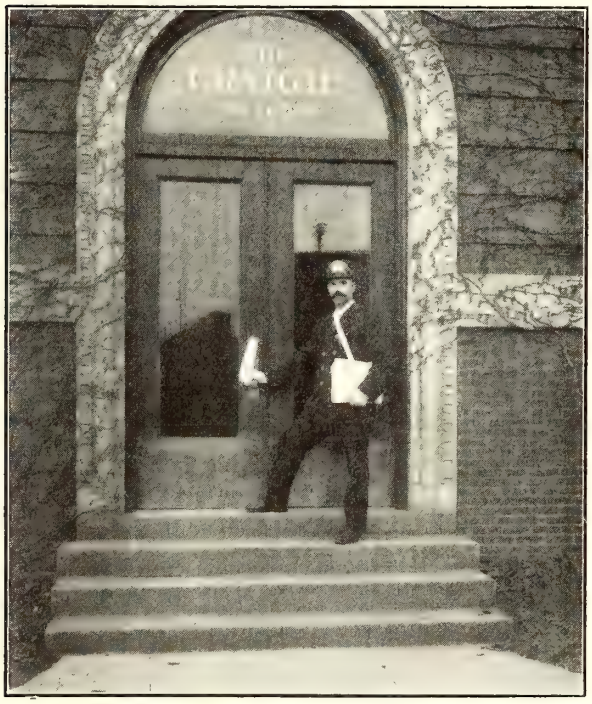
"It should also be noted that the commission has not fixed upon any specific amount as to the final sum of stocks and bonds that may be issued. The single question to be decided was, and is, whether the application should be granted. However, in order to facilitate an early reorganization upon a secure and sound basis, the commission in its original opinion indicated the factors it thought should be considered, reserving its determination upon certain factors, such as the proper allowance for discounts, commissions and organization expenses of the new company, until the time when a new plan is submitted. This was proper and necessary, for certain of these expenses were unknown and not fully ascertainable. Others depend upon the kind of securities to be issued, etc. However, as the applicants have not seen fit to modify their plans, but insist upon action upon the application as submitted, the request of the petitioners that the commission abrogate, modify or change its order herein so as to grant the relief asked for in the petition of the bondholders' committee and the petition of the Third Avenue Railroad are denied."

The expectation is that the case will now be taken to the courts.

NOVEL ADVERTISING BY THE BOSTON ELEVATED RAILWAY

As is well known, the Boston Elevated Railway during the fall inserted at intervals in the leading newspapers of the city a series of maps explanatory of the remarkable development of the system in the way of providing rapid transit since the elevated assumed control. With these maps were given some figures which disclosed facts rather startling to the layman whose intimacy with the elevated system as a whole began in the morning with his ride from his home to his office and ended in his safe arrival at the former place in the evening. Several references to this series of advertisements have been published in the Electric Railway Journal, and upon their completion, as announced in this paper, it was decided to have them reprinted and bound together in pamphlet form, with a short introduction. It was then a question of the manner in which this issue of 100,000 pamphlets should be distributed, and the thought occurred to Maj.-Gen. W. A. Bancroft, president of the company, that a novel way to accomplish this was to have them distributed from house to house by neatly uniformed employees.

The entire territory served by the company was divided into



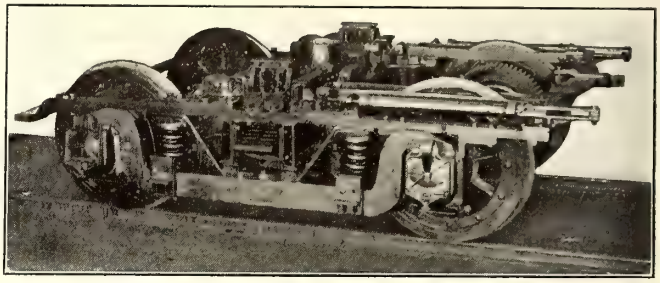
Employee of Boston Elevated Railway Delivering Traffic Pamphlets

sections and 254 men from the several divisions were assigned to the duty. They reported for work with tidy uniforms and shoes polished, and were provided with white gloves and a canvas strap in which to carry the pamphlets. Each man was supplied with 150, and he took a car to his particular district and began his route from house to house, ringing the bell and politely presenting the pamphlet, with the compliments of the company, to whomsoever answered the bell. When nobody came to the door, he left a pamphlet securely placed in the mail box. When his first load was delivered he returned for additional pamphlets until his district was completely covered.

The cut herewith shows one of the detail in the act of delivering one of the pamphlets. The entire 100,000 were distributed at an average rate of 46 per hour, and a very favorable impression was made upon the public. It is undoubtedly true that the pamphlets received more attention on account of this personal delivery than if they had been forwarded through the mail, as is the usual custom.

ELECTRIC MOTOR AND TRAILER TRUCKS FOR THE HUDSON COMPANIES

The Baldwin Locomotive Works have recently completed 50 motor and 50 trailer trucks for the Hudson Companies, New York. These trucks were built to the company's specifications for use in tunnel service in and about the City of New York, where the requirements are most exacting. The track gage is



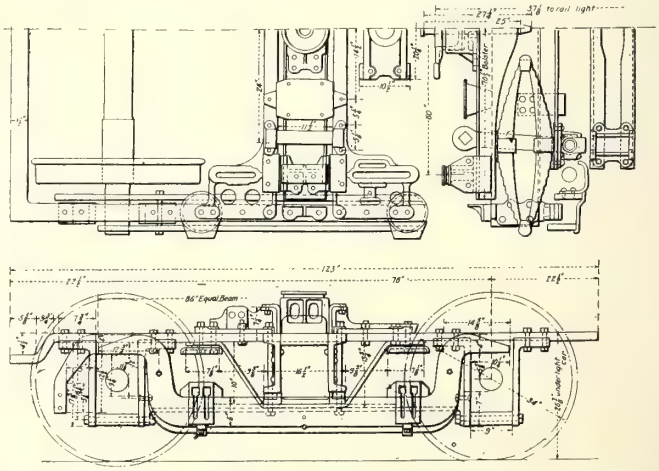
Motor Truck for Hudson Companies

standard and the trucks are all designed for a center-pin load of 30,000 lb.

The motor trucks are designated by the builders as class 78-30-S. They are of the M. C. B. standard type, and are each propelled by two GE-76-B motors, arranged for nose suspension and inside-hung. The actual weight of the truck without motors is 13,150 lb. The wheelbase is 78 in. The truck frame is of forged steel, with the side and end frames in one piece. The transoms consist of 10-in. steel channels and are braced to the side frames by heavy cast-steel gussets. These gussets act as brake lever guides and also carry the chafing plates so that the thrust is transmitted to the bolster near the ends of the latter, thus materially relieving the transoms of strain.

The bolster is built up, the main member consisting of an 8-in. channel which is placed horizontally and reinforced by a pressed-steel truss member. The bolster swing links have cast-steel adjusting blocks at their lower ends so arranged that the bolster can be easily raised to keep the center plate at the proper height as the truck settles.

The center plate is a special feature of this truck. It is of



Side Elevation and Half Plan of Motor Truck for Hudson Companies

cast steel and of ample depth so that, in the event of derailment, it would be practically impossible for the truck and car body to part company. Furthermore, the line of push in the chafing plates is so nearly in the same horizontal plane as the line of resistance in the center plate that there is practically no tendency to twist the bolster and the chafing wear on the truck parts is minimized.

The wheels are 34¼ in. in diameter, with 28-in. centers and bolted steel tires. The journals are 5 in. x 9 in. The wheels, gears and axles were finished and mounted by the Standard

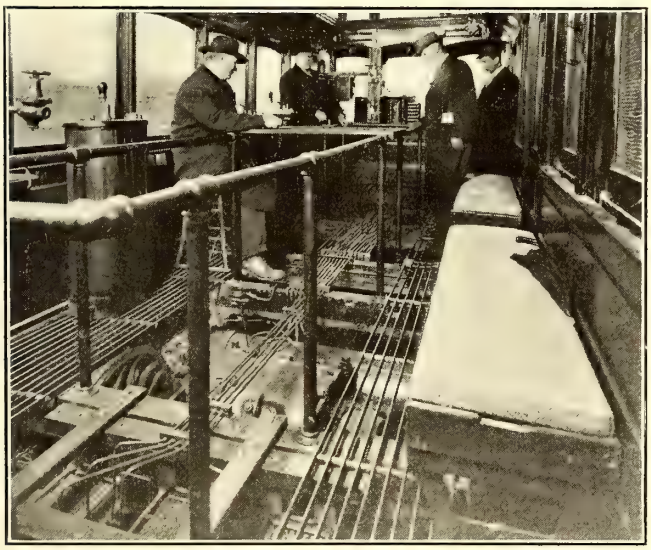
Steel Works Company. The same company also manufactured the equalizing beam springs and the bolster springs. The brake is of the inside-hung type. It is arranged with a transverse radial beam placed over the end of the truck frame and connected to the live levers by horizontal links. The brake release springs are incased in pieces of 2½-in. wrought-iron pipe.

The trailer trucks are generally similar to the motor, as far as design is concerned. The wheelbase is 66 in. and the frames are lighter in section. The wheels are of solid rolled steel, 30 in. in diameter, with 4¼-in. x 8-in. journals. The truck complete weighs 9110 lb. It is designated by the builders as class 66-30-T.

These trucks have been designed to meet specific operating conditions. The fact that the M. C. B. type has been selected for this severe work is most significant. For heavy service, where stops are frequent and acceleration rapid, the builders believe this type of truck to be unequaled.

DETROIT INSTRUCTION CAR

The Detroit United Railway has been operating since last April an instruction car in which all of the motor and braking apparatus can be plainly seen through the gratings of the floor. This car is operated over a stretch of 100 ft. in the Jefferson Avenue car house. The students are not taken on for instruction in apparatus until they have spent 6 to 15



View Showing Open Floor of Detroit Instruction Car

days under the eye of a motorman instructor on regular passenger cars. Besides the apparatus under the floor the car is furnished with every type of controller, fuse, air gage and other car equipment used on the Detroit system. The instructor explains the function of every part from the collection of the current to the disposition of the return, and also illustrates special cases, such as electric emergency braking. The student is passed along for service as soon as he has proved that he understands the motive equipment as thoroughly as his work requires.

TRAFFIC IN SYRACUSE

At the close of a hearing held in Syracuse, N. Y., on Dec. 9, 1910, to consider the application of the Syracuse Rapid Transit Railway to the Public Service Commission of the Second District of New York for permission to construct a double-track extension in Willow Street from Lodi to Townsend Street, Commissioner Decker announced that C. R. Barnes, electric railroad inspector of the commission, would be instructed to study traffic questions in Syracuse and report to the commission.

THE "TURN-IN" CAR

John F. Ohmer, president and general manager of the Ohmer Fare Register Company, Dayton, Ohio, has patented a new platform prepayment method called the "turn-in" car. The essential feature of this invention is the use of a foot-controlled registering turnstile in combination with any type of fare box. The following descriptions and accompanying plan drawings will show the adaptability of this method for efficient fare collection both on short and long platform cars.

Fig. 1 is the part plan of a car with a 4-ft. platform, 24-in. platform steps and a single body end door which gives a clear passage of 2 ft. 1 in. The ingress area is denoted by *A* and the conductor's position in the vestibule corner opposite the entrance by *C*. On cars of this kind it is more desirable, of course, to have the exit at the forward end of the car, but an ingenious arrangement of the turnstile permits the rear passage to be used for exit in the direction indicated by the arrow. This is accomplished by dropping the turnstile arm nearest the exit while simultaneously therewith the turnstile is locked against operation until the arm is returned to its normal position by the conductor. The "turn-in" mechanism requires very little space and its use calls for no change in the car construction. A convenient feature which can be applied in combination with the turnstile is a small relief table on which the conductor temporarily can place his punch, transfer pad, etc. A drawer can be built under the table top if desired.

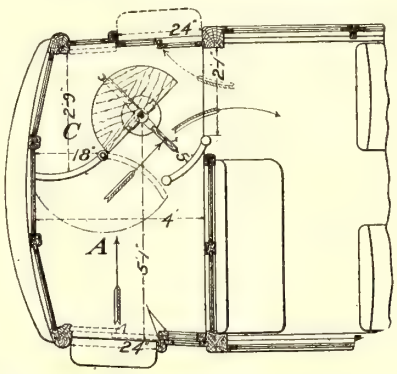


Fig. 1—"Turn-in" Principle Applied to Short Platform

Fig. 2 shows a typical application of the "turn-in" system to a car with a platform 6 ft. 7½ in. long. On this plan *A* is the ingress space, *B* the platform space for paid passengers and *C* the conductor's space. In addition to handling the turnstile equipment and accessories as used on the short platform the

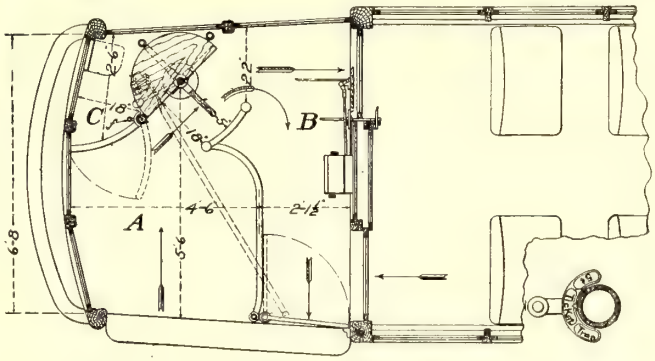


Fig. 2—"Turn-in" Principle Applied to Long Platform

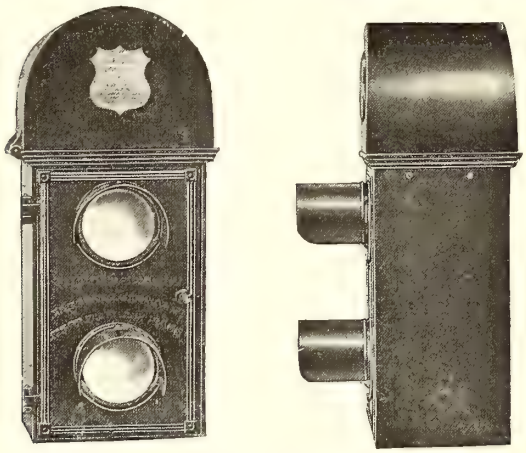
conductor controls the exit gate or door by means of an underplatform lever. Several shafts and levers are connected with the turnstile to operate the fare register, which is mounted on the vestibule side of the end bulkhead. Fig. 2 also shows a detail of the fare-setting device, which is placed at the point *f* near the turnstile.

An American consular officer in Japan reports that a local city council and city assembly, composed of Japanese, are planning an 18½-mile electric railway to cost, it is estimated, $4,500,000. Further information can be obtained by addressing No. 5685, Bureau of Manufactures, Washington, D. C.

NEW SPACING SIGNAL INSTALLED IN BOSTON

The Boston Elevated Railway Company has recently installed on several of its surface lines a new type of rear-end or spacing signal which is specially adapted to the requirements of double-track service in districts handicapped by severe grades and sharp curves. The signal has been applied to localities where the company has in the past had difficulty in securing suitable spacing of cars, notably on its double-track line in Blue Hill Avenue, Dorchester, and in the Fellsway territory. The operating rules of the company provide for the exercise of due care in the movement of cars down grades or through curves, but as an extra precaution the type of signal described below has been placed in service.

The new rear-end signals were designed and built by the



Front and Side Views of Spacing Signal Box

United States Electric Signal Company, of West Newton, Mass., according to the requirements of the electrical engineering department of the railway company, five blocks having been installed on Blue Hill Avenue and four blocks on the Fellsway. The signals are operated by direct current taken from the overhead trolley wire of the surface system, and as placed in service are of the illuminated type, without semaphore attachments, although the latter can easily be provided at any time. The wiring arrangements of a single block are shown in the accompanying diagram. In general the signal is designed to avoid the necessity of ever passing a red lamp, procedure being only upon the reception of indications by green signal lights. At the entrance of each block two weatherproof metal signal cases are installed, each containing a pair of lamps, the colors being red and green in each box. Under normal conditions an approaching car finds a green light displayed in the first of the two signal boxes if the block is free. The second signal box is located on a pole about 100 ft. beyond the first box, while the usual overhead contact switch in the trolley is placed in the line opposite the first box. Under normal conditions the red lamp in the second box is in circuit and visible as the car approaches the entrance of the block.

When the car passes the overhead contact switch at the beginning of the block the circuits of the green lamp in the first box and the red lamp in the second box are broken by a tripping relay which throws the switch in the relay case at the top of the second box upon a second pair of contacts that energize the circuit of the red lamp in the first box and that of the green lamp in the second box. The motorman, upon receiving the indication of the green lamp in the second box, proceeds to pass through the block at normal speed, the overhead contact being designed to permit the passage of cars without slackening. The passage of the trolley into the block throws on the red lamp in the first box, as outlined, and this lamp, together with the green lamp in the second box, remains in circuit as long as the car is in the block. No following car is allowed to pass the red lamp in either box, but as soon as the car which first entered the block passes out the contact of the trolley with an overhead switch permits a restoring current to flow through a clearing relay in the second box. This throws the contact switch upon the original normal connections, breaks the circuit of the green lamp in the second box and of the red lamp in the first box and at the same time throws the red lamp in the second box and the green in the first back into circuit. In the operation of this signal the motorman of a car which approaches, enters and passes through the block simply passes a green lamp in the first box, observes that the second box on the pole 100 ft. distant gives him a green lamp as the trolley passes the overhead switch and then proceeds without further signal indications. He does not see the red lamp in the first box unless a car is in the block ahead of him, in which case he is not allowed to proceed until receiving the green indication. The green indication must be given by each of the two boxes in succession in order to authorize a car to enter the block. A clear indication cannot be given in the first box until a car has passed out of the block and thrown the green lamp into circuit by making the overhead switch contact at the end of the block.

Each signal box is designed along the lines which the company has employed in its other well-known signals, a Yale lock being provided in each box. The relay contacts are covered with a dome, which is a one-piece casting, to secure protection from the weather. The relay connections are made automatically by spring contacts, and the relay mechanism and local wiring can be easily removed en bloc by taking off four nuts. The contacts are of phosphor bronze and interchangeable. The relay is connected with the signal box by spring contacts located on the under side of a slate base. The springs engage with a set of contact points in the top of the main box, and when the relay is in place are separated from each other by fiber barriers, which reduces the danger from lightning to a minimum. The relay magnets will operate on any line potential over 160 volts. The cores and pole pieces are built of Norway iron and all magnet coils are wound on spools of No. 22 B. & S. covered wire, varnished with three coats of shellac. The signal is provided with a mechanical lock which holds the switch in the relay box against the proper contacts until a release is secured by the passage of a car out of the block. Car-

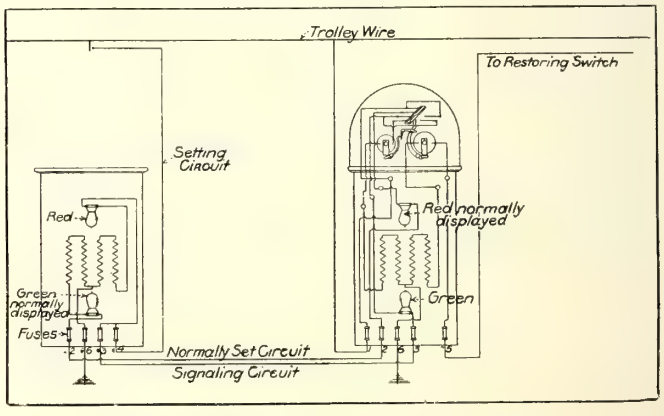


Diagram Showing Circuit of Spacing Signal

penter resistance tubes are used in the lamp circuits, and the wiring is No. 14 and No. 16 B. & S. fireproof and white-covered. The fuses are of the Noark type and are separated by porcelain barriers.

HEARING AT CHICAGO ON INTERCHANGE OF TRAFFIC

A hearing was held at Chicago on Dec. 8, 1910, before the Illinois Railroad and Warehouse Commission on the application of the Joliet & Southern Traction Company, Joliet, Ill., to the commission for an order to direct the Wabash Railroad, Rock Island Railroad, Illinois Central Railroad and the Santa Fé Railroad to interchange traffic with it. The attorneys for the steam railroads argued that the commission was not vested with authority to issue such an order as had been applied for by the Joliet & Southern Traction Company. The commission took the matter under advisement.

News of Electric Railways

Elevated Extensions in New York Approved

The Public Service Commission of the First District of New York on Dec. 7, 1910, approved the application of the Interborough Rapid Transit Company for two extensions to its elevated system in the Bronx, but did not take final action on the plan for third-tracking the Second, Third and Ninth Avenue elevated lines. The commission will hold a public hearing on the matter on Dec. 22, 1910, before submitting the plan to the Board of Estimate for final approval.

The plans provide for one line extending up Jerome Avenue to Woodlawn from the present terminal of the Ninth Avenue elevated on the Manhattan side of the Harlem River at 155th Street and an extension of the Third Avenue elevated up White Plains road to the city line. In addition the commission has decided to approve an elevated connection in Fifty-ninth Street between the Second Avenue elevated line and the Queensboro Bridge. The cost of these extensions will be $32,000,000. The third tracks are to be added, it is understood, under the present 999-year franchise held by the Manhattan Elevated Railway. The two extensions in the Bronx are to be operated on 85-year franchises, divided into terms of 25 years at first and 20 years each for three succeeding renewals, the terms of payment to the city to be subject to readjustment at the expiration of each term. The construction of each of the extensions must begin within six months after the company has obtained the consents and shall be completed in two years after work is begun. Both extensions are to be three-track roads, except that the Jerome Avenue line will be two tracks from the point of divergence to 162d Street, and from there to Woodlawn Cemetery three tracks.

W. R. Willcox, chairman of the Public Service Commission, has issued a statement reviewing the proposal of the Interborough Rapid Transit Company to construct additional rapid transit lines in New York, in which he says:

"The proposal of the Interborough Rapid Transit Company has several attractive features not contained in any offer heretofore made. I refer particularly to the offer to furnish $75,000,000 of the $128,000,000 for new construction, to the willingness to reduce the length of lease of the present contracts, to the additional extensions that the company is willing to build and to the agreement to operate additional future extensions.

"Its proposition not only embraces the normal extensions of the present subway, but the company offers to build the major portion of the Triborough route and obligates itself to operate the whole of the Triborough system if the part not included in its offer is constructed by the city. It offers to operate this entire system in conjunction with its present system for a 5-cent fare on all lines from one end of the city to the other. Furthermore, the entire system will belong to the city from the beginning, and the city will have the right to take any of these extensions after 10 years. It would thus be possible in case of improper management to set up a new system.

"The company is willing to furnish $75,000,000 of the estimated $128,000,000 necessary to build and equip these lines. It is also willing to put $31,000,000 into the third-tracking and extension of its elevated system. It also proposes to turn over to the city the Steinway tunnel, which has cost nearly $8,000,000, provided the city will pay $1,500,000 to complete it. Thus the company is willing to contribute altogether about $114,000,000 of its own money toward the development of transit in this city. The ability of the company to prevent proper extensions of rapid transit in this city as a part of the main system would be removed and this difficulty has really been the worst one to deal with in the whole transit situation.

"In view of the fact that the present subway is operated under two leases—one with a term of 50 years and right of renewal for 25 years more, and the other for 35 years, with a renewal of 25 years more, the company agrees to the suggestion of the commission that, if such course is deemed advisable, it will be willing to have the present contracts so modified that the entire period for operation of the present subway and extensions shall be merged into one period and is willing to accept 49 years from the time of the completion of these extensions with no right of renewal.

"The money to be furnished for construction and equipment by the Interborough Rapid Transit Company is to take precedence over the bonds issued by the city for the construction of those extensions, but after the payment of operating expenses and the interest and sinking fund on both classes of bonds, the net profits for five years are to be paid to the city and for the balance of the time all surplus earnings over these fixed charges are to be divided equally between the city and the company. The terms for operating the Fourth Avenue subway, it will be observed, are such that any deficit over the running expense is to be borne by the city, but inasmuch as all net earnings over fixed charges on the main extensions proposed to be built are to be paid by the city it can readily be seen that such income would doubtless much more than offset any possible deficit in the operation of the Fourth Avenue subway. The number of miles of the proposed extension will be 35.5 of road and 106.12 miles of track. The present subway consists of 25.63 miles of road and 72.83 miles of track."

William G. McAdoo, president of the Hudson & Manhattan Railroad, conferred with the members of the Public Service Commission on Dec. 9, 1910, and it was understood the subjects discussed related to terms of a supplementary offer which he is understood to be preparing for the operation of proposed new subways.

The Board of Estimate has approved the route for the Steinway tunnel of the Interborough Rapid Transit Company under the East River to Long Island City. The plans will be sent back to the Public Service Commission and consents obtained from property owners for extending the tunnel to the Grand Central Station. The work will then be done by contract and the commission will advertise for bidders to operate the line.

A two-hour conference was held on Dec. 13, 1910, between Mr. McAdoo and the members of the Public Service Commission, and on Dec. 14, 1910, Mr. Willcox, chairman of the commission, called on Mayor Gaynor. As previously stated in the ELECTRIC RAILWAY JOURNAL, Mr. McAdoo has said that his offer could not remain open after Dec. 15, 1910, but it is expected that he will supplement his original proposal with new terms.

The Chamber of Commerce, at its meeting on Dec. 1, 1910, adopted Mayor Gaynor's recent suggestion and agreed to co-operate, through its president, with the president of the Merchants' Association in appointing a citizens' committee to consider the various subway proposals and to report their conclusions to the Mayor. Subsequently A. Barton Hepburn, president of the Chamber of Commerce, and Henry R. Towne, president of the Merchants' Association, announced the citizens' committee to represent those bodies in the subway conference which Mayor Gaynor suggested in recent letters. The committee includes many men of prominence in the financial and business world. It is headed temporarily by ex-Mayor Seth Low.

Cleveland Traction Situation

G. M. Dahl, street railway commissioner of Cleveland, Ohio, spent several days in New York during the week ended Dec. 10, 1910, investigating the statement made by the officers of the Cleveland Railway after the meeting of the board of directors on Dec. 5, 1910, that new securities could not be placed by the company on account of the terms of the franchise under which the company operated.

Councilmen Henry and Pelcinski have threatened to bring the matter to a referendum vote should any change affecting the maximum rate of fare be made in the franchise. On the other hand, Councilman Gahn has suggested that the Cleveland Chamber of Commerce and other public bodies should be invited to select committees to work with the council committee in formulating plans to sell the company's bonds to secure funds for additional cars and power.

F. H. Goff, president of the Cleveland Trust Company, and representative of the Cleveland Electric Railway in the negotiations with former Mayor Johnson, has reiterated the statements which he has often made, that the maximum rate of fare should be higher in order to attract investment. The fare should be raised, and the most strenuous efforts will fail to secure money cheaply as long as the maximum fare remains as low as it is now. It is more important to the public than to the company that money be secured, according to Mr. Goff. Conditions of operation are too uncertain for capital to be attracted under the present rate of fare. The higher rate of fare may never have to be resorted to in order to meet expenses, but the higher the maximum rate is placed the cheaper capital can be secured for the needs of the company. Mr. Goff feels that with a higher maximum fare the bonds of the company could be sold on a 5 per cent basis at par.

In an interview in New York Mr. Dahl was quoted as saying that the company's bonds to an amount necessary to take care of present necessities at least could be sold with an interest rate of, perhaps, 5 per cent, but not at par. He also intimated that the future needs could be taken care of in the same way. Mr. Dahl stated that the financiers were not well informed about the results attained under the new franchise in Cleveland. He further stated that he was opposed to an increase in the maximum rate of fare while there was a possibility of securing the necessary finances.

Former Mayor Johnson, it is understood, believes that the sale of bonds at less than par would make necessary an increase of fare, even without any intentional manipulation to that end.

City Solicitor Baker on Dec. 9, 1910, stated that an amendment to the Tayler franchise affecting the fares to be charged under the grant need not be submitted to a referendum vote, although there would be no legal objection to having the voters approve the amendment.

On his return to Cleveland on Dec. 11, 1910, Mr. Dahl confirmed the statements attributed to him in the interviews in New York. He adheres to the belief that 5 per cent bonds sufficient to take care of the finances of the company can be sold in New York at a slight discount, and intimated that negotiations are under way for the sale of the bonds, on condition that the company consent to that plan of financing its needs. The information secured by Mr. Dahl will be used in connection with the investigation by the street railway committee of the City Council, which was authorized on Dec. 5, 1910.

J. J. Stanley, president of the Cleveland Railway, would make no statement other than that Mr. Dahl's ideas would be submitted to the directors' meeting on Dec. 17, 1910.

Mr. Dahl and Mayor Baehr spent the afternoon of Dec. 11, 1910, in considering the information secured by Mr. Dahl in New York.

National Fire Protection Association

The National Board of Fire Underwriters has recently put forward a plan of unification and consolidation in respect to its fire prevention engineering activities that will be of considerable interest to the underwriting and engineering fraternities alike. It has requested the National Fire Protection Association to take over the work of the two bodies heretofore unaffiliated, the Underwriters' National Electric Association and the Committee of Consulting Engineers of the National Board. The National Board officials have long felt the desirability of unifying the sources from which that body has for so many years drawn its various codes and standards. The National Fire Protection Association has furnished standards for all protective devices and systems; the Consulting Engineers have handled the hazards of gases and oils and the Underwriters' National Electric Association has been responsible for the National Electrical Code. These three standard-making bodies are now to be merged into one—the National Fire Protection Association—and the work of the two latter bodies, which will cease to exist as detached organizations, will be conducted by special committees of the National Fire Protection Association. The Underwriters' National Electric Association will be entitled the Electrical Committee, and the Consulting Engineers will be called the Committee on Explosives and Combustibles of the National Fire Protection Association. The personnel of the new committees will be identical with that of the two former separate bodies, with the addition to each of one or two desirable members.

The headquarters of the association are at 87 Milk Street, Boston, and the new electrical committee is made up of 20 members, one representing each of the following 19 organizations: Boston Board of Fire Underwriters, New England Insurance Exchange, The Union, Electrical Inspection Department of the National Board of Fire Underwriters, National Association of Electrical Inspectors, Philadelphia Fire Insurance Association, New York Board of Fire Underwriters, Underwriters' Association of the Middle Department, Factory Mutual Insurance Companies, National Board of Fire Underwriters, Underwriters' Association of New York State, Underwriters' Laboratories, South Eastern Underwriters' Association, Louisiana Fire Prevention Bureau, Western Association of Electrical Inspectors, American Institute of Electrical Engineers, American Electric Railway Association, National Electrical Contractors' Association, National Electric Light Association. The twentieth member is Ralph Sweetland, of the New England Insurance Exchange, the secretary.

President's Reference to Public Utilities in Washington

In his message to Congress on Dec. 6, 1910, President Taft made the following reference to the public utilities of Washington in discussing the government of the District of Columbia:

"There are a sufficient number of corporations enjoying the use of public utilities in the District of Columbia to justify and require the enactment of a law providing for their supervision and regulation in the public interest consistent with the vested rights secured to them by their charters. A part of these corporations, to wit, the street railways, have been put under the control of the Interstate Commerce Commission, but that commission recommends that the power be taken from it and intimates broadly that its other and more important duties make it impossible for it to give the requisite supervision. It seems to me wise to place this general power of supervision and regulation in the District Commissioners. It is said that their present duties are now absorbing and would prevent the proper discharge by them of these new functions, but their present jurisdiction brings them so closely and frequently in contact with these corporations and makes them know in such detail how the corporations are discharging their duties under the law and how they are serving the public interest that the commissioners are peculiarly fitted to do this work, and I hope that Congress will impose it upon them by intrusting them with powers in respect to such corporations similar to those of the Public Utilities Commission of New York City or similar boards in Massachusetts."

Railway Affairs in Detroit.—F. W. Brooks, general manager of the Detroit (Mich.) United Railway, announced that through service to Alter Road or the city limits would be established on Jefferson Avenue, on Dec. 12, 1910. From 5:15 a. m. to 5:45 p. m. all Jefferson Avenue cars will run through from the City Hall to the city limits, and from 5:45 a. m. to 6 p. m. there will be a 2-minute service. The rate of fare will not be changed, and the single fare to the city limits will not be put into effect. Workingmen's tickets will be accepted, as in the past.

Inquiry Into Finances of Pittsburgh Railways.—William A. Magee, Mayor of Pittsburgh, Pa., in behalf of the city, has filed a petition with the Secretary of Internal Affairs of Pennsylvania asking that the Pittsburgh Railways and the different corporations whose properties are maintained and operated by it report to the secretary concerning the issues of stocks and bonds made by them at different times and that the secretary call upon those having knowledge of these matters to appear before him and testify, if he shall find this proceeding necessary. The Mayor in his petition alleges that the Pittsburgh Railways is unable properly to maintain its property on account of unreasonable guarantees to its underlying companies.

Chicago Railways Accepts Consolidation Ordinance.—The Chicago (Ill.) Railways has accepted the ordinance which

was passed by the City Council of Chicago on Oct. 11, 1910, granting it permission to absorb the Chicago Consolidated Traction Company and extend its franchise over the lines of that company. The ordinance allowed the company 60 days in which to accept the grant and four months in which to acquire title to the property of the Chicago Consolidated Traction Company. The Chicago Railways has arranged to operate 215 pre-payment cars on the lines of the Chicago Consolidated Traction Company as required in the ordinance. The property of the Chicago Consolidated Traction Company, which was sold recently under foreclosure to Andrew Cooke, chairman of the reorganization committee, will be transferred by him under agreement to the Chicago Railways.

Strike Breaker Acquitted in Columbus.—Gerald O'Leary, alias George W. Brady, who was employed by the Columbus Railway & Light Company, Columbus, Ohio, during the recent strike of the employees of the company, was acquitted of the charge of shooting Helen Kelley in Judge Bigger's court at Columbus on Dec. 7, 1910, after the jury had deliberated nine hours. O'Leary is also under indictment for shooting Mrs. Katherine Kelley and Mrs. Charles Hart, but as the evidence in these cases would be about the same as in the case just completed the indictments will probably be quashed. Brady alleged that the shooting was done by mutinous policemen who fired at him from behind a billboard. In his address to the jury Attorney Clarence Addison for Brady said that at times during the strike Brady stood alone between law enforcement and lawlessness and anarchy. He criticised Mayor Marshall and the administration for the manner in which the riots were handled. Attorney J. P. Dawley, Cleveland, dwelt longest on the theory of reasonable doubt and praised E. K. Stewart, general manager of the Columbus Railway & Light Company, for the firm stand for law and order which he took during the strike.

Meeting of National Civic Federation.—The eleventh annual meeting of the National Civic Federation will be held on Jan. 12, 13 and 14, 1911, in New York City. The State councils, organized by the Federation during the past year to promote the unification and co-ordination of State and Federal laws, will hold their first national meeting in conjunction therewith. In addition there will be special meetings of the various departments of the Federation. State and Federal regulation of corporations and questions dealing with the limitations of combinations in restraint of trade will be considered. A feature of this part of the program will be an exposition of the new act which went into effect in Canada, May 1, 1910. This act provides that upon application of six citizens who complain against a corporation a judge may order that a commission of three be named, one member by the complainants, one by the corporation and the third by the two thus selected. The commission is required to make an extended inquiry and publish a report, which must be accepted by the corporation within 10 days upon penalty of a fine of $1,000 a day. The need for uniformity in State regulation of railroads and other public utilities, the co-ordination of the laws governing the State railroad commissions and the Interstate Commerce law, made evident at the recent hearings on the railroad rate question, and also the regulation of public utilities by commissions will be discussed. In view of the recent strike questions of special interest to the public at this time were to be considered, to wit: How far is the Canadian Conciliation and Arbitration Act applicable to and desirable for the United States? Can the State laws on mediation and arbitration be made effective in handling industrial disturbances in general? Shall special legislation be advocated appiying to street railways and other municipal utilities? Shall the Erdman Act, which is so effective in the case of interstate railways, be extended to telegraph, telephone and express companies? To promote harmony the National Civic Federation is organizing councils in every State in the Union, composed of representative men from the commercial, manufacturing, mercantile, banking, insurance and professional interests. Delegations of the State Councils will attend the annual meeting to determine upon a program and method of work. The meeting of the sub-committee of the federation on relations with employees is referred to on page 1205 of the current issue of the ELECTRIC RAILWAY JOURNAL.

Financial and Corporate

New York Stock and Money Market

Dec. 14, 1910.

The Wall Street stock market is again very dull and trade is restricted to a limited number of specialties, with trading closely confined to the professionals. As has been the case in all the periods of dull trading within the year, the tone of the market is fairly strong and prices are well maintained. There is still considerable trading in Interborough-Metropolitan and prices are a trifle stronger.

The money market is not changed materially, rates remaining very easy. Quotations to-day were: Call, 2½@ 3½ per cent; 90 days, 4 per cent.

Other Markets

There has been a fair amount of trading in traction shares in the Philadelphia market during the past week, owing to the practical settlement of the refinancing plans. Prices have declined, however, as the plan offered by E. T. Stotesbury was not considered as favorable as had been anticipated.

In the Chicago market there is still some dealing in the certificates of the Chicago Railways, but price changes have not been noteworthy. There has also been some dealing in Kansas City Railway & Light at former prices.

With the exception of a few sales of Massachusetts Electric and Boston Elevated tractions have been dull in the Boston market. Prices have remained about the same and there has been little interest in the trading.

A few shares of United Railways stock were sold in the Baltimore market during the past week. The prevailing price was from 14½ to 15. There were also some sales of the bonds of the same company at former prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 6.	Dec. 13.
American Railways Company	a43	a43¾
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a88	a86
Boston Elevated Railway	127½	a127½
Boston Suburban Electric Companies (common)	a16	a16
Boston Suburban Electric Companies (preferred)	a72	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a39½	a39
Brooklyn Rapid Transit Company	73⅛	73⅜
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	82⅛	82⅛
Capital Traction Company, Washington	*128	128
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a90½	a91
Chicago Railways, ptcptg., ctf. 2	a23	a23½
Chicago Railways, ptcptg., ctf. 3	a11	a10½
Chicago Railways, ptcptg., ctf. 4	a6¼	a6½
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a73	a72
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	a53⅛	a59¾
General Electric Company	a149½	a153
Georgia Railway & Electric Company (common)	a117½	a118
Georgia Railway & Electric Company (preferred)	a88	a88
Interborough-Metropolitan Company (common)	19	19
Interborough-Metropolitan Company (preferred)	53⅛	53⅛
Interborough-Metropolitan Company (4½s)	79½	79⅜
Kansas City Railway & Light Company (common)	21¼	a22½
Kansas City Railway & Light Company (preferred)	75	73½
Manhattan Railway	138	138
Massachusetts Electric Company (common)	a18	a18½
Massachusetts Electric Companies (preferred)	a83	a84¼
Metropolitan West Side, Chicago (common)	*21	20¼
Metropolitan West Side, Chicago (preferred)	65	68
Metropolitan Street Railway, New York	*19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	62	62
Northwestern Elevated Railroad (common)	*22	a25
Northwestern Elevated Railroad (preferred)	*60	a60
Philadelphia Company, Pittsburg (common)	*41	a41¾
Philadelphia Company, Pittsburg (preferred)	a42	a42½
Philadelphia Rapid Transit Company	a18¾	a18⅛
Philadelphia Traction Company	a83	a83
Public Service Corporation, 5 per cent col. notes	*95	a95
Public Service Corporation, ctfs.	*101	a101
Seattle Electric Company (common)	107¼	a108
Seattle Electric Company (preferred)	a102	102
South Side Elevated Railroad (Chicago)	a65	a68½
Third Avenue Railroad, New York	11¼	9⅝
Toledo Railways & Light Company	7	a8
Twin City Rapid Transit, Minneapolis (common)	108½	107½
Union Traction Company, Philadelphia	a41	a42¾
United Rys. & Electric Company, Baltimore	*14	*14½
United Rys. Inv. Co. (common)	*14¾	a15
United Rys. Inv. Co. (preferred)	*52	*52
Washington Ry. & Electric Company (common)	*33½	a33⅛
Washington Ry. & Electric Company (preferred)	87½	a87½
West End Street Railway, Boston (common)	a89½	a89½
West End Street Railway, Boston (preferred)	*100	a103
Westinghouse Elec. & Mfg. Co.	65½	66
Westinghouse Elec. & Mfg. Company (1st pref.)	124	*124

a Asked. *Last sale.

Annual Report of the Michigan United Railways

An income statement of the Michigan United Railways of Jackson, Mich., contained in the annual report for the year ended April 30, 1910, shows the following:

		—Includes Jackson—	
	May 1, 1907, to May 1, 1908	May 1, 1908, to May 1, 1909	May 1, 1909, to May 1, 1910
Passengers carried	12,095,480	17,161,948	19,860,950
Car mileage	3,705,246	4,779,441	5,284,215
Gross revenue and income	$781,963	$1,026,796	$1,248,889
Operating expenses	433,200	568,158	684,216
Net earnings and income	348,763	458,638	564,673
Taxes and fixed charges	139,919	186,009	193,236
Bond interest, Michigan United Railways	80,000	119,882	167,500
Net income	128,842	152,747	203,937
Profit and loss adjustments		873	74
Dividends	60,000	60,000	60,000
Surplus	68,842	91,874	143,863

The report also contains the following statement, showing revenues in detail and expenses:

REVENUES

Year ending April 30.	1909	1910
Revenue from transportation—		
Passenger	$946,570	$1,153,868
Baggage	2,324	5,454
Special car	649	2,886
Mail	733	718
Express	5,306	7,293
Milk	7,322	7,888
Freight	28,624	36,933
Switching		2
Miscellaneous	1,466	
	$992,995	$1,215,042
Revenue other than transportation—		
Station and car privileges	$3,288	$3,079
Parcel room receipts	308	904
Storage		9
Car service	18	58
Rent of track and terminals	3,371	3,419
Rent of equipment		162
Rent of buildings and other property	1,848	1,073
Power	27	155
Miscellaneous	19,274	9,538
	$1,021,129	$1,233,439
Other revenues—		
Interest on deposits		$4,637
Interest from securities owned		10,718
Other miscellaneous	$5,667	95
	$1,026,796	$1,248,889

EXPENDITURES

Operating expenses—		
Ways and structures	$37,562	$42,073
Equipment	48,357	77,556
Traffic expense	10,150	12,928
Conducting transportation—		
Superintendence of transportation	12,782	15,947
Power	124,053	151,775
Operation of cars	262,744	295,405
General expenses	43,354	47,924
Undistributed accounts	29,156	40,608
Total operating	$568,158	$684,216
Taxes	$26,584	$33,736
Fixed charges—		
Interest on J. & E. C. Traction Co. bonds	$60,000	$60,000
Interest on Michigan Traction Co. bonds	35,000	35,000
Interest on Michigan Traction Ex. bonds	25,000	25,000
Interest on J. C. T. Co. bonds	39,425	39,500
Balance carried to balance sheet	272,629	371,437
	$1,026,796	$1,248,889

J. Peyton Clark, vice-president, states in the report:

"The line of road between Lansing and Jackson was fully completed and operation started on Nov. 5, 1909, so that for six months of the fiscal year ending April 30, 1910, the company had the full benefit of the complete operation of all its lines. It will be of interest to note the increase in earnings from the property during this six months' period, because the statement of the gross earnings and operating expenses with the increase during these months is the only test which can be fairly made of the value of the property and its earning power since the completion of the construction of the Lansing and Jackson line for the reason that until the line was put in operation securities were issued to pay for its cost and were charged against the property without any revenue therefrom."

Mr. Clark then gives the earnings for the six months' period. The increases, as compared with the corresponding months of the previous year, were as follows: November, 29.6 per cent; December, 27.2 per cent; January, 25.3 per cent; February, 34 per cent; March, 34.9 per cent; April, 43 per cent. The report continues:

"The company spent in city extensions and various improvements during the year $495,611. It expended on the Lansing and Jackson line in addition to the cost provided the sum of $144,676, and it is due to these expenditures that the very large increase in revenue is being made from the various city systems owned by the company.

"The principal expenditure which is contemplated for the current fiscal year will be in the purchase of new cars and equipment from which a reasonably large increase in revenue is to be expected."

The company also contemplates the construction of some new lines and the addition of 30 new city cars and four interurban cars. Mr. Clark concludes his statement as follows:

"In our last annual report the purchase of an additional property was referred to, and the proposed construction of a line which would connect this system therewith. It was deemed advisable, in order that the connecting line of railway might be constructed without increasing the bonded indebtedness of the Michigan United Railways Company, to wait until such satisfactory showing of earnings was made on the properties as would justify their being taken into the system, and that the proposed purchase and construction be financed by interests friendly to the company without this company incurring any liability in connection

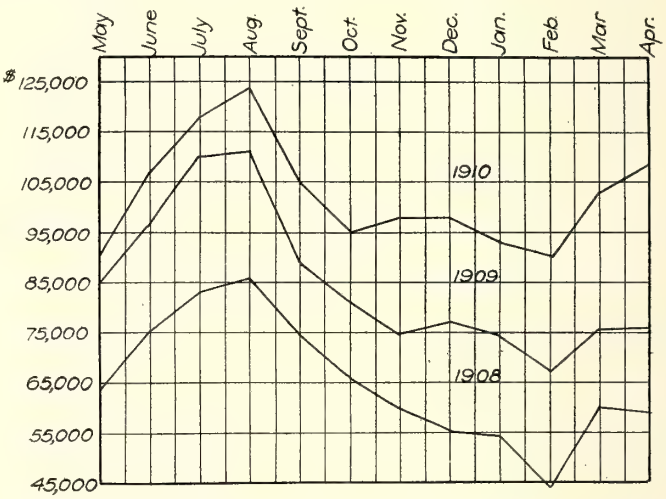


Diagram Showing Gross Revenue and Income of Michigan United Railways by Months

therewith. In accordance with this arrangement the line between Pine Lake and the City of Owosso is now more than half completed and, in connection with the city line in Owosso and Corunna, will become a feeder for your system and later, upon satisfactory terms, may become a part of your company."

The following traffic statistics are contained in the report.

—Cash and tickets—		—Transfers—		—Passes—	
1910	1909	1910	1909	1910	1909
17,618,828	14,579,189	2,596,036	2,337,188	246,086	245,571
Per cent of total:					
85.7	84.9	13.1	13.7	1.2	1.4

The following statistics are based on revenue from transportation only: Earnings per car-mile, 23 cents in 1910 and 20.8 cents in 1909; earnings per car-hour, $2.39 in 1910 and $2.108 in 1909; average receipts per passenger, 7.1 cents in 1910 and 6.8 cents in 1909.

Philadelphia Rapid Transit Company Finances

The directors of the Philadelphia Rapid Transit Company and the Union Traction Company on Dec. 7, 1910, approved the plan suggested by E. T. Stotesbury, of Drexel & Company, by which the Philadelphia Rapid Transit Company will surrender its equity in the Market Street elevated line in return for the guarantee by the Union Traction Company of a loan for $10,000,000. The following official announcement was made after the meetings of the directors of the companies:

"As a result of the numerous conferences ending with the meetings of the two directorates, the board of directors of the Union Traction Company has agreed to recommend

to its stockholders the guaranteeing of a $10,000,000 bond issue, provided the stockholders of the Philadelphia Rapid Transit Company will make over to the Union Traction Company the ownership of the Market Street Elevated road, which would then be used as collateral for the new bond issue. The board of directors of the Philadelphia Rapid Transit Company has agreed to recommend this action to its stockholders. These stockholders' meetings can be held only after 60 days' advertised notice, and the plan can become effective only in case City Councils assent. Those meetings have not yet been called, and will not be until the details of the plan are worked out. A letter will be sent to Mr. Stotesbury advising him of this action and taking up with him the other matters referred to in his letter."

Charles O. Kruger, president of the Philadelphia Rapid Transit Company, on Dec. 9, 1910, addressed a letter to Mr. Stotesbury in part as follows:

"With regard to future financing we understand that Thomas E. Mitten has recommended to you that a property of this size should have available each year for new capital requirements from $1,500,000 to $2,000,000, and that he has further advised you that, in his opinion, if this property can be financed along these lines for a period of five years it should then be in position to raise any additional capital it may need upon its own credit.

"It is proposed, therefore, to make an issue of $10,000,000 of bonds running for the life of the city contract and carrying a sinking fund, the principal and interest of which bonds will be guaranteed by the Union Traction Company; the bonds to be secured by a pledge of the equity in the Market Street Elevated Passenger Railway over and above the present $10,000,000 mortgage upon said property. This equity to-day is represented partly by stock and partly by duebills for actual cash advances for the construction and equipment of the road by the Philadelphia Rapid Transit Company. Additional stock will be issued to take up these duebills, so that the collateral back of this loan will be the entire capital stock of the Market Street Elevated Passenger Railway, all of which will represent dollar for dollar the cash paid in, and which will be subject only to the $10,000,000 mortgage bond issue now on said property.

"We may say in passing that we had already pledged our equity in this road with the Union Traction Company, and the Union Traction Company directors are only willing to recommend this plan of financing provided there is made over to them absolutely the ownership of this road, subject to pledge for the new loan, the Philadelphia Rapid Transit Company retaining its interest as lessee without additional fixed charges for the balance of the 999-year term of its Union Traction lease.

"We construe your second condition to mean that no part of the proceeds of the $10,000,000 of bonds thus provided for the capital needs of the company shall be used to meet the operating expenses, interest and rentals of the Philadelphia Rapid Transit Company, but the whole of the said fund shall be reserved for future improvements and the refunding of accruing capital obligations where the same may be necessary. And we understand that you would require as an essential feature of the policy of this company that there should go back into the property each year for maintenance and renewal of property an amount equal to 15 per cent of its gross receipts, which is about 3 per cent more than is being appropriated by the company at this time for this purpose.

"A careful estimate of the condition of our treasury shows that the Philadelphia Rapid Transit Company has available working capital to meet any future deficits or contingencies of from $1,500,000 to $2,000,000. We believe that the existence of such a fund is a sufficient guarantee that no part of the new capital would have to be drawn on for operation, maintenance, interest or rentals. If you agree with us that these resources are sufficient to meet these requirements, we will, upon receiving your assent, proceed to call together the stockholders of the two companies for final action, and also bring the matter to the attention of City Councils and request their assent to the plan."

It is generally understood that Thomas E. Mitten, president of the Chicago (Ill.) City Railway, will be elected a director of the Philadelphia Rapid Transit Company, as an associate of Mr. Stotesbury.

Columbus, Marion & Bucyrus Railroad, Delaware, Ohio.—It is said that plans have been practically completed by which the Columbus, Marion & Bucyrus Railroad will be taken out of the hands of Receivers Guthrie and Whysall. Notices have been sent out by the directors of the company that a special meeting of the stockholders will be held in Marion on Dec. 31, 1910, at which the approval will be asked for an increase in the capital stock of the company from $500,000 to $600,000, all of the new stock to be preferred. The new stock is to be used to pay bonds issued by the company and to take up other liabilities. The company has $500,000 of bonds outstanding and it is said that an arrangement has been made with the bondholders by which the past due interest will be adjusted, the bonds changed and the preferred stock issued in lieu of part of them.

Louisville & Eastern Railroad, Louisville, Ky.—The date of the sale of the property of the Louisville & Eastern Railroad under foreclosure has been fixed for Jan. 3, 1910, at Lyndon, Ky. It is generally understood that the Louisville Railway, which has taken over most of the outstanding claims against the company, will purchase the property.

Massachusetts Electric Companies, Boston, Mass.—P. F. Sullivan, president of the Boston & Northern Street Railway, has filed with the Secretary of the Commonwealth of Massachusetts a petition for legislation to authorize the Boston & Northern Street Railway to purchase the franchise and property of the Old Colony Street Railway on terms agreed upon by a majority of the board of directors and approved by a majority in interest of the stockholders of each road and by the Railroad Commission.

Oakland (Cal.) Traction Company.—The stockholders of the Oakland Traction Company will vote on Dec. 31, 1910, upon the question of creating a new bonded debt to the amount of $250,000 for the purpose of purchasing rolling stock.

Sandusky, Mansfield & Norwalk Electric Railway, Norwalk, Ohio.—The Guarantee Title & Trust Company, Pittsburgh, Pa., has brought suit in the United States Court, at Toledo, Ohio, to foreclose a mortgage of $600,000 on the Sandusky, Norwalk & Mansfield Electric Railway. The petitioner holds $200,000 of the bonds. Judge Killits instructed counsel for the company to show cause, on Dec. 28, 1910, why a receiver should not be appointed.

Sunday Creek-Hocking Traction Company, Nelsonville, Ohio.—The Sunday Creek-Hocking Traction Company has decided to issue bonds to the amount of $200,000 to secure funds to construct extensions in 1911. The Columbus Savings & Trust Company will be the trustee under the mortgage which will be given to secure the bonds.

West Chester, Kennett & Wilmington Electric Railway, Kennett Square, Pa.—The West Chester, Kennett & Wilmington Electric Railway defaulted in the payment of the coupons of its first mortgage 5 per cent bonds, dated 1905, and due in 1935. The total authorized issue of these bonds is $1,000,000, of which $420,000 is outstanding. As a result of the default a protective committee consisting of R. J. Brunker, George B. Atlee, Morris Ebert and William S. J. Wetherill has been formed, and has asked deposits of the bonds with the Girard Trust Company, Philadelphia, Pa., as depositary. The committee is given power to formulate and carry out a plan of reorganization, but it cannot assess the bondholders in excess of 3 per cent to raise funds to meet its expenses.

Dividends Declared

Chattanooga Railway & Light Company, Chattanooga, Tenn., quarterly, 1¼ per cent, preferred.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1¼ per cent, preferred.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Union Traction Company, Philadelphia, Pa., $1.50.

United Traction & Electric Company, Providence, R. I., 1¼ per cent, quarterly.

Traffic and Transportation

Circular to Employees

S. M. Felton, president of the Chicago Great Western Railroad, Chicago, Ill., recently addressed a circular on discipline to the employees of that company in which he said in part:

"It is the policy of the present administration to gain the friendship and good will of every man in the service. While strict discipline must be enforced as indispensable to an efficient operation of the property, every effort will be made to show due consideration for and promote the personal interests of deserving employees. Every employee is expected to use his best efforts toward the harmonious working of the organization. In dealing with the company he should be loyal, honest and straightforward. He must do his duty willingly and to the best of his ability. He should cultivate respect for his immediate superiors. He must co-operate with those above him in the line of service, as well as with those who are subordinate. Good team work is most essential to individual success, as well as to that of the company. Therefore, consider yourself a part of the machinery of the organization and endeavor not to diminish its effectiveness by the slightest neglect. Work first, last and all the time for the Chicago Great Western Railroad.

"In dealing with the public be courteous and accommodating. Remember it costs you nothing to be polite and attentive to the company's customers and to those whose business we hope to secure. Discourtesy or incivility will do more damage to our reputation than we can overcome in a long time by solicitation and other means. A kind word and attention take but little time and accomplish much in establishing a good reputation for the company and its employees. Go out of your way to help a customer, even though the road may not be able to furnish the facilities he asks for. In many cases the local agent of the company is its sole representative in the town where he is located. The estimate put on this man by his fellow citizens must be the measure of the company's popularity or unpopularity. Impress upon each patron the fact that you are giving his business your personal attention. If there is any complaint or delay and you are unable to remedy it yourself, advise your superior officer immediately. The company has recently expended millions of dollars for betterment of its roadway, equipment and train service, and from now on our service in all respects will be unexcelled. Do not leave it to the company's solicitors to impress this fact on all. Each employee has his own sphere of influence and every man should do his part to the end that the 'Great Western' may enjoy the business to which its improved facilities and service entitle it. Unless a railroad is prosperous its employees cannot permanently be prosperous."

Decision in Regard to Fares Between Abington and Brockton

The Railroad Commission of Massachusetts has handed down the following decision in regard to the petition of the Selectmen of Abington relative to the fare on the Old Colony Street Railway between Abington and Brockton:

"The present established fares of the Old Colony Street Railway provide for a 5-cent service in Abington and a ride from the post office in that town to the center of Brockton. The petitioners allege that a change in the latter rate should be made by increasing the distance that may be traveled for 5 cents and direct the attention of the board to other fares in the vicinity.

"After hearing and a further examination of the local conditions in and about Brockton and vicinity, including Abington, the board is unable to reach the conclusion that the existing fare complained of is unreasonable. The local fare between Abington post office and Brockton, taken in connection with special workingmen's tickets issued for travel in the vicinity, and established rates of fare for like or similar service in the area served by the Old Colony Street Railway elsewhere, show no substantial inequalities.

"Of course it must be understood that it is practically impossible, in view of local conditions throughout the commonwealth, to determine the reasonableness of rates for street railway fares exclusively upon the proposition of mileage. We appreciate, however, that the issue presented is a close one and a substantial increase in travel and the consequent increase in revenue might lead us to an opposite conclusion.

"While we make no recommendation at this time, the case may be continued with leave to the petitioners again to bring the matter to the attention of the board when substantially different conditions develop."

Stools in Louisville.—The Louisville (Ky.) Railway has decided to allow its motormen to use stools during parts of their runs.

Car License Ordinance in Paterson.—The Aldermen of Paterson, N. J., have passed the ordinance which provides that a tax of $25 a year shall be imposed for each street car operated in Paterson.

Fender Ordinance in South Bend.—The Common Council of South Bend, Ind., has passed an ordinance which requires that all street cars operated in South Bend shall be equipped with fenders after April 1, 1911. A fine of $5 to $200 a day is provided for violation.

Indianapolis & Louisville Traction Company Establishes Through Service.—The Indianapolis & Louisville Traction Company has established through limited service between Indianapolis, Ind., and Louisville, Ky., and has added a service to Dayton, Ohio. The company sells through tickets and checks baggage less than 150 lb. through to destination.

Transporting Mail Carriers in Little Rock.—At a meeting of the City Council of Little Rock, Ark., on Dec. 5, 1910, the City Council passed unanimously an amendment to the franchise granted to the Little Rock Railway & Electric Company in 1901, which relieves the company of the obligation to transport mail carriers free when attired in the regulation uniform. The amendment took effect at once.

Excursion Business Between Bangor and Stockton Springs.—John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., has announced that he proposes to take up with the Bangor & Aroostook Railroad the question of excursion business between Bangor and the seashore by electric cars from Bangor to Northern Maine Junction and thence by motor cars over the steam railroad to Stockton Springs, a distance of 31 miles.

Complaint About Need of Shelter at Gear's Corners.—The Public Service Commission of the Second District of New York has received a complaint from residents of Gear's Corners in Pittsford, Monroe County, against the Rochester & Eastern Rapid Railway, asking that a shelter be provided at Gear's Corners and that the stop be designated as Long Meadow. The company has advised the commission that it will erect a shelter at the point in question after Jan. 1, 1911.

Freight Congestion in Indianapolis.—On account of the congested condition of the Indianapolis freight terminals the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has issued the following notice: "Effective Dec. 10, 1910, all consignments of freight and interurban express not claimed and taken from freight house or express office within four days after arrival will be sent to storage house, subject to freight, drayage and storage charges."

Extension of Time in Joint Rate Case in New York.—The Public Service Commission of the First District of New York has granted an extension of time until Dec. 25, 1910, to the Metropolitan Street Railway and the Central Park, North & East River Railroad in which to establish joint rates for the transportation of passengers as provided in the order of the commission dated Aug. 2, 1910. The proceedings in this case were reviewed in the Electric Railway Journal of Dec. 10, 1910, page 1171.

Louisville & Eastern Railroad Wins Suit.—The Louisville & Eastern Railroad, which recently placed an extension to Shelbyville, Ky., in operation, has defeated the attempt of Shelbyville to prevent it from erecting a station within the city limits. The city claimed that the company had not

complied with its contract relative to the construction of the road. The case was carried to the United States Circuit Court of Appeals at Cincinnati from the Federal Court at Louisville. Both decisions were favorable to the company.

Wages in Providence.—The Rhode Island Company, Providence, R. I., established on Nov. 1, 1910, the following rates of pay per hour for motormen and conductors in its employ: First year, 21¾ cents; second year, 22¼ cents; third year, 23 cents; fourth year, 24½ cents; fifth year, 26 cents; sixth year and after, 27 cents. The rates of pay per hour for motormen and conductors of the company prior to Nov. 1, 1910, follow: First year, 21½ cents; second year, 22 cents; third year, 22½ cents; fourth year, 23½ cents; fifth year, 24½ cents; sixth year and after, 26 cents.

Complaint Against Western New York & Pennsylvania Traction Company.—The Public Service Commission of the Second District of New York has received a complaint from residents of Bolivar, Allegany County, protesting against the equipment, track and service of the Western New York & Pennsylvania Traction Company, Olean, N. Y., in Bolivar. It is stated that the track is unsafe; that the schedule calls for one car every 80 minutes to travel 18 miles; that the company has failed to arrange to meet trains in Olean, and that the rolling stock is inadequate and not fit for service.

Complaint About Service in Alexandria Bay.—The Public Service Commission of the Second District of New York has received a complaint from the trustees of Alexandria Bay against the St. Lawrence International Electric Railroad & Land Company. It is alleged that the tracks of the company in Alexandria Bay are not properly ballasted; that it is dangerous for vehicles to cross the tracks in their present condition; that the car stand of the company is on Market Street, one of the narrowest streets in the village, and that freight cars which are not in use are left standing and make the street almost impassable for teams.

Strike in Massachusetts.—A number of conductors and motormen in the employ of the Connecticut Valley Street Railway, Greenfield, Mass., went on strike on the evening of Dec. 7, 1910, because the company refused to reinstate several men who had been discharged for breaking the rules of the company. The company continued to operate its cars with the men who remained loyal to the company, and on Dec. 10, 1910, the men who went on strike agreed to return to work unconditionally pending a settlement of the differences between them and the company. The company reserved the right to hire men irrespective of their affiliations.

Reasons for Abandoning Ferries in New York.—Frank L. Sheppard, general superintendent of the Pennsylvania Railroad, explained recently to a delegation from Jersey City that the company abandoned the Twenty-third Street and Brooklyn Annex ferries because they had not paid since the opening of the Hudson & Manhattan Railroad between New York and New Jersey. There was not money enough in the vehicular traffic to warrant the operation of the ferries. Extra boats had been placed on the other ferry lines to accommodate teams. Mr. Sheppard holds that there is no legal requirement for the continuation of the Twenty-third Street and Brooklyn Annex lines.

Prizes to Section Men.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has announced the result of its annual contest among its section foremen. Foreman D. Welch, of section 13, was awarded a prize of $50 for the best line surface and level maintained. Foreman John Goguel, of section 5, was awarded $40 for the second best section, and Foreman John Akers, $25 for the third best section. Foreman G. M. Frye, section 1, was awarded a prize of $50 for the section operated with the least relative expense during the year, and W. H. Sutton, of section 9, the second prize of $25. There are 21 sections. Near the close of the year all the foremen are taken over the line in a special car, committees being appointed from their number to observe and grade the various points of excellence. The officers of the company figure out the averages and award the prizes according to the figures.

Reduction of Fare Asked on the Rochester, Syracuse & Eastern Railroad.—The Brightford Heights Land Company, Rochester, N. Y., has asked the Public Service Commission of the Second District of New York to issue an order reducing the fare of the Rochester, Syracuse & Eastern Railroad between Stop 8 and the Rochester city line in either direction from 10 cents to 5 cents. The distance from the city line of Rochester to Stop 8 is about 2.25 miles. It is charged that the company has divided its line into so-called zones so that the zone or zones from the Rochester city line to and including Stop 8, for which fares are fixed at 5 cents, are too short, thereby making the fares unjust. It is further charged that there is discrimination against passengers traveling from Rochester to Stop 8 and that Stops 7 and 8 are in the same fare zone and that from the city line a fare of 5 cents is charged to Stop 7.

Attempt to Limit Car Capacity in Kentucky.—Arguments were heard before Judge M. L. Haberson on Dec. 2, 7 and 8, 1910, on the application of the South Covington & Cincinnati Street Railway for an injunction to prevent the City of Covington, Ky., from putting into effect an ordinance regulating the number of people to be carried on the cars of the company. Attorney Cassatt for the company stated that it would be impossible to obey the terms of the ordinance, which require that cars shall carry only one-third more people than can be seated; that the people could not be carried during the rush hours, and that the ordinance is invalid, as the cars operate in Cincinnati, Ohio, as well as in Kentucky, and a question of interstate commerce is involved. James C. Ernst, president of the company, and Thomas M. Green, superintendent, explained that it would be impossible to put the ordinance into effect, and that longer cars could not be used on account of a contract with the company owning the bridge across the river. Mr. Ernst showed that the company had purchased 65 new cars since he has been its president, and that it is operating 142 cars. To place guard railings in the front vestibule would make it impossible for people to board or leave the cars at that end. The passage of the ordinance by the Council was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 3, 1910, page 1129.

Increase in Wages in Little Rock.—The Little Rock Railway & Electric Company, Little Rock, Ark., has announced an increase in the wages of its motormen and conductors, effective Jan. 1, 1911, of 1 cent an hour for men who have worked for the company for from one to five years, and an increase of 2½ cents an hour for those who have been in the service of the company eight years or more. The wage scale per hour in effect at present follows: First year, 17 cents; second year, 18 cents; third year, 19 cents; fourth year, 20 cents; fifth, sixth, seventh, eighth and ninth years, 21 cents; tenth year and after, 22½ cents. The wage scale per hour which will become effective on Jan. 1, 1911, follows: First year, 18 cents; second year, 19 cents; third year, 20 cents; fourth year, 21 cents; fifth, sixth and seventh years, 22 cents; eighth year and after, 25 cents. In announcing the increase D. A. Hegarty, vice-president, treasurer and general manager of the company, addressed a circular to the employees, in which he said in part: "On account of the loyal and honest service given by you in the past the officials of the Little Rock Railway & Electric Company wish to show their appreciation of the same by voluntarily granting an advance in wages, beginning Jan. 1, 1911. In granting this increase the company is paying its motormen and conductors wages as high as are paid the platform men in larger cities where living expenses are much higher. This will increase the operating expenses, but we cannot increase our revenue by increasing the rate of fare, which is fixed by ordinance. We expect that the men benefited by this increase will give honest, loyal service and strict attention to their duties and the rules of the company. That will in a measure prevent and curtail the expense for accidents, one of the greatest drains on the company's resources. Through your polite attention to the patrons it will keep the present friendly feeling of the public toward the company. The proper handling of the company's equipment will cut down accidents to machinery, thereby reducing our repair bills. The proper handling of the equipment by the motorman in feeding and operating his car will help the company to save power. The company has always given you a square deal, and all it asks is your co-operation in the way of giving the company a square deal on your part. This can be done by complying with the above request."

Personal Mention

Mr. L. O. Lieber has resigned as electrical engineer of the Los Angeles & Redondo Railway, Los Angeles, Cal., and the position has been abolished.

Mr. C. W. Curtis has been appointed general foreman of the Los Angeles & Redondo Railway, Los Angeles, Cal., in charge of the power department, with offices in Belvidere, Cal.

Mr. Martin A. Knapp, chairman of the Interstate Commerce Commission, has been nominated by President Taft to be a judge of the new Court of Commerce for a term of five years.

Mr. J. H. Pardee, operating manager of J. G. White & Company, Inc., New York, N. Y., has been elected a vice-president of the Albany & Southern Railroad, Albany, N. Y.

Mr. W. G. Thomas has been appointed assistant to Mr. W. H. Smaw, purchasing agent of the Georgia Railway & Electric Company, Atlanta, Ga. Mr. Thomas was formerly storekeeper with the company.

Prof. B. H. Meyer, chairman of the Wisconsin Railroad Commission, and Mr. C. C. McChord, of Kentucky, have been nominated by President Taft to be members of the Interstate Commerce Commission.

Mr. J. L. McLean has been appointed dairy traffic agent of the Illinois Traction System with headquarters at St. Louis, Mo. Mr. McLean was formerly with the Chicago & Alton Railroad in the same capacity.

Mr. H. A. Benedict, whose connection with the Public Service Railway, Newark, N. J., was mentioned in this column last week, will be mechanical engineer of the company. Mr. Benedict's appointment became effective Dec. 15.

Mr. W. H. Smaw has been appointed purchasing agent of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. G. B. Graves, resigned. Mr. Smaw has been connected with the company for eight years as a clerk and as assistant purchasing agent.

Mr. Frank L. Neff has been appointed general manager of the Indiana County Street Railway, Indiana, Pa., to succeed Mr. F. E. Pritchard. Mr. Neff was formerly connected with the electrical department of the Rochester & Pittsburgh Coal & Iron Company.

Mr. John M. Scott, who has been connected with the Kansas City Southern Railway, Kansas City, Mo., has been appointed chief of the inspection department of the Railroad Commission of Indiana. Mr. Scott began his railway career as a telegrapher. He was formerly connected with the Cincinnati, Hamilton & Dayton Railroad.

Mr. Horace Lowry has resigned as superintendent of the Minneapolis Division of the Twin City Rapid Transit Company, Minneapolis, Minn., to look after the real estate and investment features of his mother's (Mrs. Thomas Lowry's) estate. Mr. L. S. Cairns, general superintendent of the company, will, for the time being at least, perform the duties with the Minneapolis Division which Mr. Lowry has relinquished.

Mr. H. P. Crouse has been appointed secretary to Mr. J. M. Egan, president of the Metropolitan Street Railway, Kansas City, Mo., to succeed Mr. J. H. Harvey, who has been appointed superintendent of employment of the company, as noted in the Electric Railway Journal of Dec. 10, 1910. Mr. Crouse is a native of Wayne County, Ohio, and has spent practically all of his active life in newspaper work, largely in connection with railroad matters.

Mr. J. F. Van Keuren has been appointed acting superintendent of the Lansingburg division of the United Traction Company, Albany, N. Y., to succeed Mr. J. C. Thompson, who, as noted in the Electric Railway Journal of Dec. 10, 1910, has been appointed general superintendent of the Trenton (N. J.) Street Railway. Mr. Van Keuren held the positions of conductor, inspector and claim investigator with the company previous to his appointment as acting superintendent of the Lansingburg division.

Mr. Fletcher M. Durbin has resigned as general manager of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to become connected with the operating department of J. G. White & Company, Inc., New York, N. Y., effective on Jan. 1, 1911. Mr. Durbin was graduated from Williams College in 1903 and immediately became connected with the operating department of the Indianapolis Traction & Terminal Company, Indianapolis, Ind. In 1904 he was appointed assistant superintendent of the Indianapolis Traction & Terminal Company and continued in that capacity until November, 1907, when he accepted the position of general manager of the Evansville & Southern Indiana Traction Company.

Mr. Frank P. Maize, general shop foreman of the Plank Road shop of the Public Service Railway, has been appointed superintendent of shops of that company. Mr. Maize began his railway career in the shops of the Carlisle Manufacturing Company, locomotive builders, with which he was connected from 1885 to 1893. In 1893 he became foreman of the machine shop of the Atlantic Avenue Railroad, Brooklyn, and in 1894 he accepted a similar position with the Scranton (Pa.) Traction Company. While in Scranton Mr. Maize took the course in mechanical and electrical engineering with the International Correspondence School of Scranton. In 1896 he resigned from the Scranton Traction Company to become foreman of the repair shops of the second division of the Union Traction Company, Philadelphia. A year later he was appointed master mechanic of the New York & Queens County Railway, Long Island City, New York, and in 1900 he was made superintendent of power houses and equipment of the company. From 1903 until August, 1908, Mr. Maize acted as master mechanic of the Rochester (N. Y.) Railway. Mr. Maize has patented a number of railway appliances, among them an oil cup which is in use on a number of roads.



F. P. Maize.

Mr. Arthur L. Linn, Jr., who was appointed assistant auditor of the New York Central & Hudson River Railroad and auditor of its subsidiary lines on Feb. 1, 1910, has been connected with electric railways for many years. He started as assistant bookkeeper of the Cleveland Electric Railway in 1893 and remained with that company until 1898, when he was appointed assistant auditor. He remained in that position for three years and then resigned to take the office of assistant treasurer, auditor and assistant secretary of the Utica & Mohawk Valley Railway and subsidiary lines at Utica, N. Y. He resigned his connection with that company in 1905 to become general manager of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va. In the next year he came to New York City as general auditor of the street railway and power companies controlled by the New York Central & Hudson River Railroad in New York State. He was also secretary and assistant treasurer of a number of the subsidiary companies and was general auditor of the Mohawk Valley Company, which was organized to hold temporary control of certain properties. Later some of the properties were segregated and a new organization was perfected. In 1909 Mr. Linn was made general auditor and assistant secretary of the New York State Railways. Under the present organization, besides assuming new duties with the New York Central & Hudson River Railroad as assistant auditor and auditor of about 50 subsidiary companies, he continues to exercise supervision over the accounts of



A. L. Linn, Jr.

the subsidiary electric railway and power companies in the State. Mr. Linn has been a vice-president of the American Street & Interurban Railway Accountants' Association, and has been an active member of some of its committees.

Mr. F. D. Gatchell resigned recently as superintendent and purchasing agent of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C., to become manager of the office of The Texas Company at Charlotte. Mr. Gatchell was employed by the International Railway, Buffalo, N. Y., from 1897 to 1900 as switchboard operator and engineer at its Niagara Street power station. From 1900 to 1904 he was electrical engineer of the Buffalo Furnace Company, and from 1904 to 1907 he was superintendent and electrical engineer of the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss. Mr. Gatchell resigned from the Gulfport & Mississippi Coast Traction Company to become connected with the Charlotte Electric Railway, Light & Power Company.

Mr. J. E. Gibson, assistant to Mr. J. M. Egan, president of the Metropolitan Street Railway, Kansas City, Mo., has been appointed general superintendent of the company. Mr. Gibson entered the service of the Metropolitan Street Railway as a clerk in the office of the auditor. On Jan. 1, 1905, he was appointed secretary to Mr. Bernard Corrigan, who was then president of the company, and he continued in this capacity until March 1, 1909, when he entered the service of the operating department of the company as a division superintendent. In June, 1910, he was appointed assistant to Mr. Egan. Mr. Gibson was born in Kansas City, Mo., on Aug. 20, 1881, and was educated in the public schools of that city and at the Missouri State University at Columbia, Mo., from which he was graduated in 1902. From 1902 to 1904 Mr. Gibson served as private secretary to Mr. W. S. Cowherd, Congressman from the Fifth Missouri District, in Washington.

OBITUARY

John H. Barker, president of the Haskell & Barker Company, Michigan City, Ind., is dead.

L. P. Rowan, assistant superintendent of the Schuylkill Valley Traction Company, Norristown, Pa., is dead.

Thomas F. Downing, secretary and treasurer of the Chicago Car Heating Company, Chicago, Ill., died on Dec. 5, 1910, from a cerebral hemorrhage which resulted from a street car accident in June, 1910. Mr. Downing was 30 years old. He had been connected with the company since its organization in 1903.

The Massachusetts Railroad Commission gave a hearing on Dec. 12, 1910, on the appeal of the Boston (Mass.) Elevated Railway from the action of the Boston Transit Commission in determining station locations in the Riverbank subway at Charles Street, Dartmouth Street and Massachusetts Avenue. The Riverbank subway, as authorized by law, is shortly to be built from Park Street, Boston, to the Charlesgate district of the Back Bay, the route lying under Beacon Hill and the embankment recently built on the south border of the Charles River Basin.

C. S. Sergeant, vice-president of the Boston Elevated Railway, emphasized the fact that the distance between the proposed Massachusetts Avenue station and the subway outlet was only 915 ft. At the point where the station was desired there was a down grade inward bound of 3.15 per cent, which the company desired to use in accelerating cars running to the heart of the city. Even after the subway was completed it would be necessary to run many surface cars on Boylston Street and the present transfer arrangements to and from Cambridge were preferable to new ones involving stairway climbing and the use of underground facilities. The intermediate stations would prevent the company from making a quick run in the subway, which was designed to shorten the running time of outlying suburban passengers by 5 or 10 minutes. About 50,000 people would be delayed to benefit, perhaps, 3000 persons.

Mayor Fitzgerald of Boston urged the construction of three stations if the Riverbank subway was built according to present plans, but suggested that a subway under Boylston Street would fill the needs of the city's development better.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***City Railway, Los Angeles, Cal.**—Incorporated in California to construct certain lines in Los Angeles in the interests of the Los Angeles Railway. Capital stock, $5,000,000. Directors: Howard E. Huntington, George C. Ward, C. A. Henderson, J. E. Brown, W. E. Dunn, S. M. Haskins and Albert Crutcher.

***St. Simons Railway Company, St. Simons Island, Ga.**—Chartered in Georgia to build an electric or steam railway on St. Simons Island from Ocean Pier on the western part of the island to a point where Pastell and Black Bank Creek flow into the Atlantic Ocean on the eastern side of the island. Also a line from the initial point to a point near Frederica River, a distance of about four miles. Capital stock, $20,000. Incorporators: M. Kiser, New York, and Frank D. Aiken, A. Fendig, F. D. Strahan, J. B. Wright, H. F. Dunwoody, J. H. Whitmire, W. J. McPherson, George H. Smith and Newton H. Walker, all of Brunswick.

***Spray Utilities & Terminal Company, Spray, N. C.**—Chartered in North Carolina to build railways and develop water power. Capital stock, $500,000. Incorporators: S. H. Marshall, E. V. Hobbs and N. H. McCollum.

***Halite & Northern Railroad Company, Albany, N. Y.**—Incorporated in New York to build a four-mile steam or electric railway in Halite. Capital stock, $100,000. Directors: William A. Hazard, Edward W. Brown, Ashley Bigelow and Duncan A. Holmes, of New York; Wilton W. Sealby, Harry S. Keating, Brooklyn; Gouverneur O. Parks, Sheepshead Bay; Edwin M. Bennit, Hackensack; Herbert G. Buckley, Corona.

***Buckeye Lake Railway Terminal & Transportation Company, Millersport, Ohio.**—Incorporated in Ohio to build an electric railway in Millersport on Buckeye Lake. Capital stock, $15,000. Incorporators: A. E. Boone, H. A. Axline, J. L. Holden, Julius Hollinger and Lawrence Kliner.

***Portland Subway Company, Salem, Ore.**—Incorporated in Oregon to build a subway under the Willamette River at Portland. Capital stock, $100,000. Incorporators: L. Y. Keady, A. E. Hammond and A. K. Bentley, all of Portland.

***Farmers Electric Railway, Vale, Ore.**—Application for a charter has been made in Oregon by this company to build an electric railway in Vale and extend it to the Malheur Canyon and eventually to Ontario. Incorporators: R. D. De Armond, Fred L. Johnson, Vale, and G. W. Thomas, Ontario.

***Bellevue (Wash.) Electric Company.**—Incorporated in Washington to build an electric railway from Bellevue to Lake Sammamish. Capital stock, $500,000. Incorporators: E. P. Morgan, H. L. Collier and Frank J. Moran. Headquarters: 193 Twenty-seventh Street, Seattle.

FRANCHISES

Marysville, Cal.—The Northern Electric Railway, Chico, has received a franchise from the City Council to build its tracks across F and Third Streets to reach the site of the new depot on E Street between Second and Third Streets in Marysville.

San Diego, Cal.—The San Diego Electric Railway has received a franchise from the Council to extend its line on Fifteenth Street between A Street and B Street in San Diego.

***Brandon, Man.**—A Vancouver syndicate has asked the Council for a franchise to build an electric railway in Brandon. It offers to build at once if given a reasonable franchise.

Hagerstown, Md.—L. N. Downs and H. L. Kirby, representing the Hagerstown & Clearspring Railway, have received a franchise to build its tracks along the Hagerstown and Conocochegue Turnpike from Hagerstown to Conocochegue Creek. [E. R. J., Dec. 3, '10.]

Salisbury, Md.—The Wicomico Electric & Power Company has asked the City Council for a franchise to build a railway through Salisbury. This proposed 25-mile electric railway will connect Salisbury, Quantico, Roaring Point, Hebron, Bivalve and Nanticoke. M. V. Brewington, president. [E. R. J., Nov. 5, '10.]

Springfield, Mass.—The Hartford & Springfield Street Railway will apply to the General Assembly of 1911 for the right to operate a railway in Enfield and Somers.

Worcester, Mass.—The Worcester & Providence Street Railway has received a franchise to build a railway in Worcester. It will connect Worcester, Providence, Millbury and Sutton. William E. Horne is interested. [E. R. J., Apr. 16, '10.]

***Anoka, Minn.**—The Anoka-Minneapolis Suburban Railway Promotion Company has received a franchise from the County Commissioners to build railways over the Rum River Bridge at Anoka and over the United States military road running from Point Douglas to Fort Ripley, from the city limits of Minneapolis to the city limits of Anoka.

Bloomfield, N. J.—The Public Service Railway has received a franchise to connect its Orange and Passaic line with the Bloomfield Avenue line to give Bloomfield direct service to Newark.

Lambertville, N. J.—The New Jersey & Pennsylvania Traction Company, Trenton, has asked the City Council for a franchise to build its railway through Lambert Street in Lambertville to reach a new freight station which is to be built.

Asheville, N. C.—The Isothermal Traction Company, Rutherfordton, has asked the Board of Aldermen for a 60-year franchise to build its tracks into Asheville from Biltmore. This proposed 50-mile railway will connect Rutherfordton and Gastonia. J. F. Flack, Rutherfordton, secretary. [E. R. J., Nov. 19, '10.]

Dayton, Ohio.—The City Railway will ask the City Council for a franchise to build an extension of its Kammer Avenue line in Dayton.

Johnson City, Tenn.—The Johnson City Traction Company has received a franchise from the City Council to extend its lines to the Normal Building in the southwest addition in Johnson City.

***Victoria, Tex.**—D. D. Fairchold, San Antonio, and associates, have applied to the City Council for an electric railway franchise in Victoria.

Bismarck, Wash.—The Tacoma Railway & Power Company, Tacoma, will ask the Municipal Commission for a franchise to build an extension of its line from Tacoma to Bismarck, a distance of about 2 miles.

Lynden, Wash.—The Nooksack Valley Traction Company, Bellingham, has received a year extension of its franchise to build its tracks in Lynden. This projected line will connect Bellingham, Sumas, Ferndale, Lynden and Blaine. Samuel Alsop is interested. [E. R. J., Oct. 29, '10.]

***Seattle, Wash.**—Fred E. Sander, Seattle, will ask the County Commissioners for a franchise to build a seven-mile electric railway from Seattle to Lake Burien. This projected line will follow the projected route of the Seattle-Tacoma Short Line.

Tacoma, Wash.—The Tacoma Railway & Light Company will ask the Council for a franchise to build an extension of its tracks from Tacoma to Bismarck.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—It is stated that this company plans to electrify the Southern Pacific tracks from the Southern Pacific station to Oneonta tower and there have a double track connect with the inside tracks of the four-track system. It is expected to begin work the first of the year.

Fresno, Cal.—S. N. Griffith, Fresno, promoter of the proposed 50-mile electric railway to connect Fresno and Clovis, has awarded the contract to the Colorado Fuel & Iron Company for 10 miles of rails. [E. R. J., Dec. 10, '10.]

Ontario & San Antonio Heights Railroad, Ontario, Cal.—This company has completed the 6-mile extension of its line from Claremont through Upland to North Pomona. It will be placed in operation next January.

Geary Street, Park & Ocean Railway, San Francisco, Cal.—The Board of Works has awarded the Pennsylvania Steel Company the contract to furnish rails for this railway, which is to be reconstructed and to be municipally operated.

San Jose (Cal.) Railroad.—This company is now building about 25 miles of standard gage track and will expend about $75,000 for special work. W. P. Lawson, manager.

Tidewater & Southern Railroad Company, Stockton, Cal.—This company has awarded the contract to T. K. Beard, Modesto, for constructing the roadbed between Stockton, Modesto and Turlock. Byron A. Bearce is interested. [E. R. J., Oct. 15, '10.]

Jacksonville (Fla.) Electric Company.—This company has begun work on an extension from Fort Myers to Labelle and Citrus Center.

***St. Augustine, Fla.**—J. J. Brophy, Pittsburgh, and associates are said to be considering plans for constructing an electric railway to connect St. Augustine, Tampa, Kissimmee and Sanford.

Macon Railway & Light Company, Macon, Ga.—This company plans to build an extension of its Vineville and South Macon line to Rice's Mill before July, 1911.

Boise & Interurban Railway, Ltd., Boise, Idaho.—This company is said to be considering plans to extend its line.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company is considering plans to build an extension of its line to Fieldon and Hardin. Good progress is being made on its extension between Godfrey and Jerseyville. The company has moved its central office from Jerseyville to Alton.

Springfield & Central Illinois Traction Company, Springfield, Ill.—This company, recently incorporated, has begun surveys for its proposed 110-mile electric railway from Springfield to Nashville. William J. Barrett is interested. [E. R. J., Nov. 5, '10.]

***Richmond, Ind.**—The Commercial Club, of Richmond, is promoting the construction of an electric railway from Richmond to Harrison, via Abington, Clifton, Cedar Grove, Liberty, Roseburg, Dunlapsville, Quakertown, Tanfield, Brookville and New Trenton. Chas. W. Jordan, secretary.

Manhattan City & Interurban Railway, Manhattan, Kan.—The people of Manhattan have voted $20,000 and the township of Ogden has voted $10,000 to assist in building an extension of this railway between Manhattan and Fort Riley. Work will be begun at once. Joseph T. West, Manhattan, purchasing agent.

New Orleans Railway & Light Company, New Orleans, La.—This company is planning to extend its Claiborne line to St. Bernard.

Plymouth & Sandwich Street Railway, Manomet, Mass.—This company has completed preliminary arrangements and will begin construction in the spring on its proposed extension from Sandwich to Plymouth. This line now extends as far as Fresh Pond. N. H. Dunbar, Manomet, superintendent.

Detroit, Bay City & Northwestern Electric Railway, Detroit, Mich.—This company has been organized to build a line to connect Detroit, Utica, Romeo, Almont, Imlay City, Burnside, North Branch, Maysville, Caro and Bay City. From Burnside it is planned to build a branch to Marlette, Bad Axe and Harbor Beach. [E. R. J., Nov. 26, '10.]

Duluth (Minn.) Street Railway.—It is reported that this company has plans well under way for building an extension of its line to New Duluth and Fond du Lac.

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—This company has begun the construction of its proposed line from Mexico to Columbia and Fulton. This projected 20-mile electric railway will connect Perry, Mexico City, Santa Fé, Hereford, Columbia, Fulton and Mokane, Mathias Crum, president. [E. R. J., Dec. 3, '10.]

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—It is said that this company has begun surveys for its proposed railway from the Missouri River to Columbia via New Franklin and Rockport. J. Paul Price, Columbia, engineer. [E. R. J., Sept. 24, '10.]

*Wildwood & Delaware Bay Shore Line Railroad, Trenton, N. J.—The Board of Public Utility Commissioners of New Jersey has approved the sale of $500,000 capital stock and $562,500 first mortgage gold bonds by this company, and has also approved the contract awarded by the company to the Detroit Engineering & Constructing Company to build and equip its proposed electric railway from a terminus in the Borough of Wildwood to a terminus in the county of Cape May on the eastern shore of Delaware Bay.

Brooklyn & Jamaica Bay Railroad, Brooklyn, N. Y.—This company has asked the Public Service Commission for a certificate of public convenience and necessity for building a 2½-mile electric railway from Liberty Avenue and Montauk Avenue, down Montauk Avenue to Railroad Avenue and Old Mill Creek, Jamaica. Horace J. Subers, 25 Broad Street, New York, president. [E. R. J., June 25, '10.]

Syracuse (N. Y.) Rapid Transit Railway.—In the hearing on the application of the Trustees of Solvay for an order requiring this company to extend its double tracks from Bridge Street to the present westerly terminus of the line an agreement was reached that the company would do the work within a year and a half.

Neuse-Trent Traction Company, Newbern, N. C.—This company advises that it is now ready to award contracts to build a 4-mile railway in Newbern. Construction is to begin in about 60 days. It expects to purchase power from the city power station. The repair shops will be located at Newbern. Capital stock, authorized, $200,000. Bonds, authorized, $100,000. Officers: A. E. Stevens, Newbern, president; C. W. Polvogt, Wilmington, N. C., vice-president; C. D. Bradham, treasurer; Eugene Williams, Newbern, superintendent, and T. A. Colvin, Newbern, chief engineer. [E. R. J., March 26, '10.]

*Cleveland, Ohio.—Pittsburgh and Cleveland capitalists held a meeting at East Palestine, Ohio, and it is said that plans have been partially formulated for building an electric railway connecting Beaver Falls, Pa., Darlington, East Palestine and Columbiana, Ohio, making connection at Columbiana with the Youngstown & Southern Railway. At Leetonia this road connects with the Youngstown & Ohio River Railway & Light Company, which has its southern terminus at East Liverpool.

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—A. T. Herd, New York, who recently secured a controlling interest in the Columbus, New Albany & Johnstown Railway, through the purchase of its securities from Cincinnati banks; Judge Van Wyck, New York, and Colonel Pope, Parkersburg, W. Va., inspected recently the proposed extension from Gahanna to Johnstown. The Columbus, Mt. Vernon & Mansfield Traction Company, recently incorporated, is to take over this property, and it is believed that the line will eventually be extended to Mt. Vernon and Mansfield, where it will connect with the Cleveland, Southwestern & Columbus lines.

Springfield, Troy & Piqua Traction Company, Springfield, Ohio.—An effort is being made to induce this company to build a spur from the main line to St. Paris. The cost will be about $34,000 and the plan is to have Springfield and St. Paris divide the cost.

Philadelphia & Chester Railway, Philadelphia, Pa.—This company is building a ½-mile extension of its tracks in Eddystone and a 2½-mile extension of its line to connect with the lines of the Philadelphia Rapid Transit Company. Joseph L. Gilbert, president. Headquarters, 605 Land Title Building, Philadelphia.

Montreal (Que.) Street Railway.—The Aldermen of Montreal have appointed a special committee to confer with the officers of this company in regard to the construction of new lines in the city, particularly the use to be made by the company of the subway right which it secured from the Legislature in 1909.

Yazoo & Mississippi Valley Railroad, Memphis, Tenn.—An organization of business men of Helena, through President Hornor of the Business Men's League, has made an offer to the Yazoo & Mississippi Valley Railroad in which it agrees to lease the branch of the line running from Trotter's Point, opposite Helena, to Jonestown, Miss. If the offer should be accepted by the company the Helena organization will electrify the entire branch, operating a train every hour.

Tennessee Rapid Transit Company, Nashville, Tenn.—This company is said to be making preliminary arrangements for building its proposed 110-mile electric railway to connect Lewisburg, Springfield and Clarksville. J. M. Gray is interested. [E. R. J., Sept. 10, '10.]

Texas City Traction Company, Texas City, Tex.—This company has awarded a contract to the Willow Lumber Company for ties, and the contract for rails to the Hyde Brothers, New York, to build its proposed 5-mile railway to connect La Marque, Nadeau, and Texas City, connecting at La Marque with the Galveston-Houston Interurban Railway. The company will operate 35 passenger motor cars. Officers: Fordyca Ridley, 101-2 Security Building, P. O. Box 365, Galveston; W. S. Broussard, secretary, and Edward Ketchum, superintendent. [E. R. J., Dec. 10, '10.]

SHOPS AND BUILDINGS

San Francisco, Oakland & San Jose Railway, Oakland, Cal.—This company expects to build a new depot on Twentieth Street and Adeline Street in Oakland.

Athens (Ga.) Electric Railway.—This company is building a new concrete car house in Athens. It is also rebuilding its lines in various portions of the city.

Boise & Interurban Railroad, Idaho.—This company will soon build a new depot in Caldwell.

Frederick (Md.) Railroad Company.—This company is building a car house in Frederick to be 107 ft. x 150 ft. It is also building a paint shop to be 45 ft. x 100 ft. which will contain six tracks.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—This company expects to soon build a new freight station in Lambertville. The structure will be 20 ft. x 40 ft.

Ohio Electric Railway, Cincinnati, Ohio.—A contract has been closed by this company for the purchase of the property in Springfield of the Springfield Pure Milk Company. The property will be used as a site for the location of a new freight depot.

POWER HOUSES AND SUBSTATIONS

Jacksonville (Fla.) Electric Company.—This company will build a new power house on Riverside Avenue, facing the St. John's River in Jacksonville, to take the place of the old plant now in operation near the viaduct.

Illinois Traction System, Champaign, Ill.—It is reported that this company expects to build a power house in Atchison in the spring. The cost is estimated to be about $300,000.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company will construct a power house at Reeb Station, St. Louis. It will furnish power for the Belleville City line and additional power for the suburban system between Belleville and East St. Louis. Work will be begun at once. C. F. Hewitt, superintendent.

Frederick (Md.) Railway.—This company has just purchased and installed one 750-hp engine, one 400-kw a. c. generator and equipped three rotary substations complete.

Boston (Mass.) Elevated Railway.—Stone & Webster have obtained from the Boston Elevated Railway the contract for building the new power house in South Boston. It is proposed to erect a building which can be extended. A plant for unloading coal will be installed also, and storage accommodations for 100,000 tons of coal provided. It is expected that station, wharf, land and accessories will cost nearly $3,000,000. About a month ago the company contracted with the General Electric Company for two 15,000-kw steam turbines, which will be installed in the new station, giving an initial capacity to the station of more than 40,000 hp.

Toledo Railways & Light Company, Toledo, Ohio.—This company has ordered from the General Electric Company one 1000-kw, 575-volt motor-generator set and one 1000-kw, 3-unit, 135-volt motor-generator set, with transformers and station equipment.

Niagara Falls, Welland & Dunnville Electric Railway, St. Catharines, Ont.—This company expects to build substations next spring at Niagara Falls, Welland and Dunnville. J. C. Gardner, Niagara Falls, is interested.

Manufactures & Supplies

ROLLING STOCK

San Jose (Cal.) Railroads is considering the purchase of about 15 cars.

Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia., is reported to be in the market for two electric locomotives for hauling heavy freight equipment.

Columbus Railway & Light Company, Columbus, Ohio, has ordered four closed car bodies mounted on Brill No. 27-M.C.B.-1 trucks from the G. C. Kuhlman Car Company.

Texas City Traction Company, Galveston, Tex., which is building a line from La Marque to Texas City, has ordered two 35-passenger gasoline motor cars from the Sheffield Car Company.

Union Railway, New York, N. Y., has placed an order with The J. G. Brill Company for 100 cars, of the convertible type, similar to those used by the Third Avenue Railroad, New York.

Youngstown & Southern Railway, Youngstown, Ohio., is said to be considering the purchase of eight cars to be used in operating a half-hour schedule if it doubles its track between Youngstown and Leetonia.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., has ordered two combination baggage and smoking cars and two combination baggage and express cars mounted on Brill No. 27 trucks from the G. C. Kuhlman Car Company.

Frederick (Md.) Railroad has ordered one 37-ft. semi-convertible passenger and baggage car and one 31-ft. 8-in. semi-convertible passenger and baggage car from The J. G. Brill Company. Both cars will be mounted on Brill No. 27-M.C.B.-1 trucks.

East St. Louis (Ill.) Railway has on order with the McGuire-Cummings Manufacturing Company one double-end, double-truck combination snow sweeper and work car. It is to be equipped with four GE-70 motors mounted on McGuire-Cummings 6-ft. wheel base M.C.B. trucks, and a GE-800 motor for driving brooms, with K-28-B controller equipment for driving motors and K-10 controller for broom motor.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., is in the market for two double-truck car bodies, without trucks, either semi-convertible or standard closed design, about 40 ft. long over all and 8 ft. 6 in. wide. The company wants car bodies without prepayment platforms, but with large platforms with doors and steps on both sides, reversible cross seats and four sand boxes. Weights of cars to be as low as consistent with safe operation over heavy grades and delivery for April 1, 1911.

TRADE NOTES

Ralston Steel Car Company, Columbus, Ohio., has authorized an increase in its capital stock from $1,000,000 to $2,500,000.

Owen Bearse & Son Company, Boston, Mass., has moved its offices from 33 Broad Street to the Post Office Square Building, 79 Milk Street, Boston.

Edgar Allen & Company, Ltd., Sheffield, Eng., has appointed Shrock & Squires, 291 Pearl Street, New York, as eastern agents for its high-grade tool steels.

T. H. Symington Company, Baltimore, Md., manufacturer of Symington journal boxes and Farlow draft gear, has elected S. L. Kamps secretary with general offices at Baltimore, Md.

Consolidated Car-Heating Company, New York, N. Y., has received the contract for installing heaters in the 50 surface cars recently ordered by the Boston Elevated Railway. This company will also install its buzzer systems in these cars.

Railway Specialty & Supply Company, Chicago, Ill., changed its name on Dec. 1 to the P. & M. Company. This change was made because of the frequent confusion of the old name with the numerous other supply and equipment companies in the railroad field.

American Carbon & Battery Company, East St. Louis, Ill., has recently acquired the plant and business of the Doe Battery & Manufacturing Company, Kent, Ohio, and will continue the manufacture of Doe dry cells under the same name in connection with the manufacture of carbon and graphite products.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has received an order from the Stark Electric Railroad, Alliance, Ohio, to install 12 Stromberg-Carlson despatcher's signals between Canton and Salem, Ohio. This system permits the despatcher located at Alliance, Ohio, to set a signal against a crew at any selected point on the line in a few seconds' time, and each operation of the signals is automatically recorded at the dispatcher's office.

H. B. Logan, president of Dossert & Company, has been elected president of the American Oil Storage Company, a New Jersey corporation, capitalized at $500,000, which has acquired the patent rights for the manufacture, sale and rentals of Keefe's patent sectional steel flange storage tanks. Mr. Logan is well known in electrical trade circles through his connection with the successful development of Dossert solderless connectors. He will continue at the head of Dossert & Company. The New York office of the American Oil Storage Company is at 74 Broadway.

Charles G. Armstrong, consulting engineer, New York City, has taken into partnership his son, Francis J. Armstrong, under the firm name of Charles G. Armstrong & Son. Charles G. Armstrong is known in engineering circles particularly in connection with the planning and construction of the Auditorium Hotel, Stock Exchange Building, Lake Shore Passenger Station and the Coliseum in Chicago, and the Singer Building and United States Express buildings in New York City. He is also the inventor of many of the modern office building devices, particularly the elevator signaling system manufactured by the Elevator Supply & Repair Company. Francis J. Armstrong is a graduate of the Manual Training School of the Chicago University and of the Stevens Institute of Technology.

Western Electric Company, New York, N. Y., has declared an extra dividend of 2 per cent, payable on Dec. 31, 1910, to stock of record on Dec. 24, 1910. With the regular 8 per cent dividend this makes 10 per cent for the year and gives the American Telephone Company as owner of 80 per cent of the $15,000,000 stock additional income of $250,000. Due to the change in date of the fiscal year from Nov. 30 to Dec. 31, the company has declared a dividend of 1⅓ per cent, payable Dec. 31, 1910, covering the two months of November and December. Hereafter quarterly dividends will be paid Mar. 31, June 30, Sept. 30 and Dec. 31. The $5,000,000 of 4½ per cent 2-year notes have been called for payment Jan. 1, 1911, at 100½ and long-term bonds sold to provide funds for redeeming the notes. When the notes are paid off and the bonds delivered, the company will have no debt except the $15,000,000 of 5 per cent bonds.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its list of second-hand electrical machinery for December, 1910.

A. D. Joslin Manufacturing Company, Chicago, Ill., has issued a folder describing and illustrating its Cosmo dating stamp.

Western Electric Company, New York, N. Y., has issued bulletin 5500, describing and illustrating direct-current and alternating-current enclosed arc lamps.

National Wrecking & Machinery Company, Cleveland, Ohio, has issued a special list on a number of second-hand belted and direct-connected 500-volt generators ready for immediate shipment.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is distributing a leather-bound booklet which contains a diary for 1911, blanks for memoranda and miscellaneous engineering data.

Ball & Wood Company, Elizabethport, N. J., announces in a new catalog that in addition to building Rateau-Smoot turbines of the high and low-pressure types, it is also building these turbines, which are of the impulse type, for mixed flow pressure. The new type consists of a straight low-pressure turbine with supplementary wheels to economically use high-pressure steam by means of an automatically controlled governor.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, DECEMBER 24, 1910 No. 26

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, DECEMBER 24, 1910.

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A Lesson in Rapid Transit Conveniences

Nothing makes an individual more clearly realize such blessings as he may possess than a temporary deprivation of them, and the same principle applies to the public. For the past year a very large proportion of the commuters from New Jersey to New York have crossed the Hudson River through the Hudson & Manhattan tunnels and have come to look upon the conveniences which they afford largely as a matter of course. On Monday of this week a small fire in the power station of the company stopped the operation of the station and of the road just before the rush-hour period commenced and obliged the commuters to patronize the ferry service, now somewhat reduced on account of recent lack of patronage. The public was promptly notified of the discontinuance of the tube service so that there was no delay on that score, but the inconveniences of the old method of ferry transportation afforded an excellent lesson concerning the improvements which had been made in transit facilities between New York and New Jersey, and brought a realization of the benefits conferred by the Hudson & Manhattan tubes.

Railway Office Buildings

One of the greatest aids to efficiency in a large corporation is an orderly arrangement of the offices of the organization. Workmen cannot do good work unless they are equipped with proper tools and, in the same way, the energy factor of a large executive staff depends very largely upon the facilities with which the different departments are provided and upon the ability of the department heads to get together, exchange reports and discuss common matters. The organization of a modern railway company is as much more complicated than that of the early days as the modern electric car is than the horse car. For this reason one of the tendencies of the past decade has been the erection of office buildings especially designed to accommodate the needs of public utility companies. The most well known is undoubtedly that in Milwaukee. Recently the Public Service Corporation of New Jersey has erected an elaborate office building designed to house the executive staffs of the three departments of this public utility company. A description of this building which appears elsewhere in this issue illustrates the conveniences which can be afforded all departments in a building designed for the purpose. Few companies would need the extensive facilities provided in Newark, but the tendency thus to consolidate the offices of public service companies is by no means confined to the larger corporations. Smaller companies benefit in equal measure and there have undoubtedly been proportionately as many office buildings erected for the exclusive use of the smaller or moderate sized electric railway companies as for the largest corporations.

A Triumph of Reason

The indorsement by the Public Service Commission, First District, New York, of the main features of the latest proposition of the Interborough Rapid Transit Company and the recommendation of the commission that the offer should be accepted, "provided certain features not now satisfactory can be adjusted," afford strong hope that the rapid transit question in New York is settled. The outcome is creditable both to the Public Service Commission and to the Interborough company; the one for obtaining the proposition and approving its general tenor, the other for presenting it. It is sincerely to be hoped that the Board of Estimate and Apportionment, whose sanction of the plan was asked by the Public Service Commission on Tuesday of this week, will not withhold it through a false idea of the needs of the city or unreasoning prejudice against a transportation monopoly. We wish in no way to depreciate the offer made by Mr. McAdoo in behalf of the Hudson & Manhattan Railroad. In default of a better proposition it would have been desirable. But the transportation needs of Greater New York can be far better served by one company which will operate through routes along the main arteries of travel and provide free transfers at strategic points than by two independent systems. With the existing Hudson & Manhattan Railroad and its proposed extension there will remain two rapid transit systems in New York, but the direction of movement on the proposed subway system is far more closely allied with that on the existing subway than with that on the portion of the Hudson & Manhattan Railroad with which Mr. McAdoo's offer provided that transfers should be exchanged.

Auxiliary Snow-Fighting Equipments

The cost of an adequate snow-fighting equipment of the regulation type is a matter of such serious concern to some electric railways that when a heavy storm does come they are utterly unable to keep the cars moving. Of course, every road should be equipped with a few heavy plows and sweepers which are capable of bucking big drifts, but a great deal of delay can be avoided by using both light and heavy auxiliary equipment. Many of the worst blockades have originated from snowfalls which began in the early morning and some hours before their arrival had been scheduled by the weather forecaster. In such cases the management is apt to be caught off its guard and the service crippled if the cars in night operation are not equipped with shearing devices of any kind or if the snow-fighting cars and their crews are not ready. Shearing boards are inexpensive and they may render good service in situations where they will not interfere with special track work. While they cannot fulfil the functions of sweepers and plows, they are generally able to keep the line open until the heavier snow-fighting apparatus can be brought into action. Excellent reinforcements for the latter equipment are obtainable at low cost by temporarily equipping some spare work cars or freight box cars with plows and sweepers. The car framings must be properly braced for this emergency service, but otherwise the only additional expense is for the snow-fighting outfit and its installation. This practice will avoid the high fixed charges which would be incurred if the rolling stock were idle the greater part of the year. The present winter has begun with unusually heavy falls of snow, and if the weather of the last few weeks is a presage of that to follow vigilance in preparing for snow removal will pay an unusually high premium this year.

EMPLOYEES' MAGAZINES

One of the serious trials of street railway management is the constant change among motormen and conductors. Twenty-five per cent of discharges and desertions among platform men every year means, besides the losses caused by lack of training, an absence of the esprit de corps characteristic of many steam railroad services, but not so frequently found on electric railway systems. Good discipline and homogeneity are impossible of creation among a constantly shifting body of men. Any method that could be developed for bringing into existence a spirit of interest and devotion would be of evident value.

One fundamental defect in the relations of street railway managements and their employees is that it is impossible for the head of a large system to talk often to all of the men. It is equally impossible for the men to find a means of communication and expression except through avenues that more often lead to trouble than to good understanding. It is this line of reasoning and experience that has led a number of steam railroad companies and a few electric railway managements to the conclusion that their systems each needed an employees' magazine—a publication in which the men and the management could both talk and listen. Of course, such a magazine, like every publication, must supply a real need and must also be conducted by some one who understands both publishing and railroad conditions, otherwise it will not be a success. There have been examples of magazines of this kind which have perished by the wayside simply because the editor was a good railroad man, but not a good editor; others have fallen on barren ground and have been unable to take root because their editors, while understanding the newspaper business, were not acquainted with the field which the paper desired to reach. In one case an attempt was made to develop a magazine originally intended for the employees into one which would also be of interest to the general public, but in doing so the support of the original clientèle was lost and the paper died an early death. Another publication of this kind which began in the right way got into the hands of outsiders, and, while nominally the organ of the mutual aid society of the company, accepted advertisements from saloons, breweries and loan sharks. It also entered the political arena in a way to give the impression that the ideas advanced were held by the company, so that the latter had to intervene. The lessons to be learned from these instances are that the same principles which are fundamental in other publications apply to these as well, namely, that in addition to the possession of ability the motives of both the editorial and business departments of the paper should be above suspicion.

The publication should not be conducted for profit, and all advertisements, if any are taken, should be confined to those of reputable local merchants who have goods to sell to the men. The purpose of the paper should be confined to its real object, which is to take the place of voluminous correspondence, to supply a want which present means do not supply and to promote mutual respect and good will.

One of the most successful of the magazines issued by electric railway companies is the *Tramway Bulletin*, now about three years old, published by the Denver City Tramway Company. This paper is the official organ of the Denver Tramway Mutual Association and always contains the secretary's report as to receipts and disbursements, changes in membership and other items of interest pertaining to the association.

The pension department payroll is also published each month in full. The *Bulletin* also contains a personal column relating to the men of the different divisions or departments. In this way if a man has met with some misfortune or bereavement or has been sick his friends on the same and other divisions notice it in the magazine and speak of it, and the various officials of the company are kept better informed as to what is going on in a personal way among their employees. The magazine also publishes a synopsis of the bulletins issued during the month by the superintendent and of the talks to the men by the superintendent, trainmaster, master mechanic or division superintendents, so that each can talk to the entire organization. Some of the best contributions are from motormen, conductors and shopmen. The *Bulletin* also contains a record of the averages obtained during the preceding month by conductors in operating their recording registers. These records are published by divisions, and the division having the highest average heads the list. Considerable rivalry has been developed between the divisions for first place. The magazine is in every way well conducted and well edited.

The experience in Denver has been considered at length in these columns not because the plan followed there is necessarily applicable to other systems of equal extent, but because the Denver magazine is as good an instance of what a publication of this kind can be as any issued on a steam or an electric road and also because it has been found on that system to be of great educational value to both company and men.

HANDLING MATINEE TRAFFIC ECONOMICALLY

The economical handling of peak loads is always a difficult problem in connection with power station output and with the extra car service required on the street. At the concert hall and theater performances in most cities the release of the audience imposes a demand upon the local transportation system for additional facilities of relatively short duration which the regular cars cannot handle without congestion and considerable discomfort to patrons. If cars are massed at or near a single location it is most important to reduce to a minimum the time at which they stand on busy tracks. It is also necessary to encourage patronage by maintaining safe crossing of streets to stopping points in the face of the heavy automobile and carriage traffic which always occupies the roadway immediately after a performance is over. Handling traffic with such short peaks as 10 or 15 minutes economically means that close supervision must be exercised; that co-operation with the police must be insured, and that a comprehensive organization must be maintained. The problem is particularly important after matinée performances because of the coming evening rush

It is undoubtedly true that local conditions of track layouts largely control most operating companies in this matter. Observation of the way in which this class of service is handled indicates, however, that the location of a car house in the immediate vicinity of a theater or concert hall insures the rapid assembly of cars within a minute or two of the time when the exits are thrown open, and with the minimum blocking of regular tracks. Similar results are accomplished where side track facilities are available near the scene of entertainment, with arrangements for flagging cars onto the main line as needed. Two or three inspectors can handle such a situation admirably if team play is effected. An audience emerges from a large building steadily rather than with great rapidity, and it is more desirable to feed cars past the site regularly than to attempt to line them up outside in a standing row where the movement of regular cars is on a very short headway. When there are few regular cars to interrupt, as in park traffic, extended storage on even the main line tracks is feasible. In city service it is desirable to sandwich the extra cars in between the regular movements as far as possible. Prompt work at the telephone, co-operation with doorkeepers at the concert hall, the provision of adequate signs at stopping points, and the preservation of systematic car movements will insure the smoothest and most economical service. It ought always to be possible to anticipate the volume of extra traffic to a fair degree of accuracy by ascertaining the amount of patronage at each performance. Finally, economy demands that extra service of this kind shall be performed by the minimum number of cars and employees, with the shortest possible periods of standing idle and the avoidance of excessive power demands through simultaneous accelerations within a very limited distance.

FARM PRODUCE TRAFFIC

Those roads which believe that good service and low rates are the only inducements which it is necessary to offer farmers in a freight campaign to persuade them to ship their produce to the city by electric freight are apt to be mistaken. Despite the humorous papers which like to portray the traditional lack of business qualifications of the farmer, he is usually possessed of pretty keen sense in those cases where his own financial interests are concerned. The experiences of two interurban roads illustrate this point as well as that of the effect of local conditions upon all transportation problems.

One case was the apparently simple one of obtaining all the milk business within 25 miles of a large city. A fast twice-a-day service was established and the transportation rates were made far below the cost of teaming. Yet, despite two years' hard work, not more than 12 per cent to 15 per cent of the total milk product is being hauled in electric cars. In fact, the nearer the dairymen are to the city the more difficult it has been to secure their shipments. The reason for this seems to be that, while teaming takes time, the farmers take advantage of their trips to carry on marketing and other personal business.

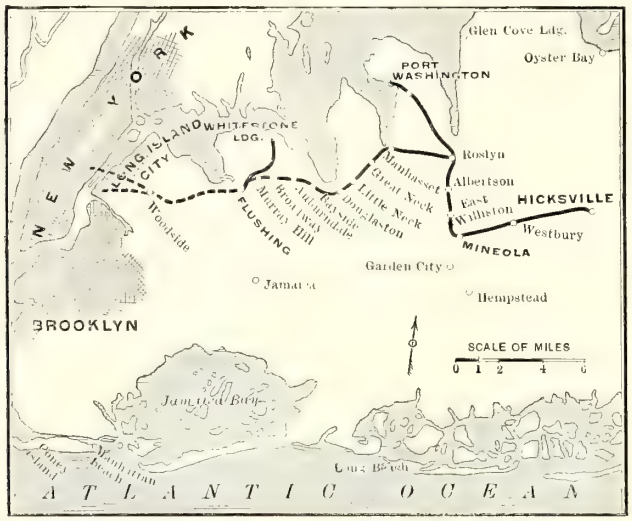
In the second case the territory served by the railway is devoted largely to truck farming. Every possible facility has been offered the farmers to ship by electric express, but a large number of them have remained obdurate and still spend six to twelve hours a day in going to and from the city. This condition is due to the fact that the farmers want to accompany their products to market, where they can drive their bargains in person, in preference to selling through a commission merchant. The prices for garden truck vary considerably from day to day and even from hour to hour, largely on account of differences in quality of the produce sold, whereas staple products like corn and wheat are seldom subject to violent fluctuations.

The lesson to be drawn from these two instances is not that the dairymen and farmers are too conservative, but that the electric operators in these two cases did not fully consider all the circumstances. Evidently, there is more to the freight question than transportation rates and service. No forecast of possible business from this source should fail to include due allowance for such special conditions as those described.

THE NEW YORK & NORTH SHORE TRACTION COMPANY

BY L. P. CRECELIUS AND R. W. EMERSON

The New York & North Shore Traction Company is an electric railway system connecting the various towns and villages within the Long Island suburban zone of New York City. The original charter was taken out in August, 1902, by the Stanley-MacElhinny interests of Cleveland, Ohio. This



New York & North Shore Traction—Full Lines Show Company's Route and Dotted Lines the Connections to Manhattan from Flushing

charter was secured in the name of the Mineola-Port Washington Traction Company, but on July 22, 1907, the title was changed to the New York & North Shore Traction Company. The present system was built and is operated in three divisions as follows: Mineola to Port Washington, 9.69 miles, built in the summer of 1907; Mineola to Westbury to Hicksville, 6.5 miles, built in the fall of 1908. The third extension connects with the Mineola and Port Washington branch at Roslyn, and extends through Manhasset, Great Neck, Little Neck, Douglaston, Bayside and Auburndale to Broadway and Prince Street, Flushing, which is the present terminal. At Little Neck the line enters the city limits of Greater New York, and continues within the city limits to the terminal at Flushing. This last-mentioned line has a branch from the junction of Central Avenue and Chestnut Street, Flushing, which runs to Whitestone Landing on the north shore of the island. The Roslyn-Flushing division is 14.37 miles long. It was commenced in the fall of 1909 and is now completed. The power plant is located midway between Bayside and Douglaston on the line of the road, and is so located that the western end of the line is supplied with power from rotary converters located at the power plant. The substation which is located at Roslyn, 5½ miles distant from the power plant, supplies power for the eastern end of the line. A description of the power plant and substation equipment will be found in another part of this article.

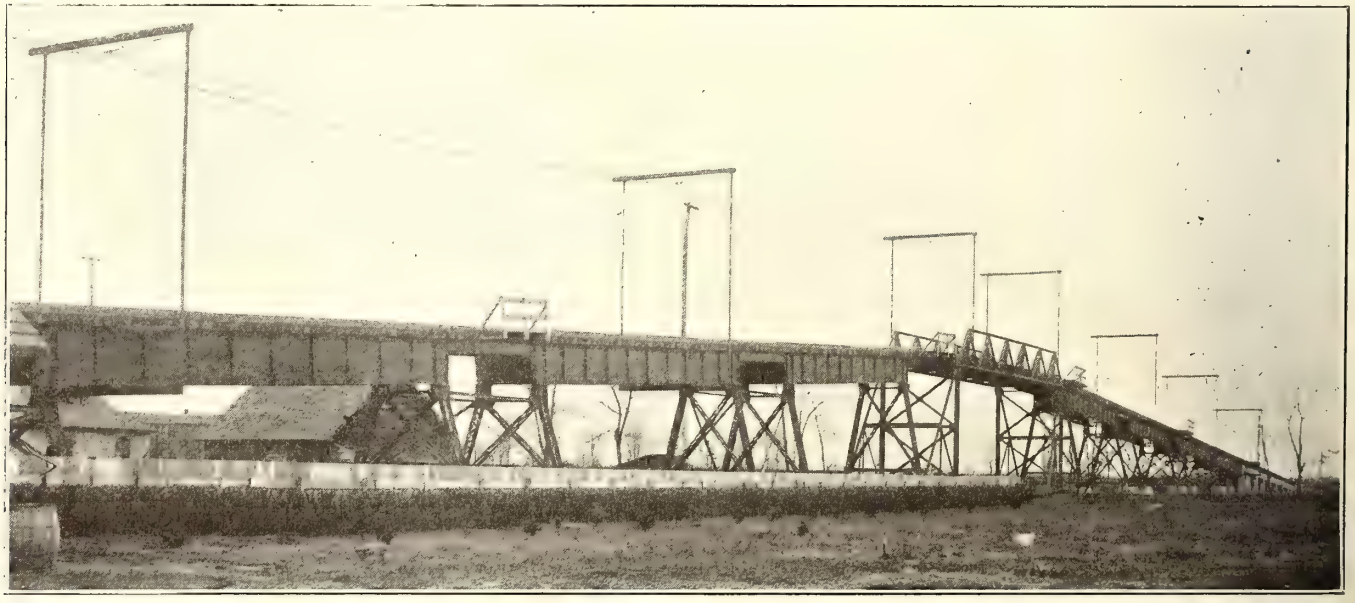
TRACK AND LINE

The track and line construction differs somewhat in accordance with the time the various divisions were built. However, one feature common to all of them is the construction of the sidings 7½ minutes apart. Within the city limits double track is used. There are 10 miles of double-track construction in all.

On the Mineola-Port Washington line there is laid 70 lb. girder rail to comply with the State law, which does not permit T rail or center-bearing rail on public highways. These rails are laid on 6-in. x 8-in. x 8-ft. ties spaced 2 ft. centers and fitted with ordinary bolted joints and No. 0000 compressed terminal bonds. The Mineola-Westbury-Hicksville line is laid with 80-lb. A. S. C. E. rails on yellow pine ties fitted with Carnegie Steel Company's Duquesne joints and No. 0000 terminal bonds. On the Roslyn-Flushing line the track construction from the junction with the Mineola-Port Washington line in Roslyn consists of Lorain section 103-426 grooved rail laid on yellow pine ties. The same rail section is used for the double-track line within the city limits. On this division the Clark thermit joint is installed throughout.

Within the New York city limits metal poles, supplied by the U. S. Metal & Manufacturing Company, are standard. These poles are quadrangular, 30 ft. to 35 ft. long, and are supplied with 30-in. cast-iron sleeves cemented to the pole. About 12 in. of the sleeve extends above the ground level. Outside the city limits the line is equipped with 30-ft. cedar and chestnut poles, except in Mineola, where tubular iron poles are used.

At Bayside the line crosses the Port Washington branch



New York & North Shore Traction—Deck-Plate Girder Bridge Over the Long Island Railroad at Mineola

of the Long Island Railroad on a wooden trestle. At Mineola the Oyster Bay branch of the Long Island Railroad is crossed by means of an open-floor deck-plate girder bridge. This bridge is 740 ft. long over all with a maximum span over tracks of 60 ft. The maximum grade on the approaches is 6 per cent.

FEEDER DISTRIBUTION

The Hicksville branch receives current from one 500,000 circ. mil weatherproof feeder extending from the substation to

Mineola, where it reduces to 350,000 circ. mil and continues to Westbury, where it ends. The Port Washington branch is supplied with current from a 350,000 circ. mil feeder, extending from the substation to a point within 2½ miles of Port Washington.

The section of the road receiving power from the substation located within the power plant is equipped with two 500,000 circ. mil feeders, which extend a distance of 4.3 miles to where the Whitestone line branches from the main line. At this point section insulators and line switches are installed in the line. These switches are so connected at this point that overhead trouble on one line does not affect operation on the other. Beyond the junction power is secured from double trolleys which are tied together at intervals.

Double-trolley construction of No. 0000 grooved hard-drawn copper is used throughout the entire system.

ROLLING STOCK

The present passenger rolling stock consists of 15 Brill semi-convertible cars of the interurban type, including two pay-as-you-enter cars. Six of these cars are equipped with four 40-hp Westinghouse 101-B motors and Westinghouse air brakes. These motors are geared 15:69. The other cars are equipped with four 40-hp GE-88 motors geared 17:69 and General Electric air brakes. The company has recently purchased a Brill sweeper and sprinkler, each equipped with two GE-204 motors. The sprinkler has an electrically operated suction pump.

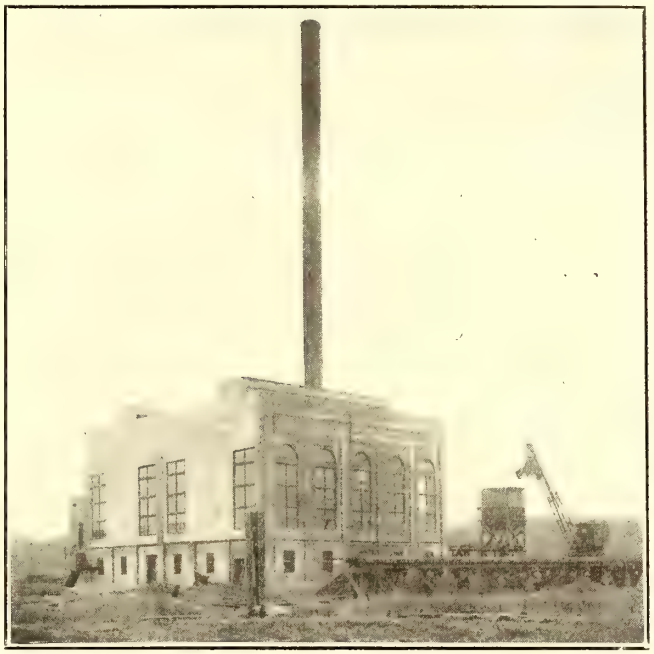
There is also a flat car, equipped with four 60-hp GE-87 motors geared 14:72 and air brakes. This car is used to haul gravel, rail, etc. and also serves for line construction and repairs. It is equipped with a detachable tower.

MACHINE SHOP

The present machine shop is a simple corrugated metal structure in Roslyn with such essential shop tools as a wheel press, boring mill, drill, shaper, lathe and grinder, all of which are driven from a central countershaft. Property has been secured in Flushing on which to build a car and repair shop.

POWER PLANT LOCATION

On Aug. 5, 1910, the company commenced operating its power plant, located on Alley Creek, Bayside, Long Island. The site for this plant had been selected and secured during August, 1909, and work on the foundations was commenced the following October, the first pile having been driven Oct. 25, 1909. The plant was therefore operating in less than 10 months from the time work on the foundations had been started. The site chosen is particularly advantageous, as plenty of condensing water is had at all times and coal is delivered by lighter directly to the power plant dock. The location also eliminates the necessity for a third substation and its consequent operating expense. The rotary converters for direct current for the adjacent lines are placed and operated by the regular power plant attendants. However, the location of the power plant in the "Meadows," as the lowlands are termed, introduced some very important elements in foundation construction. It was found necessary to stud the entire property with piles to a depth of 55 ft., which, in a general way, were driven throughout the site on 4-ft. centers. Under the building walls and other points where heavy loads are concentrated the piling was packed, that is, driven in rows of three piles, and these are on 3-ft. centers. The piles were cut off at an elevation corresponding to extreme low tide and the whole was covered over with a substantial concrete cap. The piles enter hard pan, into which they were driven until each one resisted further penetration. The design of the plant was naturally influenced to a considerable extent by the foundation requirements.



New York & North Shore Traction—Brick Power Station, Showing Temporary Concrete Wall at the Left

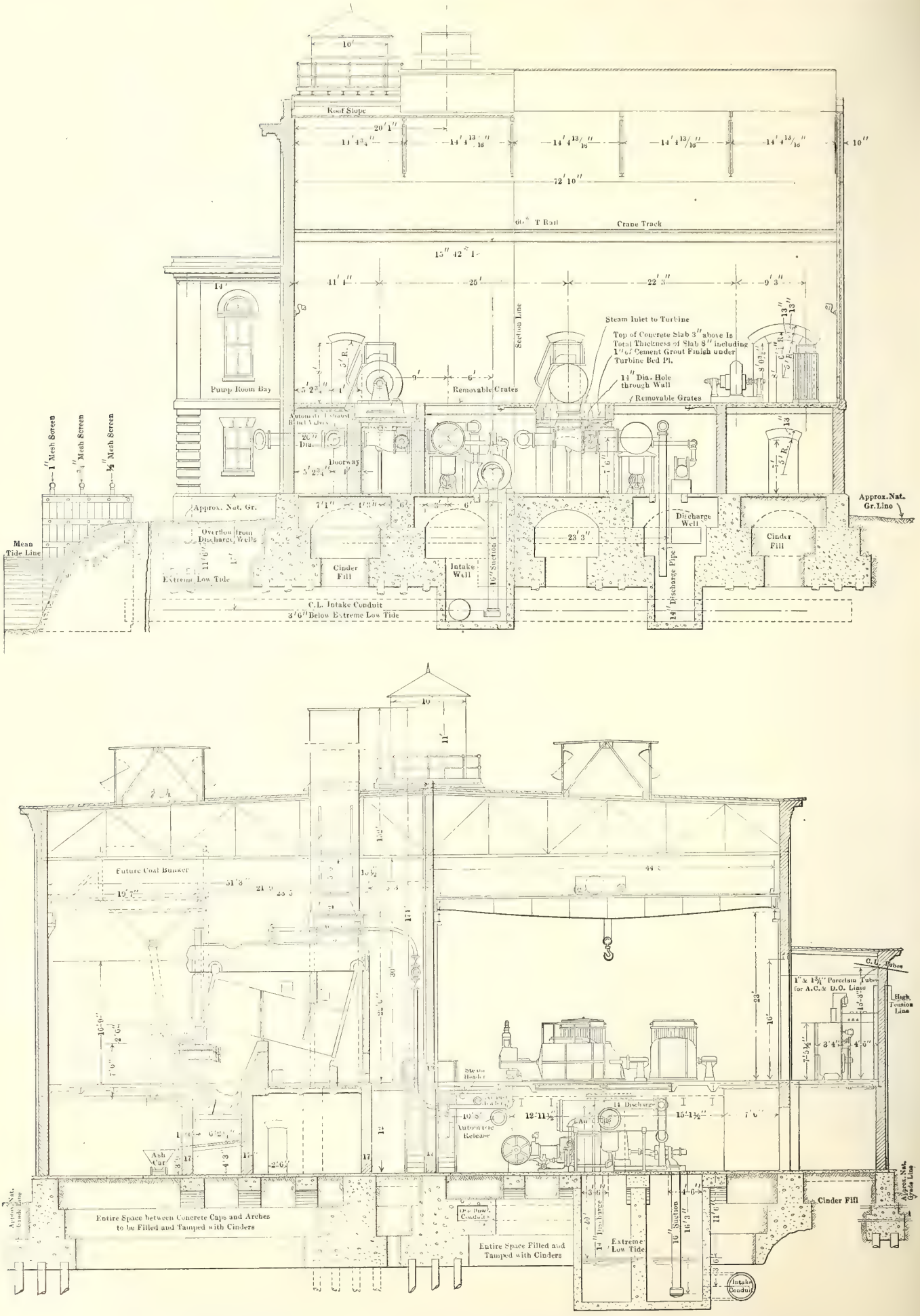
The power plant generates current at a potential of 6,600 volts, three-phase, at a frequency of 25 cycles, one-half of which is distributed by means of overhead conductors to a substation at Roslyn, Long Island, 5.5 miles distant. The other substation is located in the generating plant, and both substations contain two 300-kw rotary converters.



New York & North Shore Traction—Standard Car

POWER BUILDING

The building is a modern steel and brick structure erected on a concrete cap over piles, as noted hereinbefore. The steel work was completely erected before the masonry was commenced, and, in a general way, consists of standard channels, angles and shapes of the Bethlehem Steel Company. These were decided upon because of the fact that a number of structural steel concerns had a great quantity of Bethlehem shapes in stock and therefore could proceed at once with the work of making up the steel framing. The columns, composed of 10-in., 44-lb. and 10-in., 55-lb. I-beams, are 48 ft. long, and to these are fastened the roof trusses, which are made of standard angles. The design of these made possible a very neat truss, requiring a minimum of steel. The roof over the building proper is made of 3½-in. reinforced concrete slabs; over the monitors the roof is of cement plastered over the top of the ferroinclave reinforcing; the sides and ends of the monitors around the pivoted windows are made in the same fashion. The top is five-ply Barrett tar and gravel.

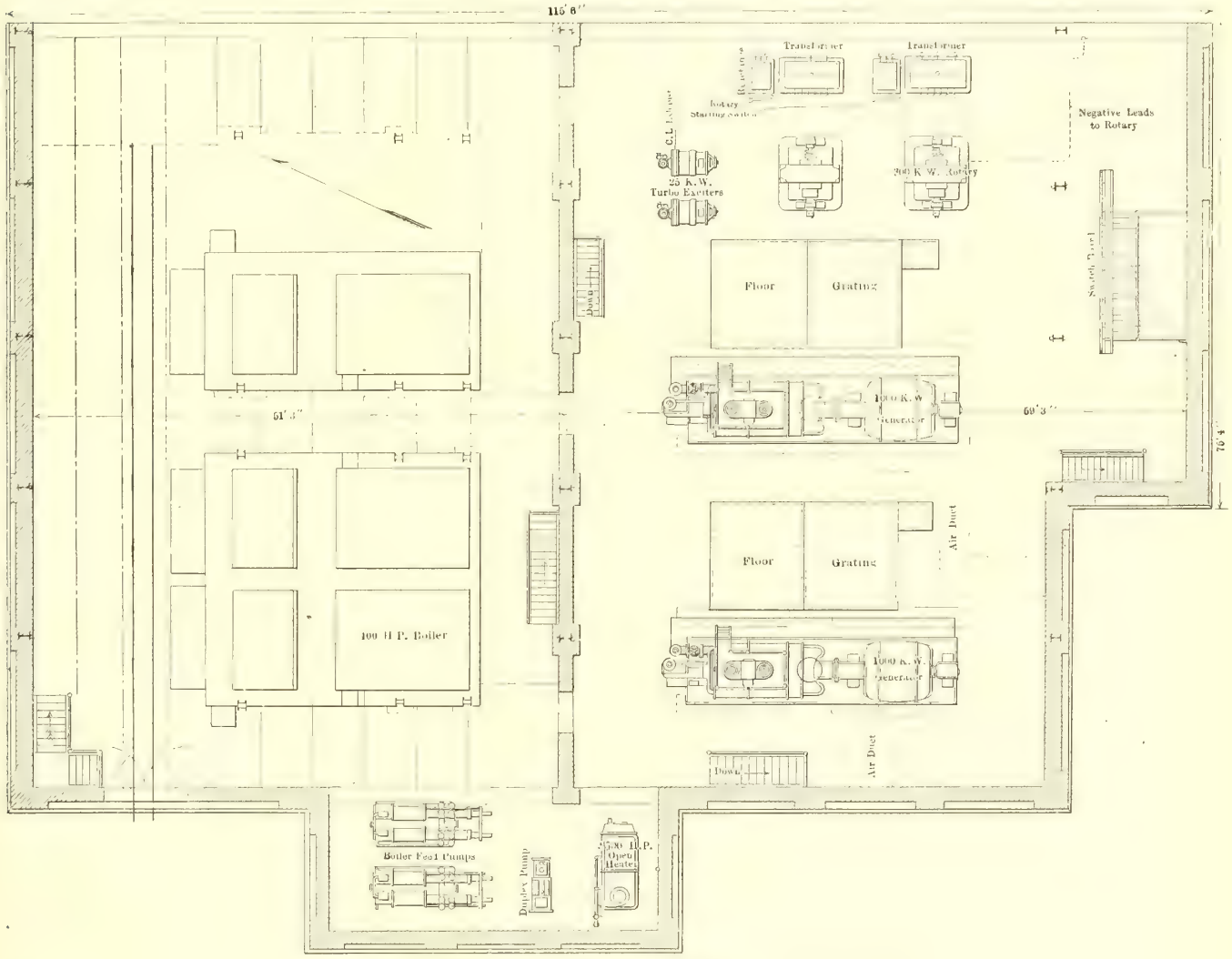


New York & North Shore Traction—Cross and Longitudinal Sections of the Power Station

The brickwork consists of hard-burned shale brick of standard dimensions laid in cement mortar. The window frames are of large dimensions, giving plenty of light. They are spaced in neatly paneled walls, which harmonize well with the general architectural scheme of the building. To accommodate the switchboard, heater and boiler feed pumps without increasing the size of the building proper, relatively inexpensive bays have been projected, in which this equipment has been installed.

The floors are of reinforced concrete 5½ in. thick, 3 in. of this being over the beams. In this are installed all the enameled steel conduits for the lights and auxiliary circuits from current and potential transformers, field circuits, etc. However, all power leads are installed in 1½-in. fiber conduits neatly cleated to the beams beneath the turbine room floor, thick, the whole making a stack 175 ft. high from the boiler room floor. The diameter of the stack is 6 ft. 6 in., and its capacity such that the battery can be successfully operated at 75 per cent overload. The third boiler is at present temporarily connected to this stack, but later, when the battery is completed, a second stack will be erected over the same. This arrangement of stacks, while detracting much from the beauty of the plant, as viewed from outside, saves much in the way of idle investment and decreases the enormous stack loss which small plants suffer by reason of the one-stack idea.

The stokers are of the new fin-grate type, as made by the Westinghouse Machine Company, having approximately 95 sq. ft. of grate surface. As they are installed in Dutch ovens projected to a point 3 ft. ahead of the boilers, a large combustion chamber is secured. The furnace arch extends well



New York & North Shore Traction—Plan of Power Station

where they are plainly in sight and easily accessible for inspection at all times.

BOILER ROOM

Approximately, the dimensions of the boiler room are 72 ft. long x 51 ft. wide. The boilers are set two in a battery and one in a half battery, the equipment consisting of three 400-hp B. & W. boilers with the usual attachments and fittings. The boilers are suspended from complete steel frames, independent of the brick settings, to allow expansion and contraction. The rear columns are extended up over the boilers and framed, making a substantial base for the steel stack, which is erected over the battery. The boilers comprise two steel drums 42 in. in diameter and 192 4-in. seamless, hot-drawn, open-hearth steel tubes of No. 11 Birmingham gage. The tubes are spaced 12 in a row and laid 14 in height.

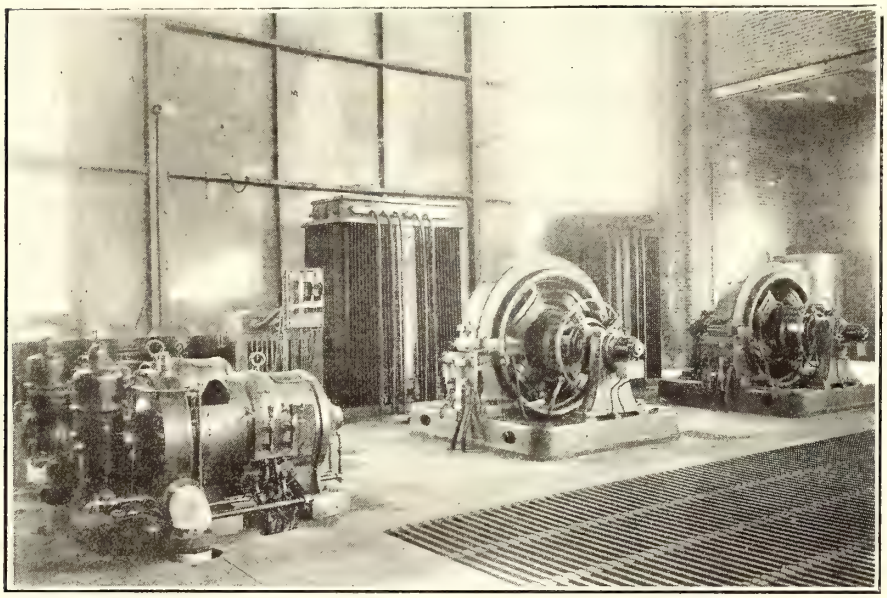
The stack is made of steel plate. The lower third is ⅜ in. thick, the center section ¼ in. thick and the top section 3/16 in.

into the furnace and is over 6 ft. long. The distance from the tip of the arch to the boiler tubes is 6 ft., thus insuring a travel of at least 12 ft. for the gases from the point of distillation on the stoker. As a result of this arrangement practically smokeless combustion is secured at all loads. The ashes are dumped from the grates into ash pits underneath, whence they are raked into a small tip car running in front and are by means of this conveyed to the outside for fills.

TURBINE ROOM AND LIGHTING

The turbine room comprises a space approximately 46 ft. wide x 72 ft. long, through the south wall of which is projected a switchboard bay about 42 ft. x 13 ft. in size. Over the turbines is installed a hand-operated 15-ton traveling crane. The only unusual feature comprised in the arrangement of the turbine room lies possibly in the large floor openings to one side of each turbine, which were arranged to allow ample freedom in the use of the crane. These openings are covered

with gratings constructed of light angles. They serve the double purpose of ventilation and illumination. Any part of the condenser, circulating pumps, air pumps and the suction pipes of the same are thus accessible to the crane, and repairs to this apparatus, the lifting up of foot valves, etc., can therefore be made with the greatest possible dispatch. All the steam equipment is operated at 150 lb. pressure at the throttles. The generating and local substation apparatus consists of the following Westinghouse machinery:



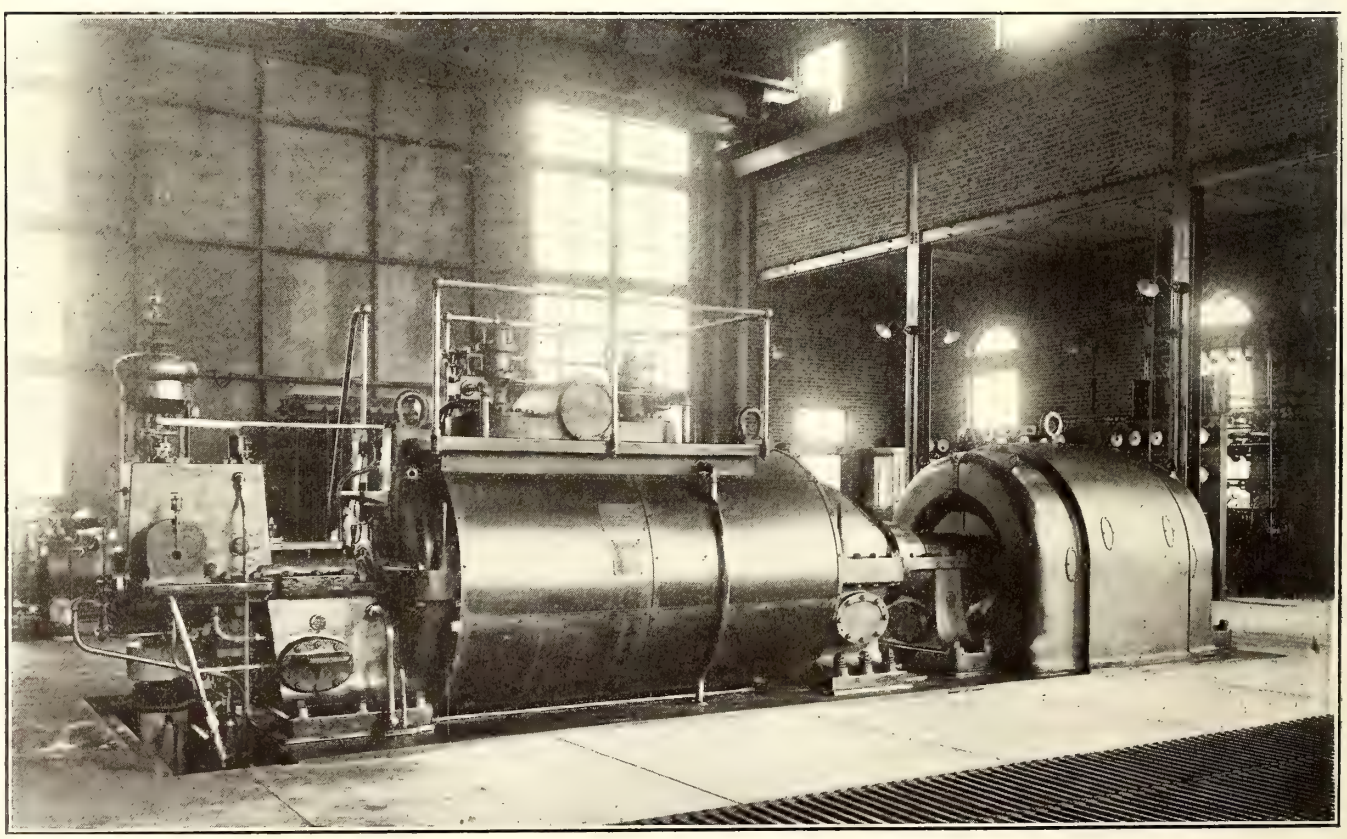
New York & North Shore Traction—Temporary Concrete Wall Opposite the Rotary Converter and Exciter Equipments

Two 300-kw, three phase, 600 volts, d.c. rotary converters, together with their oil-cooled transformers and reactances.

The rotaries both in the power plant and substation are arranged to be started by means of switches connecting them to half-voltage taps in the secondary circuits of the transformers.

The switchboard consists of nine slate panels finished in dull black containing the usual equipment for railway circuits. The arrangement of circuits and grouping of switches has, however, been extremely simplified. The negative circuits of both the rotaries and exciters are not brought to the board but run directly to their destination for control by switches conveniently located at the apparatus. Only overload circuit-breakers have been provided, both on the d.c. and a.c. circuits. However, the generator switches are non-automatic. The board also is equipped with a Westinghouse electrostatic three-phase ground detector.

The plant is illuminated by means of 33 80-cp, 115-volt Meridian lamps in Prismo reflectors mounted on brackets extending from the walls. The lamps have frosted tips and are located 12 ft. from the floor. The basement lighting is accomplished with standard 16-cp incandescent lamps suspended from outlet boxes installed in the concrete floor above. These lights are distributed to accommodate the apparatus. The wiring for the lights is carried in 1-in. enameled steel conduits installed in the turbine room floor, the conductors consisting of No. 8 B. & S. gage flat twin wire. No conductors of smaller cross-section are used in the power station.



New York & North Shore Traction—Turbine Room

Two 1000-kw horizontal turbo-alternators, operating at 1500 r.p.m., 6600 volts, three-phase, 25 cycles.

Two 25-kw turbo-exciters, operating at 3500 r.p.m. and 125 volts, d. c. These exciters are also used for lighting.

BOILER FEED PUMPS AND HEATER

The boiler feed pumps are installed in a bay about 32 ft. x 14 ft. This bay extends through the east wall of the building and lies between the turbine and boiler rooms. A water-stor-

age tank having a capacity of 6500 gal. is placed above on the main building roof and is conveniently located with respect to the pumps. Fresh water for boiler feed, cleaning, etc., is secured from a 4-in. well driven to a depth of 400 ft. The water rises in the well to within a few feet of surface and the casing is capped and piped to a sump located in the basement directly beneath the pumps. A small Blaisdell air compressor is connected to a ¾-in. pipe which is run through the cap covering the well casing and extends into the case to a depth of 150 ft. The water is thus lifted by air pressure (65 lb.) to the sump from which it overflows.

As all the steam used in the turbines is condensed in surface condensers and returned to the heater only a small amount of make-up water is required. This loss represents leakage principally and has been found to amount to about 14 per cent.

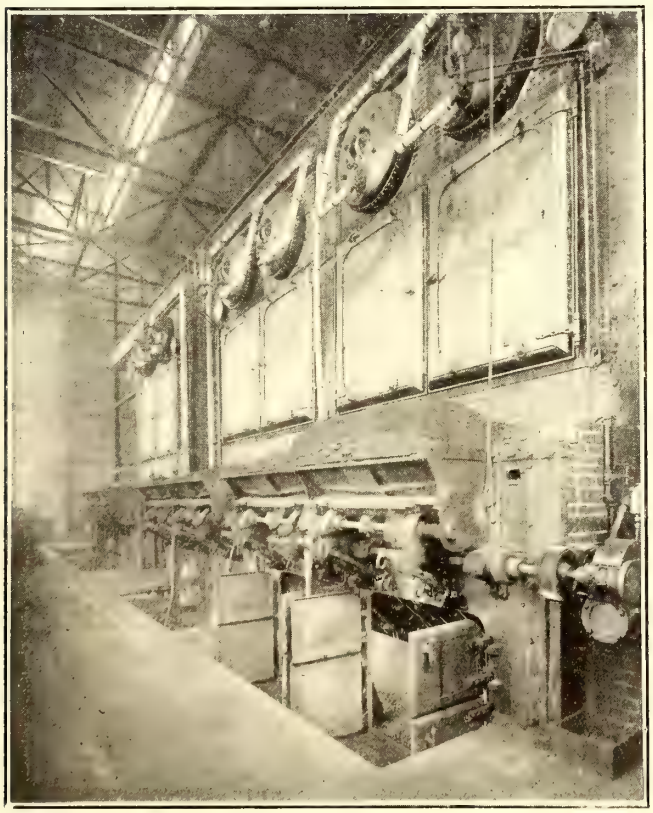
The auxiliary equipment consists of:

Two 12 in. x 7½ in. x 15 in. Worthington outside end, packed, duplex feed pumps; one 9-in. x 5¼-in. x 10-in. Worthington duplex piston pump; one 2500 hp Cochrane open feed-water heater.

The 9-in. x 5¼-in. x 10-in. pump is used as an auxiliary for house service and to elevate the water to the storage tank. However, both boiler feed pumps have been arranged with pipe connections and valves so either one can be substituted for the auxiliary pump in case the latter becomes disabled. An emergency connection has also been made with the city water mains. All exhaust steam, drips, drains, and, in fact, every bit of waste heat, is returned to the heater and most of it recovered. The temperature of the feed water in the heater averages 210 deg. Fahr.

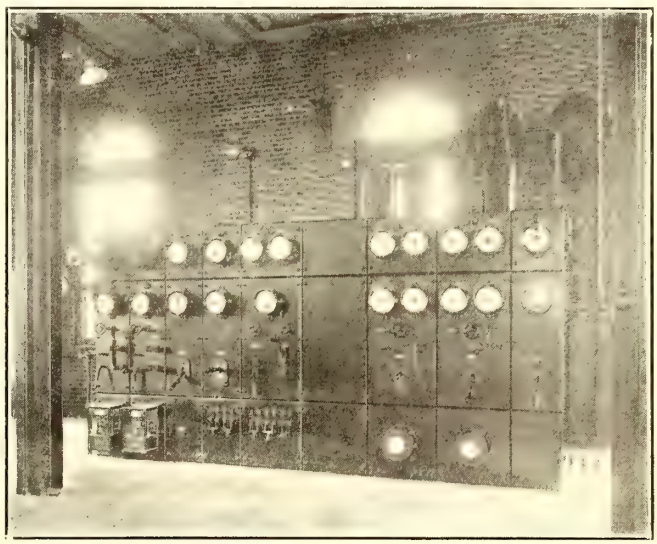
CONDENSERS.

The turbines exhaust into surface condensers, each containing 3500 sq. ft. of cooling surface. The water from the adjacent stream flows by gravity through the intake conduit to wells located directly under the circulating pumps. The water is discharged into similarly constructed wells, the overflow of which is returned to the stream. The intake conduit extends well into the stream and terminates in a crib. The crib is made of heavy timbers and faced with 4-in. sheeting. The crib is 12 ft. long x 5 ft. wide, and into this structure three rectangular screens are secured by slides so that they can be hoisted out by an ordinary chain block and cleaned. The screen in the stream side contains 1-in. meshes, the intermediate screen ¾-in. meshes, and the inner screen ½-in. meshes.



New York & North Shore Traction—Boiler Room

The circulating pumps are 12-in. volute centrifugal pumps, each coupled to an 8-in. x 7-in. vertical open-frame engine. The unit has a capacity of 3500 gal. against a head of 25 ft. To each condenser is also connected a 6-in. x 14-in. x 12-in. Blake horizontal straight line R. D. V. pump. The discharge from the hot wells is handled by a 2-in., two-stage turbine-driven pump. This equipment was supplied and installed by the H. R. Worthington Company.



New York & North Shore Traction—Switchboard in Power Station

PIPING AND TRAPS

The steam header is mounted on brackets bolted to building wall behind the boilers and is 8 in. in dameter. Into this are connected the 6-in. steam lines from the boilers. Foster non-return valves are mounted on the boiler nozzles. The steam is delivered to the turbine in 6-in. steam lines extending from the header and under the floor to the turbines. The steam supply for the auxiliaries is taken from a loop connected to each end of the main steam header and equipped with valves properly distributed so that failure in the piping at any point can only shut down one turbine. The high-pressure piping throughout consists of extra heavy steel pipe, Crane ferro-steel valves and fittings, rolled steel flanges, and is designed safe for a working pressure of 250 lb. The steam lines leading to the turbines have been equipped with Cochrane separators, each drained by one Squires high-pressure unlimited trap, which returns the condensation to the heater. The auxiliary loop is also drained by Squires traps and the heat returned to the system.

The steam connection from the boilers to turbines was made as short and direct as could be done consistently and both the high and low pressure piping systems were simplified as much as possible without destroying their effectiveness. The equipment was supplied and installed by the Pittsburgh Piping & Equipment Company.

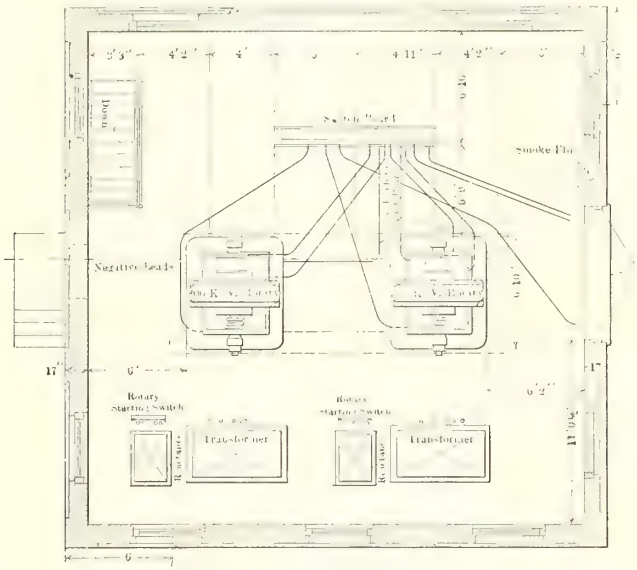
COAL-HANDLING EQUIPMENT

The fuel for the plant is delivered by lighters which are docked alongside the power station and unloaded by a grab bucket having a capacity of 1500 lb. of coal. The bucket is suspended from the boom of a locomotive crane and electrically propelled. The crane is mounted on a trestle extending along the face of the dock; a spur is also extended into the property alongside of the plant from which the coal is dumped into stock piles for use when navigation closes. At one end of the dock a coal hopper has been installed under which the crusher is placed.

The coal is dumped by the crane into this hopper and passes through the crusher, where it is emptied into a second hopper, from which it is taken by means of tip cars as required and conveyed into the boiler room. At present the coal is dumped on the boiler room floor and shoveled by hand into the stoker hoppers. The steel work in the boiler room has been arranged so a coal bunker can be readily installed if found necessary. No labor could be saved, however, at present and the extra investment, therefore, is saved while the load on the plant is light. It is doubtful if the expense of installing the bunker will ever be justified, as it has been found the firemen have plenty of time to look after the fuel supply. The addition of more boilers would naturally require more men, who would be available to look after the extra fuel required. The locomotive crane was supplied by the Brown Hoisting Machine Company, the coal crusher by the Mead-Morrison Company, the tip cars by the C. W. Hunt Company. The fuel supply consists of bituminous run-of-mine, coming mainly from the Barnesborough and Broad Tap, Pennsylvania, districts.

ENGINEERING

Attention in the design of this plant has been focused upon simplicity and this idea carried out as far as could be done without disturbing the effectiveness of the plant. This has resulted in an assembly and arrangement of modern power-



New York & North Shore Traction—Plan of Roslyn Sub-Station

plant equipment suitable for generating current for an electric railway operating 20 to 25 cars and requiring but eight attendants. The load on the plant at present amounts to but 30 per cent of the capacity of one turbo-generator, and the coal consumption averages at this rating 3.67 lb. of coal per kw-hour. Considering the size of the units and the load, this leads to the belief that the plant will operate on slightly less than 3 lb. of coal per kw-hour when operated at the load for which it was designed.

The power plant was built by the New York & Nassau Construction Company and the design of the plant was placed in charge of L. P. Crecelius. The services of Wm. J. Carter, consulting engineer, were also secured to design all building, structural steel and foundation details. The construction company was represented by R. W. Emerson at the power plant site as supervising engineer of construction.

HIGH-TENSION LINE AND SUBSTATION

The high-tension line connecting the power plant with the substation at Roslyn is 5½ miles long. It consists of three No. 2 rubber-covered wires with weatherproof braid. Where dense foliage or other obstructions make this construction impracticable there is used a three-conductor, lead-covered cable which is suspended from a ½-in. steel messenger wire. Four sections of lead-covered cable are used. Potheads are employed at the joints between the open construction and the lead-covered cable. At these points Ohio Brass insulators are used to relieve the strain in the line.

Lightning arresters of the Westinghouse electrolytic type are installed at the power plant and substation. The line is grounded at 14 points between the power plant and substation. The high-tension line is carried on the poles supporting feeders and trolleys. At some points 50-ft. and 60-ft. poles are used to clear the tops of trees. The line is brought into the substation underground through a vitrified tile duct.

The Roslyn substation building is a steel and brick structure with floors of concrete. The plan dimensions are 30 ft. x 30 ft.; height of main floor, 3 ft. above ground line; roof trusses, 13 ft. 6 in. above main floor. Its equipment is identical with the power-plant substation with the exception of the switchboard, which consists of five panels, as follows: One incoming high-tension line panel, two rotary converter switch panels and two rotary converter d.c. panels located on the power-house board. The substation is lighted by two 600-volt d.c. circuits, which supply both the first floor and basement. The rotary-converter auxiliary circuits are carried in 1-in. steel conduits buried in the concrete floor.

FARES, SCHEDULES AND ORGANIZATION

The average rate of fare on this system is about 1 cent per mile. Thus the fare from Mineola to Port Washington (9.69 miles) is 10 cents, but the same fare is charged as a minimum for the 6.5 miles between Mineola and Hicksville. The fare from Mineola to Westbury, half way to Hicksville, is 5 cents. No special rates are granted, except half-rate school tickets in Nassau County. These tickets are sold in books of 20 for $1 and are good only on school days. They are furnished to students only on proper certification from the principal or teacher.

During the past summer the company gave half-hour service on the Port Washington and Hicksville branch and on the completed portion from Bayside to Flushing and Whitestone, which began operation Aug. 12. Hourly service is being maintained between Roslyn and Douglaston, but it is also planned to give half-hour service between Roslyn and Flushing over the recently completed Alley Creek bridge.

The organization of the company is as follows: President and general manager, George A. Stanley; vice-president and secretary, James A. MacElhinny; treasurer, George F. Scofield; assistant treasurer and auditor, G. Franklin Smith; general superintendent, Thomas B. Davis; superintendent of power, R. W. Emerson; engineer maintenance of way, Harry Tappan; master mechanic, C. A. Kinsey.

MEETING OF MASSACHUSETTS STREET RAILWAY ASSOCIATION

The regular monthly meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, Mass., on Dec. 15, 1910. F. H. Smith, treasurer of the association, presided. The evening was devoted to a discussion of public relations of street railways. John T. Conway, of the Old Colony Street Railway, discussed the question of forestalling adverse legislation and the importance of overcoming various difficulties in taxation from which operating companies suffer. Edward O'Callaghan, of the Boston & Northern Street Railway, reviewed the benefits of electric traction in linking communities together and emphasized the advantages of publicity. M. A. Cavanagh, of the Norfolk & Bristol Street Railway, considered the relations of street railways to legislative programs, and the desirability of meeting legislators on a frank and friendly basis. C. A. Sylvester, general manager of the Boston Suburban Electric Companies, spoke of the benefits of co-operation by employees, secured through such agencies as clubs, associations, rewards for good suggestions, opportunities to inspect foreign properties and to report upon them, and a live interest by employees in matters of public interest likely to affect them personally.

OFFICE BUILDING OF PUBLIC SERVICE CORPORATION, NEWARK

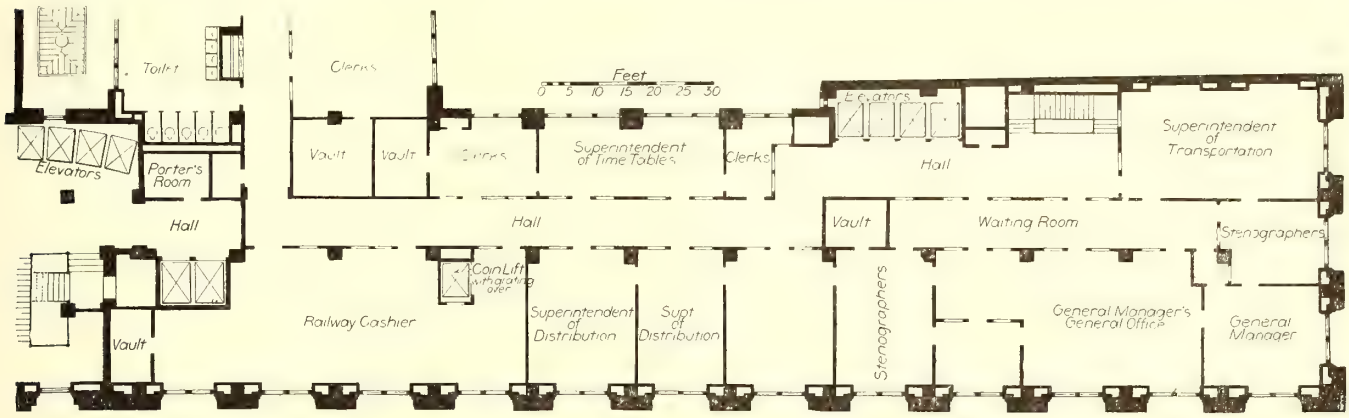
The new building of the Public Service Corporation, at Broad Street and Bank Street, Newark, N. J., about which a short note was published in the ELECTRIC RAILWAY JOURNAL Dec. 3, 1910, page 1094, has been especially designed to accommodate the different departments of that company and contains a large number of features which add to the convenience and rapidity of transacting the business of a large public utility corporation. The main corridors, halls and assembly rooms are finished in marble wainscoting, while the general and executive offices are finished in plaster, with oak trimmings. The details have been so carefully worked out that this is one of the most up-to-date buildings of its kind.

The basement, as stated in the issue of Dec. 3, will be used for testing and demonstrating all kinds of gas and electric devices. To carry out this idea two model kitchens will be built, one with gas equipment, the other with electricity, and these will be opened to the public.

The front of the main floor will be used by the publicity department, to take care of all complaints and for inquiry. The counting department will use the middle of this floor, and the contracting department the rear.

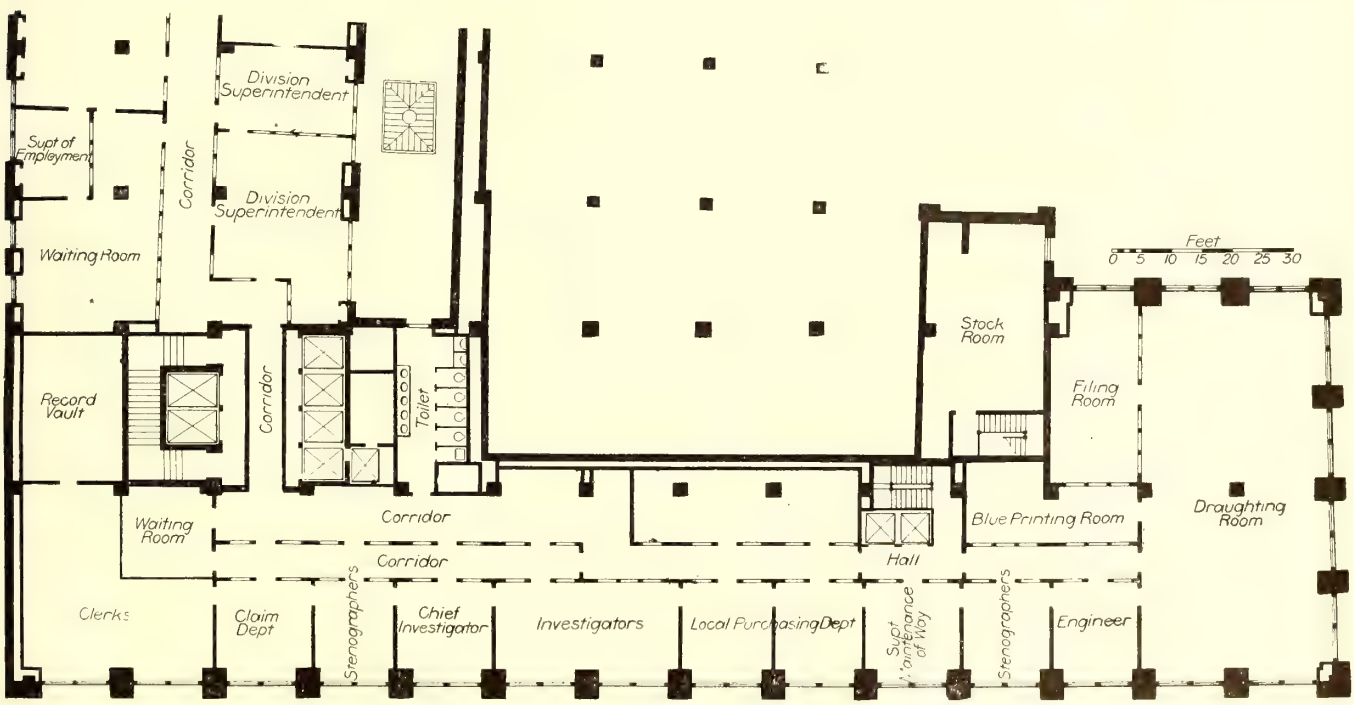
The greater part of the second floor will be used by the bookkeeping departments of the railway, gas and electric companies, while a portion will be taken by the railway auditor's staff.

The third floor will be devoted entirely to the railway company, where will be found the offices of the general manager, superintendent of transportation, superintendent of employment and the division superintendent. Also on this floor are the operating and engineering departments, local claim department, cashier's department and the general railway auditor's



Public Service Railway Building—Plan of Third Floor

The fourth floor is used exclusively by the general claim department, which includes the general claim agent and his clerical force. An interesting feature of this department is the arrangement for handling receipts. The money is placed in individual steel boxes by the conductors at the different car houses and sent from there to the Bank Street sidewalk in these boxes. From there it is sent in chutes to the basement, where the boxes are opened and sent by a small coin elevator to the cashier's department, where it is separated and counted. The whole operation can be done in an exceedingly short time.



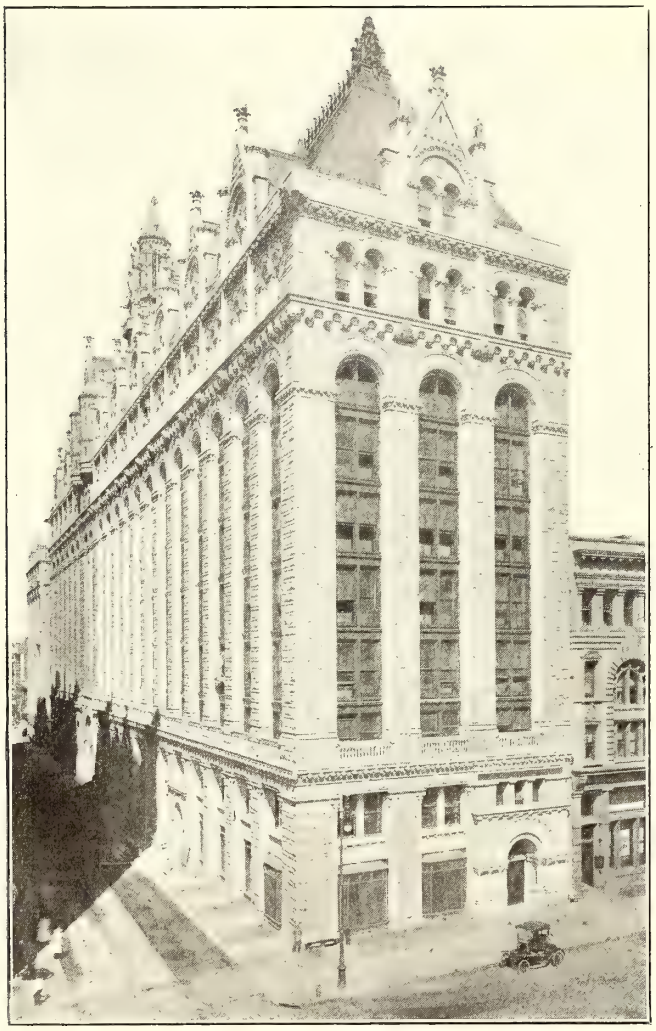
Public Service Railway Building—Plan of Seventh Floor

The fourth floor is used exclusively by the general claim department, which includes the general claim agent and his staff and the general solicitor. The next floor is used by the comptroller and the general auditors of the gas and electric companies.

The sixth floor is occupied by the treasurer's department, the railway paymaster and the operating and engineering offices of the gas company. The operating and engineering offices of the electric company are on the seventh floor. The eighth floor will be devoted to the law and real estate departments.

The ninth floor will be the executive offices, reception, directors' and committee rooms. In connection with the directors' room are a shower bath and a dressing room.

Part of the tenth floor will be used as an assembly room, which is 34 ft. x 76 ft., with a seating capacity of about 300. The rear will be divided into a small private dining room and a large one for the use of the executive and junior officers.



Public Service Railway Building—Exterior

The eleventh floor will be devoted entirely to an employees' dining room, where, by the company furnishing $25,000 annually, the charge for each meal will be reduced to about half the actual cost, or 15 cents apiece. It is estimated that 625 men will eat there daily. The top floor will be used as kitchens for all dining-rooms.

MEETING OF CENTRAL ELECTRIC TRAFFIC ASSOCIATION

At a meeting of the Central Electric Traffic Association held in the office of A. L. Neereamer, the chairman, at Indianapolis, on Dec. 12, 13, and 14, the proposed official interurban map and the publication of an official interurban guide were discussed. The committees in charge of these matters were given further instructions, with the idea that final action will be taken at the next meeting, which will be held on Jan. 16.

The association rechecked and refigured joint passenger tariff No. 3. Part of the changes were caused by a slight change in several basing rates, while the greater portion of the work arose from the fact that the following lines have become parties to the tariff: Dayton, Covington & Piqua Traction Company, Dayton, Springfield & Xenia Southern Railway Company, Indianapolis, New Castle & Toledo Electric Railway and the Muncie & Portland Traction Company.

POLES PURCHASED IN 1909

The total number of poles reported to the Bureau of the Census as purchased during the calendar year 1909 by the telegraph and telephone companies, steam and electric railways, and electric light and power companies of the United States was 3,739,000, as against 3,249,000 in 1908 and 3,283,000 in 1907. There were purchased in 1909 by the same class of users 3,509,000 cross-arms, 6,168,000 brackets and 18,463,000 insulator pins. Cross-arms, brackets and insulator pins were not included in the annual census of lumber and timber products prior to 1909.

This information appears in a preliminary comparative report covering 1909, 1908, and 1907, transmitted this week to Census Director Durand by Chief Statistician William M. Steuart, under whose supervision it was prepared by J. E. Whelchel, expert special agent of the Division of Manufactures. In co-operation with the Forest Service of the Department of Agriculture the Bureau of the Census annually collects and publishes statistics pertaining to the group of lumber and timber industries.

Telephone and telegraph companies reported purchases during 1909 of 2,916,000 poles, or 78 per cent of the total. This was an increase over 1908 in the number reported as bought by this class of users of 354,000 poles, or 14 per cent, and over 1907 of 604,000 poles, or 26 per cent. Steam railroads reported the purchase of 26 per cent more poles in 1909 than in 1908, though 34 per cent less than in 1907, while the reported purchases by electric railways and electric light and power companies were 18 per cent greater than in 1908 and 7 per cent less than in 1907.

There was little change in the average cost per pole of all lengths and from all species of wood in 1909, as compared with 1908, it being $1.89 in the later and $1.82 in the earlier year. The average cost per pole, $2.46, in 1907 was substantially larger than in either of the later years, mainly for the reason that a class of pole consumers in the United States which uses chiefly short poles was not included in the census for 1907.

THE SUMMARY OF POLES PURCHASED

Kinds of Wood.	1909 Number.	1909 Cost.	1908 Number.	1908 Cost.	1907 Number.	1907 Cost.
Cedar	2,449,000	$4,680,000	2,200,000	$3,781,000	2,109,000	$5,203,000
Chestnut	608,000	1,383,000	516,000	1,227,000	630,000	1,620,000
Oak	237,000	137,000	161,000	95,000	76,000	60,000
Pine	180,000	520,000	117,000	383,000	156,000	460,000
Cypress	78,000	117,000	91,000	148,000	100,000	308,000
Juniper	44,000	79,000	42,000	83,000	39,000	109,000
Tamarack	30,000	18,000	24,000	32,000	14,000	10,000
Douglas fir.	25,000	35,000	20,000	80,000	16,000	41,000
Redwood	23,000	49,000	13,000	39,000	31,000	109,000
Bois d'Arc	21,000	9,000	18,000	11,000	6,000	3,000
Spruce	11,000	18,000	8,000	23,000	11,000	29,000
Locust	10,000	9,000	10,000	8,000	5,000	4,000
All other	32,000	19,000	29,000	18,000	89,000	126,000
Total	3,739,000	$7,074,000	3,249,000	$5,929,000	3,283,000	$8,082,000

Cedar continues to be the principal pole timber, contributing 65 per cent of the total purchases in 1909, 68 per cent in 1908 and 64 per cent in 1907. Chestnut, after cedar, was used in greatest quantity in all three years, forming 16 per cent of the total in 1909, 16 per cent in 1908 and 19 per cent in 1907. Among the remaining species, the increase in the number of oak poles reported as purchased during the last three years is noteworthy; more than three times as many poles from this species were reported as purchased during 1909 than was the case in 1907.

Substantial progress in the practice of treating poles with chemicals to preserve them from decay is disclosed by the returns for 1909, nearly one-sixth of the total purchases during that year having had some preservative treatment, as against about one-tenth in 1908 and one-eighth in 1907.

Of the total outlay during 1909, $1,621,000, for cross-arms, brackets and insulator pins, the telegraph and telephone companies contributed 63 per cent, electric railroads and electric light and power companies 32 per cent and steam railroads 4 per cent.

The comparative summary accompanying the report is published in the table in this column.

IMPROVEMENTS IN STREET CAR WHEELS *

BY S. M. COFFIN, MASTER MECHANIC, MOBILE (ALA.) LIGHT & RAILROAD COMPANY.

It has been interesting to note the changes in size, weight and shape of chilled wheels from the horse car days, when a car was a car and the wheel only an insignificant part, weighing anywhere from 150 lb. to 200 lb. To the close observer almost every change shows advancement and betterment. We are now getting better wheels than ever before, for even with the increased service imposed upon them by heavier cars and higher speeds, the manufacturers have raised their guarantee from 25,000 miles to 40,000 miles. This fact indicates the effort of wheel manufacturers to keep abreast of other improvements in electric railroading, yet it must be seriously admitted by the mechanical department that our troubles are increasing with the heavy cars now in general use. Some years ago a prominent railroad man in discussing the problem with the writer expressed the opinion that our cars were not heavy enough in any particular, and that we must get out of our horse car habits. Have we not now overrun the limits of consistency? Surely we have, and our wheels must not be excepted.

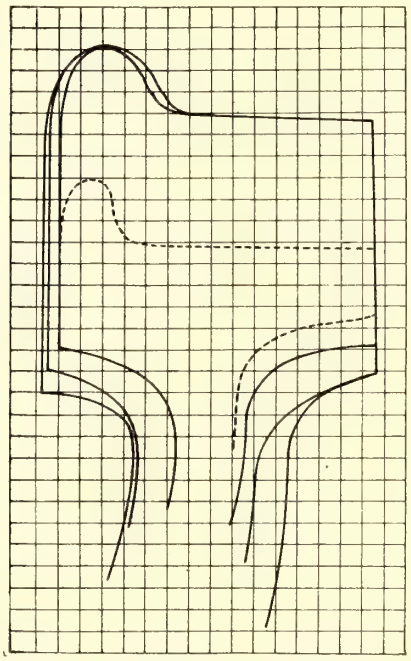


Fig. 1—Variations in Rim Sections, Webs and Flange Contours of New Steel Wheels

We started out with 300-lb. wheels for electric cars, increased gradually up to 450 lb. for single-truck cars for city service and, of course, used considerably heavier wheels for interurban work. By the time we seemed settled on a 400-lb wheel the makers of special track layouts began to assert that our wheels were so hard and sharp that they were cutting out their rails at intersections. Consequently, they introduced extra hard steel plates for intersections. The wheel people asserted that this action was a blow at them. They declared their ability to build flanges to stand hard centers, adding that chilled wheels were expensive tools for chipping out or wearing away such hard centers, but that they could make them harder by increasing the weight. It is sufficient to say that as a result we got both chipped flanges and chipped special work. The wheel manufacturers advised heavier wheels, which not only increased first cost, but unnecessarily abused our rail joints and special track work, while chipped flanges and flat treads continued a source of annoyance to most of us.

It was therefore necessary for those operating heavy high-speed cars to look about for a more durable wheel. The steel manufacturers came to the front, first offering the heavy steel-tired wheels, as used on the steam roads, and later the solid rolled steel wheels, which were also made far too heavy for city cars of moderate weight.

The question of "Car Weights as Affecting Operating Costs," reported on by the committee on equipment at the 1910 convention of the American Electric Railway Association (see ELECTRIC RAILWAY JOURNAL, page 778, Oct. 13, 1910), should have our earnest consideration, not only with regard to wheel weights, but for all other parts of car equipment. This report gives us a minimum of 5 cents per pound per annum as the cost of power for medium-weight and moderate-speed city cars, running, say, 50,000 to 60,000 miles per annum. If this calculation is accurate, we should use wheels as light as consistent with safety and economy. Assuming that we cannot expect to bring our chilled wheels below, say, 400 lb. with a possible 40,000 miles wear, in safety, let us look at the steel wheel proposition.

Steel wheels certainly can be made with lighter centers, leaving the weight at the rim where it is needed for wear. This distribution of weight, of course, builds up inertia. Where stops are frequent this inertia is a factor of vital importance, but we will eliminate it in this discussion. It is quite necessary to have the wheels very closely mated in size and pressed to neat and uniform gage when they are fitted on the axle. The tape in ordinary use for pairing 33-in. wheels is not at all suitable for 34-in. steel wheels, with the size varying with the wear, and there seems to be none on the market for this purpose. The writer graduated one for use on our wheels, measuring on the circumference but reading in diameter by 0.02 in. for diameters from 30 in. to 34½ in. As the 0.02-in. graduations are a fraction over 0.06 in. apart they may be easily divided to give 0.01-in. readings. Hence we always tape our steel wheels both new and old to hundredths, and when we find a pair running a sharp flange, slip them out and grind the thick flange 0.03 in. or 0.04 in. smaller, thus favoring the thin flange.

No doubt many of us in our early experience with steel wheels did not realize the importance of this extra care, and allowed our wheels to run too long without turning or even truing. We then cut away too much good stock from the tread in the effort to secure the original size and form of flange, which is only necessary for high-speed lines or for those operating over heavy grades or very crooked routes; uniform shape is more important.

MOBILE EXPERIENCE WITH STEEL WHEELS

The Mobile Light & Railroad Company has been using steel wheels under some of its double-truck cars since Oct. 30, 1908. We have two makes of wheels, which vary in weight from 500 lb. to 645 lb. per wheel, with a rim thickness of 2½ in. to 3 in. and web thickness ¾ in. to 1¾ in., with 2½-in. tread or

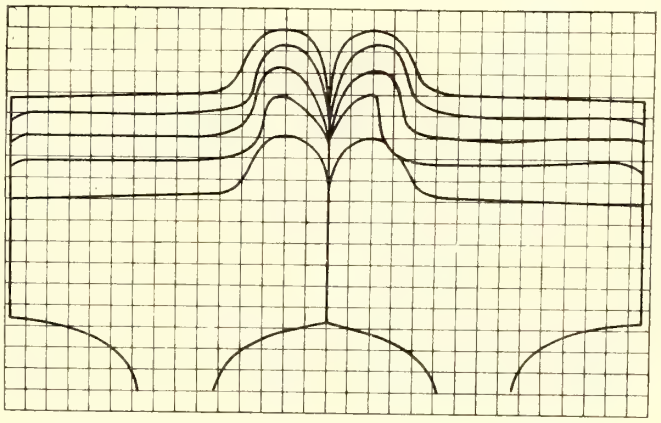


Fig. 2—Variations in Flange Wear of Steel Wheels

3 11/16-in. width of rim, as shown in Fig. 1, and also varying considerably in hardness. Two pairs tried under a single-truck car have shown more difference in wear than any others we have in service. For instance, one pair ran but 21,856 miles with a wear of 0.0183 in. per 1000 miles and had to be turned. This took off 0.0272 in. per 1000 miles, or about 50 per cent more than the wear. They then ran 19,400 miles, with 0.0231 in. per 1000 miles. They were then taken out and the one which had developed a thick flange was ground 0.13 in., making it 0.05 in. smaller than its mate, which was not touched. After this the wheels made 24,180 miles, when they had to be re-

*Abstract of a paper read before the annual meeting of the Alabama Light & Traction Association held at Anniston, Ala., Nov. 28, 29 and 30, 1910.

ground. The flanges were now quite thin, but they were allowed to run again as an experiment in flange wear. An additional wear of 8000 miles was obtained before another turning.

During all this time the other pair of wheels had never been out and their flanges were wearing uniformly, although they were getting thin by this time. They were turned, after running 93,482 miles with a wear of 0.0105 in. per 1000 miles. The stock removed in turning was 1.3 in. (0.0141 in. per 1000 miles), or a total for wear and tool of 0.0173 in. per 1000 miles. These figures, of course, are exceptional and are only mentioned to illustrate the extreme variation experienced.

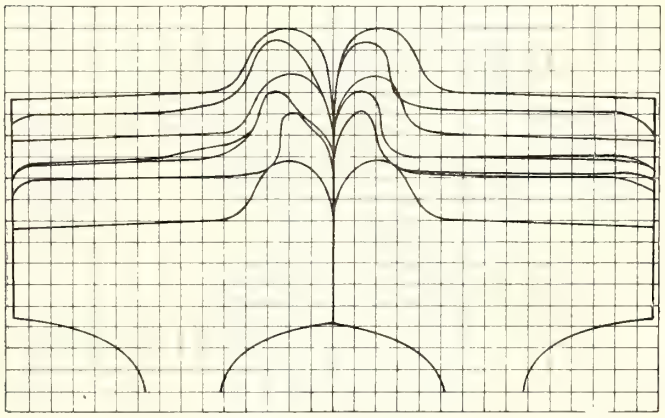


Fig. 3—Variations in Flange Wear of Steel Wheels

We have quite a number of wheels that have run 60,000 to 90,000 miles without removal, with the wear as low as 0.006 in. per 1000 miles, and with an average for 10 pairs selected at random of 0.0109 in. service wear and total wear and tool of 0.0122 in. per 1000 miles. However, by deducting the first two pairs of wheels mentioned we got an average of 57,888 miles, with an average wear of 0.00992 in. and wear and tool of 0.0098 in per 1000 miles. This result, however, was attained by grinding instead of turning. Very close watching was also required in order to touch up the larger wheel before the flange on its mate was too badly chafed.

Fig. 1 shows the outlines of three different rim sections, all with different flange contours and with webs of ¾ in. to 1¾ in. thickness, yet all were shipped to us for the same service. There is also dotted in a 2¼ in. thickness of rim and a possible wear of 100,000 miles, the metal worn away weighing approximately 150 lb. to 165 lb. Figs. 2 and 3 show the varied flange

TABLE I

	Rolled Steel 34-in.	33-in.	Cast Iron
Estimated mileage	150,000	100,000	40,000
First cost, per pair	$40.00	$34.00	$15.00
Fitting on axles	1.50	1.50	1.00
Exchanging	.75	.75	.75
Cost ready for service	$42.25	$36.25	$16.75
Exchanging for grinding (50,000 miles)	.75	.75	
Grinding	1.00	1.00	
Exchanging for turning (90,000 miles)	.75		
Turning	4.00		
Exchanging for grinding (125,000 miles)	.75		
Total cost of worn-out wheels	$49.50	$38.00	$16.75
Deduct for scrap allowance	4.00	4.00	4.00
Net cost worn-out wheels	$45.50	$34.00	$12.75
Net cost for one wheel	$22.75	$17.00	$6.38
Cost per 1,000 miles	.1516	.17	.1595

wear of the wheels referred to hereinbefore as having run under a single-truck car.

COST OF STEEL WHEELS AND CHILLED CAST-IRON WHEELS.

On comparing the cost of single and double-run wheels versus chilled cast wheels for moderate city service the writer believes that the manufacturers will be able to supply 34-in. steel wheels, with a rim 3 11-16 in. wide and a ½-in. to ⅝-in. thickness of plate, weighing as low as 400 lb. for a rim 2¼ in. thick and 500 lb. for a rim 3 in. thick, and with openings punched in the plate to eliminate much of the noise (particularly in rounding curves), for, say, $17 and $20 respectively, delivered at our shops. These wheels, which would be safe to wear to ¾-in. thickness of rim, would probably save at least 150 lb. to 200 lb. respectively. On the basis of 0.015 in. reduction per 1000 miles for wear and tool, their total lives would be 100,000 miles and 150,000 miles.

The manufacturers of cast wheels may also continue to furnish us the same grade chilled wheel weighing not more than 400 lb.

Table No. I makes it clear how we may fool ourselves by a little juggling of figures or be deceived as to the actual cost of operating with the different wheels.

The table shows a low cost for double-run wheels, but let us now deduct for the average weight worn off, neglecting the scrap weight as being equal for all. Considering half the total worn weight as follows we have:

TABLE II

	34-in. Rolled Steel Wheel 100 Lbs.	75 Lbs.	33-in. Cast Iron Wheel 15 Lbs.
Estimated mileage	150,000	100,000	40,000
Cost at $6.00 per 100 lb. a year of say 60,000 miles, or 10 cents per 100 lb. per 1,000 miles	$15.00	$7.50	$0.60
Bringing down net cost for one worn-out wheel	22.75	17.00	6.38
Total	$37.75	$24.50	$6.98
Cost per 1,000 miles	.2516	.2450	.1745

But, say the steel manufacturer and advocate of light-weight, single-run wheels, this is hardly fair to steel wheels, and particularly for light-weight single-run wheels. Take now the average total weights, as follows:

TABLE III

	34-in. Rolled Steel Wheel 400 Lbs.	325 Lbs.	33-in. Cast Iron Wheel 385 Lbs.
Estimated mileage	150,000	100,000	40,000
At 10 cents per 1,000 miles	$60.00	$32.50	$15.40
Bringing down net cost of one worn-out wheel	22.75	17.00	6.38
Actual cost of discarded wheels	$82.75	$49.50	$21.78
Cost per 1,000 miles	.5516	.4950	.5445

The foregoing figures very naturally show the low first cost of chilled cast wheels and next the low cost of double-run wheels. Without considering the dead weight carried in the wheel it has been argued that it is only necessary to consider the stock lost by wear and turning; but a more equitable reckoning is certainly for the average total weight of the wheel.

Some may consider the cost for turning given here as excessive, as those who operate their own lathes may turn them for much less. However, we have to get this work done at a local foundry at much greater cost. This point, too, lends great weight to the single-run wheels, as their use would avoid the purchase of the very expensive lathe suitable for this heavy work and would also avoid extortionate turning rates by local machine shops.

NEW HAVEN RAILROAD EXTENSIONS

It was announced by the office of the New York, New Haven & Hartford Railroad this week that the company had decided upon New Haven as the location of the second principal power station for the operation of its line from New Haven to New York, after the electrification from Stamford to New Haven will have been completed. No date has yet been set for the beginning of this work. Originally it was reported that the line would be electrically equipped from Stamford to New Haven this spring, but the board of directors has concluded not to undertake it so soon. The company has decided upon the erection of a new passenger station at New Haven.

The Panama Canal Commission is planning to build a rack railroad on which electric locomotives will be operated to move shipping through the Panama Canal locks. The Canal Commission will start the work by advertising for 8000 tons of track material. It is expected that two years will be required for the construction of this railway.

TRANSPORTATION OF MILK AND CREAM

BY G. W. PARKER, GENERAL EXPRESS AND FREIGHT AGENT, DETROIT UNITED LINES

An excellent illustration of the extent of the development of the freight and express business of the Detroit United Lines and of its importance to the community which these lines serve was offered at a dairy meeting and milk and cream contest held at Detroit, Mich., Sept. 26 and 27, 1910. This meeting was conducted under the auspices of the Detroit Board of Commerce under the immediate direction of Ivan C. Weld, of the Dairy Division, United States Department of Agriculture, Washington, D. C., and the Detroit Board of Health. Its object primarily was to improve the supply of milk and cream entering the City of Detroit by raising the standard of production. The meetings were addressed by city, State and federal authorities and practically every phase of the question involving the production and distribution of milk and cream was interestingly discussed. The number of people in attendance during the two days of the meeting was by actual count 3126. One hundred exhibits of milk and 10 of cream were made.

The exhibits were solicited by the Detroit Board of Commerce, which distributed entry blanks accompanied by a circular explaining the objects, conditions, etc., to all of the shippers and producers of milk whose names were furnished by the local Board of Health. In addition, representatives of the Health Board in charge of the country districts urged the farmers and dairymen to enter the contest. Nevertheless, the movement was looked upon with distrust by many and it required a great deal of perseverance on the part of those interested to bring it to the successful issue which was ultimately attained.

About a week before the date on which the milk and cream for the contest were to be produced the matter was called to the attention of the traffic officials of the Detroit United Lines and their assistance was solicited. It was realized that immediate steps must be taken to bring the matter again forcibly to the attention of those it was desired to reach. To this end a printed circular was issued by the company giving the date of the contest and other important information and setting forth the fact that all packages shipped on the electric lines would be carried free. These circulars were placed in the hands of all conductors on cars carrying milk, with written instructions to see that a circular should be delivered to each shipper or producer who could be reached. At the same time a supply of "pasters" was furnished to the conductors with instructions to attach one to each package containing empty bottles when they were sent out. These "pasters" indicated what the package was for and where the full package was to be delivered when returned, and it was only necessary for the shipper to fill in his name in the space provided for that purpose to establish proper identification.

DETROIT UNITED LINES
12 WOODWARD AVE.
DETROIT, MICH., SEPT. 14TH, 1910.

"Dairy Meeting and Milk and Cream Contest."

TO PRODUCERS AND SHIPPERS OF MILK AND CREAM:—

You have no doubt received notice of a "Dairy Meeting and Milk and Cream Contest" to be held by the Detroit Board of Commerce at Detroit, Mich., September 26th and 27th, 1910 under direction of the Dairy Division, Bureau of Animal Industry, U. S. Department of Agriculture and the Detroit Board of Health.

Entry blanks for the Contest have been distributed by the Detroit Board of Commerce to all of the Milk and Cream producers whose names they were able to secure. A number of entry blanks for both Milk and Cream, together with a circular letter explaining the object, conditions, etc., of the contest, have been placed in the hands of Conductors on our cars carrying milk, and if you have not already been supplied, you can secure them from him. BEAR IN MIND THAT MILK OR CREAM SUPPLIED FOR THIS CONTEST MUST BE PRODUCED SEPTEMBER 19TH, 1910 AND FORWARDED NOT LATER THAN THE FOLLOWING DAY

In recognition of the work being done by the Health authorities and the Detroit Board of Commerce, and with a desire to stimulate interest in the forthcoming contest, this Company WILL CARRY FREE, on the regular Milk Cars, the empty packages sent out to milk producers and also the packages of samples returned for the contest. A paster will be placed on each package containing the empty bottles when it goes out, showing that it is to be returned to

DETROIT BOARD OF COMMERCE
C/O MURPHY COLD STORAGE COMPANY.
DETROIT, MICH

For Dairy Meeting and Milk and Cream Contest to be held at Detroit, Mich.,
Monday and Tuesday, September 26th and 27th, 1910

The space on this paster providing for name and address should be properly filled in and in addition thereto, name and address must be attached inside for proper identification. Conductors will have a supply of these pasters on hand and will affix the same to the packages upon request.

GEO. W. PARKER
Gen Exp and Frt Agent

Notice of Dairy Meeting and of Milk and Cream Contest

Although the subject of transportation was not discussed in the addresses and lectures given during the meeting, it is evident that in a community with an approximate daily consumption of from 25,000 gal. to 35,000 gal. of milk and cream transportation plays a very necessary as well as prominent part. Aside from the proper observance of hygienic and common-sense methods in producing and distributing this valuable article of food, perhaps no one particular feature contributes more to the wholesome condition of the product than its prompt movement from the farm to the city, where it can be properly prepared for distribution to the consumer. The Detroit United Lines have long been interested in the transportation of milk and cream and have devoted a great deal of time and study to the development of this feature of their business. It was, therefore, a source of much gratification to learn that the larger proportion of the exhibitors and practically 85 per cent of the prize winners were their patrons—that is to say, shipped their product to the city over the electric lines.

RETURN TO
Detroit Board of Commerce
Care of Murphy Cold Storage Co.
Detroit, Mich.

For Dairy Meeting and Milk and Cream Contest
to be held at Detroit, Mich.,
Monday and Tuesday, September 26th and 27th, 1910.

From_____
(Producer's name in full.)

R. F. D. No._____

Address_____

Paster for Milk Cans

A reason for this can no doubt be found in the service which is rendered, as special service is provided on all divisions to take care of this commodity. On several divisions one and two-car trains are operated exclusively for this purpose. On others, where the amount of business is not sufficiently large to warrant the operation of exclusive service, the schedule of the regular express cars has been arranged to meet the requirements. The cars operated in this service are cleaned and thoroughly disinfected at frequent intervals, thereby preventing any possibility of contamination to the milk from the cars. They are operated on a schedule which is best calculated to suit the needs of the farmers and other shippers as well as to meet the requirements of the receiver, and the several city deliveries are so arranged as to be easily accessible to all. In this way the length of time required to transfer the product from the cars to the distributor has been greatly reduced.

The value of this service to the farmer can readily be appreciated when it is explained that the cars stop directly in front of his farm to pick up the milk and cream. In such cases the farmer erects a platform in front of his place, under the supervision of the company's building department, and the cans are picked up and put off at this platform. In cases where the shippers do not live directly on the line of the road platforms are erected at the nearest point, which is usually at a convenient cross-road, and this platform is made to serve all of the shippers in that locality.

The larger dairies doing business in the city of Detroit have established milk-receiving stations at different points on the electric lines. At these stations the milk is received from the farmer, cooled to the proper temperature, and in some cases separated before being shipped. This insures a constant supply and enables the dairy to regulate the city supply to meet the demand. These stations also enable the dairies to secure milk which would otherwise go to nearby creameries and cheese

factories, because the stations are able to receive the milk from the farmer at his own convenience. The demand for milk to supply the city of Detroit has been so great as to lead to the abandonment of cheese and butter making during certain seasons by some of the factories and creameries. It is found that a greater profit can be obtained by shipping the milk secured direct to the city.

The territory served by the Detroit United milk service comprises practically all of that within about 30 miles from the city and on one division the distance covered is 48 miles. But the residences are rapidly encroaching on the nearby country districts and the property is becoming too valuable for dairying or farming. It is now generally recognized that any additional supply of milk and, in fact, part of the future supply of the city must come from a territory beyond the present district. This will necessitate extra service and increased facilities, all of which will undoubtedly be forthcoming at the proper time.

The successful outcome of the milk and cream exhibit this year—and Mr. Weld declared it to have been the most successful ever held under his supervision—together with the interest displayed by the city consumers in the subject of a pure and wholesome milk supply, has fully demonstrated the necessity for future exhibits of this character. Undoubtedly the contest will be made an annual event. In this case it is safe to say that the Detroit United lines will contribute their full share toward the success of these future exhibits.

TALK ON IMPROVEMENTS IN CHICAGO STREET RAILWAY SERVICE

L. H. Davidson, assistant secretary of the Board of Supervising Engineers, Chicago Traction, addressed the Electric Club of Chicago at its weekly luncheon on Dec. 14. Mr. Davidson gave an account of the marked improvement in street railway service in Chicago that has taken place during the past three years. He told of the interest which the Chicago rehabilitation work had excited in many other large cities. Among other things Mr. Davidson said:

"We in Chicago, who have followed the rehabilitation work and use the lines, are not sufficiently impressed with the magnitude of the undertaking or with the results. One should compare the service of to-day with that of four years ago. Transportation in Chicago will never be 'good enough.' It is not Chicago's spirit to be satisfied. Yet the public has cooperated by readily adapting itself to the new types of cars, new transfer privileges and other regulations.

"Transportation facilities through the business district serve an average of about 10,020,000 passengers daily. Of this number, by count for one day, the surface lines transported 523,000 in and out of the business district. The growth of traffic is remarkable, as evidenced by the fact that on one of the elevated roads the daily average increase of November, 1910, over that of November, 1909, was more than 5000 passengers. It is estimated that during the year 1911 the surface lines will have to carry about 1,000,000,000 passengers. The figures for the 10 months ended Oct. 31, 1910, show about 704,000,000 passengers carried. With this huge increase in passenger traffic and the attendant increase in cars operated it is gratifying to know that the percentage of accidents is lower."

Mr. Davidson called attention to the increased purchasing power of the nickel as shown by longer and more comfortable rides available in Chicago in cars operating on shorter headway and better lighted, heated and ventilated. He continued:

"To bring about the improvements it has been necessary to expend vast sums of money. Our records show that on Dec. 1, 1910, the grand total of the capital account of the surface lines, excluding the Consolidated company, was approximately $111,000,000, which includes the $55,775,000 valuation allowed under the ordinance and reported by the traction valuation commissions; thus making approximately $55,000,000 that has gone into actual improvements under the ordinances.

"The investment includes approximately 765 miles of track and about 3000 cars, of which latter number 2200 are of the large double-truck type; 13 substations with approximately 100,000 kw capacity; 26 car houses, six of which are used for storage of cars only, the others being operating car houses, most of them modern fireproof structures of the latest type with the most up-to-date facilities for cleaning, repairing and rapid handling of cars.

"Under the supervision of the board there have been reconstructed 415 miles of trolley, 1150 miles of weatherproof lead-covered and bare copper cable; 200 miles of conduit, 1200 miles of duct and nearly 3000 manholes.

"The reconstruction work necessary to bring about the installation of all the through routes is rapidly nearing completion. The delay has been beyond the control of the board and the companies. The Van Buren Street tunnel is complete and is now in operation. Tracks are being laid in the Washington Street tunnel and work is progressing rapidly on the La Salle Street bore. The steel-tube river section is moored near La Salle Street awaiting the completion of the necessary excavation for its sinking for connection with the land section. Excavation of more than half of the river bed has been made for a depth of 47 ft. and it will be necessary to go about 7 ft. deeper at the middle of the river before sinking the tube. Work on relocating the elevated railway columns, which heretofore have been obstacles to the successful operation of through routes, is being pushed rapidly.

"The Chicago ordinances have demonstrated to the traction world the most remarkable results in the distribution of the nickel. Besides providing for patrons the best type of cars, frequent service, the longest rides, the most modern type of roadbed, improvement in streets brought about by paving both its own right-of-way and a large portion of the streets outside of its right-of-way, there is for the city to date approximately $5,000,000 from the gross receipts as the municipality's 55 per cent."

In the discussion Ralph H. Rice, assistant division engineer of the Traction Board, stated that more than 7,500,000 lb. of copper had been used for overhead and underground feeders during the rehabilitation period for the surface railways. All purchases had been made under standard specifications.

Taliaferro Milton described briefly the storage-battery installation of the Chicago City Railway at the Plymouth Place substation. This battery was close to the center of the downtown rush-hour load and was designed to carry the morning and evening peaks. The railway company paid a fixed amount for the maintenance of the battery, which had shown a net saving on the investment. The battery carried a load of about 5000 amp during morning and evening rush hours.

William Artingstall, divis.on engineer department of tunnels, Board of Supervising Engineers, Chicago Traction, described briefly the novel methods by which the steel-tube tunnel for the Chicago Railways was being installed under the Chicago River at La Salle Street. This tunnel, which was manufactured at some distance from its final location, consists of a steel shell 278 ft. long and about 24 ft. in depth. It has a double bore and each bore is lined with reinforced concrete. The steel structure is to be floated into place and sunk between the concrete approaches, which now are nearly completed. In building this tunnel cofferdam and retaining walls of dimensions heretofore never attempted have been required.

BULLETIN ON CITY PLANNING

The International Street & Interurban Railway Association has republished in pamphlet form the two papers on city planning by Messrs. Wattmann and Nieszen, and also the discussion at that meeting, published in abstract in the Electric Railway Journal for Oct. 1, 1910. Each member company will be entitled to a maximum of 20 copies of this pamphlet without charge. Other copies can be secured for 10 cents each.

SECOND CONFERENCE ON INTERURBAN METHODS CALLED BY INDIANA COMMISSION

The Railroad Commission of Indiana, following the conference with officials of interurban railways on Dec. 13, a report of which was published in last week's issue, called a second conference to be held at Indianapolis on Dec. 23. This conference was called to consider the following recommendations:

"1. That one year's service for motorman shall be requisite for employment to take charge of a car.

"2. That required duties and working conditions of a motorman when in charge of a train be set out.

"3. The installation of approved block system and how soon.

"4. The enforcement of the double order rule and penalties.

"5. The elimination of view obstructions at curves.

"6. The organization of safety committes on interurban systems."

CALL FOR SECOND MEETING

The call for the meeting to be held on Dec. 23 says:

"Pursuant to suggestions made at the recent conference of interurban companies with the Governor of the State and the Railroad Commission you are hereby invited and requested to appear at the rooms of the commission on Dec. 23 for the purpose of making known to the commission whether or not you will agree to and carry out the recommendations made by the commission after its investigation of the recent interurban accidents in this State.

"The commission directs your attention especially to the fact that at this conference the rule known as the 'double-order rule' will be considered and probably reformed to make it more practical and effective.

"The commission invites your special attention to its recommendation with reference to the qualifications and duties of the motormen.

"The commission directs your special attention to its recommendation with reference to the installation of block signals on such lines as on account of the density of traffic may require such signals.

"This meeting is of great importance, and the commission suggests that other engagements, however important, should be set aside in order to come here on the day and date mentioned. You will please advise whether or not you will be present at this conference."

RECORD OF ACCIDENTS

The reply addressed by the Indiana Union Traction Company to the Railroad Commission of Indiana in reference to the first specific recommendations of the commission was published in last week's issue of the ELECTRIC RAILWAY JOURNAL. Substantially the same reply was sent by the Fort Wayne & Wabash Valley Traction Company, the Terre Haute, Indianapolis & Eastern Traction Company and the Indianapolis & Cincinnati Traction Company, although these three companies gave their own records of accidents.

The reply of Charles L. Henry, president Indianapolis & Cincinnati Traction Company, said:

"This company calls your attention to the fact that among the 8,076,635 passengers carried by it and its predecessors in operation of the properties during the period from Oct. 1, 1903, when the Indianapolis & Cincinnati Traction Company first acquired the Shelbyville line, down to and including Oct. 31, 1910, a period of seven years, only one fatality occurred. Therefore this death of an interurban passenger of the company shows for the period stated an average of one to 8,076,635."

C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company, said in his letter:

"This company calls your attention to the fact that among the 8,849,305 passengers carried by it on its interurban division during the period from Jan. 1, 1904 (the time at which our records in this respect began), to and including Aug. 31, 1910, a period of six years and eight months, not one fatality occurred to passengers riding upon our cars through neglect of either company or employees. During the same period 97,348,720 city passengers were carried without fatality. You will see that we have absolutely no deaths among a total of 106,198,025 passengers which we carried on city and interurban lines during that period."

The reply of Hugh J. McGowan, president Terre Haute, Indianapolis & Eastern Traction Company, said in part:

"The company would call your attention to the fact that 30,529,538 passengers were carried by it and its predecessors from Jan. 1, 1906, to Aug. 31, 1910, a period of over four years, and only three fatalities occurred to passengers carried on its interurban cars, or an average of 10,176,512 passengers carried to one fatality; and the fatalities which occurred to passengers occurred only through the carelessness or negligence of the passengers themselves.

"On the Terre Haute division of this company, from the year 1907, when the property was acquired by this company, to Dec. 1, 1910, a period of nearly four years, 10,195,756 passengers were carried with only three fatalities to passengers, or an average of 3,398,585 passengers carried to one fatality, and all three fatalities which occurred were due to the carelessness or negligence of the passengers themselves.

"Of the three passengers killed on the lines of this company exclusive of the Terre Haute division, two were killed on account of deliberately walking off the car while it was in motion, for which there was absolutely no fault on the part of the company and no claim therefor has ever been made against the company. The other fatality occurred through a passenger being caught between the car and a projecting pole, during a period of reconstruction work. Of the three fatalities which occurred on the Terre Haute division, one passenger, while intoxicated, jumped from the car while it was running at full speed; one passenger, also while intoxicated, fell from car while it was standing still; and one passenger was killed by being struck by car going in opposite direction. In no case since the commencement of the operation of cars by this company has a passenger been killed by a collision of cars or derailment, or by the violation of rules or disobedience to orders."

REPLY OF WINONA INTERURBAN RAILWAY

William D. Frazer, vice-president and general manager of the Winona Interurban Railway, Warsaw, Ind., wrote in part as follows:

"We find that it will be impossible for any of our officers to attend this conference, owing to previous engagements, therefore answer by mail instead of in person.

"1. (a) We do not think it possible that this company can secure and employ better railroad men for motormen and conductors than it now has. Our men are capable in every respect and most of them have been with us a number of years and are thoroughly tried, and we are satisfied that better men cannot be found in interurban service. (b) It has been the policy of this company to examine the records of applicants for motormen and conductors and these records have always been carefully investigated and letters of reference and recommendation have always been required, and we will of course continue this practice. (c) As to agreeing that all motormen hereafter employed shall have at least one year's experience in train service, while we admit that experience is desirable, we are not prepared to agree that we will never employ motormen who have not had full 12 months' experience in train service and we have no assurance that motormen with 12 months' experience can always be obtained when desired. (d) The only duty we assign our motormen in addition to the operation of cars is the handling of baggage when the cars are at the stations and the motormen have no other duties to perform. We have never seen the necessity of employing extra men for the purpose of handling a few trunks which are carried on interurban cars. An extra man with nothing to do would be more likely to distract the attention of the motorman and cause accidents than the motorman's assistance in loading and unloading trunks at stations when he has no other duties to perform. (e) All of the cars of this company now have separate compartments for the motormen. (f) As to passenger trains, when

a trailer or additional car is attached to a motor car, it has been our custom to put an extra man on the extra car, but in case of freight trailers we do not see any necessity for the extra man.

"2. On the subject of block signals, this company has for some months been investigating the different systems with a view of ascertaining which is the most practicable at a reasonable cost.

"Considering the small number of cars operated by this company, we are inclined to think that your commission should decide the block system is not necessary for this line. We will, however, continue our investigation of the subject.

"3. This company now has in force the double order system of dispatching and will continue to use the double order rules.

"4. This company has been eliminating obstructions to sight at curves and will continue to do so as rapidly as the consent of the adjacent land owners can be obtained and, in the meantime, this company will post slow speed signals at such curves as may be considered dangerous.

"5. Our superintendent and train master are not burdened with other duties which interfere with safe operation of trains.

"6. Our train dispatchers are not required to handle interlocking plants or perform other duties than those pertaining to dispatching trains, except our chief dispatcher, who performs the duties usually assigned chief dispatchers."

REPORT OF COMMISSION TO GOVERNOR

The report of the Railroad Commission to Governor Marshall of Indiana said, in part:

"Conclusions as to the cause of these accidents are not difficult; the recommendation of a practical and efficient remedy for such accidents under subsisting conditions of interurban organization, operation and revenues is the most difficult work ever required of this commission.

"It is clear to us that these operating conditions are incompatible with safety, and that fatal accidents must continue to occur unless there are radical changes and betterments; that, on the one hand, the public demands and has the right to demand a much higher degree of safety than these lines now afford, and this proper factor of safety can be secured only by the expenditure of larger amounts of money than are now used in the employment of competent, trained, experienced men and the installation of adequate safety devices, and by holding to criminal responsibility whoever by flagrant neglect causes these fatalities; on the other hand, it is equally clear that if this is done, as it ought to be, there will be little or nothing left, passing all questions of dividends on stocks, to pay interest on the bonds of some of these companies.

"In 1907 the General Assembly of Indiana directed the commission to investigate the terrible accidents at Woodville, Fowler and Sandford which occurred on the steam railroads. We recommended the passage of the block-signal act, and the act to increase the efficiency and powers of the officers and men, required printed rules, frequent periodical examinations, the Indiana railroad convention, and the criminal punishment of officers and men who disobeyed these rules or who were intoxicated while in performance of duty. While the companies affected have not adequately followed the views of the commission with reference to block systems, and the courts and juries have made no convictions for offending the statute, it is significant that since 1907 no such awful accidents have occurred on the steam railroads in this State. If certain things in cases of fatal accidents were prescribed for the steam railroads and have done good, even though they have the advantage over electric lines of long years of development, instruction and organization of efficient employees, how much more necessary are the same things in the case of new electric lines, whose men have comparatively few years of training and service and whose cars are light and more dangerous when collisions take place.

"On June 19, 1909, the first of these most serious accidents took place on interurban lines. This was a butting collision on the Chicago, Lake Shore & South Bend Electric Railway. In September and October, 1910, there were five head-on collisions, two of them with great fatalities, two on the Indiana Union Traction, one each on the Fort Wayne & Wabash Valley Traction, the Terre Haute, Indianapolis & Eastern, and the Indianapolis & Cincinnati Traction. These accidents have many features so similar that they may be classed together.

"The Indiana Union Traction Company at our request furnished us with the names and length of service of its interurban trainmen. We analyze the same as follows:

In service	20 years	1	In service	9 years	6
" "	19 "	2	" "	8 "	10
" "	18 "	2	" "	7 "	11
" "	17 "	1	" "	6 "	16
" "	15 "	2	" "	5 "	12
" "	14 "	2	" "	4 "	9
" "	13 "	3	" "	3 "	13
" "	12 "	3	" "	2 "	24
" "	11 "	3	" "	1 year	21
" "	10 "	4	Less than	1 year	24

"It is especially remarkable that the two accidents on this line occurred on the divisions where there are no block signals. The Indiana Union Traction has block signals on its divisions between Indianapolis and Muncie. While these have not worked altogether satisfactorily, the managing officers stated that they would not dispense with them.

"The worst and most disastrous wreck was that on the Fort Wayne & Wabash Valley Traction Company's line Sept. 21, 1910. There were no block signals on the line, although the daily movement of trains was about 38 trains on a single-track railroad. The freight train crew causing the accident lacked the proper training, experience and fitness for the work they were performing. On analyzing the whole force, particularly so far as length of service is concerned, a most important factor in good railroading, we find that of the conductors employed on this line there have been

In service	9 years	1	In service	3 years	6
" "	7 "	1	" "	2 "	4
" "	6 "	2	" "	1 year	10
" "	5 "	1	Less than	1 year	15
" "	4 "	2			

"As to the motormen we find there have been

In service	10 years	1	In service	4 years	4
" "	9 "	2	" "	3 "	7
" "	8 "	2	" "	2 "	1
" "	7 "	2	" "	1 year	11
" "	5 "	4	Less than	1 year	12

"In our findings on the Chesterton wreck we said: 'This commission regards interurban railroads of the State as one of the greatest factors of its development and progress.' We do not believe that the people of the State are willing to do without the accommodation these lines afford, but it is necessary for the public, for the men and for the owners themselves that a higher plane of railroading shall be adopted. Many remedies are proposed, and all agree that there must be a change: Double-tracking, but there are certainly not sufficient funds for this. Licensing of the men by the Railroad Commission; this will not do. The commission cannot operate these roads from its office in the State House. Slow speed; this is entitled to consideration and may have to be enforced for some of the lines until they install block systems. But each of these accidents, and all of them, clearly point to two essential things:

"1. Better railroad men. We insist on men mentally and physically able, devoted to their work, ambitious to succeed and trained by years of service to neglect no precaution that will prevent disaster.

"2. Block signals.

"It is notable that in three instances the cars came together on curves, and that the view of the motormen on each car was obstructed by trees and foliage on the inner side of the curve of the track.

"It is the evidence in the investigation held of these collisions that the motormen did not and could not see the approaching car until it was within a distance of about 1000 ft., too short a space within which to stop.

"The growth along the track at these points, which obstructed the vision, is partly on the right-of-way, but for the most part on private lands located adjacent thereto.

"It is recommended that additional legislation be had whereby railroad companies may be authorized to condemn and re-

move certain obstructions located on lands adjacent to the rights-of-way where the same interfere with safe operation, and where the company and the owners cannot agree upon the compensation to be paid for the damage sustained.

"This commission believes that, in order to prevent such fatalities, where the officers or men of these companies, including their directors, carelessly and negligently do or omit to do an act from which the death of a passenger or employee results, they should be prosecuted and convicted. We think that not only the man who forgets, but the officer who employs an incompetent man and the director who diverts revenue that should be appropriated to securing a good man, to installing safety devices and other necessary purposes, should be held criminally accountable.

"There is no antagonism to the interurban companies, their owners, officers or men. Most of them have co-operated freely and fully with this commission."

RECOMMENDATIONS OF THE COMMISSION

The recommendations of the Railroad Commission of Indiana, which were presented at the first meeting, on Dec. 13, were as follows:

"1. (a) That said company shall secure and employ better railroad men for motormen and conductors, taking such steps as are necessary to secure capable and fit men and to keep them in its service; (b) that applicants for positions as motormen and conductors should not be employed until their former records have been carefully investigated and all letters of reference and recommendation have been carefully considered; (c) that all motormen hereafter employed shall have at least one year's experience in train service, this qualification being no greater than the law of the State requires for flagmen of passenger trains on steam railroads; (d) that no other duties be assigned to motormen than the operation of their cars, and that they shall not be required to do the work, or assist in doing the work, of baggagemen or expressmen; (e) that separate compartments shall be provided for motormen, so that their exclusive attention may be given to the operation of their cars, and so that they may not be diverted by the conversation of passengers or other persons; (f) that when a trailer or an additional car is attached to the motor car a third man shall be put on to assist and work under the direction of the conductor.

"2. That said company proceed to install block signals on its interurban railroad, and to this end that within 60 days, or by Jan. 1, 1911, it shall report and submit to this commission plans and blueprints of some adequate block system, the same to be hereafter installed and operated as soon as practically possible.

"3. That said company shall enforce the double order system of dispatching on its lines, and that hereafter no exception under any circumstances shall be made to this rule. Delays are better than accidents.

"4. That although trainmen should operate by rules and timecards and orders, and signals when installed, said company shall proceed to eliminate obstructions to sight at curves where sight is badly obstructed. And until this is done said company is directed to post slow speed signals at said curves, and to reduce speed of cars at such places to a limit of not exceeding 15 m.p.h.

"5. That division superintendents and train masters should not be burdened with other duties than those pertaining to train operation.

"6. That train dispatchers should not be required to handle interlocking plants or to perform other duties than those pertaining to the dispatching of trains."

The Moscow-Windau-Rybinsk Railway has recently acquired an electric accumulator car of Russian make for experimental and demonstrative purposes. The car cost $38,625, and is to develop a speed of 35 m.p.h. to 67 m.p.h. It is divided into first-class and second-class compartments of 23 seats and 38 seats, respectively. This car is to run on the line between St. Petersburg and Tsarskoye-Selo.

HEARINGS BY RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission, which is investigating the practicability of federal supervision of the issue of stocks and bonds by common carriers, held several public hearings in New York, beginning on Dec. 15. The hearings, which were held in the banking house of J. & W. Seligman, were attended by Arthur T. Hadley, president of Yale University, chairman; Frederick N. Judson, St. Louis; Frederick Strauss, New York; Walter L. Fisher, Chicago, and W. E. S. Griswold, New York, secretary. Prof. H. B. Meyer, chairman of the Wisconsin Railroad Commission, who has just been appointed a member of the Interstate Commerce Commission, was not able to attend all of the hearings of the Railroad Securities Commission, of which he is also a member.

TESTIMONY OF RICHARD HALE

Richard Hale, of Boston, who was the first witness of Dec. 15, thought that the government should furnish a place where investors could secure full information regarding the affairs of corporations, but that that was the only protection the government should give to investors. He suggested that the "counters," as he called the evidences of securities, should have no relation to capitalization; that there should be a definite prohibition against a valuation, such as an assumed value of $100, on the "counters;" and that rates should be based partly upon cost and partly upon market value. Mr. Hale expressed the opinion that the State of Massachusetts had not offered sufficient speculative profit to induce interurban railroad development. He described the contract by which the large investment of capital in the Boston Elevated Railway was protected by the agreement that for a period of years no taxes other than those specified should be levied and the rate of fare should not be reduced. Mr. Hale approved a method whereby a bargain should be made in the case of each railroad that for a definite fixed term of years a schedule of rates might be maintained.

TESTIMONY OF M. R. MALTBIE

M. R. Maltbie, member of the New York Public Service Commission, First District, testified on Dec. 15 in reference to the experience of that commission. In referring to the Third Avenue Railroad case, he said that the commission took the position that it should not approve securities that would be issued to the public unless a fair return could be earned on such securities. Mr. Maltbie said it was wise to avoid reorganization if possible. The commission had been trying, without surrendering at all the rights of the public, to enable one company to work out its affairs without recourse to reorganization. Over-capitalization, he said, was an injustice to the investor as well as to the public. It had the effect of causing managers to earn returns on the capitalization at the expense of the service.

TESTIMONY OF F. L. STETSON

Francis Lynde Stetson, of J. P. Morgan & Company, testified on Dec. 16. He said that the issue of excessive obligations by corporations destroyed their credit and thus caused deterioration of their service. He said that the official who made the rates would take, in the absence of governmental regulation, all that the traffic would bear up to the point where the shipper would find it cheaper to transport his goods by wagon. Rates had no relation to capitalization, he said. If there was an opening for a competitive road, the advantage of the situation would rise above all other conditions and such a road would be constructed. He had not reached a point where he believed the principal right of Congress was to regulate commerce. As between the two evils of State and national regulation, he preferred to maintain local regulations even though they infringed to some extent upon the uniformity of the treatment of interstate commerce. It was more important that the States should develop roads for the localities within their borders than for other States. The preponderant interest of each State was in its own local methods of distribution.

Mr. Stetson said that the vast system of railroads of the country had developed without any national interference. He looked with great question upon the public service commis-

sion law of New York State when that measure was enacted. When the law was administered as it had been in the Second District he was entirely satisfied. It had been administered reasonably and he would be sorry to see it repealed. Conditions might exist under which a railroad would have to get what it could for its securities. The law could not compel the payment of more than intending purchasers were willing to pay.

Mr. Stetson referred to his well-known suggestion that the dollar mark be sponged off the face of stock certificates. He said that the par value of $100, even if stock was issued at that figure, was a vanishing truth, as the price in the market was different five minutes afterward. He saw no reason to believe that assumption by the federal government of the power to regulate the capitalization of State corporations would measurably improve the conditions of transportation, which were pretty good. Under a permissive statute corporations might issue shares of stock bearing no par value, but representing a proportionate interest in earnings and assets. The disappointment of the public was keener when bond interest was passed than when a dividend payment on stock was passed, but he did not know that there was any more distress in one case than in the other. The great combinations had rendered business more stable. There had been no great industrial failures since 1901, although previous to that, when many small companies existed, panics had started in various parts of the country whenever trouble developed in a small plant.

In conclusion Mr. Stetson emphasized that he was utterly opposed to federal regulation of securities and that he had not the slightest belief that the government had any right to regulate securities.

TESTIMONY OF F. W. STEVENS

F. W. Stevens, chairman of the New York Public Service Commission, Second District, who gave his views on Dec. 16, said he wished to go on record as saying that, in his judgment, a system of national regulation of securities could not be expected to meet with the success which its advocates thought it would. It was an open question whether it would be a physical possibility for any commission to handle the multitudinous details involved. It was also a question whether regulation of this character would not make local interests entirely subservient to general interests. The commission had seen very few evils in interstate traffic as compared with those in interstate traffic. Local interests were apt to be neglected.

Mr. Stevens said that he personally favored the elimination of the dollar mark from securities. He thought that this plan was entirely practicable from an accounting standpoint. In capitalization there was too great a tendency to follow a rigid system. No system of capitalization was worth anything unless it would attract capital to an enterprise. To attract money to an established road and to attract it to a new enterprise were two entirely different propositions. No one put money into the New York Central & Hudson River Railroad or the Pennsylvania Railroad except as an investment. A new enterprise was more or less in the nature of a gamble. The chances were too much against it for it to attract capital by offering a return of simply 5 per cent.

Mr. Stevens said that the commission had recognized promoters' profits as entirely legitimate, based on services rendered in the organization of the company. It had authorized the issue of stock for such services on principles with which it was entirely satisfied. Since the law creating the commission had been passed the financial situation had been such that it was not possible to say whether the prevention of the issue of stock as a bonus to promoters had prevented the construction of new properties. The administration of any new theory such as that embodied in the public service commissions law must involve, at first, a period of uncertainty and doubt. Capitalists would wait to learn whether the law would be administered wisely or unwisely or in a spirit of helpfulness or destructiveness. In addition there had been a world-wide demand for floating capital for conversion into fixed capital. This had been in excess of the supply. The demand was in excess of anything that had ever been known in the history of the world before. Railroads had extraordinary difficulty in securing capital. They could secure more capital if they offered more interest.

If a federal commission was to regulate securities it should see that the capital desired was really required, that it was obtained and that it was used for the purpose for which it was obtained. The function of such a commission should not be to interfere with the functions of the directors of corporations, but to afford publicity. The directors should judge as to whether a scheme should be entered into. If the New York commission found a small corporation entertaining a proposition that was not a good business proposition it would confer with the officials and point out a better way. It would never think of doing that with a large corporation. The disadvantages of federal regulation of securities would overcome any advantages which Mr. Stevens had been able to see. It was to be regretted that the capitalization of corporations incorporated by States should be regulated or controlled by the federal government. On the other hand, Mr. Stevens favored State regulation.

HEARING ON INTERURBAN OPERATING METHODS BEFORE ILLINOIS COMMISSION

Thirty representatives of interurban railroads attended a hearing before the Illinois Railroad & Warehouse Commission at Springfield, Ill., on Dec. 20, for the purpose of discussing operating methods. The call for the meeting was published in the Electric Railway Journal of Dec. 17, 1910, page 1201.

Orville F. Berry, chairman of the commission, presided at the meeting. He explained the reasons for the absence of Governor Deneen and the other members of the commission. No definite program for the meeting had been prepared, but it was the desire of the commission to receive suggestions for consideration. Commissioner Berry read an address giving the general views of the commission. An abstract follows:

"The Illinois commission is very deeply interested in the welfare of the commercial interests of the State and it can render no better service to the people than to see that all means of transportation are brought to the highest standard. In bringing about this result there are three things which the commission should consider:

"First, that the movement of both passenger and freight traffic be prompt. Second, that the transportation agencies be conducted in just as safe a manner as the extent of human ingenuity will permit. Third, that a state of affairs should exist which would enable the transportation lines to earn a sufficient return on their investment to bring about this ideal standard of operation.

"One reason for the present undesirable reputation of the roads is because publicity has been limited in the past. The policy of secrecy is disappearing rapidly and better conditions are expected. In order to familiarize itself with the situation and improve existing conditions the commission has been giving special attention lately to interurban lines. The meeting is called in order that the commission may receive suggestions from operating officials in an informal way. Material improvement had been found by the commission lately in the methods of handling traffic. It is desirable that this should continue and the suggestions of the commission, designed to bring about better methods and results, are as follows:

"Employ no man without a preliminary and thorough investigation of his character. Before being given absolute charge of trains motormen should have as long experience as possible. Motormen should not assist in caring for baggage, mail, etc., carried on their trains. Motormen should have comfortable compartments. The construction of double track at curves and the installation of automatic signals should be considered and worked out as rapidly as possible. The commission is delighted with the improvements of the lines of the Illinois Traction System making for greater safety of opera-

tion. The commission recommends that responsibility regarding rules be fixed in every case upon certain individuals. Uniform signals should be adopted, if possible, throughout the State. The roads should instruct their men thoroughly before placing them on cars."

Commissioner Berry then presented figures showing the development of interurban railways in the State since 1903. He congratulated the public on the character of the men operating the roads as executives and minor employees and asked for closer co-operation between the public and the corporations.

After the presentation of Commissioner Berry's statement a discussion took place in which the officials of the interurban railways and representatives of the commission participated. The discussion at first was on the subject of the training of transportation employees.

Edwin C. Faber, general manager Aurora, Elgin & Chicago Railroad, said that no roads employed trainmen without preliminary examination and that careful training and inspection were most important factors.

H. E. Chubbuck, vice-president executive Illinois Traction System, described the comprehensive system by which the mental, moral and physical qualifications of employees of that company were determined. He said that the chief surgeon of the company was in continuous consultation with 70 local physicians, who examined the men. In the judgment of Mr. Chubbuck, the selection and training of employees was the most important factor of interurban railway operation. He told of a clause in the new contract with the employees under which brakemen are required to work up to other positions. A thorough course of education was provided. Schools of instruction on the system were part of the methods adopted by the management to educate the men.

C. F. Handshy, general superintendent Illinois Traction System, said that he did not favor the employment of steam railroad men who had had more than one year's experience. Such men would not assume responsibility and they were not sufficiently careful in the operation of interurban cars. They did not understand the short curves or realize the differences of operating conditions between steam and electric interurban lines. Therefore, such men did not provide exactly the best material for motormen of interurban railways.

Mr. Handshy favored the employment as interurban motormen of street railway employees who had had one or two years' experience. He said that such men learned the rudiments of interurban operation by observation. He described the system of employment on the Illinois Traction System. After a surgical examination and study of the rules new men were trained under regular motormen. The rules were made as simple as possible. A new employee continued to work under a regular trainman until he could pass rigorous examinations of the rules and as to his physical condition. Records were kept for every man on the system. This practice had achieved good results. The company had had an instruction school for three years in which the men discussed the rules, and all points which they did not understand were made clear. The men took an interest in the school. It had been demonstrated that the existence of the school had raised the standard of employees. A careful investigation of the character of applicants was made before they were employed as trainmen. References were secured from five non-employers and five former employers and information was required as to the places in which the men had been employed for the previous 10 years.

William Kilpatrick, secretary of the Illinois Railroad & Warehouse Commission, cited an example of a steam railroad wreck which had illustrated the need for careful supervision over the habits of employees.

Mr. Handshy said that candidates for positions as trainmen should be given a course of instruction in the shops.

B. E. Merwin, general superintendent Aurora, Elgin & Chicago Railroad, described the methods of selection of men followed by that company. This company required references and information as to previous employment similar to that mentioned by Mr. Handshy. The company also studied the character and habits of the men and subjected them to a physical examination. New men were instructed on each interurban division of the system for a total period of about five weeks. Afterward they were employed on milk trains as assistants until they knew the main-line schedules. They were required to pass a written examination of 300 questions regarding the rules and must pass with a grade of 95 per cent. The men were then given a talk by the superintendent. This company did not employ men who had not had previous steam or electric service. Some steam railroad employees had been found to be satisfactory, especially younger men who desired to be near their homes. The majority of the trainmen had been developed by experience on the property.

C. F. Hewitt, general superintendent East St. Louis & Suburban Railway, said that his general methods were similar to those mentioned by the other speakers and were equally thorough. He did not favor the employment of steam railroad men for interurban service. No men were put to work until their references had been investigated. They were kept in the shop one month and must pass an examination on the car equipment.

W. W. McCullough, general manager Rock Island Southern Railroad, said that he employed steam railroad men, who had to be approved by the superintendent of the company and by the steam superintendent at Rock Island. He had found steam railroad employees satisfactory, although men employed on his direct-current division had been unable to pass the examination for steam railroad service.

Mr. Chubbuck suggested that the conditions prevailing on the Rock Island Southern road, which secured 70 per cent of its gross earnings from freight traffic, were not comparable with the conditions existing on ordinary interurban railroads. He said that the McKinley line at Cairo operated over three miles of track of the Illinois Central Railroad, using the staff system of the Union Switch & Signal Company. For this service interurban trainmen of the regular class were employed and no difficulty had arisen. He repeated that the selection of employees was one of the most important of the vital questions facing managers at present. The interurban railways did not want the class of steam railroad employees they could get. The better class of steam railroad employees would not work for interurban railways on account of the lower wages paid unless the family relations of the men required them to be at home each day.

H. A. Fisher, president Joliet & Southern Traction Company, gave the reasons why he had not employed steam railway men when the interurban line between Columbus and Springfield, Ohio, was constructed. He said that it was difficult for steam railroad employees to appreciate the important details of interurban service. He therefore hired brakemen and firemen who had not been in steam service long and used them for interurban operation. These men were satisfactory because they were young and could adapt themselves to new conditions.

J. R. Blackhall, general manager Chicago & Joliet Electric Railway, described the employment of trainmen who were graduated to the interurban service after three or four years' experience in city service. He said that it was difficult to get satisfactory service from old steam railroad men on account of the wide difference in the characteristics of the steam and interurban service. He told of the frequent lectures and instructions given to employees.

T. F. Grover, general manager Terre Haute division, Terre Haute, Indianapolis & Eastern Traction Company, described the employment of trainmen on that system. He said that the employment of a steam railroad man for interurban service could be compared with the employment of a clerk in a butcher store to sell silk in a dry-goods store. In his experience of 20 years, the poorest motormen had been old steam railroad men who did not realize that they must watch every crossing because they had been accustomed to the habit of stopping only for stations and signals. Interurban men on his system were selected from his best city employees. In addition to the general methods of employment which Mr. Grover described he said that applicants were required to sign an affidavit that the

information in their application blank was correct. The same application had to be signed by three business men.

Mr. Chubbuck asked Commissioner Berry how much power the commission had to support the roads if a uniform application blank should be adopted. Could the commission take special action on this subject and require the applicant to swear to the correctness of his blank and to file a copy at the State House? A similar procedure might be adopted for the examination of applicants by physicians.

Commissioner Berry indicated that he approved this plan and thought that its adoption would reduce accidents.

Mr. Chubbuck suggested that the commission might be of value in the investigation of men. He said that the railroads wanted to secure the best men and desired help in getting them. If some State supervision should be connected with the application blank men would feel the importance of the service. State supervision of this nature need not be in the nature of a license. The Illinois Traction System had relied at times on decisions of the Interstate Commerce Commission. Mr. Chubbuck also suggested that the Illinois commission might have a brief set of fair rules upon whose adoption it could insist with all roads that were incorporated. One such rule would be a prohibition against drinking.

W. B. Tarkington, general superintendent Chicago & Southern Traction Company, discussed the relations between employers and employees, spoke of local situations and gave opinions based on his previous long experience with steam railroads.

Commissioner Berry discussed the authority of the commission, which was limited because based on an act passed in the year 1871, to which only a few amendments have been made since. However, he expected that additional powers would be given to the commission by the next Legislature. He favored the suggestions made by Mr. Chubbuck. The commission expected to present to the Legislature a bill providing that its powers should be enlarged greatly. It wanted the support of the railroads and also of the public. He said that an applicant who signed a false application blank was in the same class with a man who obtained credit at a bank by false representation.

Mr. Hewitt announced that a meeting would be held on Jan. 19, 1911, to form an association of electric railways in Illinois.

John Leisenring, signal engineer of the Illinois Traction System, gave a full description of the signals which are now being installed on the Illinois Traction System. They include continuous automatic blocking for 100 miles of track and also protection for all bad curves on the system. He described the methods by which the signals are operated. The construction was arranged so as to give the danger signal for any derangement. Four signals were provided at each siding.

The probable cost of signals was given by Mr. Chubbuck as up to $3,000 per mile, according to the traffic and sidings.

Mr. Leisenring explained that an installation of a similar character but somewhat cheaper could be made if alternating propulsion current should be used, although operating expenses would be higher. He described the reactance bonds and said that the company had an automatic train stop under consideration.

Mr. Faber said that the Aurora, Elgin & Chicago Railroad had recently installed two blocks covering a total of 1½ miles at an approximate cost of $7,000. The cost of other installations would vary with the situation.

Mr. Chubbuck said that the dispatcher signals of the Blake Signal & Manufacturing Company were not so expensive and had been found satisfactory. They were being installed on 200 miles of track and were similar to those approved recently by the Railroad Commission of Indiana. They facilitated the operation of trains. The company was also installing Baird Electric Company signals on 100 miles of track.

A general discussion followed as to the applicability of automatic train stops to interurban operation. The consensus of opinion was that automatic train stops had not been sufficiently perfected to be adapted to interurban service.

Marshall E. Sampsell, Central Illinois Public Service Corporation, suggested that a committee of five be appointed to frame a summary of the suggestions made at the meeting for the benefit of the roads and the commission and that later the summary be brought before the Legislature to assist in the enactment of legislation. This suggestion met the approval of the commission and the roads represented. The officials of the railways requested that the five men be chosen at the organization meeting of the proposed Illinois association, to be held in Chicago on Jan. 19.

Mr. Chubbuck asked the commission if it would recognize the committee as assistants to the commission in a semi-official capacity.

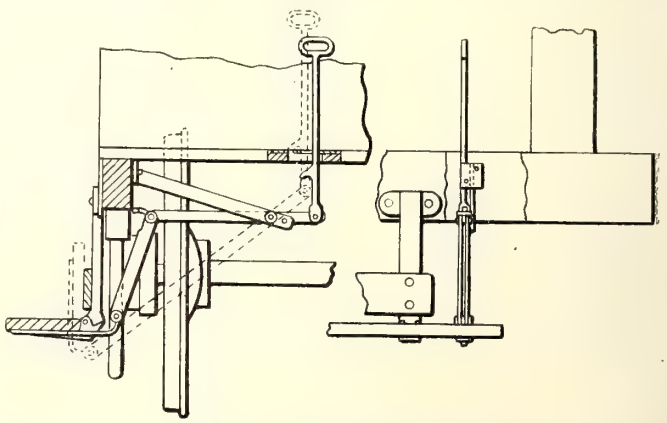
Commissioner Berry said that the commission would so recognize the committee. He said that the commission had tried to disabuse the people of the notion that electric railways were operated by inexperienced men. He also asked that the names of all railways be placed on a mailing list for copies of the synopsis of the deliberations of the commission published regularly.

H. A. Fisher, president Joliet & Southern Traction Company, described the installation made by the United States Electric Signal Company on his road as very satisfactory. This cost up to $250 per mile and was safe for speeds to 40 m.p.h., but might need further development for higher speeds on account of the trolley contact, which, however, was now being improved. This signal system would undoubtedly be satisfactory for many of the smaller roads.

Commissioner Berry, in closing the meeting, said that Governor Deneen would recommend in his message to the Legislature that legislation be enacted to enlarge the powers of the commission. He did not want the conditions made oppressive for the companies and would call another meeting before the bill was prepared. He desired that the roads see that the recommendations made were rational. He thought that it was better for the railroads to have a good commission with strong powers to handle some affairs which were now in an unsettled state. The committee of five to be appointed by the interurban roads would work with the commission in the preparation of the bill.

FOLDING STEP USED AT FORT SMITH, ARK.

The accompanying drawing shows a step adjuster, patented by John Nesbitt, foreman of repairs, the Fort Smith Light & Traction Company, Fort Smith, Ark., and installed on the open cars of this company. The vertical operating handle shown in the drawing is placed at the right front end for each direction of running. To fold the step against the riser, the motorman simply raises the vertical handle until the catch on its lower portion is drawn above the platform and moved over as indicated by the dotted lines. By pulling the handle back slightly and dropping it, the step is made return to its original horizontal position.

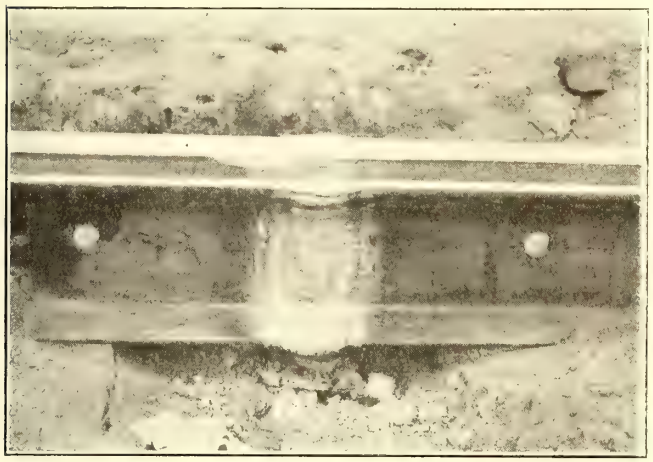


Folding Step Used by the Fort Smith Light & Traction Company for Open Cars

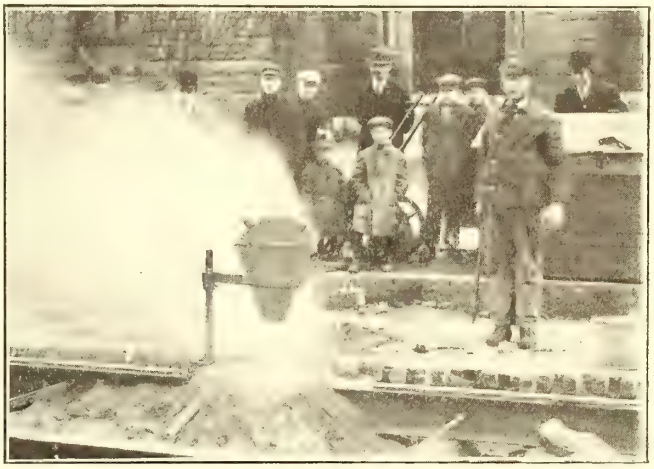
WELDING ENTIRE RAIL SECTIONS AT HOLYOKE, MASS.

BY G. E. PELLISSIER, ASSOCIATE MEMBER, A. S. C. E., SUPERINTENDENT OF THE GOLDSCHMIDT THERMIT COMPANY

Some thermit rail welding has recently been completed for the Holyoke Street Railway Company, of Holyoke, Mass., which, it is believed, marks an important advance in the art of rail welding, as the long-sought-for object finally was attained, namely, an absolutely continuous rail. As is known to everyone who is at all familiar with the welding processes now in use, including the thermit process as first applied in this country, none of them produces a really continuous rail because only certain portions of the rail are united, the head usually being left unwelded. Since one of the first essentials of the perfect track is a smooth, continuous rolling surface, the writer has always been of the opinion that the welding of the head of the rail was necessary in an ideal welded joint. This object has been attained by the new method recently used in making the welds at Holyoke.



Holyoke Welding—Completed All-Rail Weld

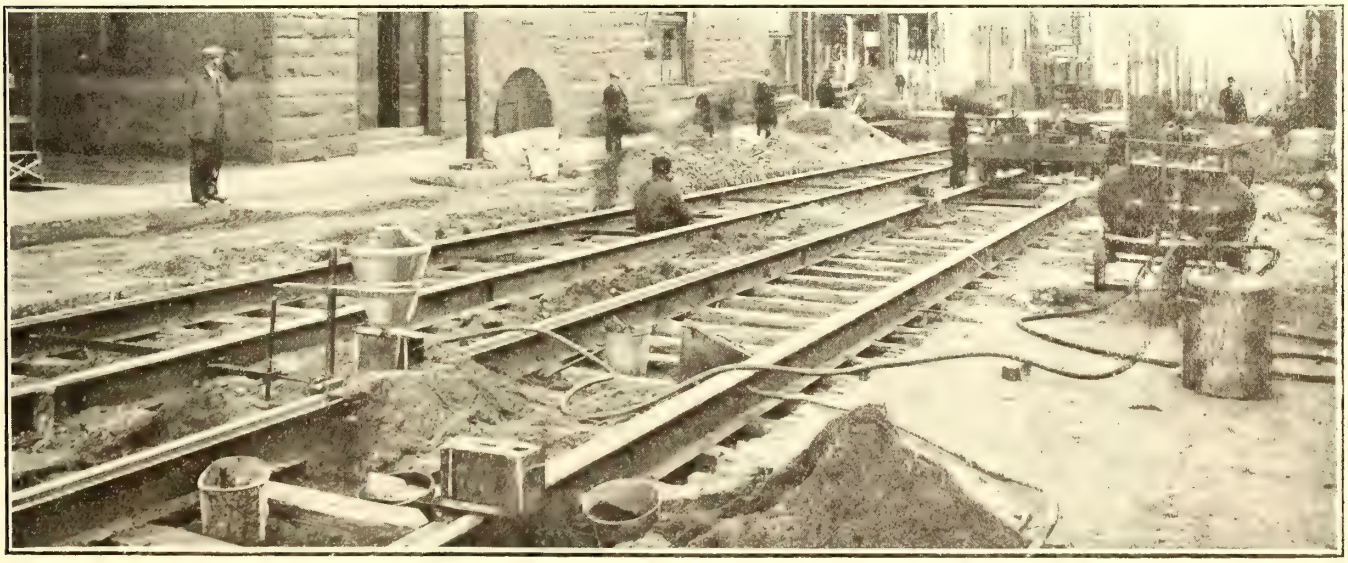


Holyoke Welding—Pouring Thermit Steel Into the Mold

Briefly stated, this method is as follows: The rails are first laid with a space of approximately ¾ in. between the ends and are aligned and surfaced by means of temporary fishplates. After the concrete and paving have been put in with the exception of a small portion around the joint (2 ft. x 2 ft.) the ends of the rail are surrounded by a three-part mold previously made on a suitable wooden pattern. In addition to the usual pouring gate and riser this mold has a hole at the center for inserting a preheater. After the molds are placed in position and secured by means of clamps and by packing sand around the mold boxes to prevent the escape of the molten metal, the interior of the mold and the ends of the rail inside the mold are brought to a red heat by means of the preheater, which is inserted at the preheating hole.

While the preheating is going on, a crucible into which the proper amount of thermit has been placed is suspended over the mold. As soon as the preheating has been accomplished the preheating hole is closed with a sand core and the steel resulting from the thermit reaction is tapped into the mold After the weld has cooled the mold is taken off and the portion of metal above the head of the rail is removed. The surface of the rail is finished by means of a grinder.

While it will be seen from this description that the entire operation itself is a simple one, the development of this method involved the solution of several rather difficult problems. The most important of these problems were the design of a suitable preheater and rail grinder and the determination by experiment of a thermit steel which would have the same hardness and wearing qualities as the steel to be welded.

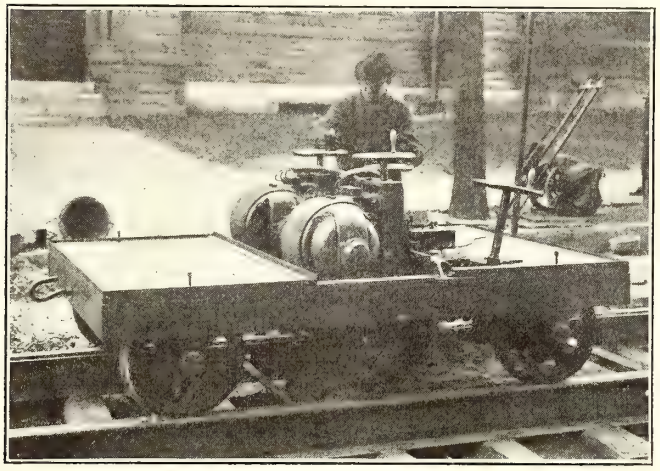


Holyoke Welding—General View of Work, and Apparatus, Including the Preheater Applied

The Holyoke preheating outfit consisted of a 5-hp motor belted direct to an Acme blower manufactured by the P. & H. Roots Company. The air from the blower was piped to a gasoline preheater designed by the writer. With this device it is possible to heat a 9-in. rail to a bright red heat in 20 minutes

The rail grinder used was also designed by the writer. It consists of a truck mounted on two axles. This truck has a

cross rail, similar to that of a planer, which is mounted in the center and parallel to the axles. This cross rail carries two grinder units (one for each rail), consisting of a 5-hp motor belted directly to a 14-in. emery wheel, the contour of which is such as to grind the desired surfaces. The grinder units are so arranged on the cross rail that each has an independent cross and up and down feed. This feed is very sensitive in order to give any desired accuracy in grinding. The entire truck is moved backward and forward on the track by means of a suitable hand-operated worm gearing which can be readily thrown out of gear when it is desired to move the



Holyoke Welding—Rail Grinder Complete

grinder from one joint to the other. One of the accompanying illustrations shows the grinder in action.

No attempt will be made here to describe the experiments made in arriving at a suitable thermit steel. It might be stated, however, that the one finally adopted has been proved by repeated strength tests, hardness tests and analysis to be at least equal to that of the usual rail steel.

A gang of only four men was employed in executing the welds, which were made on rail section No. 273, Pennsylvania Steel Company, at the corner of High and Appleton Streets, Holyoke. A small gang had to be used because the rail welding connected to the three ends of a piece of special work in the busiest part of the town, so that it was impossible to prepare many joints at once. Even under these arduous conditions these four men were able to make 10 complete joints in 9 hours. There is no reason why the same number of men could not make at least 15 joints in the same time under more favorable conditions. One of the illustrations on page 1245 will give an idea of the way the work was carried out on the track.

The Holyoke Street Railway was the first company in the United States to use thermit for rail welding, as the officials of that company early realized the necessity of something better than fishplates for paved streets. On this account it is particularly gratifying to the writer that this company was also one of the first to appreciate the advantages of the perfected method hereinbefore described.

THIRD AVENUE RAILROAD BEGINS OPERATION OF THE TWENTY-EIGHTH STREET LINE IN NEW YORK WITH STORAGE BATTERY CARS

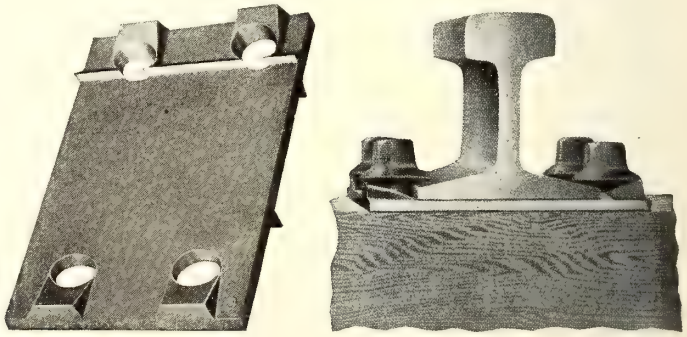
An arrangement has been made by the Third Avenue Railroad, New York, with Joseph B. Mayer, receiver of the Twenty-eighth Street & Twenty-ninth Street Crosstown Railroad, New York, whereby storage-battery cars will be operated on the Crosstown Railroad with free transfers given at all intersections of the Crosstown Railroad with the Third Avenue Railroad. Free transfers likewise will be given by the Crosstown company. The agreement went into effect on Sunday, Dec. 18, and will be continued if the expected increase in traffic materializes. The new transfer arrangements will be of great benefit to the public of New York because the Crosstown line runs on the west side to the important New Jersey ferry at Twenty-third Street and on the east side to the Thirty-fourth Street ferry, which connects with the Long Island Railroad. The transfer points are on Avenue B, Third Avenue and Tenth Avenue, so that both east side and west side passengers will be benefited.

In order to make the service as attractive as possible the Crosstown line has been equipped with some of the Gould storage battery cars which were recently built and equipped by the engineering department of the Third Avenue Railroad. Fifteen to 20 of these cars will be available for this service as traffic conditions may warrant. The first storage battery cars of this type were placed in operation by the Third Avenue Railroad in March, 1910. Since that time seven additional cars have been placed in service on the 110th Street line. These cars are giving excellent service and are earning far more money than the original horse cars.

TIE PLATES FOR SCREW SPIKES

The present method of securing rails to cross ties by means of the old square or common spike is about the same as used originally. In fact, very little improvement over old methods had been attempted until the screw spike was introduced. Some of the larger steam railways and also the elevated railroads have used the new spike to some extent during the past few years but principally in an experimental way to determine its practicability. The introduction of screw spikes prompted the Spencer Otis Company, Chicago, Ill., to design a tie plate which would solve the problem of the proper application of the spikes and at the same time produce an ideal plate which would meet the following requirements: Insure a perfect bearing for the flange of the spike to both rail and plate; furnish reinforcement back of the spike, to prevent bending caused by the lateral movement of the rail; minimize spike cutting, caused by running rail; and finally include means for so applying the spike that it could be driven only in a vertical position.

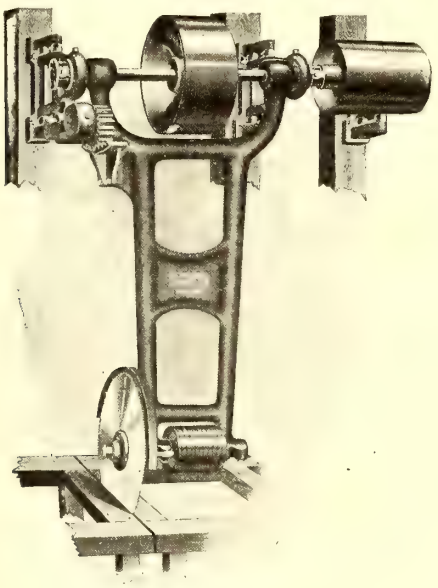
The company named states that it has succeeded in making tie plates to meet these requirements mentioned and in fact has been rolling such plates successfully at its Portsmouth (Ohio) mills for the past two years. The accompanying illustrations show the plate with the rail mounted thereon and also the plate itself. A glance at the illustration of "Economy" tie plate No. 9-R will show that it has a strong main body with a rail retaining shoulder and elevated bosses rolled on either end; these bosses have the same angle as the base of the rail and provide bearing for the flange of the screw spike and reinforce it to prevent bending and cutting. The spike holes in the bosses serve as guides or jigs when boring ties after the plates are in position under the rail. The plates are rolled from open-hearth steel with four longitudinal flanges or two transverse flanges on the bottom surface or are rolled perfectly flat on the bottom surface if desired. They are made to take any section of rail either A. S. C. E. or American Railway Association, section A or B. This company also makes other types of tie plates, screw spikes, rail joints, etc.



Tie Plates, Separate and Applied

A CAR SHOP SWING SAW

The J. A. Fay & Egan Company, Cincinnati, Ohio, is building for railway service the swing saw shown in the accompanying cut. Special attention has been given toward making the frame heavy and to using the very large main driving pulley required in the manufacture of heavy material. The automatic adjustable counterweight makes it easy to operate this machine and insures a quick return of the saw when released. The saw mandrel is fitted with an expansion bush saw flange, which permits the use of a saw having a slightly larger hole than the regular type. The journal bearings are self-oiling



Railway Shop Swing Saw

from chambers underneath. Each machine is furnished with a guard to which an operating handle is attached. With the largest saw practicable (56 in. diameter) this machine will cut off car woodwork material 19 in. square or 48 in. wide x 2 in. thick.

HAND-OPERATED UNIT SWITCH CONTROL FOR PEORIA RAILWAY TERMINAL COMPANY

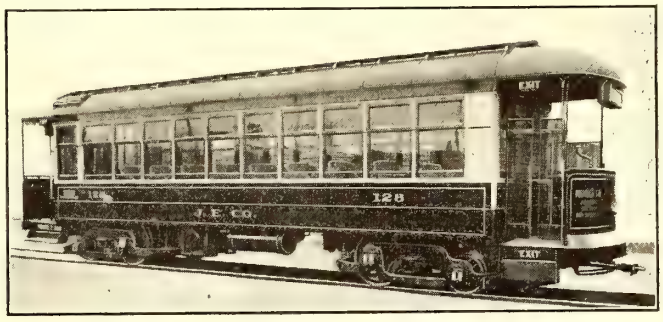
The Peoria Railway Terminal Company has recently added five double-truck passenger cars to its rolling stock. This company operates a standard gage interurban electric line between Peoria and Pekin. The new cars, which are 57 ft. over all and which when fully loaded weigh approximately 40 tons, are of the single-end type. The car bodies, complete with truck, were built by the McGuire-Cummings Manufacturing Company. The trucks are equipped with 36-in. wheels mounted on 6-in. axles with 7-in. gear fit arranged for a gear ratio of 18:69. It is expected that when operating on normal schedule the single trip will include six stops in the interurban districts and an average of six or seven stops in the 2.8 miles of city running.

Each car is fitted with a quadruple equipment consisting of four No. 304-A interpole railway motors, each motor having a nominal rating of 75 hp at 500 volts, or 90 hp at 600 volts. Hand-operated unit switch control is used on each car. The line switches and each unit of the control switch are actuated by air under pressure of 70 lb. per square inch. The only current flowing through the master controller is the small amount required to energize the electromagnetically operated needle valve which admits air to the air cylinders of the switch. Both the motors and the control equipment were manufactured by the Westinghouse Electric & Manufacturing Company.

PAY-AS-YOU-ENTER CARS FOR JACKSONVILLE, FLA.

The Cincinnati Car Company is now delivering to the Jacksonville (Fla.) Electric Company 10 double-end pay-as-you-enter type cars which have a number of interesting features. Some of these features are quite a departure in car building and are believed to give a car body of exceptionally light weight for the stability attained. The weight per seated passenger for the completely equipped car is 760 lb. This type of car was designed by C. O. Birney, of the Stone & Webster Engineering Corporation, of Boston, Mass., the general managers of the Jacksonville property. It is licensed by the Pay-As-You-Enter Car Corporation, New York.

The frame of this car is composed largely of structural steel. The side posts and roof carlines are formed of 2-in. x 2-in. x ¼-in. T-irons made in one continuous piece, extending from side sill to side sill and riveted thereto. The side sills are composed of 5-in. x 3-in. x ⅜-in. steel angles, extending the full length of car body, to which 3/16-in. x 15-in. steel plates are riveted in one continuous piece; this plate forms the lower side panel. The upper side panels are formed of No. 16 gage sheet steel, lined on the inside with 3/16-in. thick Agasote,



Jacksonville Car—Exterior Showing Flat Roof

which forms the interior wainscoting between side posts. The sides of car are additionally reinforced between the sash rail and the side sill by a 1½-in. x 1½-in. x ¼-in. steel angle which forms a seat for the cross seat wall brackets. The window rests are formed of 1½-in. x 1½-in. x ¼-in. steel angle capped with white oak. The flooring is of single thickness, 13/16 in. thick, with standard floor mat strips in the aisle. The roof, which is of the turtle-back type, is formed of ¼-in. thick Agasote covered with No. 8 canvas on the outside. This Agasote is bolted to the steel T-iron carlines. The ceiling inside of the car body is of carline finish, the roofing being painted a green shade which presents a handsome appearance.

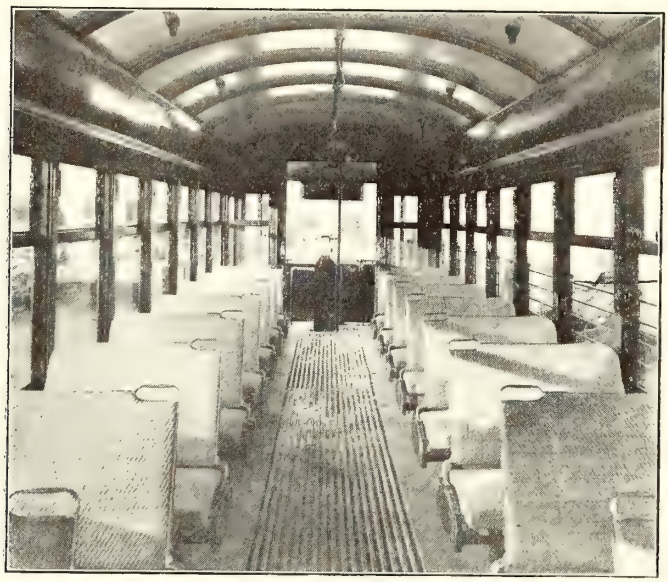
The interior finish of the car is of mahogany. There are 11 windows on each side of the car. The upper sash are formed by one continuous frame which extends for the full length of each side of car body, screwed to the outside of the T-iron posts. The lower sash, which are arranged to raise straight up behind the letter boards, are operated by O. M. Edwards No. 13-0 window fixtures and compression rollers.

The car is ventilated by means of 18 6-in. ventilators of the car builder's type, set in the roof alongside of the trolley boards. These ventilators are made so that they can be closed tight, opened part or opened all of the way.

The cars are arranged for single-end pay-as-you-enter operation, with a rear entrance and exit and a front exit. A Brill No. 2-B fare box is on the rear end of the car body. The rear bulkhead is located one window length in from the end sill, which novel arrangement permits a shorter platform than with the usual prepayment schemes. The rear bulkhead has independently operated double sliding doors. The front exit of the car is provided with a set of folding gates and a folding step which operate simultaneously under the control of the motorman. The car is completely closed by gates on the devil strip side. The seats, which are of Heywood Brothers & Wakefield manufacture, comprise 16 cross and four longitudinal rattan seats inside of the car and three wooden slat seats, two

of which are at the rear end between the bulkhead and platform and one on the front platform. The total seating capacity is 44 persons.

The general dimensions of the cars are as follows: Length over the corner posts, 29 ft. 6½ in.; length over all, 39 ft. 6½ in.; width over drip rails, extreme, 8 ft. 8 in.; height from top



Jacksonville Car—Interior, Looking Toward Conductor's Platform

of floor to top of roof, 8 ft. 0 in.; width of aisle, 36½ in.; width of cross seats, 34 in.

The weights of the car and equipment are as follows: Car body complete with hand brakes, 12,179 lb.; weight of fare box, 100 lb.; weight of air brake equipment and piping, 1730



Jacksonville Car—Exit Gate, Motorman's Platform

lb.; weight of body electrical apparatus, conduit, etc., 1463 lb.; weight of two GE-219 motors, 6000 lb.; weight of two Standard maximum traction trucks, 12,000 lb.; weight of car complete ready to run, 33,472 lb.

The special equipment of the cars includes the following: Cast steel bolsters; the car builder's signal bells and radial drawbars; Knutson trolley retrievers; United States Headlight Company's incandescent headlights; Hunter illuminated signs; P. Wall Manufacturing Company's 14-in. foot gongs; Forsythe protected groove pantasote curtains; Sterling Meaker hand brakes, and Standard Motor Truck Company's No. 0-45 maximum traction type trucks.

The electrical equipment consists of two GE-219 motors, with two K-36 controllers. The straight air brakes are also of General Electric manufacture. All of the power wiring is run in iron-armored conduit.

NEW HAMPSHIRE ELECTRIC RAILWAYS TELEPHONE SYSTEM

The New Hampshire Electric Railways is using an extensive Western Electric telephone system for train dispatching, the interconnection of the repair shop with the car houses, the interconnection of the power house with the rotary stations, and for general purposes, such as reporting defects in cars, track and overhead lines and ordering supplies.

The telephone system is divided into two general divisions corresponding to the divisions of the road, namely, the eastern and western divisions. In the eastern division, which is subdivided into the eastern New Hampshire and eastern Massachusetts divisions, the main switchboard is located at Amesbury, with pony switchboards at Plaistow and the Amesbury and Salisbury car houses. This division covers about 60 miles of road and is equipped with 28 telephones. The western division is made up of five subdivisions: Canobie Lake, Haverhill-Salem, Salem-Pelham, with branches to Nashua and Lowell; Salem-Lawrence, and Haverhill Junction.

The main switchboard is in the Salem car house, with pony boards at the Pelham car house and at the general offices of the company at Haverhill. This division of the road is 47 miles long and is equipped with 30 telephone stations, in addition to those at Canobie Lake Park.

There are also two other telephone circuits, one connecting the car house at Salem with the machine shop and the houses of the master mechanic and superintendent, the other a circuit paralleling the high-tension transmission lines, which supplies the power for the road. The power for operating the trains is generated at Portsmouth, N. H., and transmitted at 13,200 volts to 600-volt substations at Dover, Stratham, Plaistow, Amesbury, Salem, Methuen, Pelham and Hampton. The telephone line paralleling the transmission line is 55 miles long and is equipped with instruments at each rotary station. The high-tension patrolman always carries a portable telephone and by cutting into the line can connect with any point desired. The dispatchers at Salem and Amesbury can keep in constant touch with the power house at Portsmouth and the rotary stations.

Although the Canobie Lake division is but 1.5 miles long it is one of the busiest divisions during the summer on account of the amusement park at Canobie Lake. It is estimated that approximately 500,000 people visited this park in 1910.

The dispatcher for the western division is located at the Salem car house, whence he controls all the cars on this division. The telephone equipment here consists of a switchboard of 30 line capacity, with trunk lines running to pony switchboards at the Haverhill and the Pelham car houses. At each siding and at other important points along the line there is a telephone booth in which are installed a telephone set, a lightning arrester and an Egry triplicate copying machine. The conductor after receiving his orders from the dispatcher writes them out and then repeats them back to the dispatcher, who gives his O. K. and puts down the time on his train sheet. The dispatcher enters his orders on a regular train sheet similar to that used on steam roads, and he is held responsible for the service. This system is used on both the eastern and western divisions when extra cars are run over the various lines. When the regular schedules are in force all cars pass at designated points and dispatcing orders are not given except for the control of line crews during delays or when accidents occur.

News of Electric Railways

Meeting of Interstate Electric Railway Association

The committee consisting of G. W. Quackenbush, of the Illinois Traction System; H. A. Fisher, of the Joliet & Southern Traction Company, and C. E. Flenner, of the Aurora, Elgin & Chicago Railway, which was appointed at a meeting held in Chicago, Ill., on Dec. 1, 1910, to reorganize the Interstate Electric Railway Association, has called a meeting to be held in the assembly room of the Great Northern Hotel, Chicago, Ill., at 10 a. m. on Jan. 19, 1911, to consider plans to reorganize the association so as to extend its scope of usefulness to embrace all departments of electric railway work. Those who propose to attend the meeting are requested to address C. E. Flenner, Wheaton, Ill., as soon as possible so that the probable attendance can be determined in advance of the meeting. The following companies were represented at the meeting held on Dec. 1, 1910: Chicago, Ottawa & Peoria Railway, Illinois Traction System, Joliet & Southern Traction Company, Bloomington, Pontiac & Joliet Electric Railway, Aurora, Elgin & Chicago Railroad, Elgin & Belvidere Electric Company, Chicago, Aurora & DeKalb Railroad, DeKalb, Sycamore & Interurban Railroad and the Chicago & Milwaukee Electric Railroad.

Tentative Program Wisconsin Electrical Association

The annual meeting of the Wisconsin Electrical Association will be held at the Hotel Pfister, Milwaukee, Wis., on Jan. 18 and 19, 1911. In a communication addressed to the members of the association under date of Dec. 14, 1910, Clement C. Smith, president of the association, outlined the following tentative program and requested suggestions in regard to additions or changes:

Paper, "Publicity Campaigns," by Ernest Gonzenbach, president of the Sheboygan Light, Power & Railway Company. Mr. Gonzenbach will deal with the question of newspaper advertising and other methods of publicity.

Paper, "Some Principles Established by the Wisconsin Railroad Commission," by Edwin S. Mack, of Miller, Mack & Fairchild, attorneys, Milwaukee. Mr. Mack is counsel for several members of the association and has had extended experience in dealing with railroad commission matters. His paper will review rate making, going value and other subjects.

Paper, "Electric Meter Testing," by A. J. Goedjen, superintendent of tests of The Milwaukee Electric Railway & Light Company.

Paper, "Ornamental Street Lighting." (Not yet assigned.)

Paper, "Insurance." (Not yet assigned.)

Paper, "Electric Railway Repair Shop Practice," by W. J. Kelsh, master mechanic and chief engineer of the Eastern Wisconsin Railway & Lighting Company and Wisconsin Electric Railway.

Paper, "Transformers and Their Proper Arrangement." (Not yet assigned.)

Paper, "Storeroom and Stores Records of Lighting and Railway Properties." (Not yet assigned.)

Commission Favors Interborough Rapid Transit Company's Proposal

The Public Service Commission on Dec. 20, 1910, declared itself in favor of the proposal of the Interborough Rapid Transit Company for the extension of its existing lines, as against the plans for the tri-borough subway, on which bids were received on Oct. 27, 1910, by the commission and then held in abeyance. In a letter to the Board of Estimate, dated Dec. 20, 1910, the commission said that it purposes to conclude the negotiations with the Interborough Rapid Transit Company as speedily as possible, if the board approves. In its letter the commission states that there are "certain features" of the Interborough Rapid Transit Company's proposition that will have to be modified. They concern the laying out of certain routes now not on the map and the modification of others. For instance, it was pointed out that the Interborough Rapid Transit Company proposes to make the Eastern Parkway line in Brooklyn a four-track tunnel, whereas it is now laid out for only two tracks. The regular course for the laying out of routes will have to be followed in order to make such change legal. It is also understood that the commission is in favor of some alteration in the terms for the operation of the Fourth Avenue subway in Brooklyn, the stipulation of the company being that the city guarantee to make good any losses that might result from that division. The proposal of the Interborough Rapid Transit Company to the commission was reprinted in the ELECTRIC RAILWAY JOURNAL of Dec. 10, 1910, page 1156, substantially as presented to that body.

On Dec. 19, 1910, the Brooklyn Rapid Transit Company filed a new offer with the Public Service Commission to operate the Centre street loop. The company proposes to run certain lines across the Williamsburg Bridge and through the loop, elevated trains to run on the two westerly subway tracks and trolleys on the two easterly tracks. While it is proposed that the trains go as far as the Brooklyn Bridge, the plan is to stop the trolleys at Canal street. Provision is also made for a possible connection of the loop with the Brooklyn Bridge, if a feasible plan is devised in the future. The company proposes that the city shall provide the loop complete for use, with stations, signals and all other appliances necessary for operation by the concern with its present equipment. On its part, the company will provide a power substation, with feeders and connections between it and the main generating station and between it and the subway proper. The city must make the connection between the Williamsburg Bridge and the loop required for the operation over the bridge and through the subway of the maximum number of cars and trains demanded by the service. The city must also provide four terminal tracks, with platforms, at Chambers Street, for the exclusive use of the Brooklyn Union Elevated Railroad. Terminal facilities must be provided at Canal Street for the trolleys. The company proposes that the contracts for operation and maintenance of the loop shall run for 20 years, with the privilege of renewal for a similar period. It is also proposed that the rights of the company on the bridges be made co-terminus with its subway rights. The company offers to pay for its rights in the loop $45,000 the first year, this amount increasing annually to $260,000 in the tenth year. After the tenth year the company proposes to pay $275,000 a year. In case the city fails to strengthen the Williamsburg Bridge so that it can carry 10-car trains before the beginning of the sixth year, the rental amounts will be reduced by $80,000 a year. If the city will connect the subway with the Brooklyn Bridge, so that elevated trains can be run from one to the other, the company is willing to pay $50,000 the first year and $350,000 the tenth year. After the tenth year the company would pay $375,000.

The Public Service Commission on Dec. 19, 1910, received from the Manhattan Bridge Three-Cent-Fare Line an offer to operate the Centre Street Bridge loop subway, which is now practically completed except for a small section running down under the site of the new Municipal Building at the Brooklyn Bridge Plaza. The Manhattan Bridge Three-Cent-Fare Line recently obtained a certificate of public convenience and a necessity from the Public Service Commission to operate a line of cars over the Manhattan Bridge and thence northerly to Canal Street and through the thoroughfare to the Hudson River, thus giving for 3 cents a ride from Flatbush Avenue, Brooklyn, to the westerly end of Canal Street. This certificate, however, was conditioned upon the company's obtaining a working arrangement with some one of the existing Manhattan street railways for the use of its tracks on the Manhattan side. It is understood that the company has not succeeded in making the trackage arrangement necessary to make its certificate of public convenience good. It offers to construct three lines—one over the Williamsburg Bridge, entering the northerly end of the bridge loop subway and continuing down to the Manhattan Bridge, running over that to the terminal at Cham-

bers Street. Another line is to start at the plaza at the Brooklyn end of the Williamsburg Bridge and is to follow the bridge loop subway as far as Canal Street, turning there and running over the Manhattan Bridge to the Flatbush Avenue terminal. Another line is to start at the Brooklyn Bridge, running from that point to the Centre Street subway and thence over the Manhattan Bridge to the Flatbush Avenue terminal. This offer involves the provision by the company for cars, rails and other equipment in consideration of a lease which may be terminated by the city at any time after five years upon payment of the value of the equipment plus 10 per cent. The proposed lease provides for the payment, first, of operating expenses; next, for the payment of tares and bridge rentals; third, for the creation of a fund to cover depreciation and obsolescence; fourth, for the payment to the company of an amount equal to 6 per cent on its cash investment; fifth, for the payment to the city of an amount equal to the annual interest and amortization charge on the city bonds issued for construction of the Centre Street subway loop, of stations and bridge communications, and, lastly, for a division of earnings over and above these payments between the city and the railroad company.

William G. McAdoo, president of the Hudson & Manhattan Railroad, on Dec. 15, 1910, withdrew from the Public Service Commission his offer to build a modified form of the tri-borough subway system and to operate it in connection with the underground system of the company in Manhattan, New Jersey and beneath the North River. Mr. McAdoo says, in justifying his withdrawal, that when he made the offer to spend $50,000,000 of private capital under the plan he proposed he understood the policy of the commission and the city was to have a system which would be entirely independent of that of the Interborough Rapid Transit Company.

Railway Affairs in Detroit

At a meeting of the Common Council of Detroit, Mich., on the evening of Dec. 13, 1910, the ordinance to prohibit passengers from riding in the front vestibules of the street cars was defeated. The opponents of the measure argued that the ordinance would cause many men to be late at business and might result in some of them losing their places. The ordinance was intended to prevent passengers from absorbing the attention of the motormen. The committee on ordinances recommended the passage of the measure as an experiment. The committee also suggested that the so-called Codd service ordinance should be revised so as to compel the Detroit United Railway to make changes in its service which it was thought would improve operating conditions. Assistant Corporation Counsel Penniman charges that the company is disobeying the ordinance which governs the heating and ventilating of cars.

The committee on franchises of the City Council, on Dec. 17, 1910, approved the suggestion of Mayor Breitmeyer that steps should be taken to reopen negotiations with the Detroit United Railway for a settlement of the franchise question and that a new appraisal of the property should be made. It was expected that this committee would report to the Common Council during the week ended Dec. 24, 1910. Some months ago J. C. Hutchins, president of the company, proposed to pay for another appraisal if the Aldermen would agree to include in the final settlement the cost of the appraisal made by Bion J. Arnold as one of the capital items in the total valuation of the company's property. It is said that the Aldermen now favor holding Mr. Hutchins to a subsequent proposition, in which the company was committed to bear the expense of all appraisements that have been made in the past, the cost of the new work to be figured in the settlement as an item of overhead charge. In the proposed settlement, it seems, the Aldermen intend that the city shall have entire charge of the appraisal.

Mr. Hutchins has assured Mayor Breitmeyer that the company is willing to stand a reasonable expense for a new appraisal of the property if the Aldermen are in earnest in their desire to reach a settlement. He said further that the company would welcome a settlement fair to both the company and the city, as it would like to make the extensions and improvements which the natural increase in traffic demands.

In speaking of the matter Chairman Harpfer, of the committee on ordinances, said:

"The company says it is willing to settle on a fair basis and even give the city the best of the bargain for the sake of peace. The city needs the extensions and improvements so badly that it simply must have them soon or the growth of the community will be retarded immeasurably. We have been fighting in the courts for years and have got nowhere, and there is no prospect of an adjustment for years to come by that method.

"Realizing all these things, I think the Aldermen are in a frame of mind to go ahead and try to make a settlement of their own. If they do they will get the credit. If they fail they will do no worse than numbers of others have done before. For myself, I think that everything is ripe for a speedy adjustment of the whole matter on a basis that will appeal to the common sense of the thinking men of the community."

Strike in Winnipeg

The motormen and conductors in the employ of the Winnipeg (Man.) Electric Railway decided on Dec. 16, 1910, to go on strike at 6 a. m. that day. The decision to strike was arrived at during a meeting of the men early on the morning of Dec. 16, 1910, at which it was arranged to discuss the terms of the report of the board of arbitration which had considered the differences between the company and the employees and also the report of the committee which met the officials of the company on Dec. 15, 1910.

The differences between the company and its employees date back to last spring when the company discharged four of the employees for violating a rule which forbids men to enter a saloon while in uniform. Two of the men discharged were officials of a union which had been organized among the employees, and the men construed the discharges as discrimination against the union men. They took the matter up with the company, but were unable to settle the differences. Arbitration was then resorted to and a board consisting of Mayor L. L. Pelletier, of Fort William, representing the men; William Robinson, representing the company, and J. J. Christie, appointed by the Dominion government as chairman, went over the question carefully and two reports were presented. The majority report signed by Mr. Robinson and Mr. Christie sustained the company, while the report signed by Mayor Pelletier sustained the men. Messrs. Robinson and Christie in concluding their report said:

"The evidence went to show that every man employed as motorman or conductor receipted for a book of rules and regulations and that there was no complaint that they had any objections to same. There were about 23 motormen and conductors discharged for drinking intoxicating liquor between July 1, 1910, and Oct. 1, 1910, and there were no complaints as to wrongful dismissal. On Oct. 12, 1910, three motormen and one conductor were dismissed, to which exception was taken, and which is the case in dispute. From evidence taken and admissions of the four men dismissed, we are satisfied that they entered barrooms where intoxicating liquors were sold and drank same while wearing the company's uniform, which is prohibited by the company's rules.

"We find that the company was justified in dismissing these four men, and we also find that there was nothing produced in the evidence to substantiate the charge that the company had discriminated against any of the men. The manager of the company states that no motorman or conductor was ever dismissed from the company's service who was seen going into a hotel barroom after his day's work was finished.

"Your board has seriously considered the matter of asking the company to reinstate the dismissed motormen and conductor, but as the company is financially responsible to the public for damages in case of injuries or loss of life, we believe the matter should be left to the company to decide on the merits of each individual case, as it has in the past disposed of similar cases.

"The most recent rules that govern the use of intoxicating liquors are cited from a report of a board of conciliation and investigation in a dispute between the Toronto Railway and its employees, dated Aug. 20, 1910, which report states that

for serious cases, including drunkenness, drinking in uniform or drinking on cars, employees may be suspended or dismissed at the discretion of the proper officials. These rules were accepted by both the company and its employees."

The company manned as many cars as possible on Dec. 16, 1910, and gave a partial service until 7 p. m., when operations were discontinued so as to avoid disorder which threatened to break with nightfall. On Dec. 17, 1910, the company succeeded in manning 80 cars and announced that the old men would be given until Dec. 20, 1910, to return to work.

Cleveland Traction Situation

The directors of the Cleveland (Ohio) Railway did not consider plans for financing improvements at their meeting on Dec. 17, 1910, as Horace Andrews, formerly president of the company, could not be present. It was expected that Mr. Andrews would give the directors information on the attitude of New York financiers toward a bond issue. It is likely that Mr. Andrews will be present at the meeting of the directors on Dec. 24, 1910, when the matter will probably be taken up. It is said that the bond houses will send representatives to Cleveland to investigate conditions relative to the purchase of bonds.

The statement of operation of the company for November was presented at the meeting on Dec. 17. It shows an actual deficit of $1,958.41. There would have been a surplus of $9,306.89, however, had it been possible to keep the expenses within the limit defined by the Tayler grant, under which the company is allowed 5 cents per car mile for maintenance and 11½ cents per car mile for operating expenses for November. The report shows 2,126,145 car miles operated, so that the allowance under the grant for maintenance was $106,307.25, and for operating expenses $244,506.68. The actual maintenance expenditures were $96,113.01, while the amount expended in operation was $265,966.22. The statement of earnings for November follows:

Receipts		$506,288.92
Maintenance	$96,113.01	
Operating expenses	265,966.22	
Taxes	31,559 85	
Interest	114,608.25	
		508,247.33
Deficit		$1,958.41

A summary of the operation for nine months under the Tayler grant shows that the amount expended by the company for maintenance and the upkeep of the property was $191,068 in excess of the allowance under the ordinance, and the actual expense of operation has been $12,268 more than the amount allowed under the terms of the grant.

A. B. DuPont, former president of the Municipal Traction Company, Cleveland, Ohio, read a paper before the Engineers' Club of Cleveland on the evening of Dec. 13, 1910, on "The Transportation Problem of Greater Cleveland," in which he dwelt upon the need of subways or other means of rapid transit in Cleveland. Mr. DuPont said that Cleveland differed from other cities on account of the waste land which compels people to reside far from the business center. He also discussed his new car for use in subways.

Toledo Traction Situation

Brand Whitlock, Mayor of Toledo, Ohio, on Dec. 15, 1910, submitted to the City Council for consideration a letter, containing a proposition to the Toledo Railways & Light Company to proceed at once with negotiations toward a settlement of the franchise question. The letter was approved by unanimous vote of the Council, and on the following morning it was delivered by messenger to Albion E. Lang, president of the company.

Mayor Whitlock outlined a process for reaching important conclusions, such as the valuation of the property and fixing the fare. So far as can be judged from the expressions of the Mayor he appears to expect to follow the plan used in Cleveland.

Mayor Whitlock says that every feature of a new grant must be fair to the company as well as the city, and that any settlement reached must insure a return that will yield a fair interest on the money invested. Respecting the matter of control of operation, he suggests that this must not be such as will impair the value of the property or prevent its earning a just rate of return in addition to the cost of service rendered.

While the approval of the Council was unanimous, some of the members questioned the advisability of outlining the course the city expects to pursue at this time, while others felt that the letter might possibly be binding upon the city under the action taken. Mayor Whitlock explained, however, that it contains only suggestions, and that the proposition may not be accepted by the company, which may, if it so desires, present a plan that could be adopted by the administration instead of this one, if it should be found better. City Solicitor Cornell Schrieber said he felt that a brief note asking the company to take up negotiations would answer the purpose better, as the city might be compelled to yield some of its points, which would prove rather embarrassing. He stated, though, that there was no legal objection to the letter and expressed the opinion that action looking toward the settlement of the franchise question should be taken at once.

In the negotiation Mayor Whitlock will represent the city and the company is requested to appoint a man to act in similar capacity. The meetings will be held in the council chamber, so that people will have an opportunity to be present. The desire of the administration is that the fullest publicity be given to everything done in connection with the proposed new grant.

Meeting of New England Street Railway Club.—The regular monthly meeting of the New England Street Railway Club was arranged to be held at the American House, Boston, Mass., on Thursday evening, Dec. 22, 1910. At 8 p. m. the regular business session was to be held. Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., was to address the meeting. Brief addresses by prominent street railway officials in New England were also arranged.

Disastrous Explosion at New Grand Central Station.—More than 10 persons were killed and scores of others were injured in an explosion which occurred on Dec. 19, 1910, on the site of the new terminal of the New York Central & Hudson River Railroad, at Fiftieth Street and Lexington avenue. Houses for blocks around were damaged by the force of the explosion, and a trolley car which was passing was wrecked, several passengers being killed. The company, through C. F. Daly, vice-president, issued the following statement the day on which the accident occurred: "Careful investigation made by Chief Engineer Kittredge, Construction Engineer Harwood, Electrical Engineer Katte and Manager Whaley, of the Grand Central Terminal, indicates that the explosion was the result of an electric train falling over a bumping post in the storage yard and breaking a gas pipe, the escape from which penetrated the lower part of the substation and became ignited from some cause unknown.

Improvements in Montreal.—A. E. Robert, president of the Montreal (Que.) Street Railway, at a conference with the special committee of the City Council of Montreal on Dec. 8, 1910, declared that the company could not consider many of the demands of the city in regard to extensions and improvements to the street railway system which were contained in the memorandum presented to the company until a new agreement has been entered into between the company and the city. According to Mr. Robert, the views of the committee embody changes which would involve an outlay of more than $3,000,000. Mr. Robert is reported to have said: "The congestion in the central parts of the city is the most important point to be considered and the betterment of the main line is more urgent than making outside extensions. The company cannot comply with the views of the city unless the proposed improvements are based on a new agreement between the city and the company. All the extensions outside of the city which have been referred to might be live issues within five years. They certainly are not imperative now. The company and the city ought to consider all the routes suggested and determine how far conditions in the more important districts could be improved. The company is willing to go as far as it can toward meeting the wishes of the city under the terms of the present franchise, but the needs of the city as outlined in the memorandum presented to the company must be based on a new contract."

Financial and Corporate

New York Stock and Money Market

Dec. 20, 1910.

At one time this morning the active stocks on the list attained the highest prices touched by them since the post-election decline. In the afternoon prices declined again and the close was little better than that of the day previous. The market, however, showed no improvement in activity. For the week it was exceptionally dull and almost entirely professional. Even the regular traders were reticent.

Money continues to be easy and the rates of exchange point to gold imports. Quotations to-day were: Call, 2½@3½ per cent; 90 days, 4 per cent.

Other Markets

While there has been a little dealing in traction shares on the Philadelphia market every day during the week, there has been no activity. The entrance of E. T. Stotesbury into the management of Philadelphia Rapid Transit has given confidence to those interested in the transit situation, but has resulted in little change in prices.

In Chicago there continues to be considerable activity in Railways certificates, all of the series figuring in the trading. As a rule prices have been advancing. Series 1 sold to-day at 92 and Series 2 sold yesterday at 26⅝. Kansas City has also been fairly active.

During the past week tractions have cut little figure in the Boston market. Both issues of Massachusetts Electric and odd lots of Boston Elevated have covered the trading. Prices have remained unchanged.

In the Baltimore market the bonds of the United Railways are still active, at former figures, and there has also been limited dealing in the stock at about 15½.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 13.	Dec. 20.
American Railways Company	a43¾	a42¹
Aurora, Elgin & Chicago Railroad (common)	a45	a45
Aurora, Elgin & Chicago Railroad (preferred)	a86	83¹
Boston Elevated Railway	a127½	a127¹
Boston Suburban Electric Companies (common)	a16	a16
Boston Suburban Electric Companies (preferred)	a72	a72
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a39	a39½
Brooklyn Rapid Transit	73¾	76¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	82⅞	83
Capital Traction Company, Washington	128	a129
Chicago City Railway	a180	165
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a91	a92½
Chicago Railways, ptcptg., ctf. 2	a23½	a25¾
Chicago Railways, ptcptg., ctf. 3	a10½	a11
Chicago Railways, ptcptg., ctf. 4	a6½	a6½
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a72	a72
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	a59¾	68
General Electric Company	a153	a156
Georgia Railway & Electric Company (common)	a118	a118
Georgia Railway & Electric Company (preferred)	a88	a87
Interborough-Metropolitan Company (common)	19	20½
Interborough-Metropolitan Company (preferred)	53⅛	55⅝
Interborough Metropolitan Company (4½s)	79½	80
Kansas City Railway & Light Company (common)	a22½	a23
Kansas City Railway & Light Company (preferred)	73½	a73½
Manhattan Railway	138	138
Massachusetts Electric Company (common)	a18½	a18½
Massachusetts Electric Companies (preferred)	a84¼	a85½
Metropolitan West Side, Chicago (common)	20¼	*20¼
Metropolitan West Side, Chicago (preferred)	68	*68
Metropolitan Street Railway, New York	*19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	62	*62
Northwestern Elevated Railroad (common)	a20	a20
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	a43¾	47
Philadelphia Company, Pittsburg (preferred)	a42½	a42½
Philadelphia Rapid Transit Company	a18⅛	a18⅛
Philadelphia Traction Company	a83	a83⅜
Public Service Corporation, 5 per cent col. notes	a95	a95½
Public Service Corporation, ctfs.	a101	a100
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	102	102
South Side Elevated Railroad (Chicago)	a68½	a69½
Third Avenue Railroad, New York	9⅝	10¼
Toledo Railways & Light Company	a8	a8
Twin City Rapid Transit, Minneapolis (common)	107½	108½
Union Traction Company, Philadelphia	a42¾	a42⅝
United Rys. & Electric Company, Baltimore	*14½	*14½
United Rys. Inv. Co. (common)	a15	a15
United Rys. Inv. Co. (preferred)	*52	*52
Washington Ry. & Electric Company (common)	a33⅛	33½
Washington Ry. & Electric Company (preferred)	a87½	86¼
West End Street Railway, Boston (common)	a89½	a90½
West End Street Railway, Boston (preferred)	a103	a102¾
Westinghouse Elec. & Mfg. Co.	66	68
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	*124

aAsked. *Last sale.

Annual Report of Massachusetts Electric Companies

The total income of the Massachusetts Electric Companies, Boston, Mass., for the year ended Sept. 30, 1910, was $1,212,859, of which $1,040,029 was received as dividends on stocks owned and $172,830 was interest on notes and bank balances. Total expenses were $24,643, divided as follows: Salaries of general officers and executive committee, $13,917; printing and stationery, $1,181; legal and miscellaneous expenses, $8,845; federal income tax, $700. The net income for the year was $1,188,216. Against this sum there was charged $181,537 interest due on coupon notes, leaving net divisible income of $1,006,679. Total dividends of 3¾ per cent required $770,903, leaving a surplus for the year of $235,776. The surplus as of Sept. 30, 1909, was $2,898,758, making a total of $3,134,534. Against this sum there were charged $5,821 premium on coupon notes purchased and $166,500 discount on coupon notes sold, less $53,712 profit on sale of stocks, a net deduction of $118,609. The final surplus as of Sept. 30, 1910, was $3,015,925.

A consolidated statement of the returns for the operating street railway and electric light companies for two years follows:

Year ended Sept. 30:	1910.	1909.
Earnings	$8,560,949	$8,052,355
Expenses	5,360,295	5,148,396
Net earnings	$3,200,654	$2,903,959
Interest, rentals and taxes	1,792,937	1,778,129
Net divisible income	$1,407,717	$1,125,830
Dividends on common stock	1,035,017	957,895
Dividends on preferred stock	95,544	42,569
Totals	$1,130,561	$1,000,464
Surplus for the year	$277,156	$125,366
Surplus Sept. 30, 1909	216,398	.....
Surplus Sept. 30, 1908	.....	210,887
Totals	$493,554	$336,253
Deductions:		
Injuries and damages prior to insurance	.....	$8,271
Premium on bonds redeemed	$1,049	2,188
Adjustment of accounts	3,153	5,561
Reconstruction	178,001	74,388
Reconstruction of leased properties	.....	25,444
Replacement	82,991	.....
Depreciation of Hyde Park Electric Light Company property	7,000	4,003
Total deductions	$272,194	$119,855
Surplus Sept. 30, 1910	$221,360	.....
Surplus Sept. 30, 1909	.....	$216,398

Gordon Abbott, the president, says in his statement to shareholders:

"Your trustees have the pleasure of reporting to you the results of a year which has been on the whole uniformly prosperous. The gross earnings of the companies in which you are interested showed a substantial increase for the first nine months of the period under consideration, and while those of the last three months were less satisfactory, this was only in comparison with the results of a very favorable summer a year ago.

"The year shows an increase in gross of $508,593, or 6.32 per cent over the previous year, with a resulting increase in net of $281,887. Of this $52,974 was absorbed in dividends on the increased issue of preferred shares of the operating companies, leaving an increase in net divisible income applicable to the common shares of those companies of $228,913. This showing enabled the directors of the Old Colony Street Railway to raise the rate of dividend from 5 per cent to 6 per cent, the rate on the Boston & Northern Street Railway remaining the same as before, 5 per cent.

"During the year the Boston & Northern Street Railway sold 5883 shares of preferred stock, and the Old Colony Street Railway 4041 shares, a total of 9924 shares, which netted the companies $1,141,260. No bonds were sold by either of the companies during the year, but they have at the present time authority to issue an aggregate of $1,609,000 bonds, and these will be sold as the market offers a favorable opportunity. Many of these bonds have come into the treasury of the operating companies in exchange for bonds of the old underlying companies which matured during the past year. These bonds upon maturity were paid for from cash in the treasury, and under the operation of the refunding mortgages new bonds were issued in their place. To the payments for this account is due the creation of the small floating debt of $500,000 which appears in the consolidated balance sheet as due to others than the Massachusetts Electric Companies.

"It is expected that early in the year 1911 the operating companies will obtain the right to issue further bonds on account of capital expenditures during the past year.

"During the past year the sum of $1,610,691 has been expended upon the properties, divided as follows: Track construction, $186,726; track reconstruction, $538,083; cars and electric equipment, $382,240; overhead lines and feeders, $136,208; power stations, $146,288; land and buildings, $154,770; sundry equipment, $9,294; changes in Hyde Park power station, $57,082. Total, $1,610,691.

"During the year 8.1 miles of new track have been constructed and 29½ miles of track reconstructed. Work on 4.3 miles of new track construction and 14.6 miles of track reconstruction was in progress at the close of the year and will be finished before Jan. 1, 1911.

"In addition to the money spent for construction and reconstruction, the cost of maintenance charged to operation reached a higher figure this year, both in actual expenditure and in percentage of gross earnings, than ever before in the history of the properties. As a result your trustees are able again to report that the physical condition of the property is considerably improved.

"The last Legislature passed an act enabling street railway companies to issue bonds sufficient to provide cash to equal the discount on bonds previously sold, in order that the amounts of money provided by issue of stocks and bonds should be substantially equal, thus fulfilling the spirit of previous legislation. Under this act authority was given after the expiration of the last fiscal year for the issue of an aggregate of $517,000 bonds of the Boston & Northern and Old Colony Companies. The Railroad Commission in its decision authorizing this issue stipulated that annual sinking fund payments should be made by each company in amounts which, with interest thereon, will extinguish the bonds issued for discount before the maturity of the respective issues. For this reason no portion of the discount on bonds appearing in the balance sheet has been charged off during the past year, nor will any such charges be made in future, the payments on sinking fund account taking their place.

"The agreement between the operating companies and their conductors and motormen having expired Oct. 1, a new one took its place, running for four years, and containing provisions for an increase in wages of between 5 and 6 per cent. The result will be a considerable increase in cost of operation.

"Dividends at the full rate of 4 per cent on the preferred shares having been resumed, inquiries have naturally been made as to the payment or funding of the accrued and unpaid dividends on those shares, and several plans have been put forward to accomplish this result. To carry out any of these it is obvious that an income is required which will suffice not only to pay the 4 per cent dividend on the existing preferred shares, but also to pay dividends on any securities issued for the purpose of funding the accrued dividends, which now amount to $3,648,938. Your trustees are of opinion that it would not be wise to adopt and attempt to carry out any funding plan until experience has shown that such an income is better assured than at present. They believe that the interests of the shareholders will best be served by postponing any attempt at funding the accrued dividends until sufficient time has elapsed to establish still further the earning power of the operating companies."

Refinancing Philadelphia Rapid Transit Company

On Dec. 14, 1910, E. T. Stotesbury, of Drexel & Company, Philadelphia, wrote to Charles O. Kruger, president of the Philadelphia Rapid Transit Company, acknowledging Mr. Kruger's letter of Dec. 8, 1910, which contained the proposed plan for carrying out the general suggestions embodied by Mr. Stotesbury in a letter dated Oct. 20, 1910. In his letter of Dec. 14, 1910, Mr. Stotesbury said:

"The proposed issue of $10,000,000 guaranteed principal and interest by the Union Traction Company, and secured by the equity in the Market Street Elevated road, as set forth in your letter, seems to meet fairly the company's known requirements in the matter of new capital and the refunding of accruing capital obligations during the five-year period next ensuing.

"With reference to your statement that the Philadelphia Rapid Transit Company's treasury now contains an excess from $1,500,000 to $2,000,000 in current assets over current liabilities, it would appear that this sum should be sufficient to make possible the expenditure of the full amount required for maintenance and renewals during rehabilitation.

"Conforming to the suggestion contained in your letter, but having in view the double purpose of securing the substantial accuracy of your estimate, and also that the exact condition of the company's affairs be made a matter of record prior to the proposed change in management, it would seem best that there be now made a complete audit of the company's books, as of Dec. 31. With this audit before us the final details of the plan can be worked out with the Union Traction Company's directors in ample time to present them at the stockholders' meetings.

"I desire to have my position in regard to this matter clearly understood, both by yourself and the public generally. I shall undertake it solely from a desire to promote the best interests of Philadelphia and those fellow-citizens whose confidence in my ability to solve this problem I appreciate and hope to deserve; but as I accept a heavy responsibility without remuneration, and at a sacrifice of time which I can ill afford to make, I must be allowed to use my own judgment to spend such moneys as are necessary to secure the most expert advice and assistance obtainable."

Meetings of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company have been called for Feb. 28, 1911, to approve the plan for refinancing the Philadelphia Rapid Transit Company proposed by Mr. Stotesbury. The directors of both companies met on Dec. 19, 1910, and expressed satisfaction at Mr. Stotesbury's letter of Dec. 16, 1910.

Albany Southern Railroad, Hudson, N. Y.—The Albany Southern Railroad has petitioned the Public Service Commission of the Second District of New York for permission to issue $52,000 principal of its first mortgage bonds of the denomination of $1,000 each. On Sept. 15, 1910, the commission authorized the company to issue $1,250,000 in first mortgage 5 per cent sinking fund gold bonds at a price not less than 85, to provide funds to construct a second track from Rensselaer to Kinderhook Lake and to straighten and improve its railroad between these two points. The new issue is needed in addition to the bonds already authorized and sold to pay for work under way and to be completed on or before Dec. 31, 1910.

American Cities Railway & Light Company, New York, N. Y.—The American Cities Railway & Light Company has declared a semi-annual dividend of 2 per cent and an extra dividend of ¼ of 1 per cent on the $10,761,165 of common stock of the company, payable on Jan. 2, 1911, to holders of record on Dec. 20, 1910. This compares with 1¾ per cent paid in July, 1910, 1½ per cent in January, 1910, and 1 per cent in July, 1909. The regular quarterly dividend of 1½ per cent on the preferred stock was also declared, payable on Jan. 2, 1911.

Chicago (Ill.) City Railway.—The directors of the Chicago City Railway have declared the regular quarterly dividend of 2½ per cent on the $18,000,000 of stock of the company and an extra dividend of 2 per cent out of the surplus, both payable on Dec. 30, 1910, to holders of record on Dec. 16, 1910.

Chicago (Ill.) Consolidated Traction Company.—Judge Cutting in the Probate Court at Chicago, Ill., on Dec. 16, 1910, authorized Louis S. Owsler, executor of the Charles T. Yerkes estate, to transfer the underlying bonds of the Chicago Consolidated Traction Company held by the estate to the Chicago Railways in exchange for new securities, under the terms of the agreement dated Nov. 1, 1910, between Andrew Cooke and the Harris Trust & Savings Bank, Chicago, Ill., as depositary.

Chicago City & Connecting Railways, Chicago, Ill.—The Calumet & South Chicago Railway has certified to an increase in its capital stock from $5,000,000 to $10,000,000 and the Southern Street Railway has certified to an increase in its capital stock from $800,000 to $2,400,000. Both of these companies are constituent companies of the Chicago City & Connecting Railways.

Columbus, Marion & Bucyrus Railway, Delaware, Ohio.—Judge Babst has approved the report of George Whysall

and F. E. Guthery, receivers of the Columbus, Marion & Bucyrus Railway, which shows that nearly $44,000 has been expended during the year, and the court has ordered the receivers to hold one motor car and five dump cars in their possession until their ownership can be established.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—The Coney Island & Brooklyn Railroad has applied to the Public Service Commission of the First District of New York for permission to issue $500,000 of 6 per cent three-year notes, redeemable at 101. The holders are to have the option of taking in exchange bonds which are to be issued to secure them to the amount of $625,000 at 85.

Frederick (Md.) Railway.—The Public Service Commission of Maryland has taken under consideration the protest of certain stockholders of the Frederick Railway against the application of the company to the commission for permission to issue an additional $40,000 of preferred stock to pay for a majority of the shares of the stock of the Frederick Gas & Electric Company.

Northern Illinois Light & Traction Company, Ottawa, Ill.—New officers have recently been elected for the Northern Illinois Light & Traction Company as follows: W. B. McKinley, president; H. E. Chubbuck, vice-president and general manager; E. A. Moenutt, secretary; Edward Woodman, treasurer; W. J. Achelpohl, auditor; L. W. Hess, superintendent.

Syracuse (N. Y.) Rapid Transit Railway.—The Syracuse Rapid Transit Railway has applied to the Public Service Commission of the Second District of New York for approval of an increase of capital stock from $4,000,000 to $5,750,000. The increase is to be preferred stock. The company asks for an issue at this time of $1,660,000 to cover outstanding notes, $1,585,000 of which are owned by the New York State Railways, which has applied to the commission for permission to acquire the new preferred stock. W. H. Newman, formerly president of the New York Central & Hudson River Railroad, has been elected a director of the Syracuse Rapid Transit Railway to succeed the late E. V. W. Rossiter.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—Circulars have been mailed to the holders of the second mortgage bonds of the Washington, Baltimore & Annapolis Electric Railway announcing that the time for filing subscriptions under the reorganization plans has been extended to Dec. 31, 1910, and that the time for making the first payment has been extended to Jan. 16, 1911.

Dividends Declared

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 1¾ per cent.

Hestonville, Mantau & Fairmount Passenger Railway, $1.50 preferred; $1 common.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1 per cent.

Norfolk & Portsmouth Traction Company, Norfolk, Va., 1¼ per cent, preferred.

Northwestern Elevated Railroad, Chicago, Ill., quarterly, 1 per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common.

Reading (Pa.) Traction Company, $0.75.

Union Passenger Railway, Philadelphia, Pa., $4.75.

Virginia Railway & Power Company, Richmond, Va., 2½ per cent, preferred.

West Philadelphia Passenger Railway, Philadelphia, Pa., $5.

Traffic and Transportation

Service on the Surface Lines in New York

Oren Root, general manager for the receivers of the Metropolitan Street Railway, New York, N. Y., on Dec. 18, 1910, addressed a letter to the New York *Times*, in which he made the following statements in reply to an editorial which had appeared a few days previously in the *Times* commenting on the service furnished by the surface lines in Manhattan Borough:

"Obviously, it is not reasonable to set up an artificial standard of perfection and compare the actual accomplishment with the theoretical standard when the latter is unattainable, but it seems to me that the surface car situation can be properly approached from the standpoint of a comparison between the conditions existing at the time of the appointment of Mr. Joline and Mr. Robinson as receivers of the Metropolitan Street Railway and the conditions existing now.

"During October and November, 1910, the total number of cars upon which defects developed during operation was equal to only about one-fifth of the number of defective cars removed from service during October and November, 1907. These figures are indicative of the improved efficiency of the equipment, and the comparison of these two months is typical of the progress made in the operating department.

"In cases where the delay is not caused by the traffic congestion the irregularities are traceable to other causes which no amount of foresight or precaution on the part of those operating an electric railway can control. In other words, no amount of additional service would materially improve the situation when the number of cars on the line is sufficient to afford seats for passengers, but when such cars are prevented from passing over the road in accordance with the schedule because of the outside interference with their operation. Adequacy of service is measured by the number of cars operated past a given point in a given time, and not by the number of cars actually in service on a line.

"We know, and our records will substantiate, that since the beginning of the receivership in September, 1907, there has been a marked improvement in the regulation of the service on the lines of the Metropolitan Street Railway, but I cannot too strongly emphasize the fact that those in charge of the management of the Metropolitan Street Railway today welcome any suggestions which may be offered, and are glad to receive criticisms. It is our policy to give every suggestion and criticism careful consideration, and by their receipt our operating staff is stimulated. It is but fair to say that many valuable ideas of practical utility in the operation of these lines have emanated from sources outside of the officials of the road. It is our desire to merit the good will of the public and we are glad at any time to throw open our system to investigation or to explain our method of operation."

Decision in Regard to Fares on Boston & Northern Street Railway

The Railroad Commission of Massachusetts has handed down the following decision in regard to fares on the Boston & Northern Street Railway and the methods of operation of that company:

"The petition asks that transfers should be given on the Park Avenue line of the Boston & Northern Street Railway in Revere entitling passengers thereon to transportation to Lynn for a single 5-cent fare; that the Park Avenue line be extended to Washington Avenue in said town and that the company be prohibited from allowing cars not in use to remain upon its tracks located in Ocean Avenue in Revere or from so using said tracks as to interfere with and impede public travel from said avenue.

"After notice and hearing and further consideration the board finds the Park Avenue line to be one of several side lines in Revere, among them being the line to Revere Beach, and that the request for transfers must be considered with reference to its general application. Should the people of Revere be given through transfers the right to travel from all lines to Lynn the people of Lynn would naturally demand transfers from all lines to Revere Beach. A recom-

mendation that passengers should be carried between all parts of Lynn and Revere Beach for a single 5-cent fare would be unreasonable. At the hearing, however, it was shown that during certain early morning and late afternoon hours so large a number of regular patrons have occasion to travel between Park Avenue and West Lynn as to be entitled to special consideration. The board, therefore, recommends that the company meet this situation by some form of ticket at a reduced rate.

"The board does not find in the conditions existing as to the development of the immediate territory nor the prospect of possible revenue from contiguous territory—especially when considered with reference to the general conditions and needs in other sections served by this railway—justification for a recommendation that the Park Avenue line be at this time extended to Washington Avenue.

"It appears that the proposed new car station in Revere and certain other plans being considered will afford quite a measure of relief from the inconvenience caused by cars standing upon the company's tracks in Ocean Avenue, and, therefore, the board makes no recommendation, but will consider the matter further upon application should it be found that the proposed changes do not give the desired relief."

Suburban Electric Railway Magazine.—The Christmas issue of this magazine includes 52 pages and is the fifth number of Vol. I. It contains a number of interesting popular stories and sketches, as well as the timetables of several steam and electric railways in Central New York.

Service Under Hudson River Interrupted.—Service was suspended by the Hudson & Manhattan Railroad on its lines under the Hudson River between New York and New Jersey for three hours on the morning of Dec. 19, 1910, on account of a slight accident at the power station of the company in Jersey City.

Fares on Suburban Lines at Birmingham.—A resolution has been introduced in the City Council of Birmingham, Ala., which instructs the city attorney to inquire into the franchise rights of the Birmingham Railway, Light & Power Company to determine the authority of the company to charge a fare of 10 cents to Pratt City and Ensley.

Steubenville and Wheeling Connected.—The tracks of the Tri-State Traction Company, which operates between Steubenville and Wellsburg, W. Va., and the Panhandle Traction Company, which operates between Wellsburg and Wheeling, have been connected at Wellsburg and it is possible now to operate cars from Beaver to Wheeling without change.

Protest Against Fares in Schenectady.—Mayor Duryee, of Schenectady, has filed a protest with the Public Service Commission of the Second District of New York against the fare charged by the Schenectady Railway within the city limits. Since March 1, 1909, the company has charged a straight 5-cent fare within the city limits. The Mayor seeks to have the commission enter an order to require the company to restore the sale of tickets at the rate of six for 25 cents.

New Transfer System Proposed in Louisville.—A new transfer system, whereby patrons of the Louisville (Ky.) Railway may be transferred to suburban cars from cars operating on the lines in the city, is being considered by the directors and officials of the company. Heretofore passengers on cars in the city, in order to reach a point on any of the suburban lines, have been compelled to transfer twice and often three times. Under the present system a transfer from one of the city cars to another city car, good to the city limits, is issued.

Fare Protest in Maryland.—Residents along the Emory Grove line of the United Railways & Electric Company, Baltimore, Md., have protested to the Public Service Commission of Maryland against the action of the company in suspending at once all commutation fares on that and all other lines, and especially in abolishing the 7½-cent rate to nearby suburban points. The commission is asked to order the company to return to the tariff schedules filed with the commission on Sept. 16, 1910. The petition charges that the company acted hastily in abolishing all commutation rates, following a protest from residents of Ellicott City, with regard to alleged discrimination in favor of residents along the Catonville-Irvington line.

New Wage Scale of Indianapolis & Cincinnati Traction Company.—On Jan. 1, 1911, the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., will adopt a new wage scale, which will provide a wage of 20 cents an hour for the first year, with an advance of 1 cent an hour each year to the eighth year. During the eighth and ninth years 27 cents an hour will be paid, and during the tenth year the rate of pay will be 28 cents an hour. Changes are to be made from one class to another on the first or the sixteenth of the month, which is the nearest to the anniversary of commencement of service. Commencement of service is to be taken to mean the date when a man is listed as a competent motorman or conductor, either with a regular run or prepared to take a regular run as soon as there is an opening.

Mayor Gaynor on Heat in Cars.—On Dec. 14, 1910, Mayor Gaynor of New York addressed the following letter to a resident of Brooklyn who had complained to him that the street cars were not heated sufficiently to keep him and others from freezing to death: "It is my opinion that the heat in the cars most of the time makes the air in them very disagreeable and unhealthy. So far as I am concerned I wish they were not heated at all. Your statement that at least 5,000 people die every year from cold in the street cars seems to be a great exaggeration. Suppose you stay out of the cars and walk back and forth for a month. I will warrant that at the end of that time you will not care much about heat in the cars, and that, moreover, you will not feel like finding fault with everybody and everything in the world."

Limited Service on Puget Sound Electric Railway.—On Dec. 5, 1910, a liberal limited service was inaugurated on the Puget Sound Electric Railway, Tacoma, Wash. For the last five years local trains have been run between Tacoma and Seattle hourly, with the exception of trains leaving Tacoma and Seattle at 9 a. m. and 4 p. m., which were limited and made no stops. In addition to these through trains the hourly local service was run between Renton and Seattle. About three years ago the company established a parlor car service on all trains, with a view to making an effort to get a share of the through travel between Tacoma and Seattle, which had been handled largely by the boats. In addition, to make a further effort to secure this through business, limited trains leaving Tacoma and Seattle hourly between 7:35 a. m. and 9 p. m. have been put on. These trains consist of one car, half of which is intended for parlor car passengers, with a smoking apartment for both classes of passengers. The scheduled time has been reduced 1 hour and 10 minutes. In addition to this limited service the hourly local trains are run, each local train connecting at Renton Junction with a train for Renton.

Public Service Railway Increases Wages.—The Public Service Railway, Newark, N. J., has announced an increase in the wages of motormen and conductors in the employ of the company, effective Jan. 1, 1911. At present the wage scale of the company for platform men is 21 cents per hour for the first year; 22 cents for the second year; 23 cents for the third year and to the tenth year, and 24 cents for those who have been in the company's employ more than ten years. Under the new schedule 22 cents an hour will be paid the first year; 23 cents the second year; 24 cents the third year to the tenth year, and 24½ cents for those who have been in the company's employ more than ten years. While this increases the rate paid for the first three mentioned classes one cent an hour, a very large percentage of the men are in the present first and second-year classes, so that these men will profit by the raise in wages and change in classification and receive an increase of two cents an hour over their present wages. For instance, the man who began work as a first year man in 1910 at 21 cents an hour becomes a second-year man in 1911 and will be paid 23 cents an hour. Notices of the increases will be posted in the car houses under orders of R. E. Danforth, general manager of the company, and N. W. Bolen, superintendent of transportation. In addition to raising the scale of wages the Public Service Railway has put into effect a minimum weekly wage of $10.50 for the benefit of men on the extra list.

Personal Mention

Mr. Edward Carroll has been appointed trainmaster of the Inter-Mountain Railroad, Denver, Col., to succeed Mr. F. N. Dawson.

Mr. Frank Allen has been appointed roadmaster of the People's Traction Company, Galesburg, Ill., to succeed Mr. M. Kounter.

Mr. J. F. Messmer has been appointed car accountant of the Peoria Railway Terminal Company, Peoria, Ill., effective on Jan. 1, 1911.

Mr. O. Roberts has been appointed commercial agent of the Iowa & Illinois Railway, Clinton, Ia., to succeed Mr. J. C. Feddersen.

Mr. C. A. Johnson has been elected secretary of the East Shore & Suburban Railway, Richmond, Cal, to succeed Mr. E. A. Gowe.

Mr. M. D. McKinna has been appointed master mechanic of the Bakersfield & Ventura Railroad, Oxnard, Cal., to succeed Mr. C. D. Brann.

Mr. William Butterworth has been elected president of the Humboldt Transit Company, Eureka, Cal., to succeed Mr. George Heazelton.

Mr. E. D. Spruill has been elected secretary of the Pueblo & Suburban Traction & Lighting Company, Pueblo, Col., to succeed Mr. H. C. Baker.

Mr. J. W. Speidel has been appointed general manager of the City & Elm Grove Railroad, Wheeling, W. Va., to succeed Mr. J. W. Smith, resigned.

Mr. Monroe G. Ogden has been elected secretary and treasurer of the Macon Railway & Light Company, Macon, Ga., to succeed J. H. Hertz, deceased.

Mr. D. A. Faut has been appointed superintendent of the Fruit Growers' Refrigerating & Power Company, which operates a 4½-mile electric railway in Anna, Ill.

Mr. James A. Wagoner, for the last four years storekeeper for the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has accepted a position with the Interstate Commerce Commission at Washington, D. C.

Mr. T. D. Massee has been appointed purchasing agent of the Macon Railway & Light Company, Macon, Ga., to succeed J. H. Hertz, deceased, who was secretary, treasurer and purchasing agent of the company.

Mr. George V. Thomas has resigned as general manager and purchasing agent of the New York & North Shore Traction Company, Roslyn, N. Y. Mr. Thomas' duties have been taken over by Mr. George A. Stanley, the president of the company.

Mr. T. A. Cashin has been appointed superintendent of the Fresno (Cal.) Traction Company to succeed Mr. J. F. Turner, who resigned from the company in August, 1910, to become superintendent of the Power, Transit & Light Company, Bakersfield, Cal.

Mr. Allen P. Norris, who has been connected with the operating department of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., since the road was placed in operation, has been appointed freight and passenger agent of the company to succeed Mr. Charles F. Gladfelter, resigned.

Mr. J. W. Tompkins has resigned as superintendent of the interurban division of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., effective on Jan. 1, 1911, on which date the office of superintendent of the interurban division will be abolished. Mr. Tompkins will engage in private business.

Mr. J. J. Hooper has been appointed superintendent of the Stockton (Cal.) Electric Railroad to succeed Mr. Frank W. Webster, who heretofore has acted as general manager, superintendent and purchasing agent of the company. Mr. Webster will continue to act as general manager and purchasing agent of the company.

Mr. Frank C. Havens, treasurer of the Oakland (Cal.) Traction Company, has disposed of his interest in the company and in the San Francisco, Oakland & San José Railway to Mr. Frank M. Smith, his former associate, and will retire as an officer of the Oakland Traction Company to devote himself to his other interests.

Mr. C. E. Rose has been appointed superintendent of lighting of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. James E. Cowles, who, as noted in the Electric Railway Journal of Nov. 5, 1910, resigned from the company to become manager of the lighting department of the Shreveport Gas, Electric Light & Power Company, Shreveport, La.

Mr. Charles F. Gladfelter has resigned as secretary, treasurer and auditor of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C. Mr. Gladfelter became connected with the Washington, Baltimore & Annapolis Railway when the road was opened for service. In November, 1909, after the resignation of Mr. G. H. Gall as general passenger agent of the company, Mr. Gladfelter also assumed the duties of this position.

Mr. L. C. Shipherd, one of the superintendents of the Evansville & Southern Indiana Traction Company, Evansville, Ind., has been appointed general superintendent of the company, in which capacity he will succeed to the duties which will be relinquished on Jan. 1, 1911, by Mr. Fletcher M. Durbin, the present general manager of the company, who, as previously noted in the Electric Railway Journal, has accepted a position with the operating department of J. G. White & Company, Inc., New York, N. Y. Mr. Shipherd has been connected with the Evansville & Southern Indiana Traction Company and its predecessor, the Evansville Electric Railway, for several years. He was formerly connected with the St. Louis & Suburban Railroad, St. Louis, Mo. As superintendent of the Evansville & Southern Indiana Traction Company Mr. Shipherd was in charge of the Princeton division of the company. As general superintendent of the company he will have jurisdiction over all the lines of the company.

Mr. Louis A. Mitchell has been appointed superintendent of roadway of the Indiana Union Traction Company, Anderson, Ind., to succeed Mr. W. C. Sparks, who has accepted the position of general manager of the Rockford & Interurban Railway, Rockford, Ill. Mr. Mitchell was graduated from Cornell University, in June, 1902, with the degree of civil engineer. Following his graduation from Cornell and until Aug. 1, 1902, he assisted Prof. G. S. Williams at Cornell in experimental hydraulic work. From Aug. 1, 1902, until June 1, 1903, Mr. Mitchell was connected with the Utica & Mohawk Valley Railway, Utica, N. Y., first as transitman for a period of three months, and then as assistant engineer in charge of a field party. Mr. Mitchell next became connected with the United States Geographical Survey, with headquarters at Utica, N. Y., and on July 1, 1903, he became connected with the Consolidated Water Company, Utica, N. Y., and remained with this company until Aug. 1, 1903, when he accepted the position of assistant resident engineer of the Canadian Pacific Railway at Montreal, Que., in which capacity he continued until Nov. 1, 1904. Mr. Mitchell was next appointed engineer of the American Railway Insurance Company, Cleveland, Ohio, and served with this company from Nov. 1, 1904, until July 1, 1908. From July 1, 1908, to Sept. 1, 1908, he assisted Mr. Wilbur J. Watson, a consulting engineer, with offices at Cleveland, Ohio. Entering the employ of the Standard Fire Extinguisher Company, Cleveland, Ohio, as contracting agent, Mr. Mitchell served with that company from Sept. 1, 1908, until July 1, 1909. Mr. Mitchell resigned from the Standard Fire Extinguisher Company to become engineer in charge of construction of the 21 miles of electric railway for the New York & North Shore Traction Company, Flushing, N. Y., and continued with this company from July 1, 1909, until Nov. 1, 1910.

OBITUARY

Walter L. Pierce, general manager and director of the Lidgerwood Manufacturing Company, vice-president of the Gorton & Lidgerwood Company, and treasurer of the Hayward Company, New York, N. Y., died suddenly of heart disease, on Dec. 9, 1910.

Frederick G. Ely, director of the Pressed Steel Car Company, Pittsburgh, Pa., died on Dec. 12, 1910. Mr. Ely was connected with the railway supply business for many years. He was a brother of Mr. T. N. Ely, chief of motive power on the Pennsylvania Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Moodus & East Hampton Electric Railway, Moodus, Conn.—Application for a charter has been made in Connecticut by this company to build an electric railway to connect Moodus, East Hampton and Marlboro Mills. [E. R. J., May 18, '07.]

Bloomington, Decatur & Champaign Electric Railway, Bloomington, Ill.—Incorporated in Illinois to build an electric railway from Bloomington to Champaign, via Decatur. Capital stock, $3,525,000. Incorporators and directors: B. E. Bramble, W. H. Carnahan, Geo. R. McComb, L. Campbell and E. S. Cole, all of Champaign, Ill.

***Chicago, Terre Haute & Southeastern Railway, Chicago, Ill.**—Incorporated in Illinois to build an electric railway from a point in Edgar County, Illinois, to Chicago Heights. Capital stock, $2,500,000.

***Imperial Traction Company, Ottawa, Ont.**—Application for a charter will be made by this company to build proposed railways, telegraph and telephone lines to connect Hamilton, Guelph, Berlin, Stratford, St. Mary's London, Ingersoll, Woodstock and Brantford and back to Hamilton, with branches to Niagara Falls and to Sarnia.

***Darby, Media & Chester Cut-off Railway, Chester, Pa.**—Application will be made for a charter by this company to build an electric railway in Chester County. It will carry passengers, freight and express matter. Incorporators: Charles O. Kruger, president and general manager of the Philadelphia Rapid Transit Company; G. W. Mantz, Thomas K. Bell, chief engineer of the United Traction Company, Reading, Pa.; Alexander Rennick, vice-president and assistant general manager of the Philadelphia Rapid Transit Company, and Frank W. Janny.

***Rock Island, Texico, Farwell & Southern Railway, Farwell, Tex.**—Chartered in Texas to build a 75-mile steam or electric railway from Farwell to a point on the south line of Cochran County, about five miles east of the New Mexico boundary. Capital stock, $200,000. Incorporators: M. T. Healy, S. H. Witten and D. A. Lurthicum, all of Farwell, Tex., and J. W. Childers, K. K. Runnels, T. B. Martin and Thomas J. Allens, all of Texico, N. Mex.

FRANCHISES

Sacramento, Cal.—The Sacramento Electric, Gas & Railway Company has asked the City Council for franchises to extend its K Street and Twenty-first Street lines in Sacramento.

Danbury, Conn.—The Danbury & Bethel Street Railway will apply to the General Assembly for an extension of time of its franchise for the completion of its railway in Danbury.

New Haven, Conn.—The Connecticut Company has asked the General Assembly for permits to build various extensions to its lines in Fairfield, New Haven and New London Counties.

Logansport, Ind.—The Logansport & Southern Traction Company, Frankfort, has received a franchise from the County Commissioners to build an interurban railway through Clinton County. The terms of the franchise make it incumbent to complete the railway within two years. This proposed line will run through Carroll and Cass Counties. A franchise has been secured from Cass County and will be asked for in Carroll County. James R. Brown is interested. [E. R. J., Oct. 8, '10.]

Baltimore, Md.—The Wicomico Electric & Power Company has applied to the Public Service Commission for the approval of a proposition to build a 30-mile electric railway from Nanticoke Point to Salisbury. M. V. Brewington, president. [E. R. J., Dec. 17, '10.]

Palmyra, Mo.—The Hannibal & Northern Missouri Railroad has received a franchise from the City Council to build its tracks over certain streets in Palmyra. This proposed 100-mile electric railway will connect Hannibal, Palmyra, Bethel, Sue City, La Plata and Philadelphia. J. W. Latimer, Galesburg, secretary. [E. R. J., Dec. 10, '10.]

Caldwell, N. J.—The Pine Brook Electric Railway has asked the Morris County Board for a franchise to build a 10-mile electric railway between Pine Brook and Denville. This proposed railway has been organized to connect with the Caldwell and Newark electric lines of the Public Service Railway. At Denville it will connect with the Morris County Traction Company's line, which will give direct line to Lake Hopatcong from Newark. William Kerris, Pine Brook, is interested. [E. R. J., Oct. 22, '10.]

***Lambertville, N. J.**—The Business League of Lambertville has asked the City Council for a franchise to build an electric railway in Lambertville. The line will be extended to Trenton.

Madison, N. J.—The Morris County Traction Company, Morristown, has received a franchise from the Council to build in Madison.

***Niagara Falls, N. Y.**—The Niagara Falls, Dunnville & Welland Electric Railway has applied to the Stamford Township Council for a franchise. The line will extend from Niagara Falls to Welland, via Dunnville. [E. R. J., Oct. 1, '10.]

***Lebanon, Ohio.**—The Lebanon & Xenia Traction Company has received a two-year extension to its franchise, in which time to begin the construction of its railway in Lebanon.

Xenia, Ohio.—The Ohio Electric Railway has received a franchise from the County Commissioners at Xenia to enter Osborn by a new route, eliminating several dangerous curves.

Montavilla, Ore.—The Mount Hood Railway & Power Company, Portland, will ask the Council for a franchise to build an electric railway over certain streets in Montavilla.

Portland, Ore.—R. C. Gillis, representing the Mount Hood Railway & Power Company, has asked the City Council for two franchises to build electric lines and a lighting system in Portland.

***Sharon, Pa.**—The City Council will soon be asked for a franchise to build a new electric railway in Sharon. The proposed line will begin at the corner of Broadway and Haywood Street and will run over Haywood Street as far as Stambaugh Avenue beyond the borough line, thence to State Street, Sharon. Plans have already been drawn for this new line.

Salt Lake City, Utah.—The Utah Light & Railway Company has applied to the City Council for two franchises, to extend its tracks over streets in Salt Lake City. This company has also applied to the County Commissioners for two franchises, one from the city limits, on the Upper County Road to Halliday, and the second from the city limits on West Temple Street to Twelfth Street, south.

Vancouver, Wash.—The Spokane, Portland & Northern Railway, Spokane, has received a franchise from the Council to build its tracks on certain streets in Vancouver. A. M. Dewey, Spokane, is interested. [E. R. J., Dec. 10, '10.]

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company is double-tracking its railway on South Fifteenth Street, from the corner of Avenue C to a point south. The Avenue B loop will be doubled from Twentieth Street to Avenue I, on the South Fifteenth Street line, in Birmingham.

***San Luis Obispo, Cal.**—A. M. Bianchi, Cayucos, and James E. McFee are interested in a plan to build an electric railway from San Luis Obispo to San Simeon, and from Cayucos to Paso Robles.

San Joaquin Valley Electric Railway, Stockton, Cal.—This company has awarded the contract to Moriarity & Perkins, 503 Market Street, San Francisco, for building a reinforced concrete bridge over the Stanislaus River south of Ripon. The concrete work will be of crushed rock and on each end of the structure there will be abutments and about 900 ft. of trestle. Morris L. Brackett is interested. [E. R. J., Nov. 19, '10.]

***New Britain, Conn.**—Frank F. Hanford and Chas. F.

Lewis, Berlin, will soon apply for a charter to build a proposed 9-mile electric railway between New Britain and Meriden.

Atlanta & Carolina Railway, Atlanta, Ga.—This company has purchased material for building 30 miles of its proposed railway to connect Atlanta and Augusta, a distance of about 200 miles. Matthew Mason, chief engineer.

Decatur Southern Traction Railway, Decatur, Ill.—This company has filed a mortgage in favor of the Knickerbocker Trust Company, New York, which has agreed to finance the proposition. This proposed 35-mile electric railway will connect Decatur, Macon, Assumption and Pana. From Pana the line will go to Witt and southeast to East St. Louis, using the new McKinley bridge across the Mississippi River. H. C. Simmons, Virden, secretary. [E. R. J., Dec. 3, '10.]

Tri-City & Northeastern Interurban Railway, Port Byron, Ill.—This company expects to be in a position in the spring to bond its proposed 23-mile electric railway to connect Moline, East Moline, Watertown, Hampton, Rapid City, Port Byron, Cordova and Albany. Capital stock, authorized, $10,000. Officers: J. W. Simonson, Port Byron, president; W. H. Ashdown, vice-president; G. W. Turner, Hampton, secretary; C. E. Peck, Albany; R. S. Woadburn, Moline, purchasing agent, and Wallace Treckler, chief engineer. [E. R. J., July 23, '10.]

Beech Grove Traction Company, Indianapolis, Ind.—This company has laid tracks for more than half the distance between Indianapolis and Beech Grove. The overhead work will be completed within a few days. C. F. Smith, secretary. [E. R. J., Dec. 3, '10.]

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—At the request of President Charles L. Henry, of this company, President Reiss, of the Chamber of Commerce of Hamilton, Ohio, has appointed a committee to confer with the officials of the line regarding an extension to Hamilton, New Liberty, College Corners and Oxford, Ohio.

Bangor Railway & Electric Company, Bangor, Me.—It is announced that this company is contemplating extensive plans for electric railway and electrical development in the vicinity of Bangor. It expects to rebuild the old Veazie dam on the Penobscot River above Bangor, or else to build a dam in a location at or near Basin Mills. Plans for a public bridge between Bangor and Brewer strong enough to carry electric cars are also to be prepared.

Wicomico Electric & Power Company, Salisbury, Md.—This company has filed for approval with the Public Service Commission of Maryland preliminary plans providing for the construction of a 30-mile electric railway from Salisbury to Nanticoke Point. M. V. Brewington, president. [E. R. J., Dec. 17, '10.]

Worcester & Providence Street Railway, Worcester, Mass.—At the annual meeting of this company, which expects to build a proposed electric railway between Worcester and Providence, the following officers were elected: Walter F. Angell, Providence, president; William A. Leete, treasurer and clerk, and A. George Bullock, Waldo Lincoln, Worcester; Samuel Durfee and Frank W. Matteson, Providence, and Lincoln Davis, Boston, are directors. [E. R. J., Dec. 17, '10.]

Mankato (Minn.) Electric Traction Company.—This company, it is reported, will build an extension of its railway from Mankato to St. Peter via Kasota, a distance of about 12 miles. H. E. Hance, general manager.

Dunkirk & Jamestown Electric Railway, Jamestown, N. Y.—A company is being organized to build an electric railway to connect Fredonia, Lily Dale, Cassadaga, Moons, Sinclairville, Gerry, Ross Mills and Falconer. Among those interested are: A. N. Broadhead, president of the Jamestown Street Railway and the Chautauqua Traction Company; James A. Hughes, of Jamestown, and John Wurtenburg, of Cassadaga. [E. R. J., Nov. 5, '10.]

Frontier Electric Railway, Niagara Falls, N. Y.—This company has filed plans with the County Clerk for a new high-speed electric railway to extend from Buffalo to Niagara Falls along private right of way, which virtually parallels the tracks of the Erie Railroad. T. S. Ramsdell, president. [E. R. J., Sept. 24, '10.]

Spray Utilities & Terminal Company, Spray, N. C.—The Luck Construction Company has been awarded a contract by this company to build a 10-mile electric railway from Ridgeway, Va., to Spray, N. C. S. H. Marshall is interested. [E. R. J., Dec. 17, '10.]

Ohio Electric Railway Company, Cincinnati, Ohio.—It is said that $200,000 will be spent in improvements of the tracks of this company between Springfield and Dayton during 1911. It is proposed to build the line along the Erie right of way between the Masonic Home, near Springfield and Durbin. Several sharp curves will be eliminated and a number of new bridges will be built.

Portsmouth Street Railway & Light Company, Portsmouth, Ohio.—This company will build an extension between Sciotoville and Hanging Rock, where it will connect with the Ohio Valley Electric Railway. It is expected to begin work next summer.

Youngstown & Southern Railway, Youngstown, Ohio.—It is reported that plans are under consideration by this company for double-tracking the entire line between Youngstown and Leetonia.

Lehigh Valley Transit Company, Allentown, Pa.—At a recent meeting of the board of directors of this company it was decided to improve the Philadelphia division by making a large cut-off in the Borough of Coopersburg. This cut-off will be about 1 mile long, and will save a number of curves and a bad grade, and will improve running time considerably.

Southern Cambria Railway, Johnstown, Pa.—This company is considering plans to raise $200,000 for the purpose of building an extension of its line from Mineral Point to Ebensburg.

Titusville (Pa.) Electric Traction Company.—Plans for building a 2-mile extension of this company's line are being considered by the company. They will also include the construction of a new bridge over Oil Creek. Attempts will be made to buy or lease from the Pennsylvania Railroad the old line from the Tryonville station to Canadohta Lake, which could be electrified or used as a road for the operation of a gasoline car service.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.—This company has completed and placed in operation its railway extension to the Shandon annex section in Columbia.

Temple (Tex.) Northwest Railway.—This company proposes to build an extension from Gatesville to Hico, a distance of about 40 miles. This projected 100-mile railway will connect Temple, Comanche, Bell, Coryell and Hamilton Counties. W. E. Dozler, Temple, general manager. [E. R. J., June 18, '10.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company has issued bonds to the amount of $400,000. The proceeds are to be used for building an extension from Jimtown to Blacksville, and for the erection of a new power house.

Gogebic & Iron Counties Railway & Light Company, Ashland, Wis.—This company will begin work about Jan. 1 on its proposed interurban railway to connect Ironwood and Bessemer. Capital stock, authorized, $700,000. Bonds authorized, $2,500,000. Its power station will be located at Bessemer. The company has received a franchise for furnishing power for lighting. Officers: W. M. Reid, Ashland, president; I. S. Smith, secretary; A. W. Sanboone, treasurer; M. M. Reid, general manager; F. D. Sullivan, superintendent, and C. A. Hutchinson, chief engineer. [E. R. J., Dec. 10, '10.]

***Green Bay, Algoma, Sturgeon Bay & Northern Traction Company, Manitowoc, Wis.**—This company has been organized to build an electric railway through the region north of Two Rivers. The power will be furnished from the plant at High Falls. W. Frye, Chicago, is interested.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company has decided to build a depot at the junction of North Sacramento and Arcade Creek, in Sacramento. The structure will be similar to the depot at Oreville.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—It is said that this company will begin work

within the next month building a station on I Street in Fresno. The cost is estimated to be about $25,000. F. S. Granger, general manager.

Connecticut Company, New Haven, Conn.—Improvements will soon be made by this company on the old Ferry Street car house now used as a paint shop in New Haven. The addition will be 104 ft. x 45 ft. The cost is estimated to be about $9,000.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—This company has decided to build car houses at Granite City to take the place of the old structures now at Alton. The cost is estimated to be about $25,000.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company is receiving bids for building a car house in Granite City. The structure will be one story 107 ft. x 226 ft. The frame will be of corrugated iron. C. F. Hewitt, East St. Louis, superintendent.

Boston (Mass.) Elevated Railway.—This company will remodel its Sullivan Square Station in the near future.

Erie (Pa.) Traction Company.—This company has taken possession of its new station at Cambridge Springs. The structure is 70 ft. x 16 ft., and built of brick.

POWER HOUSES AND SUBSTATIONS

Fresno, Hanford & Summit Lake Interurban Railway, Hanford, Cal.—It is said that this company proposes to build a new power house at a point north of Fowler and 10 miles southeast of Fresno. The cost is estimated to be about $100,000.

Valparaiso & Northern Railway, Valparaiso, Ind.—This company has arranged with the Northern Indiana Gas & Electric Company for a 10-year power contract for sufficient power to operate this railway and the La Porte-Gary division of the Chicago-New York Electric Air Line Railroad. A substation, to contain three 300-kw converters, will be built at the junction of the two lines. By Feb. 1, 1910, or soon after, cars will begin operating between La Porte and Chesterton, Ind., using 1200 volts and taking power from a temporary station until the substation can be completed. Lewis E. Woodward, secretary.

Minneapolis, St. Paul, Rochester & Dubuque Traction Company, Minneapolis, Minn.—It is stated that this railway, which is operating with gasoline cars, will build a power house in South Minneapolis.

Columbus Railway & Light Company, Columbus, Ohio.—This company is now installing three new motor generators in the power house of the Columbus Edison Company, in East Gay Street, to transform the alternating current from the new 4000-kw generators in the Spring Street power station into the direct current.

Toledo (Ohio) Railways & Light Company.—This company has purchased from the General Electric Company one 300-kw rotary converter, including transformers and switchboard.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—This company announces that it will spend $350,000 in making extensions to its power plant. A new substation will be erected at the corner of Cannon Street and Stirton Street, in Hamilton, to cost $100,000. It will install a new 6800-kw generator at the generating station at Power Glen. J. B. Griffith, purchasing agent.

Mt. Hood Railway & Power Company, Portland, Ore.—This company has purchased from the Peninsular Lumber Company a tract of land on the Willamette River for a site for its first auxiliary steam power plant. The contract has been let to Chas. E. Moore & Company, San Francisco, for the erection of the plant, the project to be completed within four months.

Buffalo & Lake Erie Traction Company, Fredonia, N. Y.—According to press reports two boilers in the power house of this company, at Fredonia, N. Y., exploded on Dec. 16, killing two firemen and causing a property loss said to amount to $150,000, as several buildings near the power station were also damaged.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company is said to be considering plans for building a new power house in Morgantown.

Manufactures & Supplies

ROLLING STOCK

York (Pa.) Railways has ordered a standard Brill sweeper from the J. G. Brill Company.

Hudson & Manhattan Railroad, New York, N. Y., is in the market for 80 pairs of trucks.

Pittsburgh (Pa.) Railways has ordered 5000 steel wheels from the Forged Steel Wheel Company, Butler, Pa.

Holyoke (Mass.) Street Railway has ordered one 8-wheel shear plow from the Wason Manufacturing Company.

Rio de Janeiro Tramway Light & Power Company, Rio de Janeiro, Brazil, is in the market for 50 pairs of trucks. The bodies that will be used on these trucks will be built in the company's own shops.

Macon Railway & Light Company, Macon, Ga., reported in the ELECTRIC RAILWAY JOURNAL of Nov. 5, 1910, as having ordered eight cars, has ordered six 30-ft. 8-in. pay-as-you-enter cars from The J. G. Brill Company.

Boston (Mass.) Elevated Railway has ordered 25 pairs of trucks from the Standard Motor Truck Company, and the same number from The J. G. Brill Company. The bodies to be placed on these trucks were ordered some time ago.

Brooklyn Rapid Transit, New York, N. Y., has purchased from The J. G. Brill Company two gravity sprinkling cars, with a capacity of 5000 gallons each. This company has also purchased one McGuire-Cummings and six Smith & Wallace sweepers.

Chicago (Ill.) Railways will build 250 double-truck cars for city service on the lines of the Consolidated Traction Company. The designs for these cars have not been completed, but it is stated that they will conform to the type of 49-ft. closed cars now operated. The designs for the new cars will be approved by the Board of Supervising Engineers, Chicago Traction Company.

United Railroads, San Francisco, Cal., noted in the ELECTRIC RAILWAY JOURNAL of Sept. 10, 1910, as having ordered 80 pay-as-you-enter cars from the Jewett Car Company, has specified the following details for these cars:

Seating capacity 44	Bumpers,
Weight (body only).16,000 lb.	Hedley anti-climber
Bolster centers....20 ft. 10 in.	Curtain fixtures..Curt. S. Co.
Length of body....32 ft. 4 in.	Curtain material...Pantasote
Over vestibule.....47 ft.	Gongs .....Am. Car Co.
Width over sills...8 ft. 7½ in.	Destination signs ....Hunter
Over posts at belt.....9 ft.	Hand brakes .....Peacock
Sill to trolley base.....9 ft.	Headlights .....dash
Height top of rails to sills, 31¾ in.	Push button signal...Consol.
	Sanders .....air
Body .....wood	Seats .....longitudinal
Interior trim.....ash	Seating material.....rattan
Underframe .....wood	Step treads.....Universal
Car trimmings.....bronze	

TRADE NOTES

S. L. Kemps has been elected secretary of the T. H. Symington Company, Baltimore, Md.

Ackley Brake Company, New York, N. Y., has received an order for 60 brakes, with ratchet handles and staffs complete, from Japan.

Consolidated Car Heating Company, New York, N. Y., has received an order to equip 140 cars of the Hudson & Manhattan Railroad with heaters.

Canadian Car & Foundry Company, Montreal, Can., has opened a New York office at 30 Church Street, in charge of Robert E. Powers, sales manager.

Pittsburgh Spring & Steel Company, Pittsburgh, Pa., has moved its New York office, which is in charge of J. N. Brownrigg, to suite 2038, Grand Central Terminal.

Wonham, Sanger & Bates, New York, report receipt of an order from the Union Railway, New York, N. Y., for 200 H-B Universal Life Guards to equip the 100 new convertible cars just ordered.

T. H. Price has resigned from the Horace L. Winslow Company and accepted a position as representative in the railway lubrication department of the Indian Refining Company, Cincinnati, Ohio.

Charles J. Nash, chief mechanical engineer of the W. H. Miner Company, has been appointed representative of the Westinghouse Air Brake Company, with headquarters in the Railway Exchange Building, Chicago.

Whipple Supply Company, New York, N. Y., has secured a two-year contract for gears and pinions from the Syracuse (N. Y.) Rapid Transit Railway and the Oneida Railway. The contract was taken on the usual mileage guarantee.

J. G. Bower has been appointed assistant manager of sales, western district, of the Pressed Steel Car Company and the Western Steel Car & Foundry Company, to take effect Jan. 1, 1911, with offices at the Old Colony Building, Chicago, Ill.

Jeffrey Manufacturing Company, Columbus, Ohio, has opened a new office in the Fourth National Bank Building, Atlanta, Ga., with D. C. Rose, formerly with the Dodge Manufacturing Company, as manager. This is the tenth branch office of the company to be opened in the United States.

Northern Engineering Works, Detroit, Mich., have installed two 25-ton Northern cranes, one in the machine shop and the other in the power station of the Detroit River Tunnel Company. The works have also installed several similar cranes in the buildings of the Pennsylvania Railroad & Terminal Company, New York.

Curtain Supply Company, Chicago, Ill., has received an order from the United Railroads, San Francisco, Cal., to supply curtains with No. 88 ring fixtures and Rex rollers for 80 cars. This company has also received an order from the Boston Elevated Railway to supply curtains with No. 48 ring fixtures and Rex rollers for 50 cars.

W. N. Matthews & Brother, St. Louis, have just appointed Victor L. Crawford their eastern representative, with headquarters in New York. Mr. Crawford has been connected with W. N. Matthews & Brother for the past five years in the Western territory. His office in New York will be in the Glackner Building, 227 Fulton Street.

Morgan Engineering Company, Alliance, Ohio, has erected a large sign in Alliance with the letters hung perpendicularly down the side of a 400-ft. smokestack, which spells the name "Morgan." The letters, which are about eight feet square, have a total of 310 electric bulbs. It is estimated that it will cost the company between $800 and $1,000 a year to operate the sign.

Sterling Fare Register Company, Newark, N. J., has been incorporated in New Jersey to manufacture and sell the Sterling fare registers. The company has received an exclusive license from the Sterling-Meaker Company, under all its register and fittings, patents and rights. The officers of the Sterling-Meaker Company are the same as those of the Sterling Fare Register Company.

Vonnegut Hardware Company, Indianapolis, Ind., will operate its machinery department after Jan. 1, 1911, under the name of the Vonnegut Machinery Company, as a branch of the Vonnegut Hardware Company. The Vonnegut Machinery Company will be located at 43 and 45 South Meridian Street. The sales organization will include Anton Vonnegut, Charles Rassman and C. B. Williamson.

Automatic Appliance Company, Boston, Mass., has purchased the entire business, good-will and accounts of the Couch & Seeley Company and the Transfer Issuing Machine Company. The business of these companies will be carried on by the Automatic Appliance Company at the office and factory formerly occupied by the Couch & Seeley Company, 162-172 Columbus Avenue, Boston. The officers of the Automatic Appliance Company are: F. H. Whitman, president; Adams D. Claflin, treasurer, and R. L. Whitman, general manager.

Richardson-Phenix Company, Milwaukee, Wis., a consolidation of the Sight Feed Oil Pump Company, Milwaukee, and the Phenix Lubricator Company, Chicago, has completed the equipment of its new factory in Milwaukee, which it claims is the largest plant in the country devoted exclusively to the manufacture of lubricating devices. The new company will manufacture the well known Richardson and Phenix mechanical lubricators, individual oiling systems, power plant oil filters and general appliances for lubrication, for cylinder lubrication and also for machinery.

Union Switch & Signal Company, Pittsburgh, Pa., held a stockholders' meeting on Dec. 14, 1910, to act upon the recommendation of the directors to increase the capital stock. It was voted to increase the capital stock from $2,500,000 to $5,000,000 by the issue of $2,500,000 of common stock. At a meeting of the directors, held on the same day, the usual dividend of 3 per cent quarterly was declared on the preferred and the common stock, payable on Jan. 10, 1911, to the stockholders of record Dec. 31, 1910. The directors also decided to issue to stockholders of record Dec. 31, 1910, a special stock dividend of 60 per cent of their holdings. Of the remaining 40 per cent of the new stock authorized by the shareholders 20 per cent, or 10,000 shares (par value $50 each), will be offered to the shareholders at $75 per share. The remainder of the new stock authorized will be held in the treasury.

ADVERTISING LITERATURE

International Register Company, Chicago, Ill., has recently issued bulletin No. 80, illustrating and describing the Heeren enameled badges.

Allis-Chalmers Company, Milwaukee, Wis., has reprinted bulletin No. 1501, in which Allis-Chalmers Reliance belted Corliss engines are described.

Dean Bros. Steam Pump Works, Indianapolis, Ind., have issued Catalog No. 83, which illustrates and describes special boiler feed and pressure pumps.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued several new circulars, covering various types of battery instruments.

Bonney-Vehslage Tool Company, New York, N. Y., has issued a 36-page catalog in which its various styles of ticket punches are listed and illustrated.

Osborn Manufacturing Company, Cleveland, Ohio, has issued catalog No. 131, in which, among other things, all kinds of car and track brushes and brooms manufactured by it are illustrated and described.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued two catalog sheets on ball bearings and their correct use. Sheet No. 62 is devoted to bearing mountings, without shoulders on shaft, and sheet No. 63 to ball-bearing mounting and demounting tools.

American Bank Note Company, New York, has issued an ingenious calendar for 1911. It is printed in the form of four excursion tickets good for passage "from the order desk to the American Bank Note Company." Each ticket contains three coupons, or monthly calendars, making the 12 for the year.

Babcock & Wilcox Company, New York, N. Y., has issued in pamphlet form, with notes by Lieut.-Commander H. C. Dinger, U. S. N., the report of a test of Babcock & Wilcox boilers for the U. S. battleships Wyoming and Arkansas. This report was reprinted from the November, 1910, issue of the *Journal of the American Society of Naval Engineers.*

General Electric Company, Schenectady, N. Y., has issued bulletins Nos. 4662A, 4790, 4794. In bulletin No. 4662A Thomson watthour meters for switchboard service are described, and bulletin No. 4790 describes electric mine locomotives. In bulletin No. 4794 the 1200-volt d.c. interurban lines of the Milwaukee Electric Railway & Light Company are described.

NEW PUBLICATIONS

Proceedings of Master Car Builders' Association. Published by the association, J. W. Taylor, secretary, Chicago, Ill., 1910. Cloth, 850 pages.

This volume contains the full report of the 1910 convention of the Master Car Builders' Association, which is now in the forty-fourth year of its existence. Among the committee reports of special interest to electric railway officers which were presented at this convention were the following: Train brake and signal equipment; tests of brake shoes; coupler and draft equipment; car wheels; classification of cars; mounting pressures for wheels and axles and lumber specifications. The standards and recommended practices of the association are reprinted in full, including the 63 double-page illustrated plates to which the text refers.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVI. NEW YORK, SATURDAY, DECEMBER 31, 1910 No. 27

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
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CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1015 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, DECEMBER 31, 1910.

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Our Index of Articles

This number completes the current volume of this paper and, according to our regular practice, includes the index to the articles in the volume. The publication of the index this week involved the entry of the articles in this issue after the paper was prepared for the press, and hence some additional expense and delay. But the advantages to the subscriber of having each volume complete with its index before he begins to receive copies of papers belonging to the next volume are so manifest as to outweigh any disadvantages which the plan entails. A year ago we published in the editorial columns of this paper a statement of the principles upon which our indexes are compiled and briefly our views of the best method of using these indexes, so that the subject need not be further discussed here. We shall only say that we have paid the same amount of careful attention to the preparation of the index in this volume as in previous volumes and have attempted to make it even more nearly perfect. Most of the articles appear under several entries, and to long articles in which various topics are discussed have been given as many as 10 and even 20 entries. While every developing art is accompanied by changes in the nomenclature of the apparatus used, instances of this kind have been few this year, and, so far as this index is concerned, have not occurred in any of the important key words. We believe that the more any good index of periodical literature is used the more its value becomes apparent, and we trust that this will be the case with the indexes of the ELECTRIC RAILWAY JOURNAL.

Traffic Suggestions from Conductors

On railways which cannot afford an inspection system it is a good practice to invite the conductors to submit suggestions for improvements in the transportation service. The fact that no one is more familiar than the conductor with the traffic conditions over his particular route was brought out very forcibly by these means a short time ago in a small Eastern city where the railway offered prizes for available ideas. As the result of the suggestions turned in it was found possible to reduce the amount of transfer business and dead mileage in directions which had never occurred to the company. Furthermore, several pertinent changes in car equipment were also suggested and accepted, among them being the introduction of automatic ventilators. The company is highly gratified with its experiment, for by this call for co-operation it has saved in one year far more than the total amount of the prizes, it has become better acquainted with the wants and habits of its patrons and it has made all of its employees feel that they too can have more than a perfunctory share in the operation and maintenance of the transportation service.

The Outstanding Securities

Conservative views upon one point of importance and seriousness have been expressed by several of those who have given their opinions at the hearings before the Railroad Securities Commission appointed by President Taft to investigate the practicability of federal supervision of securities issued by common carriers. They have said that the jurisdiction of any governmental regulating body that may be appointed to pass upon such securities should be limited absolutely to new securities. We assume that the natural effect of this policy would be to give some sanction to outstanding issues of stocks and bonds. This would reassure the holders of outstanding securities. Of course, no governmental authority could be expected to bestow integrity in flagrant cases of over-capitalization and excessive impairment of the capital value of the physical and non-physical property. But the assurance of fair protection to holders of outstanding securities issued for value would contribute a confidence which is needed in the general situation. The question of the fate of outstanding securities is one that affects not only thousands of individual holders throughout the country, but also many thousands whose combined savings, now in the custody of banks and insurance companies, are invested at rates of interest that are so small as to imply perfect safety of the principal.

Public Service Companies and Policies

Mr. McCarter's address in Boston on "The Electric Railway Situation," published in abstract in our issue this week, is a common-sense view of a much debated question. He did not attempt to justify the policies which had actuated all public utility companies in the past, but saw equal, if not greater, danger to the public from too wide a swing of the pendulum in the other direction. Mr. McCarter might have added that the basis for the extreme reactions which are often experienced in popular movements of the kind which he was discussing is usually to be found in politics. Fortunately, the responsibility of office usually sobers even radical men, and this fact has constituted the salvation of democratic government. It has given rise on numerous occasions to the complaint that post-election performance has not "squared" with pre-election promise. This is a serious charge, but it is not so serious as one that an elected officer, with all the facts before him, did not administer the law in accordance with his oath of office and did not do his duty to the whole people, instead of simply pleasing the portion which elected him. Mr. McCarter approved of intrusting to commissions the supervision of public utility corporations to prevent overcapitalization and secure proper service, but he did not think they should administer the properties, as some have attempted to do. Finally, he scored the policy which would exclude from all activity in civic and political matters the responsible officials of public utility corporations. Modern business life is essentially corporate, and the corporations necessarily attract the services of many, if not most, of the men with broad executive ability and experience. These men may be railroad men or they may be managing the affairs of some other public service property or other corporation. But they are primarily citizens, and to disregard their suggestions upon subjects to which they have given the study of a lifetime, on the ground that they were disqualified because of their connections, would be a public misfortune, as well as an individual injustice.

SAFETY ON INTERURBAN RAILWAYS

During the past two weeks three conferences between State officials and interurban railway managers have been held in the Middle West to discuss means for improving the safety of operation of high-speed electric roads. The recommendations of the railroad commissions and the governors of Indiana and Illinois were strikingly similar. The officials of each State desire a higher standard for interurban trainmen and the immediate adoption of the block system on all lines of heavy traffic. A serious problem confronts the interurban railways in this territory. Governor Marshall of Indiana intimated that drastic legislation might be necessary, in order to bring about the improvements in operating methods which were deemed absolutely essential, although it was admitted that these improvements, if carried out as they should be, might be so costly that there would be little or nothing left from the operating income of many roads to pay interest on the bonds, to say nothing of dividends on the stock. A gratifying spirit of harmony and unity of purpose, however, was manifested on both sides at these conferences, and they promise to result in some immediate reforms which will go far toward improving the safety of interurban railway travel.

At both the Indiana and the Illinois conferences emphasis was laid on the importance of investigating the character and previous record of applicants for positions as interurban motormen and conductors. It was claimed that by means of forged letters of recommendation or by other dishonest practices men discharged by one company have obtained employment from another company. The Indiana commission in its report cited the record of the conductor who was partly responsible for one of the most serious interurban wrecks last fall. In his application he stated that he was a farmer and had never before been employed by a railroad. This was false, as he had been employed at one time as a telegraph operator on a steam railroad. It was agreed at the Illinois conference that it would be desirable to have the Legislature enlarge the powers of the railroad commission so as to give the latter authority to require the use of a uniform employment application blank, with provision for suitable penalties for making false statements thereon. In this connection it may be interesting to state that the penal code of the State of New York imposes a severe penalty for making false statements on application blanks. Section 570 of the code reads as follows: "A person who obtains employment or appointment to any office or place of trust by color of or aid of any false or forged letter of recommendation or of any false statement in writing as to his name, residence, previous employment or qualifications * * * is guilty of a misdemeanor and is liable to imprisonment for not more than one year or a fine of not more than $500, or both." Many electric railway companies in the State print this extract from the penal code at the top of the application blank as a warning and require all applicants to swear under oath before a notary that the answers made by them are true and correct. Unfortunately the statute is seldom enforced with severe punishment, and we doubt if all the railway companies to which protection is thus afforded under the law are much, if any, more immune from the vicious "floaters" than companies in other States which have no statute of this kind. Any man who is caught in the act of lying about his previous experience ought to be punished to the limit of the law, and the law should be adequate to protect both the company and

the public in this respect, for both are vitally concerned in it.

The training of interurban trainmen is quite as important as their selection. The Indiana commission has recommended that at least one year's experience in steam or interurban train service should be required of all interurban motormen, but the recommendation of the Illinois commission is merely that motormen "should have as long experience as possible." It is coming to be generally conceded that men with previous steam railroad experience in the majority of instances do not make the best interurban trainmen. The lower scale of wages paid to interurban employees does not serve to attract good men from steam railroad service, and those men who do change have to be taught as much as a green man. Furthermore, they are inclined to be careless and do not seem to appreciate the responsibility of having charge of a car. Interurban railway service provides no adequate training school for prospective motormen employed in subordinate positions on the cars. An idle man in the motorman's cab would only be a menace. The Illinois Traction System has inaugurated a plan of putting new men to work as brakemen on freight trains, but there are only a few interurban roads which at the present time are operating enough freight cars or passenger trailers to afford an opportunity for training a sufficient number of men to take the place of those motormen who leave the service each year. This phase of the difficult problem of training employees cannot be solved by legislation. No rigid rules of this kind can be laid down that will provide absolute safeguards against the employment of incompetent men and at the same time will not bar competent and efficient men from the service.

Both commissions recommend that motormen shall not be required to assist in handling baggage and express on and off the cars. This imposes a hardship on the railway companies and is of doubtful value as a safety precaution. This recommendation was defended on the ground that during the time spent at station stops the motorman should have an opportunity of consulting his train orders and timetables. If the train orders are placed in a clip in the front of the motorman's cab where they can be seen at all times, there should be no necessity for the motorman to consult them at station stops.

The Indiana officials seem to be a little hazy in their own minds as to their recommendation that all lines be equipped promptly with block signals where the volume of traffic requires it. In the discussion at the first conference the Governor and the commissioners seemed willing to accept an installation of dispatcher's signals as fulfilling this requirement. It is possible, of course, to operate dispatcher's signals substantially as a manual block system, but this would require the crew of every car to stop at every signal and report to the dispatcher before resetting the signal arm to the clear position. Dispatcher's signals are very useful and efficient safeguards, but they do not take the place of a block signal system. We believe that it would be most unwise for the State officials to order or recommend the equipment of all lines with dispatcher's signals at this time. If they make no specific recommendations regarding the type of signals to be installed, but officially approve the dispatcher's signals, which are the cheapest and the quickest to install, the result will be that a large number of roads will proceed to equip their lines with these signals in order to comply with the recommendations of the commissioners. They may then have all the work to do over again in a few years, if there are further developments in an automatic, a controlled-manual or a staff signal system adapted for electric railways.

ENCOURAGING INVENTION AND EXTRAORDINARY INSPECTION

Occasions arise in almost every line of manufacture or repair where an employee makes an invention or improvement of such limited applicability that it is not worth being patented for general sale. This is especially true of many so-called electric railway shop "kinks." Eventually a "kink" may save hundreds and even thousands of dollars for the inventor's employer, yet it may have but a very small field for commercial exploitation. Thus, in one instance, a railway effected a very large saving because one of its men discovered a method for replacing broken glass in its special cash boxes without dismantling the entire receptacle; in a second instance accidents were averted by an improvement in the vestibule door and step mechanism; in a third instance appreciable economies were obtained by devising a home-made electric welding system.

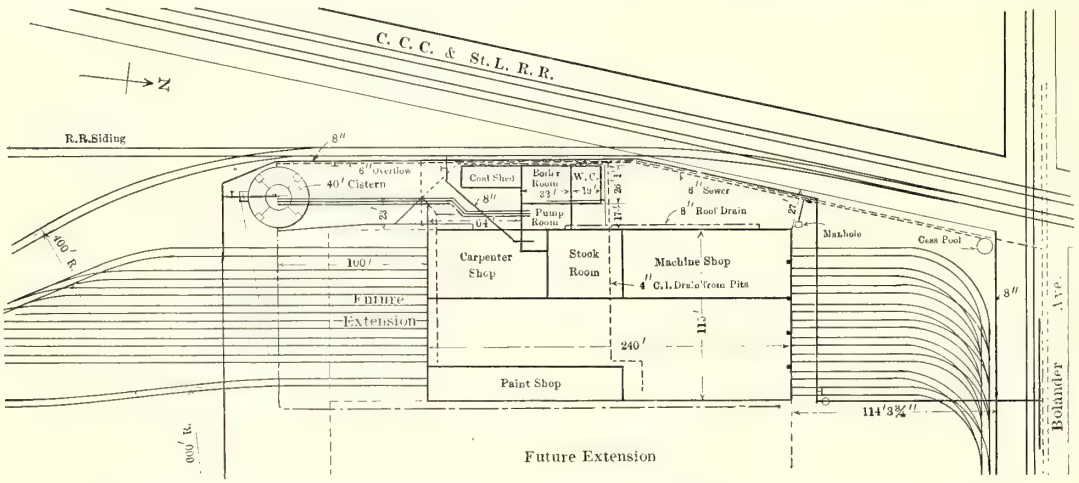
Employers often want to recognize merit of this kind, but it is not easy to determine the best way to do so. The promotion of the inventor is not always the best solution to the problem, because he often lacks executive ability. Nor is it generally satisfactory to pay lump sums for individual inventions, first, because their value is often problematical, and, second, because the inventor is likely to have a very exaggerated idea of the importance of his improvement. Possibly the best method is to have a suggestion box with a permanent standing offer of two or three prizes for the best ideas, whether they are adopted or not. This policy will keep the men constantly reminded of the fact that they, too, are considered a thinking part of the organization. It should not be forgotten that in many men the love of praise is even stronger than the love of money. In one highly efficient shop organization many betterments have come from the rank and file not through promises of financial award but on account of the department manager's policy to give ample public credit to every man who suggests an improvement. As a matter of fact, nothing will discourage the workmen more than a narrow-minded shop superintendent who takes all credit to himself for the original thoughts of his subordinates.

A subject cognate to that of encouraging invention is that of inducing electric car inspectors to look for those minute defects which if not observed in time might lead to disaster on the very next trip of the car. Such close examinations are not essential in city operation, but they are an absolute necessity for high-speed lines on which even a weakened gear case may lead to a costly derailment. Thus a service of extraordinary merit is performed by the inspector who notes, say, a hair-line crack in an axle or truck frame, despite the condition that the equipment is covered with dirt and must be examined in poorly lighted pits. One large railway has made it a practice to give an extra day's pay for every revelation of incipient danger. On other roads it might prove more satisfactory to have a publicity system and combine it with occasional prizes for extraordinary records. By doing this they would follow the custom of some lines which reward track gangs and station agents for superior maintenance.

REINFORCED CONCRETE CAR HOUSE, DAYTON, OHIO

BY J. C. LATHROP, SUPERINTENDENT OF CONSTRUCTION, PEOPLE'S RAILWAY COMPANY

During the summer of 1910 a car house was built at Dayton, Ohio, for the People's Railway Company, a subsidiary company of the American Railways Company, of Philadelphia. Reinforced concrete was used throughout except for the walls and partitions, which were respectively brick and tile. This structure is located in the southwestern part of the city, in a rapidly growing district called Edgemont. The north end of the building faces Bolander Avenue, and the westerly side is parallel with the tracks of the Big Four Railroad. The general layout of this building, together with the tracks, railroad switch, etc., is shown on the accompanying plan.



Dayton Car House—General Plan of Property and Divisions of the Main Building

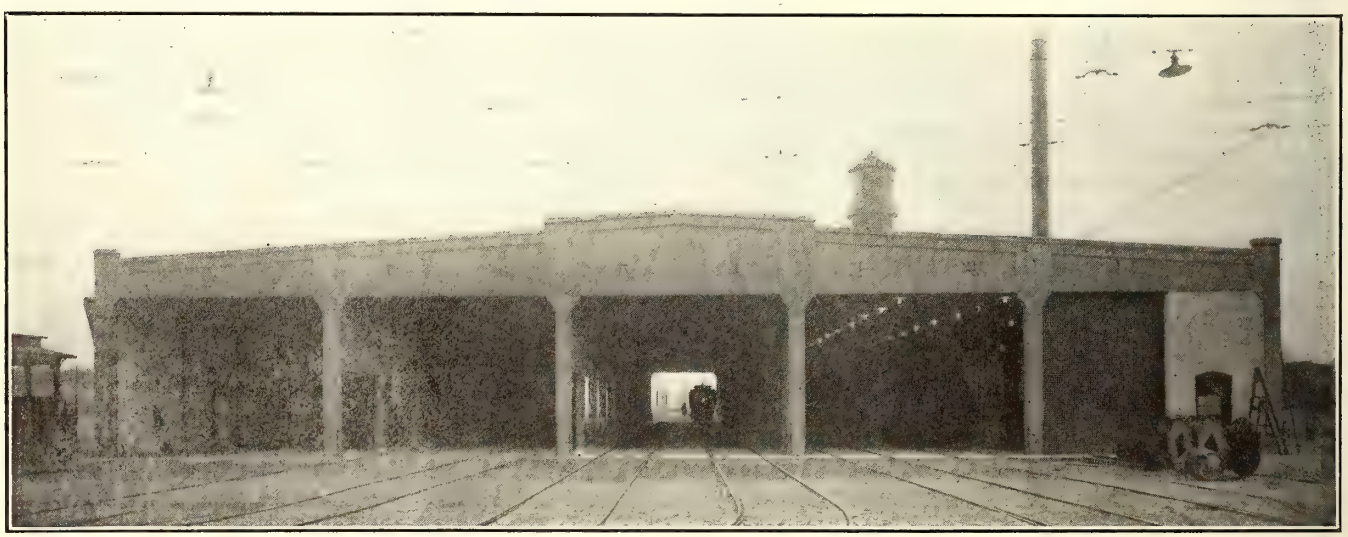
The car house proper is 115 ft. wide (or five 23-ft. bays) x 240 ft. long (or 15 16-ft. bays), with an additional wing on the west side, containing a pump room with basement, carmen's room, boiler house, toilet room and coal shed. The portion now built is only a part of a future building layout including an office building and quarters for various departments. A switch from Bolander Avenue connects with a ladder track on the company's property at the northeast corner of the car house lot. From this ladder nine tracks enter the car house. Seven of these tracks pass clear through the building and join another ladder in the south part of the lot. An eighth track, which is an extension of the main outbound track to the south, enters the paint shop from the south.

The general contract for this structure, together with the plumbing and drainage system and cistern, was let on Dec. 31, 1909, but owing to the extremely severe weather during the following two months, ground was not broken until Feb. 28, 1910. The contract was taken with a time limit of 90 working days for the completion of the entire work. However, on account of numerous unforeseen conditions and delays, the work was not completed until a total of 140 working days had elapsed.

The present layout provides temporary quarters for a machine shop, carpenter shop, paint shop and storeroom, which occupy about one-half of the total space. Pits were installed throughout, as it is expected that this portion of the building will be used for car storage at some future time. At present certain portions are planked over.

MACHINE SHOP TOOLS AND WHEEL SET REPLACER

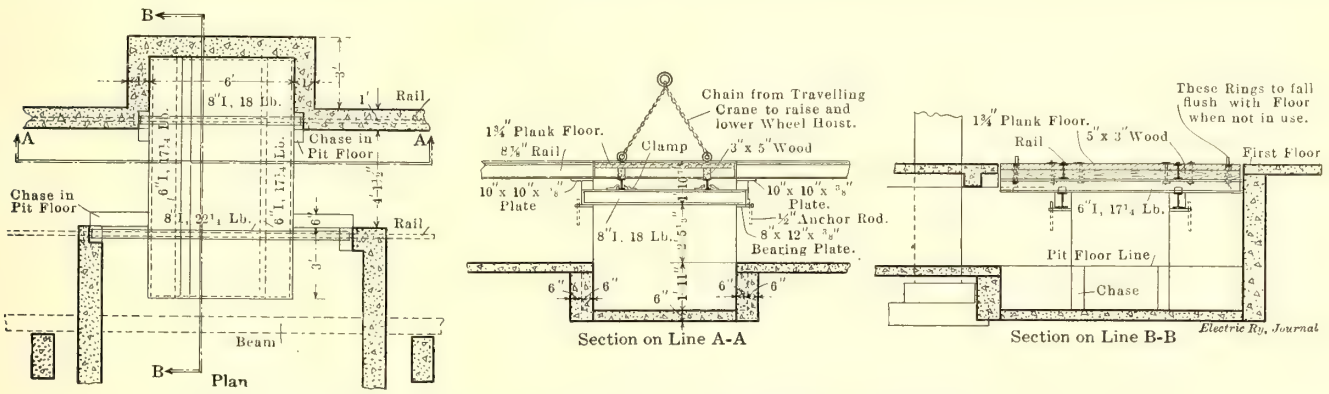
The machine shop is equipped with two 8-ton cranes, each having two 4-ton hoists. One hoist on one of these cranes is electrically operated, while the other three are operated by hand. The shop is also equipped with a large two-center lathe, for turning both axles and wheels, a wheel borer, a 400-ton wheel press and a drill, which are all operated by individual motors. In addition to the foregoing a smaller lathe has been installed, together with other minor machinery, all of which is operated by a line shaft belt connected to a single motor. An additional device has been installed to remove and replace a set of wheels quickly. This contrivance consists of a platform on the main floor level 6 ft. long in the direction of the track run and 3 ft. on either side of the track, a total width of about 10 ft. 8½ in. Sections of rail 6 ft. long cut from the track, together with the platform, are supported on two I-beams crossing the pits, which in turn rest on two other beams directly under the rails. The ends of these lower beams normally rest on concrete walls, while the beams are hung from the cross beams in such a manner that they can be pulled into the pit clear of their supports when they are relieved of the weight of the platform by the cranes. A pit is provided below the level of the pit floor so that the platform level can be dropped flush with the pit floor level.



Dayton Car House—Front View, Showing Four Storage Bays and One Shop Bay

The sequence of operation with the wheel set replacer is as follows: A car is placed so that one pair of wheels rest on

the platform. Then while one crane lifts the end of the car body, together with the truck, the platform is drawn up slightly by means of the two hoists on the other crane. Then the two I-beams directly beneath the rail are pulled out by hand, toward the center of the pit, and the whole platform together with the set of wheels to be removed is dropped until the platform level is down to the pit level. The wheels are then rolled to one side and the new ones placed on the platform and hoisted



Dayton Car House—Details of Apparatus for Transferring Wheel Sets from and to Cars

to place. This entire operation can be completed by two men in about 30 minutes. It is thought that this method is original with the writer.

The street railway in Springfield, about 25 miles northeast of Dayton, is owned by the American Railways Company and it is intended that this machine shop will handle all the work for that company as well as that for the People's Railway Company.

CARPENTER SHOP

The carpenter shop is equipped with a facer, a circular saw, a band saw and a mortiser, all operated by individual motors. It also has several ordinary work benches. Both the machine shop and the carpenter shop are excellently lighted, each having five skylights, while each 16-ft. bay on the west side of the building has a large double window 8 ft. x 11 ft.

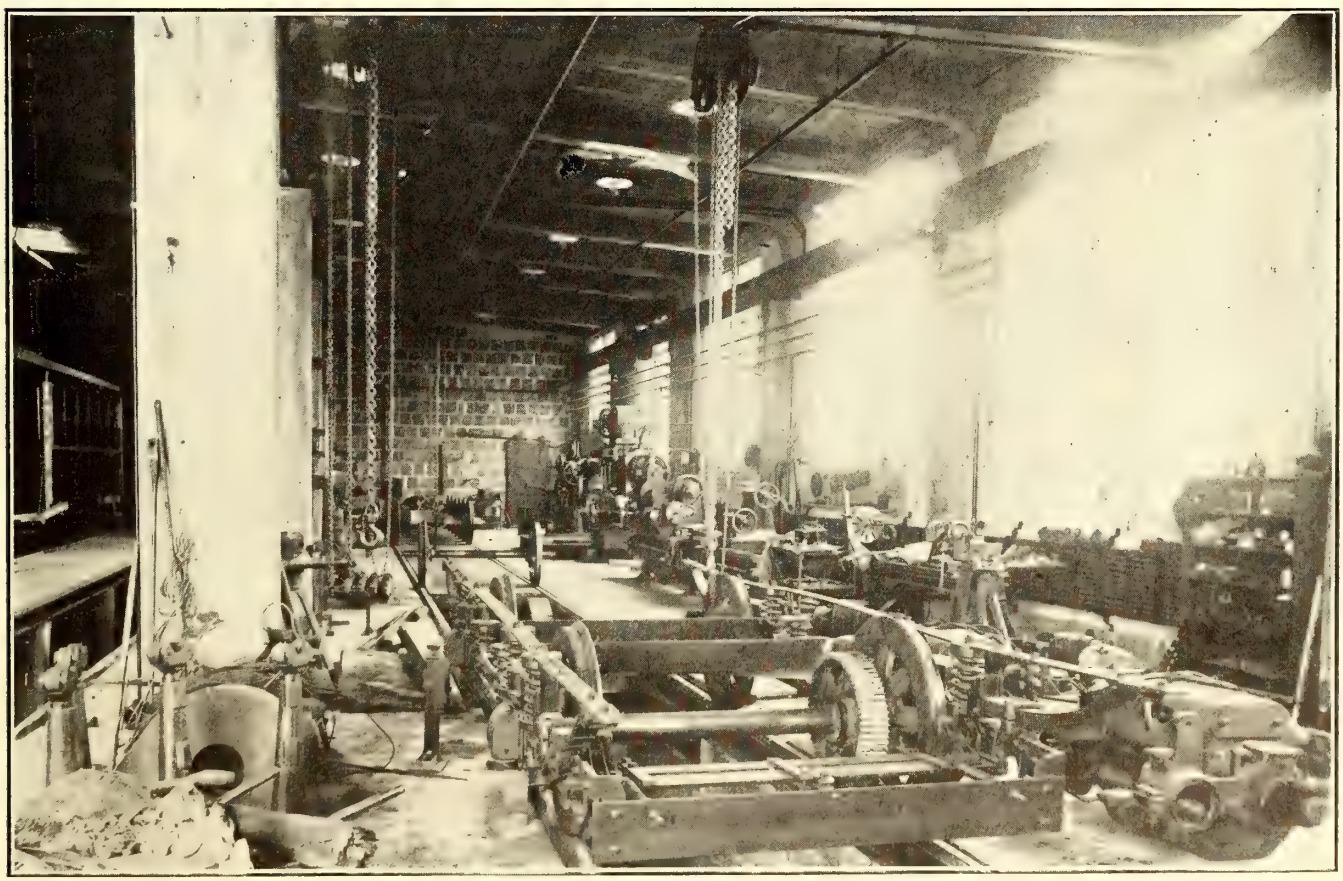
PAINT SHOP

The paint shop in the southeast corner of the building is so arranged that the cars may be run into it from the north on either side of the two easterly tracks, or from the south on a single track, one rail of which is common to one of the two other tracks. Three cars can be accommodated at one time. This shop is lighted by seven skylights and by a large double window in each bay on the easterly side.

DETAILS OF CONCRETE CONSTRUCTION

The column foundations, wall foundations and floors on earth were composed of concrete in the proportion of 1-3-5. All the reinforced concrete work throughout the building was composed of concrete in the proportion of 1-2-4. A considerable portion of the gravel and sand excavated from the pits, cistern foundations, etc., was found suitable for concrete. Crescent Portland cement was used throughout.

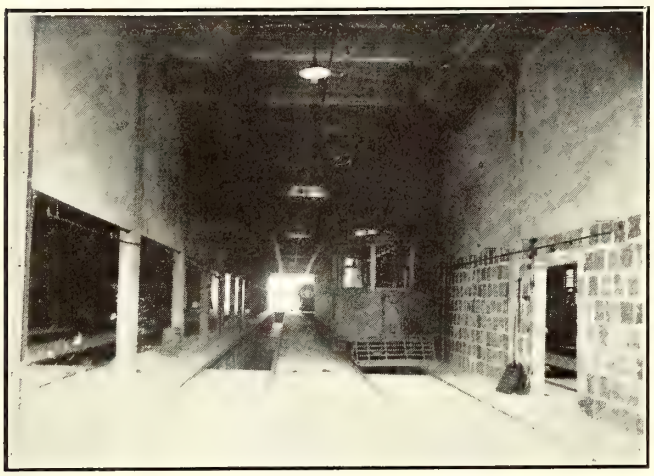
Reinforced concrete piers on 12-ft. centers support the



Dayton Car House—The Truck and Machine Shop

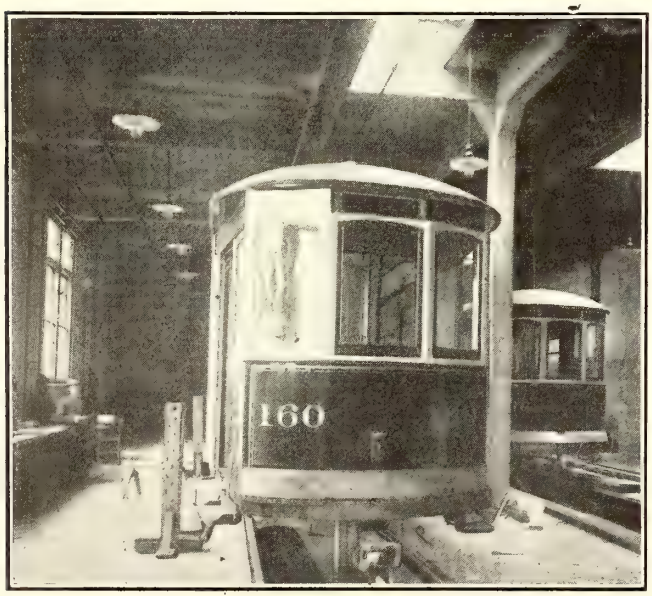
dummy or floor between the tracks and the 9-in. center-bearing girder rails which form the track. This leaves the pit space free the entire length of the pit. Reinforced concrete steps at both ends of the pits lead from the first floor level to the pit floor. The rails are of the Kansas City center-bearing type to prevent water entering the pits from the space between the tracks.

The concrete columns in the interior of the building are 12 in. square, reinforced by four 7/8-in. rods, while the front and rear columns are 14 in. x 18 in. The roof girders running lon-



Dayton Car House—Type of Curtain Wall and Partition

gitudinally have a 16-ft. span and are 12 in. wide x 20 in. deep. The beams which run across the building have a 23-ft. span and are 8 in. wide x 16½ in. deep. This system of beams and girders supports a 4-in. roof slab which is covered with a five-ply Barrett roof. The columns on the east side of the building have large reinforced concrete brackets projecting about 8 ft. to provide for the future extension shown in the plan drawing on page 1264, to which previous reference has been made.



Dayton Car House—Roof Construction and Lighting

The fire partitions, which run longitudinally with the building between the columns, from the roof to within 8 ft. 6 in. of the first floor, were made of Trussit metal with 1¼ in. of cement plaster. This partition is hung by ⅜-in. rods from the roof girders and is protected at the bottom by a 3-in. channel. All temporary partitions around the shops and the storeroom are constructed of 8-in. hard-burned tile. All openings in these walls are provided with standard fire doors. The front and rear of the building and the north end of the paint shop are equipped with Kinnear rolling steel doors.

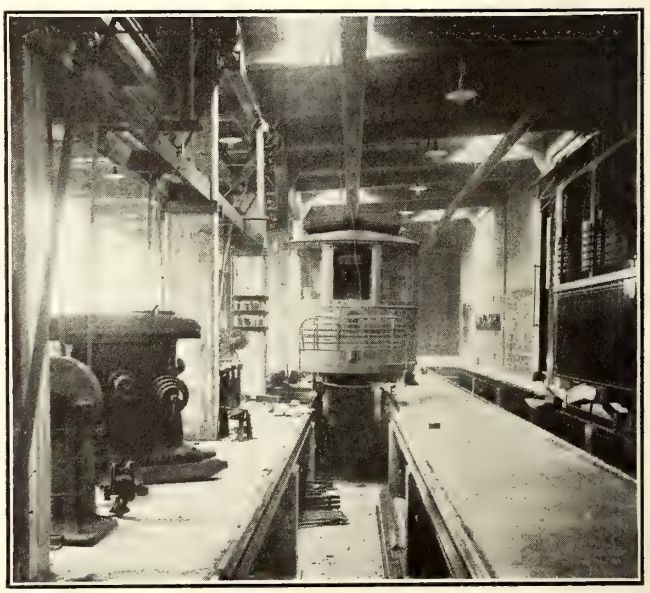
Sand lime bricks laid in cement mortar were used for all exterior walls. These bricks, being light gray in color, harmonize nicely with the exposed concrete, such as columns, parapet walls, etc. The wing on the west side follows in general the same details used in the car house proper, the boiler room, however, standing much higher than the rest of the building. A coal shed adjoins the boiler room and has concrete walls about 6 ft. high, above which is a light steel frame to support the corrugated iron roof.

PLUMBING AND DRAINAGE SYSTEM

The extensive drainage system which has been provided may be divided into three parts: first, roof drainage, which is carried to the cistern through 8-in. terra cotta drain tile; second, drainage to a storm sewer in Bolander Avenue, consisting of overflow from the cistern, drainage from the car-washing floor in the south part of the barn adjoining the paint shop, drainage from the pits and surface drainage from trenches at either end of the building; third, a 6-in. terra cotta sanitary sewer from the toilet room to the cesspool.

The main drain to the storm sewer is a 12-in. terra cotta pipe, with 12-in. connections from the trenches at the ends of the building and 6-in. connections to the cistern overflow and the pit drain. The cesspool is 10 ft. 8 in. in diameter x 12 ft. deep. The lower portion is built of dry rubble while the upper 4 ft. 6 in. is concrete, the whole covered with an 8-in. concrete roof. A cast-iron manhole is provided for inspection. The cesspool is located near the front of the lot so that the 6-in. sewer need not be disturbed but continued past the cesspool and connected to a sanitary sewer in case one should be built. All drain pipes inside the building are made of cast iron.

Water for all service connections is taken directly from the elevated tank riser through a 3-in. main which is also used for filling the tank from either the cistern or well. As the soft water is not suitable for drinking, a 1-in. connection has been made with the city water main leading to taps in the shops and car men's room. This can also be connected with the service lines when desired. Hot water is provided for the toilet room and car washing by a heater separate from the main boiler.



Dayton Car House—In the Overhauling Section

Two 1¼-in. hose bibbs and six ¾-in. hose bibbs are provided for car-washing purposes.

LIGHTING

The interior is well lighted in the daytime by means of 26 reinforced concrete skylights 4 ft. x 7 ft. 4 in., while the shops have in addition large double windows 8 ft. wide x 11 ft. high. At night the machine shop and carpenter shop are each lighted by 20 100-watt tungsten lamps placed just below the ceiling; the remainder of the building has similar lamps at frequent intervals. All wires are carried just below the roof slab in

conduits, which were inserted in the beams and girders during construction.

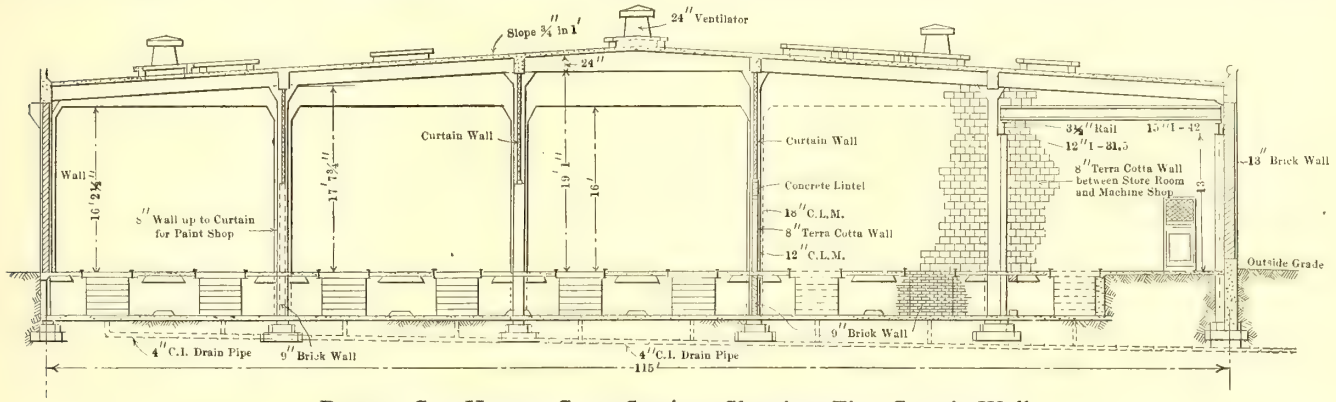
HEATING SYSTEM

A hot water heating system has been installed to provide a temperature of 65 deg. Fahr., in the car house proper and 70 deg. in the paint shop in zero weather. For the heating plant an old 300-hp Berry boiler was taken from the power house of the People's Railway Company and installed in this boiler room. The Hunt industrial railway installed from the coal shed to the boiler room was provided with one car for hauling the coal and another for removing the ashes. Five-inch supply and return mains have been provided across the building, both of which are concealed in pipe ducts below the pit floor. These mains supply hot water to coils of 1¼-in. pipe on both sides of the pit underneath the dummies or floors between the tracks, and to overhead coils in the lavatory, basement of pumproom, etc.; also to numerous cast-iron radiators in the shops and car men's room. The heating plan is shown on page 1268.

In designing the building, provision was made for a space between the floor of the dummy and the top of the piers which support the tracks, so that these 1¼-in. coils could be run the full length of the building. The water is forced through the entire system by means of a centrifugal circulating pump with direct motor drive. The pump is located in the pump-room basement. Suitable thermometers are supplied on both the supply and return mains together with other necessary automatic apparatus.

FIRE PROTECTION

Although the building itself is thoroughly fireproof in all respects, the contents are very inflammable, hence it was considered desirable to have the utmost possible security against fire. From the fire protection standpoint, the essential feature of the design (as developed by A. S. Kibbe, then chief engineer of the American Railways Company, in consultation with Everett U. Crosby, of the Independence Inspection Bureau), consists in a floor space unbroken save by necessary pits and columns while each bay is segregated for fire protection by the longitudinal curtain walls extending from the roof down to the proper level at which the aisle sprinklers should be placed as shown in the cross-section on this page. The aisle sprinklers are spaced at 8-ft. intervals along the bottoms of these curtains and the ceiling sprinklers at 8-ft. intervals along the center line of each bay between the two tracks in that bay. It is believed that these sprinklers would confine a fire to the car in which it originated or, at the worst, to the two cars which might be standing side by side in the same bay at the time.

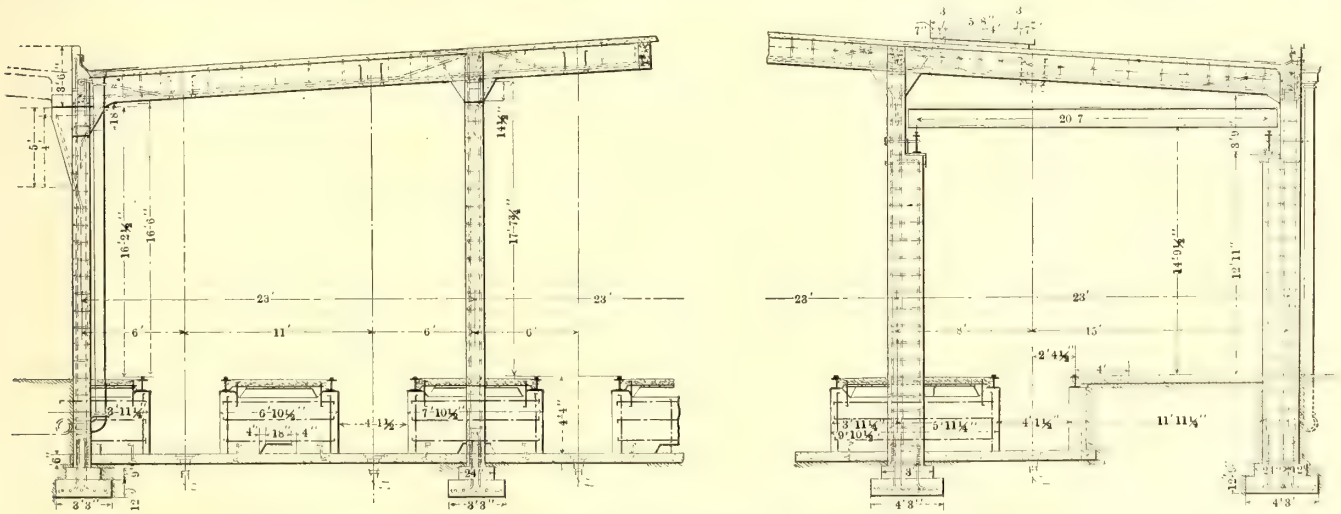


Dayton Car House—Cross-Section, Showing Fire Curtain Walls

The sprinkler system is installed in four separate lines, leading respectively to pit sprinklers, aisle sprinklers, roof sprinklers and hose stand pipes. It includes a cistern holding 92,000 gal., an elevated steel tank holding 50,000 gal. and a 6-in. connection to the city water main. The elevated tank is so arranged that it can be filled by the company service pump, with a capacity of 200 gal. per minute, from the cistern, the well or the city main.

The sprinkling system proper throughout the building consists of the Grinnell dry-pipe, automatic sprinklers. There are 514 sprinklers in all on three dry-pipe valves, 168 of which are in the pits about 1 ft. under the floors between the tracks; 136 are aisle sprinklers and 210 are roof sprinklers. In addition there are 10 hose standpipes each provided with 2½-in. hose angle valves, which are located as follows: One in the paint shop, one in the carpenter shop, two in the storeroom, two in the machine shop and four in the car house proper. These 10 hose standpipes are all connected with one dry-pipe valve.

All the four valves are located in the valve pit adjoining the pump-room basement. Three of them are shown in one of the half-tones on page 1269. The air compressor, which is used to keep the proper air pressure on these valves and in

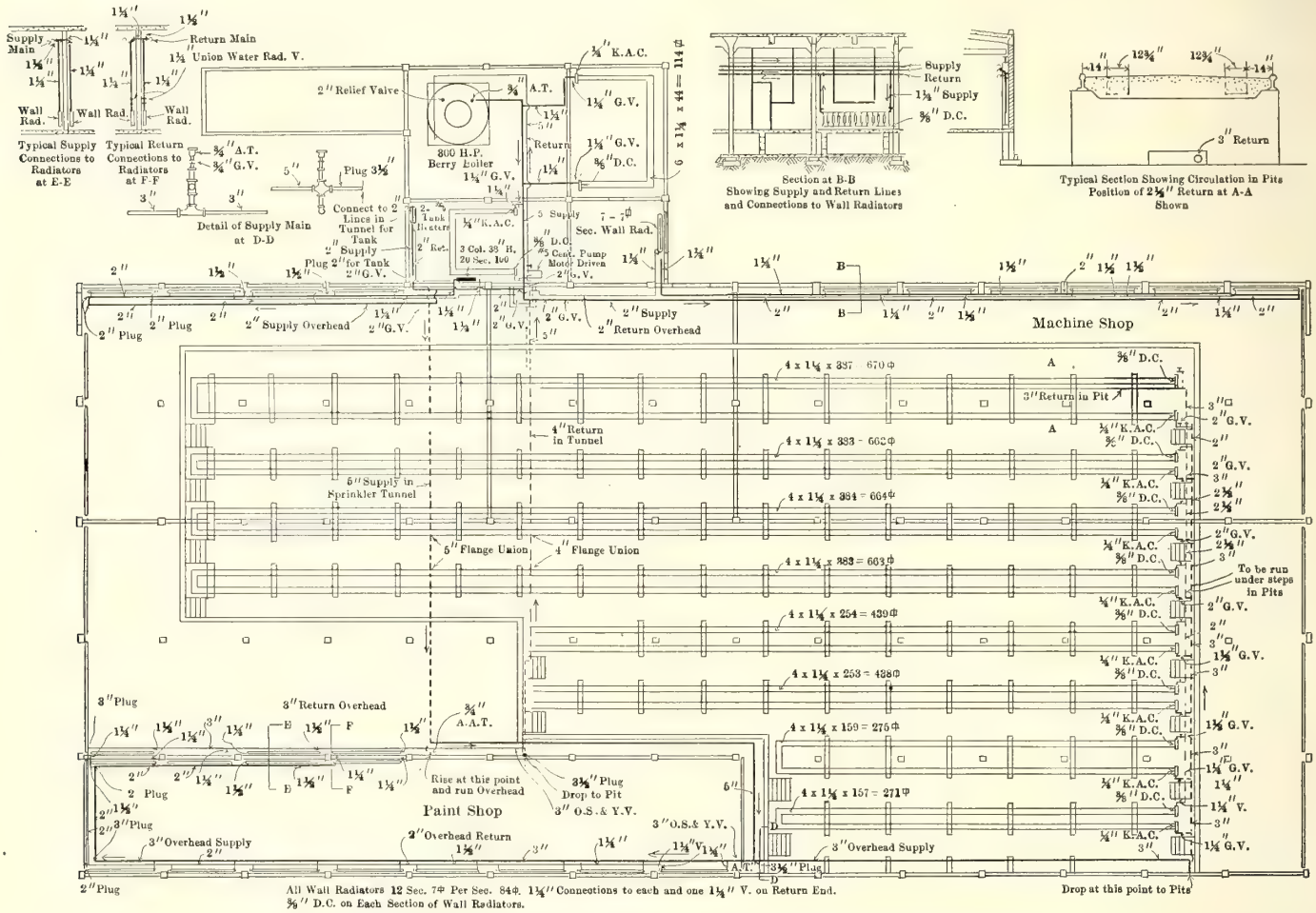


Dayton Car House—Concrete Reinforcement and Details of Pit Construction

the various pipes, is located in the pump-room basement. This compressor also supplies compressed air where needed in the shop, as valves are connected with a common air tank by suitable reducing valves.

A further system of 8-in. outside mains has been installed on the north, east and south sides of the building, connected

Four mains from the four valves are carried under the pit floor from the valve pit across the building. Near the center of the building connections are made to these mains, running to the north in another pipe duct. An additional duct has been provided in part of the building and blank flanges are attached to the main at this point to provide for a future exten-



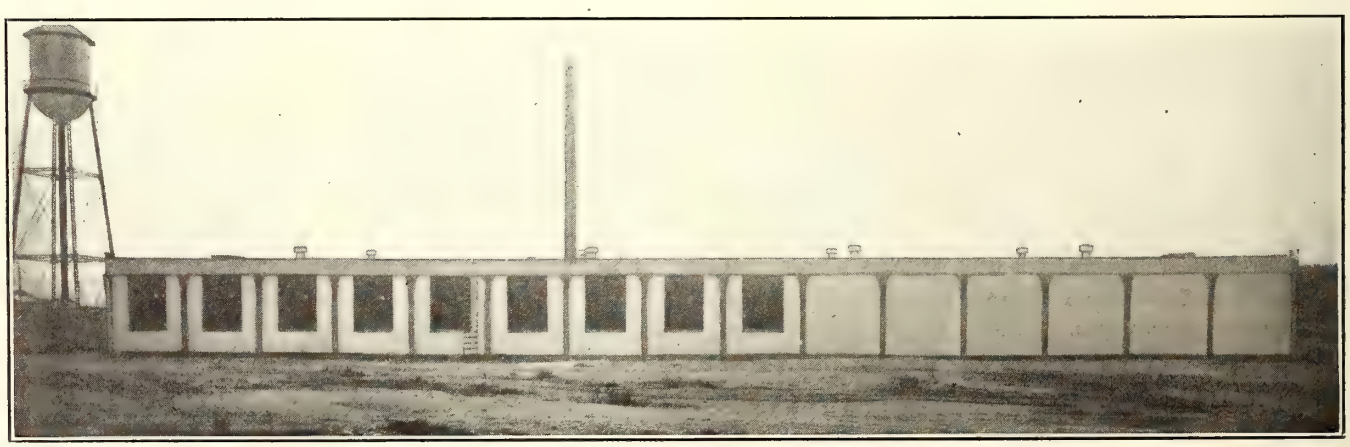
Dayton Car House—General Plan and Details of the Heating System

at one end by a 6-in. main to the city water main on Bolander Avenue. A hydrant has been provided at this point, which is intended to be opened only in case of fire because another 1-in. connection to the city main has been provided for service use.

The other end of the 8-in. main is connected directly to the 8-in. riser to the steel tank and an 8-in. lateral from this main also leads directly to the valves. Thus the entire system is at all times under a pressure due to the elevation of the water in the tank and in case of an emergency it can be further connected with the city main, where a pressure up to 80 lb. or 90 lb. may be expected.

sion of the building in a southerly direction. Plugged flanges are provided at the end of the main on the east side of the paint shop to provide for future extension easterly.

A complete outfit of signals, such as high and low tank alarm, sprinkler alarm, low pressure alarms for the four valves,

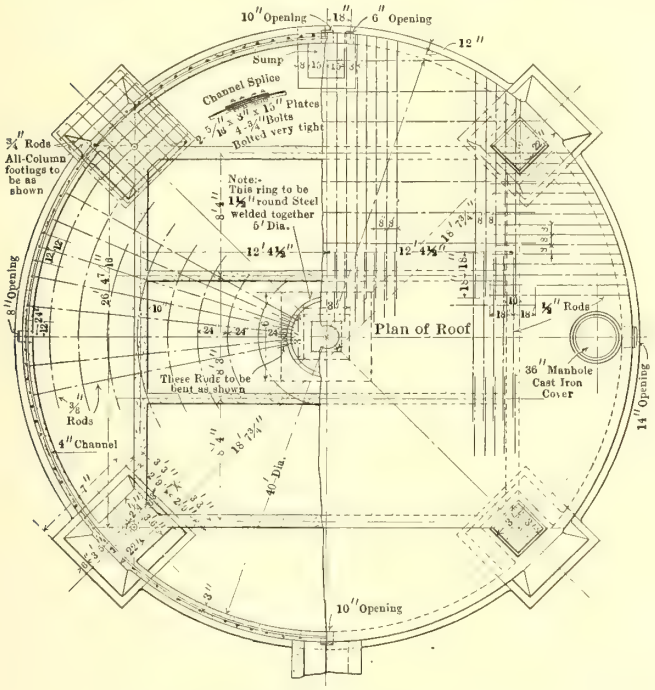


Dayton Car House—Side View of Building, with Fire Tank at the Left

etc., have been located on the west wall of the storeroom as there is always an attendant at that place.

The cistern is 40 ft. in diameter and 13 ft. deep with an 8-in. concrete bottom on earth. This bottom had to be reinforced on account of the possibility of back-water. The outside walls are 6 in. thick and the roof is a 4-in. slab supported by four

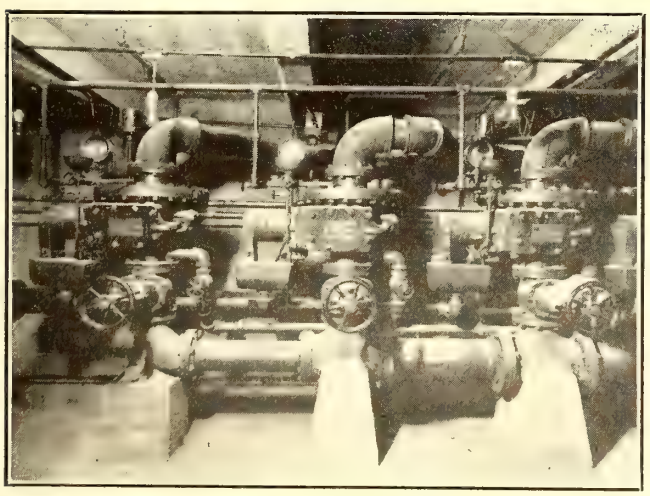
concrete beams, two of which frame directly into the footing piers, while the two center beams frame into girders which in turn frame into the same piers. These four piers in the outside of the walls of the cistern are on 26-ft. 5-in. centers and support the legs of a 75-ft. tower, which carries a 50,000 gal. steel tank. This tank is cylindrical in form with spherical



Dayton Car House—Plan and Foundation Reinforcement of Water Tank

bottom and is 18 ft. in diameter x 29 ft. high. The top of the tank is 104 ft. above the pier.

The tower legs are each made up of two 12-in. channels. The metal in the tank proper is ¼ in. thick, except the roof, which is ⅛ in. thick. The 8-in. tank riser is provided with a three-ply frostproof casing from top to bottom. In freezing weather the water in the tank is warmed by direct circulation



Dayton Car House—Three of the Four Sprinkler System Valves

through a heating coil connected with the hot water heating system.

ENGINEERING

The work described was carried out under the general direction of A. S. Kibbe, while chief engineer of the American Railways Company, and under the direct supervision of George C. Towle and the writer, respectively general manager and superintendent of construction for the People's Railway Company. The Hall-Cronan Company, of Dayton, was the general contractor for the building including the cistern and cesspool with sewer and drains. The General Fire Extinguisher Company, of Providence, R. I., was the contractor for the heating and sprinkling system, except the steel tank, which was furnished and erected by the Chicago Bridge & Iron Works.

HINTS FROM A CONDUCTOR

The Philadelphia Rapid Transit Company has inaugurated the practice of placing in its cars a card on which are printed the car number, run number, conductor's number and the motorman's number. This card therefore gives at a glance all the information which an inspector or other interested person may desire in regard to identifying a car and its crew.

It is the custom of many railway companies to detail inspectors, or even conductors, to direct passengers during the rush hours at crowded places. The men assigned for this duty usually wear their ordinary badges. It would be a good idea if these men were to wear a badge with the word "Information," so that those in need of direction would have less hesitation in asking for guidance.

When at Columbus recently the writer was much impressed with the advantages of the horizontal wheel brake as compared with the ordinary spindle type. With the spindle in use the motorman on getting into a tight place must first bring the brake into a certain position and then turn it all the way back and "saw" to stop the car. A wheel brake allows the motorman immediately to tighten the brake with both hands, thus saving considerable time. The wheel brake also saves the motorman's strength and prevents injuries to any one from flying spindles.

The Yonkers Railroad Company and the Union Railway Company, operating in the northern suburbs of New York City, use in the motorman's vestibule a curtain hung from the center of the roof between the motorman's window and the front door. When the motorman reaches the end of his run he gives this curtain a slight pull and it folds up out of the way without further trouble. When he starts the car he simply has to pull it down. The style of curtain generally used is hung on the inside of the front door. If it is not set when the car starts the conductor has to worm his way to the front and attach both halves of the curtain to each window. Furthermore, if the catch comes off the front door the curtains will pull open. An important advantage of the new curtain is that the passengers and conductor can see the motorman at all times, if he should happen to fall.

It is not a very good argument for the value of car advertising in general that many companies which let out their car advertising space do not reserve enough room for their own announcements. It certainly appears unwise to spend a large sum of money advertising in other mediums when much less money is received for the valuable space inside the car. Car advertisements by the railway company itself necessarily attract more attention than announcements carried in the newspapers, because they seem posted in an official place. It would also be a good thing if the railway companies exercised a little more censorship over the character of the advertisements carried. In one instance a department store stated in its advertisement that customers would avoid paying car fare if they patronized that particular store. An advertisement of this kind certainly is not of benefit to the railway company which carries it.

In Toronto a motorman is called a "motor-driver"; a special car is called a "private" car. This company charges 10 cents between 1 a. m. and 5 a. m.

The Public Service Railway, Newark, N. J., last Fourth of July, adopted an ingenious arrangement to sweep firecrackers from the track by tying cloths on to the front of the fenders. This is a valuable hint in places where mischievous boys on the Fourth of July have a habit of throwing lighted crackers in front of an approaching car.

NEW THROUGH ROUTES AND JOINT RATES PROPOSED IN NEW YORK

The question of through routes and joint rates between the Fifty-ninth Street line of the Central Park, North & East River Railroad and the Queensboro Bridge shuttle line of the South Shore Traction Company was considered informally before Commissioner Bassett, of the Public Service Commission of the First District of New York, on Dec. 8, 1910. A. C. Hume, secretary of the South Shore Traction Company, appeared for that company and Charles Mellen, of Strong & Mellen, counsel, appeared for the Central Park, North & East River Railroad.

Commissioner Bassett said that the hearing was held to permit the commission to ascertain as nearly as possible the wishes and status of the persons interested. A private session had been held by the representatives of the companies in an effort to bring about a 5-cent joint rate, but there had been a disagreement.

Mr. Hume said that the South Shore Traction Company was willing to establish a joint rate provided it could be arranged on a basis that would not involve a loss to the company. He was not prepared to say what rate should be established, but it should be borne in mind that the distance which the South Shore Traction Company carried passengers was 1 2/3 miles, while the average ride on the Central Park, North & East River Railroad of passengers crossing the bridge would be only a few blocks.

Mr. Mellen said that the nature of the service of the South Shore Traction Company differed materially from that of the Central Park, North & East River Railroad. The South Shore Traction Company operated a shuttle service over the Queensboro Bridge at a fare of 5 cents for a round trip. The company's cars were not compelled to stop en route for passengers, whereas the Central Park, North & East River Railroad had to stop its cars about every block and the company was subject to difficulties of traffic and traffic regulations which were unknown to the South Shore Company. The round trip of the cars of the South Shore Company was a little more than 2 miles. On the other hand, the Central Park, North & East River Railroad would have to operate cars over the bridge or to Tenth Avenue, New York, and the round trip from Tenth Avenue and Fifty-fourth Street to the bridge was 3½ miles and from Tenth Avenue and Fifty-ninth Street 3 1-3 miles. The Central Park, North & East River Railroad operated cars not only through Fifty-ninth Street, but down the West Side of the city and the East Side.

Commissioner Bassett said it had been suggested that the through route and joint rate should apply only to cars to the bridge and across the city to the Hudson River and that there should be no compulsory north and south fares on the line.

Mr. Mellen said:

"The Central Park, North & East River Railroad has been operating its road, since it received it back into its own hands, under very great financial difficulties, and has been rendering the best service in its power with its financial ability and is gradually making both ends meet. It is not in condition to have any new and untried problems put upon it. A system of transfers is to be inaugurated between the Metropolitan Street Railway and the Central Park, North & East River Railroad. This is an experiment. Neither the company nor the commission knows what the result is going to be. Why put upon the Central Park, North & East River Railroad something else before some result at least can be ascertained from the exchange of transfers with the Metropolitan Street Railway? There are many lines contributory to the crosstown line that will enjoy these transfer profits, and people living in any section of the city will also enjoy them. The company is also trying to arrange with the New York & Queens County Railway, which operates over the bridge and in Queens County, for a system of transfers."

Mr. Mellen did not know what the probable joint rate between the Central Park, North & East River Railroad and the New York & Queens County Railway would be. It would be unfair to make an extensive system like the Central Park, North & East River Railroad transfer with a shuttle service upon a basis such as would have to be made to meet the demands in this case. He requested that the company should have an opportunity to present further views on the case.

Mr. Mellen also said: "When this franchise was granted to the Central Park, North & East River Railroad it was granted not to be extended to the Borough of Queens. The franchise is confined to the old City of New York, and was granted to accommodate the new residents of the old City of New York. Through the growth of the city, by an act of the Legislature, there is thrown into the old City of New York an immense territory that was never in the minds of the Legislature when the franchise was granted or in the minds of the grantees of this franchise when they took it, and there is an equitable consideration that lies at the bottom of any question of this kind."

In concluding the hearing Commissioner Bassett said:

"The Legislature of New York has put these joint rate and through route provisions into effect to cover exactly such cases as these. If that was not so, you would not find them in the law. Now, when you speak as you do, you as much as say that the Legislature has done something that it should not do. You know that the commission cannot do anything that would be confiscatory. You are protected in that both by the State courts and the United States courts."

HEARINGS ON NEW YORK COMMUTATION RATES

Hearings in reference to the increased commutation rates of the New York, New Haven & Hartford Railroad and the New York Central & Hudson River Railroad were held by the New York Public Service Commission, Second District, in the Metropolitan Building, New York, on Dec. 7 and 8. Testimony was offered by officials of both of the companies concerned.

L. F. Vosburgh, general passenger agent of the New York Central road, presented, in the course of his testimony, a statement of the commutation business on the three divisions of the company for the calendar year 1904 and for the fiscal years ended July 31, 1907 and 1910, respectively. This statement is published on page 1271. It is based on ticket sales in the commutation zone and on the mileage of commutation trains. In the computation the number of usable rides on commutation tickets was taken.

Another statement presented by Mr. Vosburgh, published on page 1271, shows the average commutation rates per mile on various roads in different parts of the country. The averages are based on the totals of allowable rides.

Mr. Vosburgh testified that the commutation rates were raised on account of the higher cost of operation and the increase in wages. The company felt that the commuters should bear their share of the increased expense. In September, 1910, as compared with September, 1909, there was a decrease of $21.000 in gross revenues from commuters and of 1463 in the total number of commutation tickets sold. The loss was greater in family tickets than in the monthly tickets. Of the total population the following percentages bought commutation tickets on the New York Central road in the communities named: Yonkers, 1 1-3 per cent; Peekskill, 1 1-3 per cent; Mount Vernon, 2 per cent; White Plains, 8 per cent.

Testimony was offered by S. C. Fleetwood, auditor of the New Haven road, to show that the annual cost of operation by electricity between New York and Stamford was $1,119,998 as compared with $510,278 by steam. The tollage charges paid by the New Haven road to the New York Central road for the use of the Grand Central terminal aggregated $685,063 for regular passengers and $157,412 for commuters.

E. D. Robbins, general counsel for the New Haven road, said that the company was compelled to pay 14 cents for every passenger carried into the Grand Central terminal. Even with the

advanced rates, the company lost money, as the revenue from each commuter averaged about 11 cents. The hearing affecting the New York Central road will be resumed on Jan. 4. Further testimony in the New Haven case will be given on Jan. 18.

AVERAGE COMMUTATION RATES PER MILE

(Presented by L. F. Vosburgh, General Passenger Agent, New York Central Lines)

Roads	Monthly	Family
Pennsylvania	$0.00695	$0.01700
Lackawanna	.00580	.01482
Erie—All divisions	.00544	.01491
Greenwood Lake	.00606	.01556
N. J. and N. Y.	.00555	.01569
N. Y., S. & W.	.00530	.01382
Main line	.00501	.01460
New Haven	.00518	.01613
Long Island	.00517	.01839
Central New Jersey	.00510	.01491
New York Central—All divisions	.00508	.01697
Putnam division	.00523	.01589
Harlem division	.00514	.01794
Hudson division	.00489	.01617
West Shore	.00490	.01694
Pennsylvania (from Philadelphia)	.00795	
Boston & Albany (from Boston)	.00812	*.01490
Chicago & Northwestern (from Chicago)	.00547	*.01123
Chicago, Burlington & Quincy (from Chicago)	.00546	*.01118

*25 ride tickets.

STATEMENT OF COMMUTATION BUSINESS

(Presented by L. F. Vosburgh, General Passenger Agent, New York Central Lines)

	Division	Year ended Dec. 31, 1904	Year ended July 31, 1907	Year ended July 31, 1910
Total commutation passengers. (Actual)	Hudson	2,282,980	2,359,185	1,947,211
	Harlem	2,579,821	3,094,657	3,125,300
	Putnam	720,148	705,819	520,400
Total passengers — all classes	Hudson	3,997,272	4,192,628	3,210,948
	Harlem	3,890,672	4,844,672	4,673,916
Percentage of commutation passengers	Hudson	.57113	.56270	.60645
	Harlem	.66308	.63877	.66867
Total commutation earnings. (Actual)	Hudson	$226,128.08	$250,574.27	$244,893.45
	Harlem	236,658.45	303,267.63	353,885.60
	Putnam	41,898.27	43,901.39	40,126.75
Total train earnings—all classes	Hudson	710,043.76	705,486.28	646,424.64
	Harlem	545,507.92	739,940.64	805,830.20
Percentage of commutation earnings	Hudson	.31847	.35518	.37886
	Harlem	.43383	.40985	.43916
Average earnings per train mile on com. tickets	Hudson	.3074	.3742	.4007
	Harlem	.3228	.4236	.5144
Average earnings per train mile—all classes	Hudson	.9652	1.0534	1.0578
	Harlem	.7441	1.0346	1.1714
Percentage of earnings per train mile derived from commutation tickets	Hudson	.3785	.3552	.3788
	Harlem	.4338	.4094	.4391
Total miles commutation passengers. (Actual)	Hudson	51,233,060	58,610,420	51,241,910
	Harlem	48,868,612	63,979,996	65,621,976
	Putnam	6,572,757	7,338,294	6,648,859
Average miles per commutation passenger. (Actual)	Hudson	22.44	24.84	26.31
	Harlem	18.94	20.67	21.00
	Putnam	9.13	10.40	12.78
Average rate per ride on commutation tickets. (Actual)	Hudson	$0.09904	$0.10621	$0.12576
	Harlem	$0.09173	$0.09800	$0.11323
	Putnam	$0.05818	$0.06220	$0.07711

The figures compiled from estimated train earning statements for the periods ended Dec. 31, 1904, July 31, 1907, and July 31, 1910, were based on months of January, May and September of each year except period ended July 31, 1911, which was based on January, August and October, 1910.

The figures opposite captions that are marked "actual" are the actual figures compiled from commutation sales for the first three periods; the latter period ended July 31, 1911, is based on the actual figures for July, August and September on the ratio of these months to the corresponding months in 1909.

In preparing this statement only commutation trains, New York to Peekskill, inclusive, were taken on the Hudson division and New York to Brewster, inclusive, on the Harlem division, and the figures were used in connection with the actual commutation sales (except period ended July 31, 1910, as noted above) from all stations from which commutation tickets are on sale to New York. This would tend to show an increase in "percentage of commutation earnings."

The figures that we have shown for the Putnam division are actual except for the period July 31, 1911. We could not make any estimate of commutation business on the Putnam division for captions not marked "actual" as we have no way of compiling the earnings of the rapid transit trains.

CHANGE IN SUBWAY SERVICE ORDER IN NEW YORK

The hearings before Commissioner Eustis, of the Public Service Commission of the First District of New York, on the question of service on the subway lines of the Interborough Rapid Transit Company, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Dec. 10, 1910, page 1152, and Dec. 17, 1910, page 1206, were concluded on Dec. 13, 1910. The commission on Dec. 23, 1910, adopted an order, effective on Dec. 28, 1910, increasing the service in the subway by the requirement that enough trains shall be operated at times when the traffic allows the operation of anything less than the maximum equipment to provide seats for all passengers riding in every quarter of an hour instead of every half hour, as at present. The headway of one minute and forty-eight seconds during rush hours remains in effect.

TRAIN STAFF ON THE WARREN & BRISTOL RAILROAD

On Dec. 11 the Warren & Bristol Railroad, Providence, R. I., which is operated as an electric division by the New York, New Haven & Hartford, put into service two electric train staff instruments for controlling the movements of trains over the single-track branch connecting Warren and Bristol, a distance of 4.1 miles. The system has worked smoothly from the start. The train staff instruments, which are of the standard high-speed type, with permissive attachment, made by the Union Switch & Signal Company, are placed in the telegraph offices at Franklin Street, Bristol, and at Warren, and the stretch of track between these two stations constitutes a single block. The telegraph operators on duty at these stations are in charge of the operation of the staff instruments.

The two staff instruments are electrically interconnected, and it is impossible to operate one without the knowledge and co-operation of the operator in charge of the other. Only one staff can be removed from either instrument at a time. When a staff has been withdrawn another cannot be removed from either instrument until the staff first taken out has been replaced in the same instrument from which it was removed or in the instrument at the opposite end of the block. An absolute block system for ordinary operation is therefore effected.

The permissive staff attachment permits trains to follow each other in the same direction through the block at short intervals when required. Under the winter timetable now in effect this method of operation is used only occasionally, but with the summer timetable it is expected that heavy traffic will require frequent operation of trains in more than one section. In no case is the permissive staff used except when directed by the train dispatcher, who issues a "19" train order to all motormen and conductors of following trains to run through the block, as they would with a caution card, expecting to overtake the train ahead.

The permissive staff consists of a steel rod and 12 removable rings, any one of which authorizes a train to pass through the section between Warren and Franklin Street, Bristol. If less than 12 trains are to follow each other, the last one takes all the remaining rings and steel rod. When all the rings and rod are received at the opposite end of the block section the operator reassembles them into the complete permissive staff, which he then places in the permissive attachment of the instrument in his office, and locks it therein by the absolute staff already in the lock of this attachment. By so doing he releases the absolute staff, which he restores to the absolute instrument in the regular manner, after which a movement can be made with an absolute staff in either direction or with the permissive staff in the opposite direction from which it was last used. There is only one permissive staff, and before the permissive system can again be used in the same direction the permissive staff must be forwarded to the opposite end of the block section as a whole by the first train moving in that direction and replaced in the permissive staff instrument. The entire permissive staff confers the same rights as an absolute staff.

The following instructions to trainmen regarding the use of the staff system have been incorporated in the working timetable:

"1. No train will run in either direction between Warren and Franklin Street, Bristol, unless the engineman (or motorman) has in his possession a train staff (or ring taken from the permissive staff), which must be retained so long as his train or any portion of it is in the block. The possession of a staff (or ring taken from the permissive staff) is authority for the engineman (or motorman) and conductor to proceed regardless of opposing trains, provided conductor's signal has been given and train order and other signals are in proceed position, where such signals exist.

"2. The conductor is the only person authorized to receive or deliver the staff (or ring of permissive staff) from or to operator in charge. When no conductor in charge of train, engineman (or motorman) will receive and deliver it. Upon arrival of train at opposite end of block, the staff (or per-

missive ring) must be delivered to the operator in charge, but not until entire train has cleared the block.

"3. When a train parts or doubles, the staff (or permissive ring) must be retained by the engineman (or motorman) until the entire train is clear of the block.

"4. A staff (or permissive ring) must not be transferred from one train to another, but must be delivered to the operator in accordance with these instructions."

MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Dec. 22, with President Hile in the chair. After the usual dinner President Hile called upon R. S. Goff, general manager of the Massachusetts Electric Companies, who congratulated the club upon its prosperity and influence in the industry, conveying to it the greetings of the Massachusetts Street Railway Association as president of the latter organization. Mr. Goff touched briefly upon the hospitality of the State of New Jersey to corporations and emphasized the fact that in Massachusetts less freedom is permitted, this tending to embarrass enterprise somewhat more than in New Jersey. He noted that the latter State, however, has recently taken steps to bring its public utilities under closer supervision. Concluding, he stated that the influence of the club extends much farther than its members suppose, rising each year to a climax in the annual banquet, which is attended by men of distinction from many parts of the United States and Canada. The club commands the respect of public authorities and by combining opportunity with brains has reached a high stage of success in the eyes of the transportation industry.

President W. A. Bancroft, of the Boston Elevated Railway Company, expressed his pleasure at being a guest of the club and referred briefly to the extent of public utility control which prevails in Massachusetts. The supervision of the State is decidedly ample, to say the least, there. It is not carried on in such a manner as to be injurious but tends to be fully as detailed as is desirable. General Bancroft spoke briefly of the temper of the popular mind, which seems inclined to prohibit anyone from making profits out of a public service business, and pointed out that service must be rendered the public under all conditions, whether the transportation systems are privately owned and supported by adequate fares from users, or whether supported by the government or run on a socialistic basis—"which nobody pays for!" Fares must be sufficient to pay operating expenses, fixed charges and other necessary disbursements if capital is to be induced to enter the field.

The principal address of the evening was on "The Electric Railway Situation," by Thomas N. McCarter, president of the Public Service Corporation of New Jersey. Mr. McCarter expressed his pleasure in having been able to take a part of the Western trip of a year ago under the auspices of the Massachusetts Street Railway Association and then delivered the address which is published in abstract in the following columns.

On Wednesday, Dec. 28, there was held at the New York headquarters of the National Electric Light Association another meeting of the joint committee on overhead construction to which reference was made on page 1186 of the Electric Railway Journal for Dec. 17. This committee is composed of representatives of the National Electric Light Association, American Railway Engineering & Maintenance of Way Association and the American Electric Railway Engineering Association. Considerable work was done at the meeting on Dec. 28, but it will be necessary to hold at least one more session before a report is submitted to the organizations mentioned.

THE ELECTRIC RAILWAY SITUATION*

BY THOMAS N. M'CARTER, PRESIDENT PUBLIC SERVICE CORPORATION OF NEW JERSEY

During the last five or six years we have discussed among ourselves most of the problems which have so unexpectedly arisen to confront us, but while these conferences are always useful, I think the time is coming when the benefit to ourselves will not be so great, because we will be threshing old straw. What we really need is the larger audience of the public to present our views to. This, I confess, is very difficult to get. I do not succeed in doing it, and I do not think companies through the country generally get their side of the case well before the public. That of itself is one of the problems we have to meet. But, at the expense of a little repetition, I am going to rehearse the situation as I view it.

I was reading, coming over on the train this afternoon, the life of Charles I of England, written by Abbott. He shows, with remarkable clarity, the point of view with which this King ascended the throne, namely, that he ruled by divine right and that he owed his seat on the throne of England and Scotland to no one but to God. Parliament was a mere creature to do his will, with no rights whatever of its own. Abbott shows how, through his life, this became the ruling passion, and how Parliament, on the other hand, was daily and yearly made more restive under the yoke of monarchy as administered by Charles I. He further shows how Charles, in his constant fight with Parliament, prorogued Parliament for good, as he thought, and began to raise money which had formerly been raised by Parliament, by granting monopolies; monopolies of soap, of sugar and of all those things then as now the necessities of life. The recipients of these monopolies paid him large sums of money, which he had failed to get from the ordinary sources of taxation, without the aid of Parliament. Having received these monopolies, they began to give forth inferior qualities of merchandise and to exact enormous prices for it.

I am talking to an audience of men who are united upon one side of a question, yet we must look the other in the face. It struck me that in a very modified form, in a very restricted form (for I do not wish to have my statement misconstrued in this manner), that was what, perhaps, things were drifting toward a bit here a few years ago. The essential rights that Englishmen held dear were the right of personal liberty, the right of private property and the succession to the throne. When this country was established its founders brought with them the right of personal liberty, and gained it through the war of the Revolution in better form than the Englishman had ever acquired it, and the right of private property. We discarded the right of kings to rule and established our government on an entirely different basis. In the course of time public means of transportation and quasi-public services (like furnishing light and gas) came to be necessities, and privileges were granted by the sovereign power of the State for their development. Isn't it perhaps a little true that, speaking broadly, the character of those rights was mistaken a little by the people who received them? Isn't it true that many of our predecessors, or even some of us, if we have been in the business long enough, failed to appreciate that these rights did not belong to that class of private property rights which we brought with us from the old country, but that they combined a species of public and private right? Is it not true that in the early days things were done as a result of this—not perhaps in Massachusetts as much as elsewhere in the country, because you have long been subject to commission or other control here—that things were done which tended to arouse the public?

In the time of Charles I the fight went on, Charles growing more bitter in his way, and Parliament growing more bitter in its way; the king fighting for his prerogatives and Parlia-

*Abstract of address presented at meeting of the New England Street Railway Club, Boston, December 22.

ment fighting for its prerogatives, until the king lost his prerogatives and lost his head.

With us the usurpations were of a different character; printing presses had been grinding out securities represented by no value; neglect of duty toward the public; poor service, accompanied by lack of sense of obligation, all of which (carrying the simile back) tended to arouse the public as it was aroused in the time of which I have been speaking. The public began to draw the halter. But here, differing from the situation to which I have been adverting, no revolution was needed because the companies themselves were the first to respond to the popular clamor, to put their houses in order, to adopt plans different from those which had been in operation before and to conduct themselves in altogether a seemly manner, or as much so as the nature of their business would permit. This has been the course of public service business, to my knowledge, for the last eight or ten years. I can say, from a familiarity with the business in its various branches through this country during that time, that I believe the business now to be honestly conducted, with the twofold purpose which the managers of these corporations have a right to have, of giving the public proper service and of expecting a fair return on their investment and on their property.

As is usual in such cases when there is a public uprising, the reaction goes too far. However justified they may be in their inception, it is the history of the world that these movements go too far, the pendulum swings too much the other way, and the public, not willing to take the captains of these corporations at their word that their houses are put in order, have demanded a complete change in the method of conducting the business. The four principal demands, as I view it, which the public makes as a result of this uprising are these, of which I wish to speak in turn:

First, supervision of these corporations by commission.

Second, cessation of stock watering.

Third, a limiting of the rate of return upon properties of this character.

Fourth, an insistence that all men connected with work of this character shall be deprived of all "say" in public life.

First, with regard to supervision by commission, it is perhaps superfluous for me, a six-months-old baby in that particular, to come into Massachusetts, which has had this principle established for a quarter of a century, and say anything on the subject, but I am entirely willing to state my own views. I have changed my mind somewhat on this subject. I used to believe, and said so publicly on many occasions, that supervision by commission could not work practically and could not but be a menace to all properties of this character. In that belief I disagreed with a good many strong men who are familiar with the business. We have now had a commission for six months in New Jersey, and of course it is too short a time to express any opinion upon the result of its labors. I am glad to be able to say, however, that the commission has started its work in a serious-minded and fair-minded manner, and if time goes on as successfully under it as it has for the past six months, we shall have little to complain of. But, speaking fundamentally, this, in my present judgment, is the limit to which supervision should go. I do not think any of us in this enlightened age object to supervision, pure and simple, by commission. By supervision I mean supervision that requires securities to be issued in compliance with the law; supervision that shall see that there is no further stock watering; supervision that shall have power in a general way to require proper and adequate service.

But there is a fundamental distinction between supervision and administration. The moment that the government gets into the business of administering these properties itself it might as well own them, because governmental administration is only governmental ownership without governmental responsibility. Let there be a proper supervision of the character I have spoken of, but let it stop at supervision and not go on to administration. There is where the State of New York, in my judgment, has made its fundamental error. The bill creating the two commissions in New York State is as long as the moral law, and the actions of the commissioners thereunder simply substitute themselves for the directors of the respective companies. It has gone so far, I am creditably informed, that in one instance where a gas plant was about to be built in one of the cities in New York State, under plans designed by perhaps the most eminent gas engineer in this country, the gas plant all to be erected on the private property of the corporation, the plans thus prepared by this eminent engineer were ordered discarded at the whim of some engineer of the commission in favor of a plan of his own. That perhaps will illustrate as well as anything that I might say the fundamental distinction between supervisory control and the administration of this class of property by a commission. Whether I like supervision to the extent I have spoken of or not perhaps is academic. The result of the movement to which I referred in the early part of my remarks seems to have come to stay and to have become engrafted in the science of American government. I think if we will meet supervision, as distinguished from administration, in the frame of mind I have spoken of, we shall not have much trouble, for my experience with men is that when they are appointed to serious office they sober down. However radical they may be in their talk, which perhaps leads to their appointment, it is seldom they carry their radicalism to the point of performance, and perhaps it is well it is so.

The second price which corporations have got to pay as the result of the embryonic discontent of which I spoke is the cessation of all so-called watering. I know that in Massachusetts that question has been an academic one for years, but it is not so everywhere. Not a dollar of water has gone into my organization under my management, or into the consolidation for which I am responsible; but we fell heir to a large amount of what I suppose is water in the underlying companies. So far as public sentiment now requires a cessation of that, I am in entire sympathy with it, and believe it is for the best interests of our business there should be nothing more of the sort done. On the other hand, while my interest is in the new company rather than the underlying companies, I am absolutely opposed to any legislation, whether by way of rate legislation or otherwise, that has for its object the repudiation of those securities issued in times past under due forms of law and now distributed widely for value and in the hands of innocent holders. We must take the condition as we find it, where that condition exists, and do the best we can with it. The proposition of Senator La Follette applied to the steam railroads of the country would, in my judgment, work havoc and disaster throughout the length and breadth of the land. His proposition in brief is this. There are $13,000,000,000 of securities of the steam roads issued in this country. He proposes to show by revaluation that they are not worth more than $7,000,000,000, and to squeeze out the water. These securities are scattered from Russia to South America, and from Greenland to South Africa, and any attempt to repudiate them would, in my judgment, create the same kind of a national scandal of repudiation as did the attempt to place the country upon a silver basis in 1896. It may be that public sentiment will no longer stand for over-issues. It should be that public sentiment will no longer stand for new abuses, but where they exist, issued in the manner I have spoken of, we have got to meet the condition as we find it.

With regard to the rate of return, this is the most practical and perplexing question that remains as yet unsettled, in my judgment. I was very much interested a year ago in hearing Mr. Sullivan, of the Boston & Northern and Old Colony systems, speak on this subject in New York. He was describing the effect of commission rule in Massachusetts, and he made the statement that there were about 80 companies in Massachusetts which reported to the commission in 1908. Of those 80 companies, 40 paid no dividends whatever, and the other 40 paid a dividend that netted them approximately 6 per cent, and an average of all the 80 companies reporting of about 5¼ per cent. In my judgment, if that is the best that properties of this character can earn or can be allowed to earn, the

industry is not justified. I have also read with much interest the recent pamphlet issued by the Boston Elevated Railway, showing maps and the vast expenditures of money made by that corporation within the last few years for subway and other developments, rising from something like $20,000,000 to $80,000,000. I speak approximately. If they are to be limited to any such return as 5, 6 or even 7 per cent, what is the inducement to put in some $60,000,000 of new money in a few years?

Take the gigantic enterprise in New York now nearing completion, known as the McAdoo tunnel system, connecting New York and New Jersey by subaqueous tunnels, which when they were started were unknown, at least on this side of the water. They are in operation and are earning only a very moderate amount of money. I do not think I am making any statement that cannot be verified when I say that at the present time they are barely earning the interest on their cost, because perhaps they are not fully completed, but if such a property as that is to be limited, as La Follette would limit it, to 5 or 6 per cent, what under Heaven is the use of building any such thing? Better by far to leave one's money in the savings bank and let it draw 4 per cent while you sit at home and read your newspaper than to put it in the bottom of the Hudson River and take the chances when it gets to be prosperous of having it give you 6 per cent; go through lean years that all properties have at the start; bear the burden of that, and then, when prosperity comes, have the screws turned on at 6 or 7 per cent. No better way to kill enterprise or to stop building conveniences for public use could be invented. Shall we say that these properties shall not pay a return attractive to investors, and shall we say that over and above that return they shall not be enabled to earn a surplus for a rainy day; for some years when, due to panics or other causes, they may not earn that sum of money? Shall we say that they shall not protect themselves against a year in which, perchance, they may have a strike, as in Philadelphia last year, which cost a million and a half of dollars? Shall not ordinary rules that pertain to common business prudence that a man would use about the management of his own affairs, whether he keeps a grocery store, runs a bank or is in any other walk of commercial life, pertain to our business as well? If such is not to be, our industry must stagnate and the public will quickly suffer as a result thereof.

The fourth demand which has arisen as a result of the movement to which I referred in the early part of my remarks is that all of us, because we are connected with corporations of this character, shall have no public influence whatever; our views shall not be consulted. We are biased, not only on subjects that relate to us, but we are tainted, as it were, and we shall not be allowed to have a say in public affairs. I protest against the "new nationalism" that would drive us all out of public life. I was delighted, as any one of you who were there must have been, with Mr. Calhoun's address at Atlantic City this year on this subject, among others. He stated this proposition far better than I can. He said he was willing to be driven out of the old method of political life, where you paid for immunity from politicians; where the politician who berated you and said he would have nothing to do with you or yours came around to your back door the next day and asked for a political contribution. I do not criticise all that may have been done along those lines in the past. I have sympathy with the man who, under pressure, has had to submit to blackmail. I have nothing but contempt for the man who voluntarily seeks to produce a grafter. But it is time that the whole business should be stopped wherever it exists throughout this broad land. But shall we say the country shall not have the benefit of the judgment and advice, in all the matters that pertain to its welfare, of men important enough to be put at the head of these great enterprises? I say no. I protest against being shipwrecked on the shoals of public clamor because I have set sail in the public service craft. Will the people of a community like this say that they will not hark or listen to the judgment of a man like General Bancroft, simply because he is at the head of the Boston Elevated system? On the contrary, as Mr. Calhoun so well said at Atlantic City, these men must take their position, with all the influence they have, to guide their country, not only in matters pertaining to interests which they represent, but all other matters as well. In substitution for the old-fashioned methods will come the influence of the high corporation official, through the potentiality of mentality and the force of character.

These questions of the rate of fare and of the influence of strong men who happen to be connected with a corporation in the country's welfare are going to be settled. They are troublesome at present. The fare situation in Boston is troublesome. I have had many a talk with Mr. Sergeant on the subject and know his views about the length to which the nickel is expected to go. I still believe that if men of the type of Mr. Sergeant and of General Bancroft, here and elsewhere, will settle down to this problem along the line I have suggested, of forcing the public to recognize that, though there is a public duty in connection with these properties that does not pertain to commercial business, nevertheless the same basic principles of commerce must apply—I believe that this question will be worked out. In working out the one they will of necessity work out the other, so that their views will come to be respected, not only on the subjects on which they speak for their companies, but on all matters of public welfare, for, after all, the world is growing better rather than worse. You can read history as much as you please and at any age you please and you find that the old times were pretty wicked compared with the present day. Whether they were kings, emperors or popes, their whole thought was of their own power and the fulfilment of their own wishes. Nothing was allowed to stand in the way of their whims and wishes. All that is changed. New problems have come up and they are being gradually settled. King George V lives in a better day than did Charles I. Cardinal Gibbons lives in a better day than did Richelieu, and the era of Taft is better than the age of Augustus Cæsar.

THE SALE OF REDUCED-RATE TICKETS ON CARS

A decision has been rendered by the Railroad Commission of Wisconsin in a case involving the sale of reduced-rate tickets on cars by the Green Bay (Wis.) Traction Company. Labor tickets, for which provision is made in the franchise granted by Depere, Wis., and the rate on packages were also considered in the decision.

It was held by the commission, in brief, "that the conductors have ample time, in addition to their other duties, to handle commutation tickets; that if the sale of such tickets in cars results in reducing the revenue of the company so that it is unable to render adequate and efficient service, then public interest demands that the use of such tickets be discontinued entirely or the price raised; that the sale of such tickets at certain offices only amounts to a discrimination against such patrons as are unable to avail themselves of such privilege; that the carrying of baggage and package freight on passenger cars discommodes passengers and increases the hazards of operation, and the policy and schedule of the respondent, which tend to confine the carrying of baggage and package freight to emergency cases, is reasonable; that it does not appear that the labor tickets should be interfered with at this time. A new form of ticket is suggested. The respondent agreed to make necessary repairs at street crossings. It is ordered that reduced rate tickets be sold on cars."

The petition on which the case was founded was filed by the city of Depere, which is located about 5 miles from Green Bay. The Green Bay Traction Company operates an electric railway in Green Bay and three interurban lines, two of which reach parts of Depere, located on opposite banks of the Fox River. A fare of 10 cents was charged between Green Bay and Depere, although six 5-cent tickets could be bought for 25 cents at certain stations, by the use of two of which the fare would be reduced to 8 1/3 cents. Regarding these stations the decision says:

"People living one mile or more from the car line on the west, east or south side must travel some distance to the station to avail themselves of this privilege. It is inconvenient in stormy weather or winter weather for people to travel such distances for these tickets, as they can board the cars at any corner. This gives those residing near the drug stores, where tickets are sold, an advantage over those residing at a distance. The ticket offices on both sides of the river are on the main business streets. The stations at which these tickets are sold usually are drug stores, and do not open until 7 a. m. and close at 10 p. m. The first car on the east side leaves Depere at 6:15 a. m., and the west side car leaves before 7 a. m. In the evening there are cars leaving as late as 11:30 p. m. from the east side and 11:20 p. m. from the west side. On Sunday afternoons during the winter months, that is from Nov. 1 until April 15, the drug stores are closed, so that people cannot secure tickets at reduced rates."

Testimony regarding the duties of conductors was offered by J. M. Carl, superintendent of transportation of the company, who stated that he often found that the conductors were kept very busy, and that selling trip tickets and making change on the cars for passengers would make the conductors' duties very burdensome, and there would be difficulty in keeping schedule time.

Mr. Carl stated that the practice of selling tickets on cars was stopped in order to give better service to the public, as traffic was increasing and it was becoming too cumbersome for the car men, and trouble had arisen with reference to the "knocking down" of fares by the conductors under that system. For every six fares the conductor collected it would be possible for him to take a package containing six chips and substitute them for the cash fares. After the sale of tickets was discontinued on the cars an increase in revenue was noticed, and was due both to the fact that the extra nickel was turned in and to the fact that more cash fares were paid. Under the old system, where tickets were sold aboard the cars, 67 per cent of the total receipts were ticket receipts and 33 per cent cash fares. Under the present system 43 per cent of the total receipts are ticket receipts and 57 per cent cash fares.

Testimony on the same subject was offered by other railway officials:

Thomas Higgins, president and general manager of the Manitowoc & Northern Railway, testified that tickets were not sold on his company's city or interurban cars. He knew of no way to prevent the conductor from turning in ticket fares instead of cash. A register would not always prevent the substitution of a ticket fare for a cash fare, as only a few passengers notice the register at all; most of them notice only the ringing of the bell. If the conductor rang up four or five fares rapidly the passenger could not distinguish whether they were ticket or cash fares.

J. P. Pulliam, manager of the railway department of the Eastern Wisconsin Railway & Light Company, testified that he had been engaged in the operation of street and electric railways for 15 years; that he never sold tickets at reduced rates on interurban or city cars; that he knew of but one case where interurban roads sold tickets on their cars and where there was a reduction on the round trip rate or one trip; that this practice added an unnecessary burden; that it would be better to reduce the rate to the ticket basis and have one fare; that it was a bad proposition for a man to take in what he sold, as it absolutely destroyed a check on him. He also stated that the handling of tickets at reduced rates resulted in financial loss to the company, as it was impossible to keep a check on it; that his company used what he thought the best register, the Ohmer fare register, with 12 points, and the fares were separated in such a manner that the best check possible was obtained. The witness stated that it was generally accepted throughout the country that the best form of operation was to keep the tickets out of the hands of the conductor; that his duties of collecting fares, looking after his trolley, railroad crossings, tail lights and making up his trip sheets, sufficiently occupied his time; that the added duty of selling tickets would increase the number of platform accidents on cars; that it would be cheaper in the end for the company to reduce the rate to the ticket rate. He admitted that selling tickets on cars would be more convenient for passengers. If a railroad company was selling transportation it should sell it at its offices, just as did the steam roads.

John T. Huntington, general manager of the Green Bay Traction Company, testified that conditions on the lines between Depere and Green Bay at important times were such that no man could do his duty by the company or passengers, or do his duty with safety, if the duties were increased; that some cars ran light, but on other trips the traffic was heavy; that, with the best conductor in charge, there were times when he, as one of the responsible officers of the company, was very anxious and perturbed over possible accidents.

L. E. Jacobson, auditor of the Green Bay Traction Company, said that the company operated at a loss, and had done so ever since he had been connected with it. The gross income from earnings did not equal operating expenses and interest charges on the property. No salaries were paid to officers except to operating officials, and no dividends had been declared during his employment.

PACKAGE FREIGHT

Mr. Carl testified that originally there was no established rate, the conductors taking what they saw fit. The merchants of Green Bay and the produce dealers and others tied up large bundles, sometimes two or three bunches of bananas, weighing from 50 lb. to 150 lb., requiring two or three men to handle them. They would give the conductor two tickets, which amounted to 8⅓ cents. This became such a nuisance that the company discontinued it. A number of wholesale grocery and produce houses of Green Bay shipped goods to Depere on the company's lines. The rear platform was often covered with melted ice and filth of various kinds connected with the handling of these packages, and the conditions were such that the passengers were discommoded. In order to prevent this abuse, the company had established the present rate, 10 cents in the city limits and 20 cents between Green Bay and Depere, limiting it to packages weighing not over 50 lb., unless neatly packed, equipped with handles and not too cumbersome. In such case the limit was 100 lb. The packages were to be called for, but sometimes the conductors were courteous enough to deliver them, and, as a result, people neglected calling for them. The packages were returned to the Green Bay office and held until assurances were given that they would be called for and the car indicated on which they should be delivered. Sometimes the packages were carried all day. On the west side line a freight car was operated three times a week; on the east side line only on special occasions when there was enough freight to pay for the trip.

Mr. Huntington testified that the transportation of packages on cars had been adopted originally by companies, particularly in Ohio, but that gradually they found that it was not proper, and in almost all instances it resolved itself into the carrying of packages on special cars when the business warranted it, or else not carrying them at all, except in emergency or as a special accommodation.

LABOR TICKETS

Mr. Huntington testified that when the complaint had been made he read the franchise governing operation in and out of Depere, and found the provision that labor tickets should be sold to citizens of Depere, good during certain hours in the morning and evening, and monthly books should be sold, not exceeding $2.50. The company issued a book and limited it to 30 days from date of sale, but not transferable. He found that passengers forgetting to purchase tickets would borrow tickets from other passengers having such a book, and transfer them to their monthly cover. Passengers having books good for 30 days had after that time had expired tried to pass the tickets. Also books were sold indiscriminately to people riding anywhere over the system, between Green Bay and Depere, whereas the franchise provides this only for Depere residents. In order to comply with the franchise, and at the same time to

correct the abuses, the company issued a new form of book, changing the color on the cover every month, and good only for the calendar month, but redeemable, if a person ceased its use, on the basis of the full cash fare for the number of rides had. He stated that the company was giving the people just what the franchise called for, but that the citizens of Depere and the Council had repeatedly and frequently tried to have him do things not provided in the franchise.

Commenting on its statement of the evidence, the commission says in part:

"It appears that the principal objections of the respondent to placing tickets on sale on its cars are (1) that the time required of the conductors to make such sales will interfere with their cars, (2) that the opportunity afforded the conductors of defrauding the company by exchanging tickets for cash fares will be taken advantage of by some to the detriment of the company's revenue, and (3) that the number of cash fares will decrease and the gross operating revenue will be diminished.

"The first objection does not seem tenable. While, doubtless, at infrequent times, when traffic is abnormally heavy, the sale of tickets will require a little more time than the mere collection of fares from passengers purchasing tickets would require, generally conductors have ample time to discharge all their duties, including sale of tickets. In cities throughout the country where commutation tickets are offered to the public by companies such tickets are on sale on the cars at all times. During certain hours of each day in such cities the traffic is congested to a greater extent, perhaps, than on the rare occasions of heaviest traffic on respondent's lines, and yet conductors are able to discharge all the duties imposed upon them reasonably well.

"That the company should conserve its revenue by employing reasonable means to prevent losses because of dishonest employees must be conceded. The public is interested in the financial results of the operation of the railway, for any material loss in revenues, however incurred, may impair the ability of the company to render adequate and efficient service. But any regulations the company may establish to protect its earnings must be of such a character that their application will not result in unjust discriminations between its patrons. To afford convenient facilities for acquiring tickets at reduced rates to persons who reside near certain stations or stopping points, and to deny such facilities to others who reside in the vicinity of other stopping points, results in subjecting the latter persons to an undue disadvantage. The injustice of such discrimination is emphasized by respondent's final objection to restoring the sale of tickets upon cars, because the granting of equal facilities to all patrons of the road in the matter of acquiring tickets will increase the use of tickets and decrease the amount of revenue derived from cash fares.

"If the sale of tickets upon cars shall result in any material reduction in revenue, then public interest demands that the use of such tickets be discontinued entirely, or the price thereof raised, so that the revenues will be adequate to maintain and operate the property for the public convenience. The law imposes upon the company the duty of furnishing 'reasonably adequate service and facilities,' and this commission is empowered to enforce such obligation in case of failure or neglect to perform. If the charges exacted of the public for the services are unreasonably low—and such would be the case if the operating revenues were inadequate properly to maintain the service—then the only means of enforcing the legal obligation resting upon the company in the premises would be to increase the rates. Any stipulation or agreement made by a public service corporation which would prevent it from properly performing its public function is in violation of public policy and should be disregarded.

"Upon the question of the reasonableness of the rates charged for package freight, it appears that the present schedule was adopted for the purpose of discouraging the shipment of packages. Passenger cars should be used only for the conveyance of persons and their parcels in hand, unless equipped with compartments for baggage and package freight. With platforms filled with freight, accidents upon the platforms are almost inevitable at times. Under the circumstances we believe that the schedule is reasonable, as it seems to have accomplished the purpose of its adoption, which had in view the comfort and convenience of passengers as well as the safety of operating the cars.

"Respecting the use of labor tickets, the company has issued a new form of book. Until it appears that the new practice operates prejudicially against some of the users of labor tickets, no order will be made in the matter.

"There was some complaint that the respondent had not properly made and kept in repair the crossings of its lines with the streets in Depere. This was explained upon the ground that the season was such as to prevent work of that character. The respondent agreed to repair and put in safe condition all such crossings as soon as the weather would permit. Under the circumstances no action of the commission is required in the premises."

SHELTER STATIONS ON ILLINOIS TRACTION SYSTEM

The accompanying engraving from a photograph shows the latest design of roadside way station erected on the Illinois Traction System lines. Four of these stations have been built and it is planned to use the design shown for all other small waiting stations to be built in the future at country road crossings. The ordinary shelter as formerly erected at road crossings cost about $60. The new stations cost $325. Because of the extra facilities and conveniences offered by the higher-priced stations the local passengers who use these stations at



Shelter Shed at Road Crossings

the road crossings have clubbed together and furnished sufficient money to purchase the materials for each of the stations of this type which has been built. The company has furnished the labor and erected the structures complete.

The general design of the station with its overhanging eaves and inclosed waiting space is credited to H. E. Chubbuck, vice-president. The stations are substantially built with concrete foundations surmounted by battered walls of rock-faced, hard-burned brick. The superstructure is framework covered with creosoted shingles. At each station a concrete loading platform extending to the roadside is built.

During the recent parliamentary election in England the car houses of the different tramway systems were used extensively for political meetings. This was the case in Reading, for instance, where the Prime Minister addressed one monster audience on one day and two days later Mr. Balfour spoke in the same building to another huge gathering. It was estimated that about 20,000 persons were present at the two meetings. Great precautions were taken to prevent suffragettes from entering the building on the occasion of the Prime Minister's visit, with success, as the meeting was undisturbed by female interrupters.

MONTHLY STATISTICAL REPORT, ILLINOIS TRACTION SYSTEM

The accompanying table gives freight, passenger and mileage statistics of the interurban lines of the Illinois Traction System for September, 1910, and shows the method of classification employed in compiling these figures. As will be seen, a record is kept in tons of the different kinds of freight moved. The classification used has five main subdivisions. Bituminous coal constitutes in tonnage the largest item in the list. Stone and sand come next. Besides giving statistics of freight traffic the table also shows locomotive and car mileage and statistics of passenger traffic.

ILLINOIS TRACTION COMPANY, INTERURBAN LINES, FREIGHT, PASSENGER AND MILEAGE STATISTICS, SEPTEMBER, 1910.

Description of freight moved and tonnage (company material excluded)	Sept. 1910	Comparative same mo. last yr.	Cumulative from July 1, 1910	Cumulative same period 1909
Products of Agriculture				
Grain	1,235	561	4,254	2,149
Flour	225	260	558	686
Other mill products	98	125	313	325
Hay	134	90	306	152
Tobacco		4		6
Cotton	3	1	4	3
Fruits and vegetables	257	94	420	347
Other products of agriculture	16	27	22	52
Products of Animals				
Live stock	283	267	935	705
Dressed meats	22	113	38	212
Other packing house products				
Poultry, game, fish	10	15	13	37
Wool	5	1	33	4
Hides and leather	1	2	2	20
Dairy products		6	2	10
Other products of animals				
Products of Mines				
Anthracite coal				
Bituminous coal	16,387	11,184	54,141	28,416
Coke	57		57	
Ores				
Stone, sand, etc.	12,593	426	25,903	1,629
Other products of mines	28		47	
Products of Forest				
Lumber	470	185	842	424
Other products of forest	1,217	1,307	4,471	1,564
Manufactures				
Petroleum and other oils	98	83	188	162
Sugar	28	240	61	485
Naval stores	15		298	
Iron—pig and bloom		45	52	87
Iron and steel rails	24	4	151	13
Other castings and machinery	39	45	153	106
Bar and sheet metal	33	12	39	32
Cement, brick and lime	724	179	3,160	721
Agricultural implements	8	8	27	57
Wagons, carriages and tools	4	3	26	29
Wines, liquors and beer	272	324	652	1,209
Household goods and furniture	380	336	945	728
Other manufactures	741	7	2,608	32
Other commodities under 2000-lb. lots	6,886	5,707	17,678	16,142
Total tonnage—All freight	42,691	22,470	119,703	59,851

Freight Traffic	Sept. 1910	Comparative same mo. last yr.	Cumulative from July 1, 1910	Cumulative same period 1909
No. of tons carried of freight-earning revenue	42,293	21,661	118,399	56,544
Tonnage—company freight	398	809	1,304	3,307
Total tonnage—all freight	42,691	22,470	119,703	59,851
No. tons carried 1 mile—revenue	2,652,802	918,625	7,810,999	2,565,781
No. tons carried 1 mile—company	24,627	67,915	67,867	195,375
Total mileage—all freight	2,677,429	986,540	7,878,866	2,761,156
No. tons carried per 1 mile per mile road (rev.)	6,316	2,187	18,597	6,109
No. tons carried per 1 mile per mile road (all frt.)	6,375	2,349	18,760	6,574
Aver. distance haul of 1 ton (rev.)	62.72	42.49	65.09	45.37
Aver. distance haul of 1 ton (all frt.)	62.72	43.90	66.54	46.13
Total freight revenue	$35,182.02	$23,802.68	$102,090.60	$66,790.42
Aver. amt. recd. for each ton of frt.	.83	1.10	.86	1.18
Aver. receipts per ton per mi.	.013	.026	.013	.026
Miles of road operated in frt. service	420	420	420	420
Frt. rev. per mile of road	$83.76	$56.67	$243.07	$159.02
Frt. rev. per loaded car mile	.2220	.2327	.2175	.2195
Rev. from switching service	1,004.47	1,031.92	2,892.04	2,403.01
Locomotive Mileage				
Freight locomotive miles	22,035	14,510	66,367	40,032
Passenger locomotive miles			114	
Switching locomotive miles	5,398	1,308	17,141	3,818
Total in revenue service	27,433	15,818	83,622	43,850

	Sept. 1910	Comparative same mo. last yr.	Cumulative from July 1, 1910	Cumulative same period 1909
Car Mileage Revenue Service				
Freight car miles:				
Loaded	158,420	102,293	469,307	304,380
Empty	59,666	34,493	186,709	100,500
Caboose	5,971	3,832	15,670	8,276
Total	224,057	140,618	671,686	413,156
Revenue passenger car miles	449,761	457,687	1,397,578	1,399,549
Special revenue passenger car miles	424*		4,131	
Sleeping car miles	16,147*		43,812	
Total	466,332		1,445,521	
U. S. express miles	3,774		11,599	
Total revenue passenger car miles	470,106	457,687	1,457,120	1,399,549
Total locomotive freight and passenger miles	721,596	614,123	2,212,428	1,856,555
Non-rev. service car miles	20,674	8,280	67,947	24,511
PASSENGER TRAFFIC				
Revenue passengers carried	741,236	682,338	2,299,222	2,169,660
No. of pass. carried 1 mile	9,844,404	9,658,512	30,871,345	30,243,280
No. of pass. carried 1 mile per mile road	23,439	22,996	73,503	72,723
Average distance carried	13.2	14.1	13.4	14.1
Total passenger revenue	$153,524.99	$137,797.41	$474,784.51	$430,346.39
Average amount received for each passenger	20.71	20.19	20.65	19.19
Total passenger service train revenue	161,963.06	145,083.18	498,882.01	451,991.41
Miles of road operated in passenger service	420	420	420	420
Passenger service revenue per mile of road	$385.62	$345.42	$1,187.81	$1,076.15
Passenger service train revenue per car mile	34.4	31.7	34.2	32.4
Average rate per passenger per mile	1.56	1.42	1.54	1.40

MARSEILLES (ILL.) HYDROELECTRIC DEVELOPMENT

H. E. Chubbuck, general manager Western Railway & Light Company, has just placed equipment contracts for a hydroelectric plant at Marseilles on the Illinois River, which will have a present capacity of about 3000 hp and an ultimate capacity of 6000 hp and will supply lighting and railway current for the McKinley System in northern Illinois. The Northern Illinois Light & Traction Company, a subsidiary of the Western Railway & Light Company, recently leased water rights from the Marseilles Land & Water Company which will make available the 3000 hp. Options also were completed on additional water rights at this location, which will come under control of the Northern Illinois Light & Traction Company as fast as the contracts under which they are now held expire.

The dam across the Illinois River at Marseilles is a concrete structure 920 ft. long and 9 ft. high. This dam will supply water through a headrace to a new power plant. A contract for excavating the power-plant site and placing the concrete for the structure has been closed with the L. E. Meyers Construction Company for a sum said to be about $112,000. Contracts also have just been placed with the Westinghouse Electric & Manufacturing Company for generators, transformers and auxiliary electrical apparatus. The Leffel Water Wheel Company will supply the waterwheels.

The units now to be installed include six umbrella-type generators of 350-kw capacity each and two similar generators of 450-kw capacity each. The latter generators will be moved to this plant from an older plant and each will be connected to three waterwheels. Exciting current will be furnished by two 100-kw waterwheel-driven units. One-half of the generating capacity will furnish 60-cycle current and the other half 25-cycle current. A 1000-kw Westinghouse frequency-changing set will serve to tie the two halves of the generating capacity and make available the complete plant for either frequency. It is planned to furnish energy for lighting the towns of Morris, Seneca, Marseilles, Ottawa, Utica and La Salle. The surplus energy will be fed to the transmission system of the 90-mile interurban railway operated in this district by the McKinley interests. C. W. Humphrey, consulting and designing engineer, Chicago, has been retained to direct the engineering work.

TESTIMONY BEFORE RAILROAD SECURITIES COMMISSION

The Railroad Securities Commission concluded its sessions in New York on Dec. 22, and then adjourned to meet in Chicago on Jan. 23. In addition to those whose testimony was mentioned in last week's issue of the Electric Railway Journal, a number of others whose experience makes them competent witnesses have appeared before the commission. Abstracts of the testimony of some of those who have given their views, supplementing the report published in last week's issue, follow:

TESTIMONY OF PAUL D. CRAVATH

Paul D. Cravath, who testified on Dec. 20, said that it was not his function as a lawyer to determine what was economically wise. His clients consulted him in order to determine what could be done legally. He thought that there was danger of too much regulation rather than too little regulation. The indications were that during the next two or three years the plan of commission control would be made effective in nearly every State in the Union. He assumed that the policy of federal regulation of interstate railroads was here to stay. If the commission would bring about reasonable uniformity of the laws of the various States affecting corporations, it would accomplish a great deal. If it could prevent the extremes of regulation which threatened the country, it would accomplish material results.

Ignoring constitutional difficulties, Mr. Cravath thought that the more effectively authority could be centered in the federal government the better off the corporations would be. The prosperity of corporations meant the prosperity of the country. The Railroad Securities Commission should be exceedingly cautious in advocating any radical change from present conditions. One great danger was the idea fostered by some people that the approval of securities by a commission made the securities good. A public commission was not responsible for losses of corporations. The directors of corporations were responsible legally and morally for such losses and could not shift responsibility to a commission. It would be unfortunate to create an impression that the approval of a commission meant soundness in securities.

In the opinion of Mr. Cravath, only very simple laws regarding the regulation of security issues should be imposed. They should place the responsibility directly on the directors and continue the present assumption that investors must make their own investigation and determination, relying on high-minded directors to safeguard the trust. Greater publicity was needed. There was lack of sufficient fulness in the information afforded by corporations as to securities and what was behind them. In the main the public good was fostered if a great degree of freedom in business operations was allowed. It would hamper corporations if they were compelled to reveal in advance the purposes for which they desired to issue securities. Regulation on this point should be confined to a requirement that bonds should be issued at the fair market value. However, after the expenditure of money raised by the issue of securities a very full report should be made as to the disposal of the funds.

Mr. Cravath said that he had been told that in boom times it was a disadvantage to a railroad to have the fact known in advance that it intended to spend a large amount for equipment, rails or for any other specific purpose. He thought that securities, if issued under regulative statutes, should be issued to provide funds for any one of a dozen purposes. He would favor, in any scheme for the regulation of corporate securities, a requirement that the total bond issue should bear some fixed proportion to the stock issue. The modern tendency in railroad consolidation to use issues of stock as security for issues of collateral trust bonds was economically dangerous because it resulted in a condition where an undue proportion of the total capitalization was represented by bonds.

It would be a great injustice, Mr. Cravath said, if the government should demand such reduction of rates as to interfere with established dividends and interest rates of railroad companies. Mr. Cravath was asked whether, if the railroads were allowed to increase their rates now because of increased expenses, the result would not be that as expenses increased in the future permission to make further proportionate increases in rates would be expected. He replied that the increase of rates by railroads under these circumstances was simply the application by these corporations of methods that applied to any other business or profession. A commission which had power to regulate rates should first take into consideration the numerous hardships involved to investors in disturbance of conditions.

Mr. Cravath thought that the large railways should be protected against needless competition. They were not like the promoter of new enterprises who was in the business of taking chances. In answer to one question regarding value, Mr. Cravath said that in the experience of the New York City surface street railways $20,000,000 had been invested in cable lines legitimately and for improvements that were absolutely needed. There was not now a scrap of property to show the investment of this money because the cable railways had been superseded by electric lines.

In referring to conditions in New York, Mr. Cravath said that in the Legislature which was in session the year before the creation of the public service commissions 120 bills affecting railroads were pending. A consolidation of the State's policy of regulation by commissions would tend to overcome this condition. He said that the commission of the Second District of New York State had been exceedingly conservative. It had attempted a minimum of interference with the corporations.

MR. MATHER SAYS REGULATION HAS LIMITED EARNINGS

Robert Mather, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, stated that, inasmuch as the United States government had gone as far as it has in the regulation of railways, it ought to go further in the interest of both the railways and the communities which the railways served. He said that regulation had resulted in the limitation of the earning capacity of the railroads. This had been done upon the theory that these corporations, as public highways, were engaged in public business, and therefore the public ought to have some voice in their control. This theory confused two distinct purposes which the railroads served. Mr. Mather said that, while the ownership of the highways by the railroads was a matter of public concern, the business of carrying the goods of the country was different. That had never been and never would be the business of the public, although, of course, it was subject to some regulation. By limitation of the earning capacity of the railways their credit had been affected. The railways were confronted with the practical problem that the purchasing public did not want their securities, because they were not permitted to earn a sufficient margin above the amount required to pay a fair return.

Mr. Mather said that the country was more interested in having sufficient and efficient highways of commerce than it was in the question of whether dividends were paid on watered stock. The government ought to substitute some equivalent for the limitation of credit which the present regulation entailed; it ought to see that rates were such that railways operating with average economy could earn sufficient, not only to pay their fixed charges, but also a fair return on outstanding capital stock, making at the same time adequate provision for contingencies. The government ought not to stop now and let the railways flounder out of their present difficulties.

W. D. HINES ON THE COST OF SERVICE

Walker D. Hines, chairman of the executive committee of the Atchison, Topeka & Santa Fé Railway, said that, in his opinion, Congress had the power to regulate the capitalization of railways engaged in interstate commerce, and that he personally was not disposed to offer any objection to the exercise of that power. Mr. Hines emphasized the great number of factors entering into the making of rates, and declared that

it was absolutely impossible for a railway to ascertain, even in a very general way, the cost of service. Even a distinction between passenger and freight traffic was only a series of approximations. He said that he was not willing to oppose supervision, but would urge that the attraction of capital to railways was of the utmost importance. This need must be taken into account by any commission.

REGULATION A MATTER OF PUBLIC INTEREST

Frank Trumbull, chairman of the board of directors of the Chesapeake & Ohio Railway, declared that he was in favor of the regulation of the issue of railway securities, and that his sympathies were toward federal regulation to the exclusion of State regulation, not because he believed that capitalization had any particular bearing upon rates, but because regulation had come to be a matter of public interest.

BOND ISSUES NOT INTERSTATE COMMERCE

Edward M. Shepard said that he was opposed to the general principle of federal regulation of the issue of railway securities. He did not understand how the bond issues of railways could be construed as any part of interstate commerce. Mr. Shepard favored the issue of stock without par value. He declared that enforcement of the utmost publicity in all questions relating to the issue of securities would accomplish in the end all the reforms sought. He thought that it would be exceedingly unwise for the government to undertake to protect the interests of private investors.

RESTRICTIONS ON PRICES OF STOCKS

Jacob H. Schiff, of Kuhn, Loeb & Company, said that the time had long been passed when capital stock should be issued for less than money, but if it should not be possible to issue railway stock at less than par, the West and South might not be able to get all the railways they needed. Railway construction was done to-day by the large existing companies, and it should not be otherwise. The commission should recommend that stock should be issued either at par or, with the permission of the commission, at a legitimate discount. He would not impose any restrictions as to the prices at which bonds should be sold. Where interstate commerce prevailed, Mr. Schiff thought that federal, not State, regulation should prevail.

R. S. LOVETT COMMENDS INTERSTATE ACCOUNTING SYSTEM

R. S. Lovett, president of the Union Pacific Railroad, said he was not opposed, from the railway point of view, to government regulation. Personally, he believed it unnecessary and unwise in the public interest. He said that there was no connection between rates and financing. Traffic managers knew nothing of financing, and rates were not made or influenced by the stocks and bonds outstanding. It was impossible to state the factors that entered into the making of rates. In their growth and development rates were like the common law of England. Regulation of the issue of securities was not necessary for the protection of investors or of the public from higher rates. In the protection of investors the government had not regulated the issue of mining stocks or of other properties that had proved total losses to speculators and investors. The essential value of the Interstate Commerce Commission lay in the accurate accounting which it prescribed and enforced and in the publication of complete reports. The accounting methods of this commission were well-nigh perfect, and were a perfect protection to the public, making regulation unnecessary. If each State should regulate the issue of securities, based on the property within the State, financing would become impossible, because State legislation was not uniform and would cause financial confusion.

If rates depended on the stocks and bonds outstanding, Congress would have the power to regulate the issue of securities, but they did not so depend. President Lovett would do away with the designation of a par value for stocks. The value of a stock would then depend upon its worth. As the bonds had par value, and the actual value depended upon the credit of the company, it was absolutely necessary to sell at a discount, especially in these times. The investor was not concerned so much with the sale of bonds at a discount as with the return he got for his investment. The proper way to get capital was from the stockholders by subscription, so that the public or government was not interested in the amount of stocks and bonds outstanding. The government was not interested in the question of whether a bond or a stock was a good or bad investment, but might be interested in what the railroad got in return for the sale or issue of stocks or bonds. An attempt to find the cost of reproduction of the property of a railroad was a mischievous plan. It was wholly useless and unnecessary.

SECOND CONFERENCE ON INTERURBAN OPERATING METHODS IN INDIANA

The Railroad Commission of Indiana held a second conference with the interurban railway managers of that State at Indianapolis on Dec. 23. The purpose of the meeting was to ask the representatives of the railway companies whether or not they would agree to and carry out the recommendations made by the commission in its report to the Governor presented at the previous conference, which was held on Dec. 13. These recommendations were as follows:

(1) (a) Employ better men for motormen and conductors. (b) Do not employ applicants until former records have been carefully investigated. (c) All motormen to have at least one year's experience in train service. (d) No duties beside operating car to be imposed on motormen. (e) Provide separate compartment for motorman. (f) Give conductor one assistant when motor car hauls trailer.

(2) Proceed to install block signals on interurban railroads and by Jan. 1, 1911, report progress and submit to the commission plans and blueprints of some adequate block system to be hereafter installed and operated as soon as practically possible.

(3) Enforce the "double order" system of dispatching and make no exception under any circumstances to this rule.

(4) Trainmen should operate by rules and time cards and orders, and signals when installed, but companies shall proceed to eliminate obstructions to sight at curves where sight is badly obstructed. Until this is done companies are to post slow-speed signals at dangerous curves and reduce speed of cars at such places to not more than 15 m.p.h.

(5) Division superintendents and trainmasters should not be burdened with duties other than those pertaining to train operation.

(6) Train dispatchers should not be required to handle interlocking plants or to perform duties other than those pertaining to the dispatching of trains.

About 30 interurban managers and their chief assistants attended the meeting, which was held in executive session. It is understood that the discussion was confined to the same questions which were argued at the meeting of Dec. 13, which was reported in the issue of this paper for Dec. 17, page 1201. Preceding the meeting the commission had obtained from a number of roads statements of the number of years' service of their train employees. The reports of 21 companies showed that out of 505 motormen only 68 had had one year or less of service with the road now employing them, and some of these 68 men previously had worked on other roads. Thus, less than 10 per cent of the motormen employed by these 21 companies had had less than one year's experience in train service. Out of 490 conductors employed by these companies 80 had had one year or less of service with the company for which they are now working, but practically all of these had had previous experience on other lines.

The three topics around which the discussion centered were: (1) Conditions of employment and service, (2) signals and (3) method of delivering orders. As a result of the discussion the following committees were appointed to consider these subjects and report to the commission by Jan. 5:

Committee on conditions of employment and service, C. L.

Henry, president Indianapolis & Cincinnati Traction Company; W. G. Irwin, vice-president Indianapolis, Columbus & Southern Traction Company; H. A. Nicholl, general manager Indiana Union Traction Company; C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company.

Committee on block signals, Arthur W. Brady, president Indiana Union Traction Company; C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway; R. I. Todd, general manager Terre Haute, Indianapolis & Eastern Traction Company; C. D. Emmons, general manager Fort Wayne & Wabash Valley Traction Company.

Committee on delivery of train orders, A. Shane, general manager Indianapolis, Columbus & Southern Traction Company; C. L. Henry, president Indianapolis & Cincinnati Traction Company; G. K. Jeffreys, superintendent Terre Haute, Indianapolis & Eastern Traction Company.

The chairman of the commission stated to a representative of this paper that at the meeting which would be called for Jan. 5 the commission will insist that the roads agree to carry out its recommendations or offer satisfactory substitutes. The block signal committee will be assisted by the signal expert of the commission, Mr. Hovey, who, previous to the meeting of the committee on signals, will collect information that can be used by the committee in formulating a report for the Jan. 5 meeting.

PROGRESS ON WORCESTER CONSOLIDATED PLANT

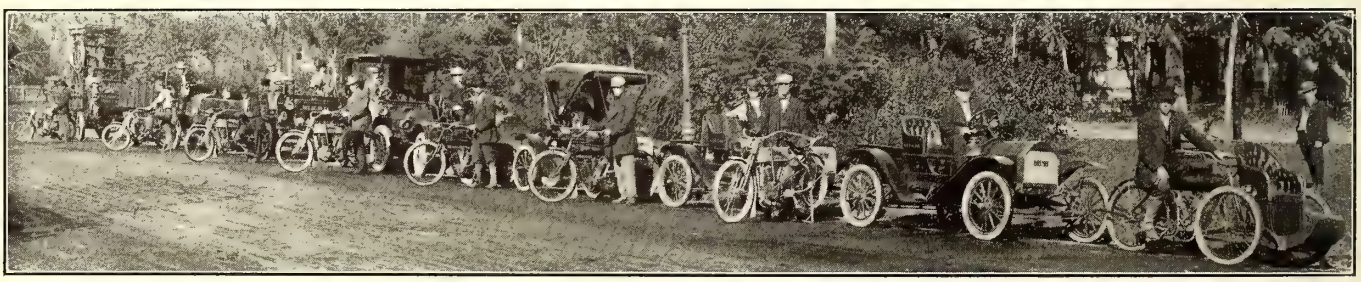
Rapid progress toward completion before the close of the winter is being made at the new 5000-kw turbine station of the Worcester Consolidated Street Railway Company in Millbury, Mass. The machinery has practically all arrived upon the ground, and the turbine foundations are ready to receive the initial 5000-kw unit, which will be installed on the north side of the existing engine-driven station of the company. Two batteries of two 840-hp Edgemoor water-tube boilers for battery have been installed and equipped with Murphy automatic stokers. Two more similar batteries will be erected as soon as possible. These boilers are probably the largest individual units in New England, and the draft supply, instead of being obtained through individual temporary stacks as first intended by the company, is furnished by a Kellogg circular brick stack, 225 ft. high and 12 ft. in inside diameter. This chimney is said to be the largest in diameter for its height in New England, and it is installed with one side blank to accommodate future boiler units, which will be necessary to handle the expansion of the plant in the near future.

Fuel is being handled outside the plant by cars hauled to the station on a spur track connection with the New York, New Haven & Hartford system. A locomotive crane, steam-driven, with a 55-foot boom, is in service, and this easily handles five 40-ton cars loaded. The capacity of the crane is 7000 lb. at 45 ft. radius and 14,000 lb. on a 20-ft .radius. and it was furnished by the McMyer Interstate Company. The railway company has built a bridge across the Blackstone Canal at the plant site, the principal horizontal members being two concrete girders which are reinforced with 30-in. I-beams 31 ft. long, rolled by the Bethlehem Steel Company. A reinforced-concrete ash pit 26 ft. deep has been built at the side of the spur track, and a system of ash cars will be installed to carry the ashes from a receiving chamber below the boilers over a narrow-gage track to the pit, whence they will be loaded into standard-gage cars for removal by the locomotive crane. No manual labor will be required in ash handling. Feed water for the present boiler plant is being provided by a 4-in. centrifugal pump driven by an old railway motor, the pump suction being carried to the bottom of a 20-ft. well outside the station. The water is being analyzed at the present time to determine its fitness for boiler supply, and in case it proves unsatisfactory the company will probably establish a pumping station on the shore of a pond within a few miles of the plant and supply water by a suitable pipe line.

All the parts of a General Electric 5000-kw turbo-alternator have reached the station, and construction work has begun prior to the installation of a Wheeler surface condensing equipment. The circulating water for the plant will be handled entirely by gravity, the head being sufficient to provide adequate flowage without the use of a pump. The coal and ash-handling equipment is to be supplied by R. M. Beaumont, of Philadelphia. Current will be transmitted to the Worcester substation over a line carried on steel towers, which are being furnished by the Archbold-Brady Company, of Syracuse, N. Y., the average span being about 400 ft. Construction work is progressing rapidly on the Worcester substation, which will contain an ultimate installation of rotaries having a total rating of 7500 kw. Foundations have been completed for the first rotary, and excavation is in progress in connection with the underground section of lines which will tie the substation in with the power plant and the rest of the system. The contractor for the power house at Millbury is the firm of Durkee, White & Towne, of Springfield, Mass.

AUTOMOBILE EQUIPMENT OF THE KANSAS CITY RAILWAY AND LIGHT COMPANIES

The management of the Metropolitan Street Railway Company and the Kansas City Electric Light Company within the past year has purchased a very extensive equipment of automobiles and motorcycles to be used in all departments which have men who must make hurried trips about the city. The accompanying illustration shows the entire gasoline-driven equipment. The following is a list of the nine machines used by the street railway department and the seven machines used by the electric light department:



A Line-Up of Auto-Vehicles Used by the Railway and Lighting Companies of Kansas City

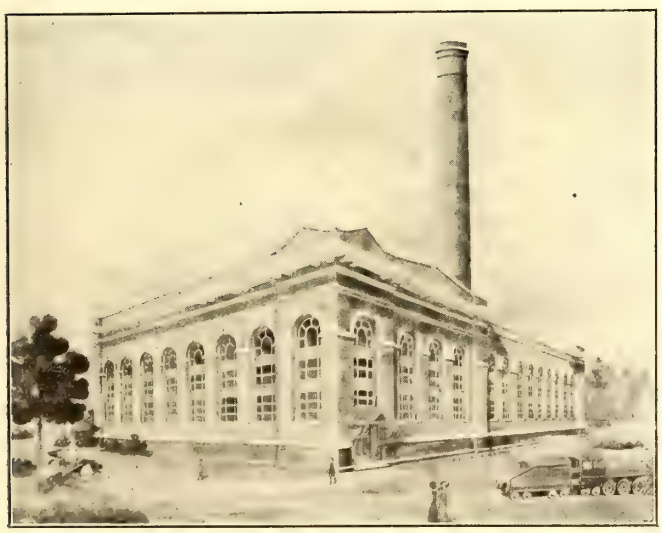
Metropolitan Street Railway—One Frayer-Miller tower truck, electrical department; one Knox, 3-ton truck (wreck wagon), operating department; one Packard 3-ton truck, mechanical department; one Pierce-Arrow touring car, executive officers; one E-M-F "30" runabout, transportation department; one Brush runabout, way department; three Harley-Davidson motorcycles (emergency), electrical department.

Kansas City Electric Light Company—Two Brush runabouts, one Indian tricycle, one Harley-Davidson motorcycle and three Indian motorcycles, all of which are used by the trouble department.

LARGE NEW INDIANAPOLIS POWER PLANT

The Terre Haute, Indianapolis & Eastern Traction Company is constructing a large new generating station in Indianapolis. Energy from this station will be used for operating the city traction lines and part of the company's interurban mileage. It is probable that the large central station, when completed, will supplant some of the outlying stations now furnishing energy for the different interurban divisions. The new station is being built on a piece of property 8.5 acres in extent located within the city of Indianapolis on the White River opposite the mouth of Fall Creek. This is a particularly valuable location inasmuch as the second stream during the summer months has a larger flow than the main river. The site of the new station is on a belt line which handles freight for all the steam roads entering the city. At the present time construction work is in progress on half of the proposed ultimate turbine room and on a third of the ultimate boiler room. The present turbine room will be 160 ft. long x 94 ft. wide, subdivided by a partition wall setting off a transformer room and series of electrical galleries, each 160 ft. long by 22 ft. wide. The present boiler house is 193 ft. long by 121 ft. wide. The first installation of generating units will include two double-flow Westinghouse-Parsons turbines with a normal rating of 6000-kw capacity and a minimum rating for 24 hours of 10,000 kw. These units will generate current at 13,000 volts which will be stepped up to 33,000 volts for distribution to suburban lines. The local property will receive direct current from an installation of three 2000-kw rotaries located in the turbine room. The control of the main units and all auxiliaries will be centered in a benchboard in one of the four galleries facing the turbine room. The galleries will be shut off from the turbine room by a brick wall inclosing glass lookout bays. The raising transformers will be located in the basement of the gallery section.

The present boiler room will include twenty 520-hp B. & W. boilers, of which 12 are now being installed. These boilers will exhaust into a radial brick stack 320 ft. 6 in. high above the basement floor line, having an inside diameter of 18 ft.



Architect's Drawing of Indianapolis Power Plant Now Under Construction

at the top. The boilers have internal superheaters and Roney stokers.

The facilities for handling coal at this large new plant include a coal trestle connecting the nearby steam tracks with the receiving hopper at the side of the boiler house. This trestle is built of plate steel girders carried on concrete piers and is of such a height that 10,000 tons of coal may be stored underneath it where it will readily be available for reclaiming with grab buckets. The plan of the complete station includes a duplicate coal trestle. As coal is received into the hopper alongside the boiler house it will pass through a cracker and then into an intermediate receiving bunker. From this bunker it will be loaded by gravity into push cars running on an industrial railway leading to an elevator which will serve to raise the coal cars to tracks leading over the main bunkers above the boilers. These bunkers extend the full length of the boiler house and have a capacity of four tons per lineal foot. The industrial railway system within the boiler plant also will serve for carrying ashes from the plant to a loading hopper erected above the coal receiving hopper. A track also leads into the base of the stack and facilities thus are provided for carrying away the soot collected there.

Circulating water for the condensers which are being erected directly under the turbines and between the piers which support the turbines will be delivered to the pumps located close to the condensers by a duplicate system of large concrete intake and discharge conduits. Each of the four conduits, which have been built in a group, is 270 ft. long between the nearby river and the wall of the power plant. They also extend under the full length of the station. The conduits are 6 ft. x 12 ft. in section, each built of reinforced concrete and grouped as a united structure.

The large new power station as shown in an accompanying reproduction made from an architect's drawing has been designed with regard to attractive exterior appearance. The superstructure has been laid with buff and brown brick trimmed with Bedford stone and having superimposed copper cornices. The large window openings are fitted with Fenestral steel sash.

SPOKANE & INLAND RAILWAY COMPLETES BRIDGE OVER SPOKANE RIVER

The latest steel and concrete bridge built by the Spokane & Inland Railway, Spokane, Wash., was completed on Dec. 13, 1910, when an inspection trip was made by several members of the company.

The large window openings are fitted with Fenestra steel sash. hundred feet south of the old wooden structure, and makes a more direct route between Spokane and Cœur d'Alene. The construction of this bridge has eliminated a number of severe curves on each side of the river and reduced the maximum grade from 1.5 per cent to 0.5 per cent. Excavations were re-

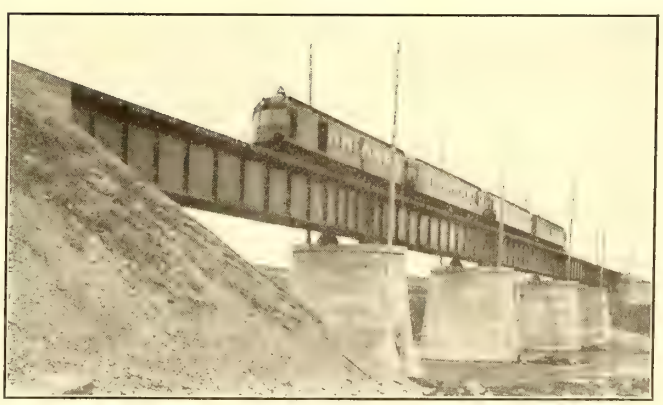


Plate Girder Bridge of the Spokane & Inland Railway on Route to Cœur d'Alene

quired 7 ft. below the river bed. As the material was compact cemented gravel, the concrete piers were constructed on the natural gravel. In grading for the approaches to the bridge, it was necessary to make a fill of 30,000 cu. yd. of material on the west side and a fill of 40,000 cu. yd. on the east side. The girders, which are 80 ft. or 100 ft. in length, are all 9 ft. 4 in. in depth and weigh 20 tons and 32 tons respectively. The total weight of steel used on the bridge was 286 tons. The girders were furnished by the American Bridge Company.

APPROVAL OF BOND ISSUE FOR CONEY ISLAND & BROOKLYN ROAD

An order of the New York Public Service Commission, First District, authorizing the Coney Island & Brooklyn Railroad to issue $490,000 consolidated mortgage 4 per cent bonds is accompanied by an opinion written by Commissioner Bassett. The commission decided that, although the company may charge the cost of some improvements to capital account, sinking funds shall be created to retire in 20 years part of the bonds issued therefor. The discount on the bonds is to be similarly amortized.

The company applied to the commission on April 8, 1908, to authorize the issue of $462,000 bonds. It desired to use the proceeds as follows: $278,000 for estimated cost of reconstruction of road on Coney Island Avenue; $16,000 to pay balance of the cost of 10 new cars above $30,000 par value of car trust bonds; $82,973 for balance of cost of reconstruction of power system over money therefor raised by sale of stock.

In an order adopted on March 8, 1910, the commission authorized the company to issue $151,000 of the bonds, but on account of later developments a larger issue was approved. The opinion says in part:

"The main purpose is to pay for reconstruction of the two-track road on Coney Island Avenue between Park Circle and Coney Island. The present tracks are laid along the westerly edge of the roadway. A long-continued public demand has been exerted to cause the tracks to be placed in the center of the street. The Board of Estimate and Apportionment of the City of New York adopted, Jan. 18, 1907, a resolution changing the location of the tracks to the center of the avenue. Later the board provided by resolution for the parking of the center of the avenue and placing the tracks in spaces which are to be turfed and curbed.

"The company thereupon submitted an amended application, providing for construction involving a somewhat increased expense, and requested authority to issue $568,500 bonds at 80, the proceeds to be used for the following: $428,000 for reconstruction on Coney Island Avenue; $16,000 balance of the cost of 10 new cars; $7,241.26 cost of new construction of vestibules upon 100 cars; $13,443.67 proportion of the cost of new elevated approach to the Brooklyn Bridge.

"The estimated cost of the work upon Coney Island Avenue as introduced by witnesses of the company is $378,269. The unit prices and measurements are substantially approved by the engineers of the commission, but their estimate is that the cost should be $353,468. This includes 10 per cent for contractor's overhead charges and profit and 10 per cent for engineering and incidentals.

"The 10 per cent for contractor's overhead charges and profit is allowed upon the entire cost of labor and materials, which includes the track, track special work, bonding, overhead trolley wires, overhead feeders, resetting of poles, underground conduits, cables, etc., and also an allowance to include the overhead charges of the general contractor. The 10 per cent for engineering and incidentals is allowed and divided into two parts: first, engineering, including cost of design and testing of all the construction and equipment items; second, incidentals, which would include superintendence and inspection, and also to provide for any contingencies, that is to say, expenses that may arise in the course of construction which were not anticipated when the estimate was made, together with the loss or waste of material.

"The engineers of the company and the commission concur in the opinion that the cost to reproduce the present structure upon Coney Island Avenue is $140,291. If the new construction cost is $353,468, the addition really made to the property is $213,177. The engineers concur in the opinion that the present structure upon Coney Island Avenue was depreciated $49,898, and that the salvage to be derived therefrom is $10,676, leaving the value of present construction abandoned $79,717. So much of the new work as represents additions to property, namely, $213,177, should be allowed to be paid for by the proceeds of bonds.

"The value of present construction abandoned by reason of legislative enactment, that is to say, $79,717, is to be treated in a different manner. Vicissitudes of various sorts will compel a corporation to lose good material before it is worn out. But it is not justifiable to capitalize these losses permanently, because they are in no sense a permanent addition to the property of the company. Constant repetition of capitalizing such losses would result in undue enlargement of the capital. Ordinarily the commission would advise that such a loss be met at once out of the earnings, but in view of the fact that this company has been making very large expenditures for reconstruction out of earnings and will need to continue this policy for some time, it is considered that the company should be allowed to issue bonds for this amount and should make annual payments to a sinking fund sufficient to pay off said sum in 20 years from the date of this order.

"So much of the rest of the cost as represents depreciation on the present structure and salvage, that is to say, $49,898 plus $10,676, a total of $60,574, should not be allowed to be paid for out of the proceeds of bonds. It was the duty of the company to set aside a fund to take up the depreciation, and it has, of course, the benefit of the salvage. These items have already been once capitalized and the commission cannot approve of their being again allowed, especially as the earnings of the company are sufficient if allowed to accumulate a short time to take care of this depreciation.

"Evidence is presented to show that in connection with procuring the right to relocation and construction expenses have been incurred for condemnation proceedings, consents of public authorities and property owners, and for litigations and negotiations, which ought to be considered as part of the cost and paid for from the proceeds of bonds. These include $9,989.65 for canvassers, printing, engineers' services, condemnation commissioners, real estate experts, etc., and the attorneys' disbursements, $2,061.85, besides fees of attorneys and counsel already incurred or necessary to the amount of $50,000. The question arises whether these disbursements should become a part of the permanent capitalization. The usual percentage of the cost of legal work in connection with construction is from 2 to 5 per cent. The improvement under consideration, however, has, under the policy pursued by the company, consisted largely of legal work, and although the commission is unwilling that the whole of the sum should be permanently capitalized, it considers that it is fair under all the circumstances that one-half should be permanently capitalized and that the other half, although bonds may be issued therefor, should be paid in 20 years by creating a sinking fund. This makes the total allowance for the Coney Island Avenue construction work $354,495.50, of which $110,742.75 should not be permanently capitalized.

"The items of $16,000 for new cars and $7,241.26 for vestibuling were paid out of the proceeds of promissory notes. Bonds issued therefor are to refund the borrowings. These items have been approved by engineers of the commission, and as they are additions and betterments should be allowed.

"The item of $13,443.67 for bridge work was also paid out of the proceeds of promissory notes. The property represented by this outlay became at once the property of the city, subject to being repaired or replaced from time to time by the several operating companies so long as they use it. The 10-year definite period of use has now expired and the company's tenure of the bridge is terminable on three months' notice. In case of termination no payment for the property need be made by the city. Under the circumstances the commission is of the opinion that the cost of this work should be paid out of earnings. The commission is willing to prescribe the long period of 20 years for its payment by the sinking fund method.

"Authority should accordingly be given to issue bonds, the proceeds to be used for the following purposes:

"Additions, $213,177; property abandoned pursuant to legislative enactment, $79,717; other expenses, $62,051.50; balance

of cost of new cars, $16,000; cost of new vestibules, $7,241.26; proportion of cost of the new approach to Brooklyn Bridge, $13,443.67; total, $391,630.43.

"In view of the necessity of the case and of the great public need of this improvement, the commission is of the opinion that it should authorize the sale of these securities at not less than 80 and that the money to be procured by issue of the additional bonds necessary to cover this discount is reasonably required for such purpose. If sold at 80 the issue will need to be not $391,630 but $489,539. The additional amount of bonds necessary to be sold by reason of this discount is therefore $97,908. The discount should be spread over the term of the bonds and amortized from income as a condition of the authority to issue the bonds.

"The order should therefore, in the clause stating that the bonds authorized are not, in whole or in part, reasonably chargeable to operating expenses or to income, except specifically the bonds authorized for the purpose of making good such discount."

REPORT TO PUBLIC SERVICE COMMISSION ON ALBANY CARS

The New York Public Service Commission, Second District, has transmitted to the United Traction Company of Albany the result of an investigation made by the commission and its electric railroad inspector, Charles R. Barnes. As a result the commission has recommended to the United Traction Company that 18 new double-truck cars, with a seating capacity of not less than 40 passengers, with arrangements for exit or loading on each end, be purchased; that the cars be put in service on the Pine Hills and West Albany lines; that after the new cars are received none of the present 18-ft. or 16-ft. cars shall be run upon these lines except in cases of emergency. The company is asked to advise the commission by Jan. 2 if it will comply with the recommendations, or any of them, without formal action by the commission.

From the investigation conducted by the commission the following conclusions have been reached:

1. That the double-truck car properly equipped is as safe to operate as the present single-truck car with its present equipment.

2. That reconstructed car No. 82 as at present constructed and equipped is not considered a safe car to operate on the Pine Hills and West Albany lines on account of its excessive length over all compared with its length of wheel base, and on account of its weight loaded, and with only hand-brake equipment.

3. That more passengers can be carried in a given length of time in a double-truck car with front exit than a single-truck car with single-end operation.

4. That additional service is needed on both the Pine Hills and West Albany lines.

5. That very little if any relief can be afforded to the Pine Hills and West Albany lines by the double tracking of Hamilton Street. Any additions to the present belt line which may be made as a result of such double tracking are necessary to provide for present traffic on that line.

6. A double-truck car seating not less than 40 passengers should be adopted as the standard for use on the important lines in the City of Albany, and that all additions to the equipment for use on such lines should be of that type.

7. That all of the 16-ft. and 18-ft. cars in use at present on the Pine Hills and West Albany lines (18 in number) should be replaced by the above type of car.

8. That if all of the 16-ft. and 18-ft. cars at present in use on the Pine Hills and West Albany lines were replaced with cars seating 40 people the congestion of traffic which now exists during the rush hours on these lines would be materially relieved and passengers during these hours could ride in comparative comfort and convenience.

The commission finds that the estimate made by the company of the cost per car for double-truck cars of $7,000 each is practically correct, but to replace the 18 small cars in use would require an expenditure of $126,000 instead of $140,000, as estimated, for new cars, and as it is proposed by the company to substitute the small car with reconstructed cars, the cost of such reconstruction must be deducted from the $126,000 to show the additional expenditure caused by the purchase of double-truck cars instead of the use of the reconstructed cars.

To the statement on behalf of the company that an expenditure of $70,000 for car houses would be necessary for the housing of large cars the commission points out a plan whereby this can be done satisfactorily for $6,000.

To the contention that the installation of large cars will entail an additional expenditure of $90,000 for transformer stations and feeders the commission says that this is entirely unnecessary and that the replacing of 16-ft. and 18-ft. cars by 18 large cars on the West Albany and Pine Hills lines would not require transformer capacity additional to that which the company now has.

The commission points out, however, that the $90,000 estimated by the company to be necessary for additional transformer capacity could be spent in additional power-house capacity.

In response to the contention that the operation of the large double-truck cars on the Pine Hills and West Albany lines would add yearly to the operating cost the sum of $36,700, the commission's figures show that the operation of double-truck cars during the same hours that the present 16-ft. and 18-ft. cars are now run on the Pine Hills and West Albany lines would add only $3,110 to the yearly operating cost.

The commission estimates that the total additional cost of the 18 new cars and the necessary changes in car house would make a total expenditure of $132,000, instead of $300,000, as estimated, which at 5 per cent interest would add $6,600 to the yearly carrying cost, instead of $15,000, as estimated, making a total increased cost for the items mentioned by representatives of the company, due to putting on large cars on these lines, of $9,710, instead of $52,000, as estimated.

ELECTRIC RAILWAY BUSINESS POSSIBILITIES IN THE FAR EAST

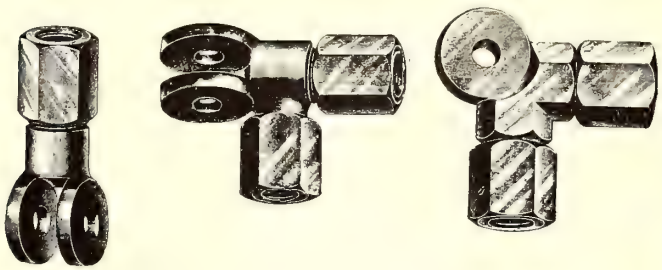
An American consulate in the Far East reports that an electric tramway company in his district will extend and improve its lines in the near future. The exact time has not yet been decided and specifications have not been completed, but a positive statement has been received from the company that American firms will be given an opportunity to bid on materials. The consul believes it would be advisable for American firms that can furnish steel rails and rolling stock to write at once to the general manager and request that specifications be sent them through the consulate as soon as they are decided upon. Further information regarding this matter can be obtained by applying to No. 5885, Bureau of Manufactures, Washington, D. C.

The Public Service Commission of New York, Second District, has called a conference of interurban railway officers to be held in Syracuse on Jan. 19, 1911, at which questions relating to the safety of interurban railway operation will be discussed. Charles R. Barnes, electrical expert of the commission, is preparing a program of subjects to be assigned to different railway officials for discussion.

The *Light, Railway and Tramway*, London, England, says that a life of Sir J. Clifton Robinson, who died recently, is being written by G. E. Cummings, who has for some years been associated with Sir Clifton. A preface to the work, which will be published by Messrs. Ouseley and will include an account of the origin and development of the tramway systems of the world, has been written by Sir William Bull, M. P., a personal friend of the subject of the memoir.

THREE CABLE ANCHORS

The three cable anchors shown in the acompanying cuts are recent products of Dossert & Company, New York, N. Y. The design indicated as style "S" is used to connect the end of a cable to a strain insulator, so as to anchor it. The next cut shows style "R," which is employed to anchor one cable and to



Cable Anchors, Styles S, R and E

take a branch wire off the anchor cable. The third cut shows style "E," which is used to splice and anchor two cables that are at right angles to each other. All of these can be used on stranded conductors only.

A NEW FREIGHT LOCOMOTIVE FOR THE GALT, PRESTON & HESPELER STREET RAILWAY COMPANY

The accompanying illustration shows the new Westinghouse-Baldwin electric locomotive recently purchased by the Galt, Preston & Hespeler Street Railway, of Ontario. This company operates some 30 cars on a standard-gage interurban line, 21 miles in length, connecting the places named in its title with the towns of Freeport, Centreville, Berlin and Waterloo. The power station and repair shops are at Preston. The railway traverses a farming country and does a thriving business in both local and through passenger and freight service.

Several years since this railway purchased a Westinghouse equipment consisting of four No. 93-A d.c. motors with a nominal rating of 60 hp each at 600 volts, for a locomotive similar to the one shown, but of smaller capacity. Its operation has been eminently satisfactory in every respect and the recent order for a larger locomotive of the same general characteristics argues strongly for the excellence of design and low maintenance charges of this type of slow-speed freight locomotive.

The new locomotive is designed for standard gage and weighs, complete, 100,000 lb. The gear ratio of 16:57 gives a normal speed of 8.25 m.p.h., at which speed a tractive effort of 18,220 lb. is developed. The maximum tractive effort is 25,000 lb. The locomotive carries four No. 308-B2 interpole d.c. motors having a nominal total rating of 400 hp at 600 volts. These motors are fitted with special windings for slow-speed service. Standard nose suspension is used.

Unit switch control is provided through two master controllers, one in each end of the cab. These controllers carry only the very small current from a storage battery, for exciting the electromagnetically actuated needle valve which admits air at 70 lb. pressure to the air cylinders of the unit switch. The action of each switch is therefore positive and independent of fluctuations of the line voltage.

This locomotive is of the double-swiveling truck type, with rigid frame and centrally located cab. The trucks are of the equalized pedestal type, with square wrought-iron frames and semi-elliptic springs. Each axle carries one motor. The Standard wheels have cast-iron centers, with steel tires bolted on. The flanges, journals and boxes are M. C. B. standard.

The longitudinal frame sills consist of four 10-in. channels, the width over the outside sills being 92 in. The end bumpers are of cast iron. They have heavy lugs which are riveted to the longitudinal sills and carry M. C. B. automatic couplers. Suitable steps are provided at each end. The frame bolster truss members consist of wrought-iron plates, 1¾ in. x 15 in., which are strongly braced. The entire frame construction is most substantial.

The cab is of wood, and is roomy and convenient, with four windows in each side. These, with additional windows in the ends, give the operator an unobstructed view in all directions. Suitable hoods at either end of the cab cover the resistance and other electrical equipment.

This locomotive is fitted with a hand brake on all the wheels,

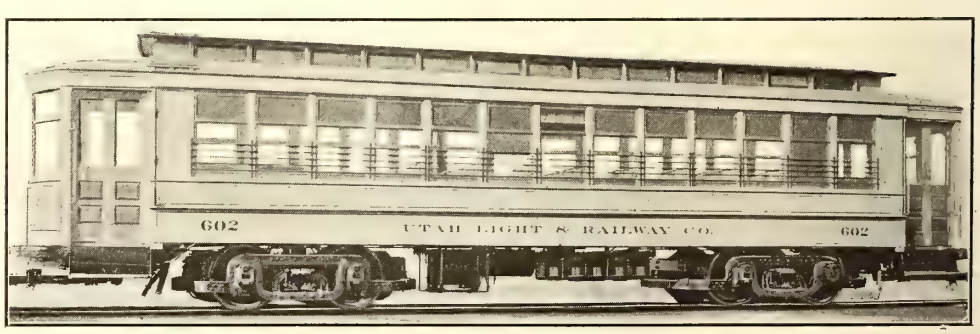


Electric Freight Locomotive for the Galt, Preston & Hespeler Street Railway

also with the Westinghouse air brake, schedule ET, with motor-driven compressor. Sand boxes, with pneumatic sanders, are provided at each end. The equipment also includes a bell and whistle. The principal dimensions are as follows: Wheel-base of each truck, 7 ft. 4 in.; total wheelbase of locomotive, 29 ft.; diameter of driving-wheels, outside, 36 in.; diameter of driving-wheels, centers, 31 in.; journals, 5 in. x 9 in.; width, 9 ft.; height to top of cab, 12 ft.; length, 36 ft.

CARS FOR THE UTAH LIGHT & RAILWAY COMPANY, SALT LAKE CITY, UTAH

The St. Louis Car Company has just shipped to the Utah Light & Railway, Salt Lake City, 12 cars of its semi-convertible type, in which both sash enter the roof. These cars are 34 ft. 4½ in. over the corner posts, the length of the platform inside is 4 ft. 6 in. and the length of the car over bumpers is 45 ft.



Vestibuled Car for Utah Light & Railway, Salt Lake City, Utah

4½ in. The width over the side posts is 8 ft. 4 in. and the width over all 8 ft. 6 in.

The side sills consist of long leaf yellow pine plated on the inside with ⅜-in. x 14-in. steel plate for the entire length with yellow pine subsills; the whole is thoroughly bolted together. The center sills are 5-in. x 9¾-lb. steel I-beams, with yellow pine fillers on each side. The end sills are of oak, 5 in. x 10 in., plated on the inside with ½-in. x 9-in. steel plates; the

intermediate cross frame and bracing are of yellow pine, angles and flat steel.

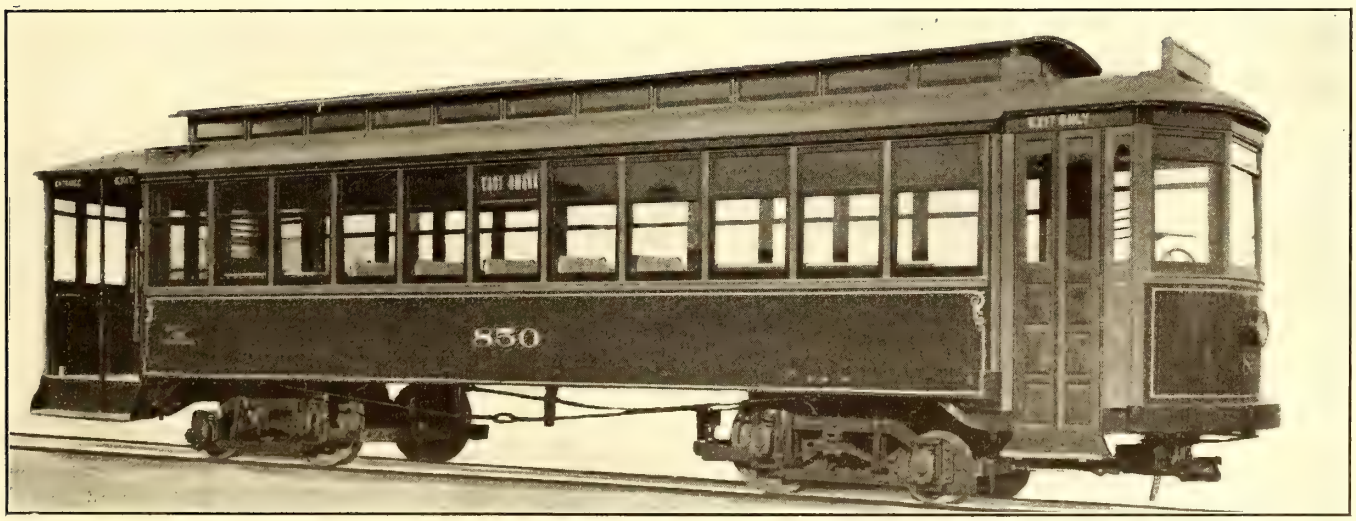
The cross framing between the center sills consists of cast-iron blocks with a hole in the center to permit the passage of electric cables and air pipes from end to end of car body. The lower floor is of 13-16-in. tongued and grooved flat yellow pine laid lengthwise, while the top floor is of 13-16-in. tongued and grooved vertical-grained yellow pine laid crosswise under the seats. In the aisles inside on the top floor the floor mats are of removable hard maple laid lengthwise.

The platforms are supported by four knees at each end of car, the larger outside knee being a 7-in. 12¼-lb. steel channel bent in shape and extending from the buffer to the bolster along the side sills. This knee is reinforced with 1-in. x 6-in. steel plate forged to shape and riveted to the inside of the channel. The center knees consist of railroad T-rail which weighs 45 lb. per yard and extends from the buffer to a point 4 ft. ¾ in. back of the bolster.

The panels are of the concave-convex type. The cars have 13 windows per side, two at each end, and double sliding doors in the bulkhead. The interior finish is of cherry. The metal trimmings throughout are of bronze highly polished and lacquered and are of the car builder's standard pattern. The cars are further equipped with four illuminated signs and walk-over seats upholstered in rattan and furnished with a top rail. The signs and seats are also of St. Louis manufacture. Besides the vestibule doors, there are four channel iron folding gates per car.

PAY-AS-YOU-ENTER CARS FOR OMAHA

The Omaha (Neb.) & Council Bluffs Street Railway lately received from the American Car Company the 25 pay-as-you-enter cars of the type shown in the accompanying illustration. The cars are of the single-end closed type, 41 ft. long over all, with body 29 ft. 4 in. long. The width over the sill and over the posts at the belt is 8 ft. 3 in. and the height from the sill to the trolley base is 8 ft. 11¾ in. The seating capacity of 34 is furnished by Brill transverse seats except opposite the end body doors, where short longitudinal seats are used to facilitate passage. The entrance and exit doors at the conductor's end slide into a center bulkhead. The motorman's platform is divided with a vestibule door which closes the exit. When this door is closed the step is covered by the piece hinged to the bottom of the door, thus making it impossible to board the car. All the interior fixtures are of polished bronze. The curtain fixtures were furnished by the Curtain Supply Company. The trucks are Brill 39E maximum traction type, each carrying a GE-80 motor. The cars carry Tomlinson couplers, Hunter destination signs, Mason safety tread, International registers and Consolidated heaters.



Pay-as-You-Enter Car for the Omaha & Council Bluffs Street Railway

SEAMLESS COLD-DRAWN STEEL TROLLEY POLES

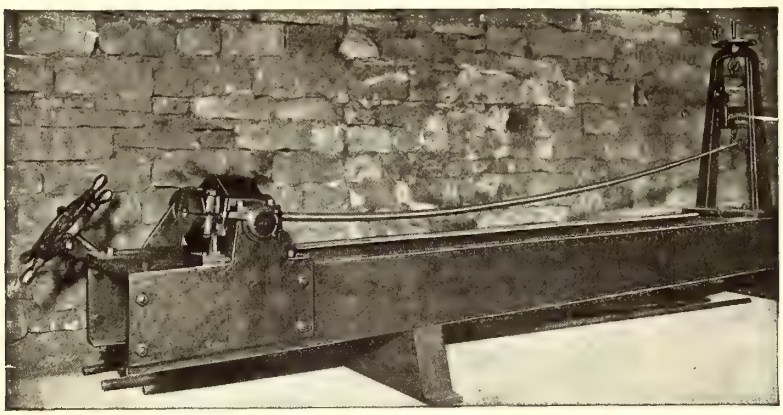
Under normal conditions of service, a trolley pole is subjected to stress as a beam rigidly secured at one end and loaded on the free end. This condition of loading causes a maximum bending moment at the point of support, which bending moment decreases uniformly to zero at the point of applying the load. Abnormal conditions cause other stresses of unknown magnitude which can be provided against only by a judicious increase in the strength of the pole over that required for the known stresses.

The trolley pole of minimum weight to resist the known stresses would have a maximum cross-sectional area at the trolley base or point of support, with the cross-section decreasing uniformly to nothing at the harp. For practical reasons such a theoretical pole is not desirable. In the design of the poles made by the National Tube Company, Pittsburgh, Pa., the requirement for minimum weight has received careful consideration. Its poles are made from No. 13 gage material, as experience has shown that a lighter gage may fail by local injuries while a heavier gage simply adds to the weight of the pole. The theoretical requirement for a pole of minimum weight points out a method for increasing the strength of the pole without a proportionate increase in the weight. This method consists in using a reinforcement at the base end and on the inside of the No. 13 gage member. The length of this reinforcement is varied, to suit the requirement as to strength, up to a maximum which occurs when the length of the reinforcement is such that the resistance to bending at the end of the reinforcement is just equal to the resistance to bending at the trolley base. The reinforcement is integral with the body of the pole.

These trolley poles are regularly manufactured in two designs, namely, standard "A" and standard "B." In the standard "A" pole the reinforcement is only of sufficient length to prevent deformation of the circular section by the stresses caused by the service of the pole or by the clamp on the trolley base. This design is suitable for all ordinary service and makes the lightest pole it is practicable to manufacture or use. In the standard "B" design the reinforcement is of the maximum length required by the condition of two points in the length of the pole with equal resistance to bending. Special designs are made to meet special requirements. All of the poles are made from a basic open-hearth steel of about 0.17 per cent carbon, low in phosphorus and sulphur. Prior to the last cold drawing operation, the material is given a special heat treatment to leave the grain in the finest condition. The elastic limit of the material in the finished pole is from 60,000 lb. to 70,000 lb. per sq. in.

The machine for testing trolley poles includes a frame or base of 15-in. steel channels, the rigidity of which is so great

that the deflection of the frame is negligible. At one end of this frame is a sliding adjustable stand carrying the load-weight device, which consists of a scale of 500 lb. capacity reading to ½ lb. and sensitive to 2 oz. At the other end of the frame is



Trolley Pole Testing Machine

the device for applying the stress to the piece under test. This consists of a frame carrying a horizontal shaft capable of being rotated by a hand wheel operating a worm and gear, through an angle of about 10 deg. This amount of rotation will produce a deflection of 30 in. on a test piece 16 ft. long. The horizontal shaft carries a chucking arrangement by which the piece under test is clamped rigidly with the center lines of the horizontal shaft and the piece under test intersecting. The end of the horizontal shaft carries an arm in the end of which is fixed a micrometer reading to 0.001 in. whereby the movement of the horizontal shaft is measured. The micrometer reading is translated into deflection by simple proportion.

In testing trolley poles, the scale is set at the proper distance from the rotating chuck, corresponding to the length of trolley pole under test; the pole is then placed in the chuck and on the scale, and the weight of the pole so supported recorded. The chuck is then tightened. The micrometer is set at zero and the scale elevated or depressed in its stand until it indicates the weight of the pole as before recorded. Load is then applied by the hand wheel and the deflection measured by the micrometer.

LOADS AND DEFLECTIONS OF VARIOUS LENGTHS OF POLES.

Length Ft.	Average Weight Lb.	Load Carried at End of Pole at Elastic Limit. Lb.	Deflection Due to Load at Elastic Limit and Weight of Pole, In.
Standard "A" Pole.			
12	18.4	48	13¼
13	20.3	44	15¼
14	22.3	40	17¾
15	24.3	36	19½
Standard "B" Pole.			
12	22.7	75	22½
13	24.7	69	26½
14	26.7	62	30
15	28.7	55	33

RECORDING CAR MAINTENANCE

The company which operates only a few score cars cannot afford to keep elaborate records of each equipment detail, but it is desirable, nevertheless, to have a fairly good idea of the comparative cost of different equipments so that excessive maintenance expenses can be quickly detected. This end is readily attained by employing a car record form such as the one used by the Lynchburg (Va.) Traction & Light Company and reproduced herewith. This blank is a monthly summary of daily labor and material reports from the shop on work done on individual cars. The original form is 32 in. x 16 in. in size and is divided into enough columns vertically to allow the listing on one sheet of all the cars operated. It will be noted that the left-hand side of the sheet contains a list of the principal truck, body and electrical parts. Reading vertically under each car number shows the separate truck, body or electrical costs as well as the total maintenance cost for one car; reading horizontally shows the total monthly cost for all cars for any given item such as brushes, rheostats, etc. Space is reserved also to record the mileage of each car. This simple record has been found of material value. Thus, in one case, it clearly demonstrated that certain GE-800 equipments were costing just about twice as much for maintenance as GE-80 motor outfits in the same service.

COST OF CAR MAINTENANCE for the Month of_____ 19_____

	Car Numbers	10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36		TOTAL
		No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	
TRUCKS	Carbon Brushes																																																			
	Brake Shoes																																																			
	Wheels																																																			
	Truck Parts																																																			
	Brake Parts																																																			
	Air Equipment																																																			
	Fenders																																																			
	Time																																																			
	Time Prorated																																																			
	Sub Total																																																			
BODIES	Bells																																																			
	Lamps																																																			
	Woodwork, Handles, Doors, Tools, &C.																																																		
	Glass																																																			
	Trolley Wheels, Rope and Parts																																																			
	Heater Parts																																																			
	Register Parts, Cords, &C.																																																			
	Time																																																			
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Maintenance Record of All Cars Used by the Lynchburg Traction & Light Company

News of Electric Railways

Toledo Traction Situation

A man whose identity has been kept secret told John B. Merrill, chairman of the committee on railways and lights of the City Council of Toledo, Ohio, on Dec. 21, that he represented a group of capitalists who were ready to equip a system for the city to be operated with a straight fare of three cents and universal transfers, and to permit the insertion of a clause in the grant that would give the city the right to purchase the property after the expiration of a certian period at a fixed price or to nominate a purchaser. Mr. Merrill placed the matter before Mayor Whitlock. As the franchises of the Toledo Railways & Light Company on a large part of the streets do not expire for some years, any attempt to establish a new system would undoubtedly result in complications that would keep the city in a turmoil for many years.

City Solicitor Schrieber said that the company could continue to operate where its rights have not expired, and that its tracks could be condemned for joint use for interurban purposes only. He suggested that there might be two ways of solving the present problem. One was to make arrangements with the company to use the streets where its franchises have expired until the expiration of all others in 1914 and then take up the matter anew. Another was to take up the question of a blanket franchise now and give an entirely new grant to take the place of all others, as suggested by the administration.

The letter addressed to Mr. Lang on Dec. 15 by Mayor Whitlock, which was mentioned in last week's issue of the ELECTRIC RAILWAY JOURNAL, said in part:

"It is our hope that we may come as speedily as is consistent with the magnitude of the question involved to an understanding that will make possible not only the lowering of the rates of fare charged, but that enlargement and improvement of the service which is demanded by the growth of the city and desired alike by the people and by the company.

"In our view the modern theory of the relations between public service corporations and municipalities requires that the control of service should rest exclusively with the public authorities as the representatives of the people for whom the service is performed. In saying this we do not wish to be understood as ignoring in any sense the rights of those who are to perform this service, and therefore I hasten to add that no such control of service is intended as will either impair the real value of the company's property or affect its ability to earn a just rate of return in addition to the cost of the service rendered. As your company is no doubt aware, we of this administration have long declared, and still believe, that a rate of fare fixed at three cents with universal transfers would be possible under a reorganized system that would enjoy the benefits of a more economical routing of cars, of improved and more scientific methods for the collection of fares and of those betterments to which you referred in your letter of July 5, not the least of which inducements is that stimulus to traffic which reasonably may be expected from a reduction in the rate of fare by the company.

"Upon this point the administration has pledged itself to the people of the city, and its pledges are, of course, inviolable. But inasmuch as any franchise, before it becomes operative, must be submitted to the people for their approval, we think it is safe to say that if it should be clear that 3-cent fares are impracticable the people, with whom the power rightly rests, would nevertheless solve the whole problem upon just and equitable terms. That is to say—I wish not only to avoid misunderstanding but to be perfectly frank—if 3-cent fares are unjust, then the people would not insist upon them, and we intend, after the subject has been thoroughly and publicly investigated and discussed, to go to the people with the result, to consult and abide by their judgment and, by the submission to a vote of the whole people of any franchise ordinance that may be enacted, to leave with them the conclusion of the whole matter.

"We suggest the following for consideration of your company:

"1. That the City of Toledo and the Toledo Railways & Light Company immediately proceed to negotiate in public a general settlement of the street railroad problem, that settlement to be reached under an ordinance to be drawn upon the following lines:

"(a) The reservation to the city of the power to control the service, character, schedules and routes of all cars operated upon the streets of Toledo, including the interurban cars.

"(b) The stipulation of a fixed present value of the company's property, with suitable provisions for additions thereto, such value being the basis of a fixed return to the company over and above operating expenses for the service performed.

"(c) If, after ascertaining this value and the return to be justly made upon it, considering it in connection with the expense of operation under the method herein set forth, it shall be apparent that a 3-cent fare is impracticable and unjust, then to provide a sliding schedule of fares that will automatically adjust the rate of fare to be charged at any time, so as to provide for the cost of operation, the payment of interest and taxes and the just returns already mentioned.

"(d) Suitable provisions to protect the company against any loss in the value of its property and against such regulation of service on the part of the city as might impair the ability of the company to earn the agreed dividends upon capital employed.

"(e) Suitable provisions for the maintenance of the property as well as reasonable restrictions upon inflation of the cost of operation or maintenance.

"(f) Suitable provisions for extensions by the building of new lines and otherwise.

"(g) A reservation to the city of the power to purchase the property of the company when authorized by the State to own and operate street railway systems, or to designate a purchaser therefor at an agreed price.

"(h) The reservation to the city of the power of revocation upon failure to comply with the terms of the ordinance.

"(i) Such other provisions as may be necessary to carry out the general principles above outlined.

"2. After the preparation of such an ordinance, leaving in it blanks for the ultimate insertion of valuation and the agreed or, in certain contingencies, the initial rate of fare, we suggest that the value of the property be fixed. The preparation of the ordinance and the determination of value should be by open negotiations between the company and the Council, the company selecting a representative, the city a representative, and these two to negotiate in public in the Council Chamber and in the presence of the Council in its official capacity the terms of the ordinance and the value of the various items of the company's property, arriving in the end at an agreed valuation and also at the rate of fare which shall seem to be enough to produce the revenue required to meet the charges fixed by the ordinance."

The Business Men's Club has decided not to act upon the suggestion that a committee be appointed to secure the data now in possession of the city and keep in close touch with the negotiations. The club considers that its services may be needed under certain contingencies and that it will then act, if necessary, but unless so needed it will not take part in the negotiations.

At noon on Dec. 24, 1910, Albion E. Lang, president of the Toledo Railways & Light Company, sent the following letter to Mayor Brand Whitlock in reply to the one addressed to Mr. Lang by that official recently, of which an abstract giving the principal statements is published in the foregoing:

"We desire to convey to you our appreciation of the kindly expressions in your letter, and fully agree with you that satisfactory service is one of the most important questions for consideration.

"In order to put the franchise question in concrete form for discussion we respectfully ask that you cause to be

drawn an ordinance, based upon the principles enunciated in your letter, and fully protecting the rights and interests of the city and its citizens, with such provisions safeguarding the company as to you seem fair. In accordance with your suggestion, the ordinance should contain blanks for the ultimate insertion of such matters as valuations and rates of fare.

"Upon receipt of this ordinance, we will immediately draft such amendments or additions, if any, as the company may deem necessary. It seems to us that this course will put the matter in definite form for the public discussions referred to in your letter, and confine these discussions to those matters as to which the city and company may not find themselves in full accord.

"We recognize how important it is for the growth and welfare of the city that the franchise question should be disposed of speedily, and we feel sure, with the form of an ordinance prepared as suggested above, the discussion will be productive of much quicker results, and will insure what the city and company each desire, namely, the fairest and earliest possible settlement."

Subway Offer in Newark

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, addressed a letter on Dec. 22, 1910, to Mayor Haussling, of Newark, which contained an offer for the construction of a subway in Newark for surface cars of the Public Service Railway as a solution of the traffic problem in that city, and for the use of the Morris Canal for high-speed operation. In his letter to the Mayor Mr. McCarter said, in part:

"The time has come when it is imperative that the problem of congestion at the 'Four Corners' and the development of rapid transit for Newark and its suburbs should be solved. Five years ago our schedules called for the passage of 387 cars per hour across the 'Four Corners' during the rush hour. The present schedules call for the passage of 525 cars during the same period. For nearly eight years my associates and I have been carefully studying this problem, and we are prepared to suggest a plan which, we think, will accomplish the purpose. It follows:

"First—A subway into which surface cars may run should be built on Broad Street, from approximately Bridge Street to Clinton Avenue. Such small portions of the apexes of Washington Park and Lincoln Park as may be necessary for the purpose should be used for the portals of the subway, in order that Broad Street itself should not have to be cut. This portion of Broad Street covers the congested centre of the city, and a subway constructed along its length would be available for such portion of the cars on practically all north and south lines of the city as it would be found desirable to operate therein.

"Second—If possible, the Morris Canal should be abandoned and its roadbed, from the Pennsylvania Railroad westward at least, should be similarly utilized as an open-air subway. Such of the cars as thought desirable on all of the east and west lines of the city could enter this open subway near the Market Street depot and emerge therefrom at various points on the hill. These two subways would cross (of course not at grade) at the apex of Military Park. By their joint construction and use rapid transit to all the outlying sections of the city and to the suburbs would be provided, while the surface tracks would remain to be devoted principally to the short-haul traffic.

"The expense attendant upon the construction of such a system as is now suggested can be handled in two ways, either of which would be agreeable to this corporation. If the corporation could obtain a franchise for the Broad Street subway under fair terms and for a proper duration of time, and could acquire the bed of the canal, it would finance the entire undertaking. If, on the other hand, it was deemed better for the city to build and own the Broad Street subway and acquire title to the canal bed and equip it for subway purposes, the corporation would be willing to lease both for the purposes of operation, paying a rental therefor that would pay the interest on the cost of the improvement, and in addition thereto such a sum annually as would, compounded over a period of years, amortize the entire cost of the improvement to the city during the life of the lease, so that at the end thereof the city would own the subways without cost to itself.

"I also think it would be possible to induce the Pennsylvania Railroad to extend its high-speed line now proposed to terminate at Saybrook Place to practically a junction point with these subways at the apex of Military Park.

"In connection with the development of the canal, if the city saw fit, another municipal improvement could be made, namely, the removal of the market and the development of a wide thoroughfare embracing both the present North Canal Street and South Canal Street and the present location of the market, running easterly from Broad Street to connect with Passaic Avenue or other new highways in the eastern section of the city.

"The Lehigh Valley Railroad, which is the lessee of the Morris Canal & Banking Company, is naturally anxious to have the canal abandoned, as its continued operation causes an annual financial loss to that corporation of approximately $250,000. The Public Service Corporation has no interest, direct or remote, in the abandonment of the canal, except the possibility of utilizing it when abandoned for the purpose set forth in this letter.

"Third—If the abandonment of the Morris Canal is impracticable within a reasonable time, the alternative is a subway on Market Street of a type similar to the one proposed for Broad Street, which should run from the Market Street station of the Pennsylvania Railroad to a point in the approximate vicinity of the court house, to be used by the east and west lines in precisely the manner outlined for the use of the Broad Street subway by north and south lines. This is obviously by no means so attractive a proposition as the canal and is confronted with some engineering difficulties.

"This corporation has no pride of opinion in the plan suggested in this letter if a better one can be devised. I suggest to your honor that the whole subject be taken up promptly by the city officials in conjunction with the representatives of this corporation and that the Public Utility Commission and the Board of Trade be invited to cooperate."

Cleveland Traction Situation

A. Winthrop Coffin, of Perry, Coffin & Burr, Boston, Mass., bankers, began to investigate street railway conditions in Cleveland on Dec. 19, 1910, at the instance of N. W. Harris & Company, New York, and upon his report will depend the decision of the bond house as to whether or not the needs of the Cleveland Railway for the next few years will be financed. All of the bonds of the company, which amount to about $12,000,000, will become due within the next two years. Mr. Coffin stated that the following important points form the basis of his investigation and of the report which he will make:

First—Character of the city, including the territorial size and quality of its people and industries.

Second—Franchise under which the company is operating.

Third—Physical property of the company and its condition.

Fourth—The earning capacity.

Fifth—The management.

It is thought that Mr. Coffin will dwell particularly in the report on the franchise. He has refused to discuss the matter, however.

Mr. Coffin suggested that what might be termed a belt line, extending from the lake, on one side, through the outskirts of the city to the lake, on the other, would aid in retaining the 3-cent fare, with a cent for a transfer. The line suggested would cross every line radiating from the center of the city, and by taking a large proportion of the travel would lighten the traffic on the direct lines considerably and shorten the average length of haul. Councilman Shimmon has prepared a resolution to be introduced at the next meeting of the Council which calls upon Street Railway Commissioner Dahl to prepare estimates for such a line.

Mr. Coffin is acquainted with the officers of the Cleveland Railway, former Mayor Tom L. Johnson and a number of the local bankers, and he has taken advantage of this fact and consulted with many of them on the situation. Street Railway Commissioner Dahl has also been consulted frequently.

J. J. Stanley, president of the Cleveland Railway, was

quoted in one of the local papers as saying that the bond houses will undoubtedly ask for some changes in the Tayler grant before they will take the bonds of the company, but did not indicate what these changes would be.

Recent observations of the Health Department have shown that on an average the air in the street cars is as pure as in school buildings.

Before leaving the city on the evening of Dec. 23, 1910, Mr. Coffin expressed some doubt as to whether a subway system would pay in a city the size of Cleveland. He feels that a city should have a population of 1,500,000 people to make a subway system profitable, especially where so many lines must be built.

Horace E. Andrews, former president of the Cleveland Railway, stated on Dec. 25, 1910, that he would meet Allen B. Forbes, of N. W. Harris & Company, and A. W. Coffin in New York on the afternoon of Dec. 28, 1910, but asserted that nothing could be said about financing the needs of the company until after that meeting.

Tax Questions in Ohio

Attorney-General Denman of Ohio has attacked the contentions of the Cincinnati, Georgetown & Portsmouth Railway and the Felicity & Bethel Railway, both of which had previously asked for an order to restrain the State tax commission from listing them as railroads and charging them with the excise tax under the Langdon law. The companies claim they are not railroads under the intent of the law, because they are not operated entirely by steam. The Attorney-General contends that the powers granted in the charter govern the matter and not the manner in which cars or trains are operated. He asserts that the facts stated in the petition of the companies are immaterial and that the properties should be classed as railroads.

Judge Rogers, at Columbus, Ohio, recently granted a temporary order restraining the State Tax Commission from certifying the Youngstown & Ohio River Railroad to the State Auditor and State Treasurer as a steam railroad. The company operates between Youngstown and East Liverpool, Ohio. It asserts that only 14 per cent of its business is done by trains operated by steam, and that if it is compelled to pay a tax of 4 per cent on its gross income as a railroad it will be compelled to abandon the freight business, to the inconvenience and damage of its patrons and itself.

In its first annual report to the Governor the Tax Commission of Ohio discusses the situation arising as the result of the contentions of the Ohio Traction Company, in a case filed recently in the court, as follows:

"The Ohio Traction Company owns and operates an interurban railway between Cincinnati and Hamilton. As such it made report of its gross earnings from the operation of the 25 miles of interurban railway, amounting to $203,080, the taxes upon which would amount to $2,437.90. But the Ohio Traction Company, in addition to owning the interurban railway between Cincinnati and Hamilton, is the owner of the Traction Building, in Cincinnati, from which it receives a large income. It is also the owner of the stock of the Cincinnati Traction Company, from which it also receives a large income, and the owner of stock in the Cincinnati, Dayton & Toledo Traction Company, from which it receives income.

"Section 52 of the act of May 10, 1910, requires interurban railways to report 'the entire gross earnings, including all sums earned or charged, whether actually received or not, for the year next preceding the first day of May, from whatever source derived, for business done within the State, excluding therefrom all earnings derived wholly from interstate business or business which is done for the federal government.'

"The commission ruled that under the provisions of that section the Ohio Traction Company should return its earnings from the Traction Building in Cincinnati and from stocks in other companies. The company, being dissatisfied with this ruling, has instituted proceedings to enjoin the commission from considering anything but the earnings from its operation of the interurban railway in determining the amount of the gross earnings of the company to be certified to the Auditor of State for computing the amount of its excise tax, and the action is now pending.

"The Ohio Traction Company is a corporation organized under the laws of Ohio, with an authorized capital stock of $20,000,000, of which $16,000,000 is issued and outstanding, invested in the various holdings named. But a small portion of this vast capitalization is represented in the interurban railway between Cincinnati and Hamilton—probably not as much as $1,000,000. If the contention of the company is right, all it is required to pay to the State for the privilege of exercising franchises representing $20,000,000 is the excise tax of 1.2 per cent upon its gross earnings from the interurban railway, amounting to $2,437.90.

"Did the Ohio Traction Company not own the interurban railway it would be required to pay a fee of 0.1 of 1 per cent for 1910 and 0.15 of 1 per cent for each year thereafter upon its subscribed or issued and outstanding capital stock. The fee it would have been required to pay for the present year would have amounted to $16,000.

"If that is the proper construction of the law as it stands at present there is nothing to prevent either domestic or foreign corporations from escaping substantially all State taxes by adopting the simple expedient of investing a small portion of capital in a public utility and paying an excise tax upon the gross receipts derived from that source."

Transit Affairs in New York

The Board of Estimate at its meetings on Dec. 22, 1910, referred the Public Service Commission's letter favoring the adoption of the Interborough Rapid Transit Company's subway plan to the transit committee of the board. It was provided that the committee should not have the power of delaying action on the recommendations made by the commission and that it should report to the board at the regular meeting on Jan. 5, 1911. The transit committee is made up of Mayor Gaynor, Comptroller Prendergast and President Mitchel of the Board of Aldermen. In the discussion before the Board of Estimate which followed the reading of the commission's letter some of the members held that the commission was seeking to place entirely upon the Board of Estimate the responsibility of accepting or rejecting the offer of the Interborough Rapid Transit Company. Messrs. Prendergast and Mitchel were willing to have the whole matter submitted to their committee, but the rest of the members of the board objected. Mayor Gaynor did not feel well enough to preside at the meeting. Mr. Mitchel presided, and when the commission's communication was brought up the Mayor suggested that the letter from the Public Service Commission should be held over until the first meeting of the board in January, when the subject could be considered by the board sitting as a committee of the whole. Borough President McAneny moved that the Mayor's recommendation be adopted. Finally the motion to send the matter to the committee on transit of the board was adopted.

The Public Service Commission considered on Dec. 23, 1910, the proposed forms of contracts for third-tracking the elevated lines of the Interborough Rapid Transit Company and the extensions of the elevated lines in the Bronx. The commission and the company have agreed on contracts giving the company extensions on an 85-year franchise, becoming indeterminate after 10 years, and its third tracks on a perpetual franchise, for which the company, after making the improvements on its own credit, is to pay the city 2 per cent on the gross receipts of the elevated extensions and a like amount on the estimated increased receipts at the express stations of the elevated lines which are to be third-tracked.

Most of those at the public hearing on Dec. 23, 1910, represented property holders, taxpayers and similar organizations in the Bronx, which is most largely concerned with the proposals. Most of the delegations from the Bronx favored the extensions and the third-tracking. Many of the protests which had been expected were forestalled by the announcement that the company had arranged to use the Putnam Division bridge of the New York Central & Hudson River Railroad to carry the Ninth avenue extension across the Harlem River, instead of the Macomb's Dam Bridge at 155th Street, as the original plan contemplated. The principal appearance in opposition was made by Prof. Edward W. Bemis, representing the newly organized Franchise Conference.

Decision in Des Moines Franchise Case

Judge Applegate, at Des Moines, Ia., has decided that the Turner franchise under which the Des Moines City Railway operates did not expire in 1898, as the city claimed, and that the City Council had the power to grant an unlimited franchise. Judge Applegate also held that he was without jurisdiction to determine whether the franchise expired in 1916. He advised that the city appeal the case to the Supreme Court. N. T. Guernsey, counsel for the company, in commenting on the decision said:

"Five years ago the Civic League asserted that the Turner ordinance expired Jan. 1, 1898, the date when the exclusive grant in that franchise terminated. They therefore contended that on Jan. 1, 1898, all rights of the company to maintain and operate its street railway system ended. This claim the company denied. Several members of the Civic League as relators brought the suit that has just been tried in order to determine this question. This suit was taken up at a later date and prosecuted by the city.

"In this suit we shaped our answer so as to compel the court to decide whether this ordinance expired Jan. 1, 1898. We wanted this decided definitely. In determining whether or not the Turner ordinance expired Jan. 1, 1898, it was necessary for Judge Applegate to determine three or four fundamental matters. He held, as is shown by his opinion:

"'First—That the city had the power to grant a perpetual franchise.

"'Second—That by its terms the Turner franchise was not limited to 30 years, but was unlimited as to time, and that this clearly appeared from the language of the ordinance.

"'Third—That both the company and the city, both before and after January 1, 1908, had treated the Turner ordinace, not as a grant for 30 years, but as a grant unlimited as to time.'

"The determination of these fundamental questions inevitably resulted in the holding that the company is not unlawfully maintaining or operating its street railway in the streets, but that it has authority to maintain and operate it under the Turner franchise.

"Judge Applegate did not decide that the Turner ordinance will expire Oct. 1, 1916, which is 50 years from the date when the corporation to which it was granted was organized. He expressly stated that this question was not involved in this case, and that he had not the jurisdiction to decide it. He did not say that if this question were presented to him his present inclination would be to hold the grant limited to the 50-year period above referred to, which would expire in 1916. This is not a decision of anything, but is what the lawyers call a pure dictum, which neither binds the court which makes the statement nor any other court.

"What this case actually decides is this: that the Turner ordinance is a valid existing franchise under which the Des Moines City Railway has the right to construct, maintain and operate its system of street railways in the streets of the City of Des Moines, and that this franchise contains no time limit. The case does not decide when this franchise will terminate or that it will ever terminate."

Railway Affairs in Detroit

The committee on franchises of the City Council of Detroit, Mich, had a report ready for presentation at the meeting of the evening of Dec. 20, 1910, in which it was recommended that this body negotiate with the Detroit United Railway for a settlement of the franchise question. This report was accompanied by a letter from J. C. Hutchins, president of the company, in which he agreed to stand the expense of another appraisal of the property. Alderman Gutman, however, asked that an opportunity be given him to prepare a minority report, recommending that the Council make another effort to persuade F. T. Barcroft to defend his appraisal. The committee acceded to the Alderman's request.

The question of reverting to the Barcroft appraisal was threshed out at a meeting of the committee on franchises on Dec. 22, 1910. Clyde L. Webster, who served as attorney for the committee of fifty, was present, and scored Mr. Barcroft's appraisal and his connection with the committee. He asserted that Mr. Barcroft had delayed matters until the committee finally disbanded in disgust. Mr. Webster said that a settlement would never be reached if it was left to Mr. Barcroft to defend his figures. Mr. Barcroft was present and stated that he could defend his appraisal, but is said to have evaded naming the precise conditions under which he was willing to make the defense. The committee will doubtless recommend the Common Council to authorize a new appraisal.

J. C. Hutchins, president of the Detroit United Railway, is said to have agreed in his letter to the Council to pay the expenses of another appraisal and to leave it to the engineer or board of engineers appointed by that body to decide whether the cost of the appraisal shall be charged up to capital account or disposed of in some other way.

A suit has been brought to compel the Detroit United Railway to pay an additional rental of $200 a day for the use of Fort Street, West.

Constitutionality of Wisconsin Utilities Act Questioned.—In the Supreme Court case of the Kenosha (Wis.) Electric Railway, now pending, the constitutionality of the Public Utility Law has been attacked. The attorneys for the company charge that the right of the commission to decide whether a new public utility can be started in any city where there is a public utility is unconstitutional because it involves a legislative function. The State argues that the function is administrative.

Winnipeg Strike.—The Winnipeg (Man.) Electric Railway gave its employees until Dec. 20 to return to the service of the company, but the men concluded to continue the strike despite the fact that practically a full service is being operated by the company with men secured from Toronto, Montreal and other places. Wilford Phillips, general manager of the company, has declared that, as far as the company is concerned, the strike is at an end. A car was burned at Weston, a suburb of Winnipeg, on Dec. 23, but no arrests were made as the crowd dispersed before the police arrived on the scene.

Metropolitan Association of Electric Tramways Managers Elects Officers.—At a meeting of the members of the Metropolitan Association of Electric Tramways Managers, held at the Municipal and County Club, London, England, on Dec. 9, 1910, the following officers were elected: Chairman, A. H. Stanley, managing director, London United Tramways; vice-chairman, H. E. Blain, tramways manager, West Ham Corporation Tramways; honorable secretary, T. G. Goodyer, tramways manager, Croydon Corporation Tramways. Mr. Stanley succeeds the late Sir Clifton Robinson as chairman of the association.

Women Strike Victims Sue Company.—Mrs. Catherine Kelly and Mrs. Jennie Hart have brought suit against the Columbus Railway & Light Company, Columbus, Ohio, for damages to the extent of $5,000 and $2,500, respectively, for injuries received from shots fired by Gerald O'Leary, alias George W. Brady, who was acquitted on the charge of having shot Helen Kelly, daughter of one of the women. All three women were injured at the same time, but the wound which Helen Kelly received was the most serious, and the attorney for the women states that he will shortly bring suit for $10,000 damages because of her injuries. The attorney says that the fact that Brady was acquitted on the criminal charge will not affect the suits, as a preponderance of evidence only is needed in the suit for damages, while in the criminal case guilt had to be established beyond a reasonable doubt.

Powers of District Commissioners Defined.—Judge Pugh, of the Police Court of the District of Columbia, in dismissing a complaint on Dec. 20, 1910, against a motorman of the Capital Traction Company who operated a car equipped with an arc headlight held that the power of the Commissioners of the District of Columbia, by whom the complaint was lodged, ceased so far as street railways were concerned when the law of May, 1908, giving the Interstate Commerce Commission jurisdiction over the railways in the District, went into effect. In rendering his decision Judge Pugh said: "Extraordinary powers were conferred on the District Commissioners to draw up and enforce

police regulations by the joint Congressional resolution of 1892. This power continued until May, 1908, when the legislation was passed conferring upon the Interstate Commerce Commission the right to regulate the street railway systems in the District. There is no doubt that Congress intended that this commission should have sole jurisdiction over the local railway systems. Since this legislation became effective the Board of District Commissioners has been deprived of its former power so far as the electric railways are concerned, in my opinion, and all regulations previously passed by it affecting such street railways are void. Two sources for the same character of regulations would terminate in conflict and misunderstanding. In the present case the commissioners, by assuming to prosecute, have taken the position of regulating a regulation."

Briefs Filed in Regard to Riverbank Subway in Boston.—Thomas L. Babson, corporation counsel of Boston, and Frederick C. Snow, attorney for the Boston (Mass.) Elevated Railway, have filed with the Railroad Commission of Massachusetts their briefs in the matter of the stations to be operated in the new Riverbank subway. The board gave a hearing recently on an appeal of the company from a decision of the Boston Transit Commission fixing the number of stations at three, and their locations at Massachusetts Avenue, Dartmouth Street and Charles Street. The company desires that there be no stations whatever. Mr. Snow points out that the cost of three stations, according to the estimates of the engineers for the Transit Commission, will be $304,000, and of the engineers of the company, $317,000, this amount being over and above the cost of the subway without stations; this estimate also is based upon plain stations, with little in the way of architectural effect or tiling. This means an extra annual expense to the company of interest on the additional cost of maintaining, lighting and heating the stations; loss due to the stopping of the trains, and the additional labor cost made necessary by the longer running time of trains. It is estimated that the cost of lighting and heating the stations will be $6,296.85 per year; stopping trains will cost $16,302.09 on account of motive power alone; the additional labor cost on account of longer running time will be $17,386.81, and there will also be additional wear and tear of equipment which it is not practicable to compute.

Railroad Terminal Electrification Agitation in Chicago.—A letter from H. A. Stillwell, the president of the Association of Commerce of Chicago, to the Mayor and the Common Council of Chicago was made public at the meeting of the City Council on Dec. 19, 1910. As previously announced in the ELECTRIC RAILWAY JOURNAL, the Association of Commerce, an influential organization of business men, has been investigating the subject of terminal electrification at Chicago. The work is in charge of a special committee of the association, and Mr. Stillwell says in his letter that a point has been reached where it seems necessary to go into the practical or business side of the question, which involves, among other things, the element of cost. It appears that the committee of the association has finished its work in relation to the feasibility of electrification from an engineering point of view, and desires to co-operate with the city in relation to the economic problems involved. Mr. Stillwell asked the Mayor to name four persons to represent the city in making the remaining investigations, and with the concurrence of the City Council Mayor Busse named Alderman Milton J. Foreman, chairman of the local transportation committee; Dr. W. A. Evans, health officer; Paul P. Bird, chief smoke inspector, and T. E. Donnelley, a member of the Anti-Smoke Commission, as the city's representatives to assist in making the inquiry requested by the association. At the meeting of the City Council at which this request was received Alderman Britten introduced an ordinance which was referred to the local transportation committee, and which, if enacted into law, will require all the railroads operating cars or trains of cars within seven miles of the city hall in Chicago to propel them "by other power than that of steam, or in a manner that will not produce smoke or any noxious gases." The date fixed for the enforcement of this requirement in the proposed ordinance is Jan. 1, 1913. A penalty in the shape of a fine of $200 a day for every movement of any car or train by steam power after the date mentioned is provided in the ordinance.

Financial and Corporate

New York Stock and Money Market

Dec. 27, 1910.

The stock market opened after the Christmas holiday in much the same condition that it closed the previous week. Trading was extremely dull, prices were unsettled and inclined to be lower and there was a general feeling of uncertainty, if not of positive anxiety. It is the general opinion that it is useless to expect any definite direction or movement in the stock market until after the trust cases have been decided and the railroad rate question is settled.

The money market remains easy, but rates have advanced the past few days. Rates to-day were: Call, 3¼@3½ per cent; 90 days, 4 per cent.

Other Markets

The Philadelphia market has largely reflected the condition of Wall Street. Trading has been dull and prices have sagged. While traction shares have been dealt in at every session of the Exchange the trading has been light and prices have shown a tendency to decline.

In the Boston market some activity is still exhibited in Boston Elevated and Massachusetts Electric, but prices have barely been held at former figures.

There has been desultory trading in the certificates of the Chicago Railways Company on the Chicago Exchange during the past week. Series 2 has been the most active issue, but the price has remained in the neighborhood of 25.

In the Baltimore market the bonds of the United Railways & Electric Company have been duller than usual, but there has been some movement in the stock. To-day 600 Railways certificates were sold at 16.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 20.	Dec. 27.
American Railways Company	a42½	a42½
Aurora, Elgin & Chicago Railroad (common)	a45	45
Aurora, Elgin & Chicago Railroad (preferred)	83½	*83½
Boston Elevated Railway	a127½	128
Boston Suburban Electric Companies (common)	a16	*16
Boston Suburban Electric Companies (preferred)	a72	70
Boston & Worcester Electric Companies (common)	a10	a10
Boston & Worcester Electric Companies (preferred)	a39½	a39½
Brooklyn Rapid Transit	76¼	a74¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83	82⅝
Capital Traction Company, Washington	a129	a129
Chicago City Railway	165	165
Chicago & Oak Park Elevated Railroad (common)	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred)	*7¼	*7¼
Chicago Railways, ptcptg., ctf. 1	a92½	a95
Chicago Railways, ptcptg., ctf. 2	a25¾	a25¼
Chicago Railways, ptcptg., ctf. 3	a11	a10
Chicago Railways, ptcptg., ctf. 4	a6½	a6¼
Cleveland Railway	*91½	*91½
Consolidated Traction of New Jersey	a72	a73
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Detroit United Railway	68	*68
General Electric Company	a156	a153¾
Georgia Railway & Electric Company (common)	a118	a117
Georgia Railway & Electric Company (preferred)	a87	88
Interborough-Metropolitan Company (common)	20½	19¼
Interborough-Metropolitan Company (preferred)	55⅝	53¼
Interborough-Metropolitan Company (4½s)	80	79½
Kansas City Railway & Light Company (common)	a23	a22¼
Kansas City Railway & Light Company (preferred)	a73½	a71½
Manhattan Railway	138	139
Massachusetts Electric Company (common)	a18½	a18½
Massachusetts Electric Companies (preferred)	a85½	a86
Metropolitan West Side, Chicago (common)	*20¼	21¼
Metropolitan West Side, Chicago (preferred)	*68	a68
Metropolitan Street Railway, New York	*19½	*19½
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	*62	64⅞
Northewstern Elevated Railroad (common)	a20	a22
Northwestern Elevated Railroad (preferred)	a60	a60
Philadelphia Company, Pittsburg (common)	47	a49¾
Philadelphia Company, Pittsburg (preferred)	a42½	a43
Philadelphia Rapid Transit Company	a18¼	a18¼
Philadelphia Traction Company	a83⅜	83¾
Public Service Corporation, 5 per cent col. notes	a95½	a95¼
Public Service Corporation, ctfs.	a100	a100½
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	102	a102
South Side Elevated Railroad (Chicago)	a69½	69½
Third Avenue Railroad, New York	10¼	10
Toledo Railways & Light Company	a8	a8
Twin City Rapid Transit, Minneapolis (common)	108½	108½
Union Traction Company, Philadelphia	a42⅝	a42¾
United Rys. & Electric Company, Baltimore	*14½	*14½
United Rys. Inv. Co. (common)	a15	a15
United Rys. Inv. Co. (preferred)	*52	*52
Washington Ry. & Electric Company (common)	33½	a33¾
Washington Ry. & Electric Company (preferred)	86¼	a86¼
West End Street Railway, Boston (common)	a90½	a91
West End Street Railway, Boston (preferred)	a102¾	a101
Westinghouse Elec. & Mfg. Co.	68	66
Westinghouse Elec. & Mfg. Company (1st pref.)	*124	*124

a Asked. *Last sale.

Annual Report of Aurora, Elgin & Chicago Railroad

The annual report of the Aurora, Elgin & Chicago Railroad for the year ended June 30, 1910, compares with the previous year as follows:

Year ended June 30—	1910.	1909.
Gross earnings	$1,530,898	$1,411,722
Operating expenses	902,778	796,270
Net earnings	$634,120	$615,452
Other income	71,540	55,492
Gross income	$705,660	$670,944
Deductions from income	373,824	341,327
Net income	$331,836	$329,617
Profit and loss—surplus at beginning of year	271,679	211,395
Other profit and loss credits	6,369	3,444
Profit and loss—gross surplus	$609,884	$544,456
Profit and loss charges:		
Dividends	$279,000	$225,750
Other	14,213	17,028
Total	$293,213	$272,778
Profit and loss—surplus at end of year	$316,671	$271,678
Operating expenses—percentage to gross earnings.	58.74	56.40

The details of revenues and expenses for the two years were as follows:

Year ended June 30—	1910.	1909.
Gross earnings and other income:		
Railroad department:		
Gross earnings from operations	$1,444,316	$1,326,070
Sale of power	55,896	44,354
Light department:		
Gross earnings from operations	92,582	85,652
Rentals, land and buildings	3,138	2,391
Interest and discount	213	645
Earnings—sinking fund investment	10,135	8,102
Adjustment of materials and supplies—stores account	1,843	.....
Profit on Elgin, Aurora & Southern Traction Company bonds purchased for sinking fund.	315	.....
Total gross earnings and other income	$1,608,438	$1,467,214
Operating expenses:		
Railroad department:		
Maintenance of ways and structures	$55,312	$57,011
Maintenance of equipment and power house.	103,609	77,301
Transportation—operation of power plant	133,738	113,522
Transportation—car service	312,430	265,974
General expenses	248,050	225,250
Total railroad department	$853,139	$739,058
Light department:		
Cost of current—operating	$19,275	$33,251
Cost of current—maintenance	2,848	752
Operation of distribution system	11,633	10,817
Maintenance of distribution system	7,270	4,791
General expenses	8,613	7,601
Total light department	$49,638	$57,212
Total operating expenses	$902,778	$796,270

L. J. Wolf, the president, says, in part, in his report to stockholders:

"The additions to trackage aggregate 34,372.8 ft. of track. The tracks and roadbed of all lines have been properly maintained and are in good condition.

"Several of the wooden bridges and culverts of the Fox River division have been replaced by permanent concrete construction.

"The dispatchers' telephone line has been extended from Ingalton to Elgin, thus completing the duplicate telephone line over all parts of the system.

"Electric automatic block signals have been installed on the Elgin branch of the third-rail division at two locations. These signals are of the alternating-current track-circuit type of the very latest development. It is intended to install more of these block signals from time to time. There have also been installed on the Fox River division six sets of trolley contact electric block signals on congested sections of track.

"Our increasing power requirements have necessitated an enlargement of plant. We are installing a 3000-kw, low-pressure turbine unit with surface condenser and necessary auxiliaries.

"All wooden pilots on third-rail cars have been replaced by steel pilots, with air trip for automatically stopping the train in case the motorman should fail to observe a danger signal on the elevated structure in Chicago.

"In July, 1909, the city of Aurora granted your company a new 20-year franchise for all lines, excepting the third-rail division, which is operating under a grant which expires in 1949. In the cities of Geneva and St. Charles, where your franchises expire in a few years, 50-year grants, applicable to your routes and tracks, were made to the Chicago, Wheaton & Western Railway Company. The acquisition of the Chicago, Wheaton & Western, as proposed, will give your company the benefit of these grants. The acquisition of the Chicago, Wheaton & Western will also bring to this company a 50-year franchise in West Chicago.

"In my last report reference was made to fire protection that had been installed at our various shops. As result of this and other improvements we have reduced our insurance cost one-half.

"In June a 3-year contract was entered into with our employees at an average increase of about 6 per cent. The relations between the company and its employees are cordial.

"The construction of the Chicago, Wheaton & Western Railway Company has been completed, thus connecting with your railroad the cities of West Chicago and Geneva.

"The electrification of the former steam road, extending from DeKalb to Aurora, has been completed and the road is now in regular operation, with the effect of developing business for your company through the sale of interline tickets.

"Our operating statements were also seriously affected by the coal strike, which began in March and lasted for a number of months. We prepared in advance by laying in a supply of coal sufficient to carry us for 60 days. We were compelled to store a considerable proportion of this in the open, which involved double handling and added cost. The strike continued much longer than was anticipated and upon the exhaustion of our stock pile we were compelled to pay an excessive premium for several months.

"For the year ending June, 1911, we should show a substantial improvement over the year covered by this report in respect to cost of coal and maintenance of equipment."

Montreal Tramways & Power Company, Ltd.

The Montreal Tramways & Power Company, Ltd., has been incorporated in London with a capital stock equivalent to $20,000,000, divided into 200,000 shares, to hold a majority of the $10,000,000 capital stock of the Montreal Street Railway and a majority of the $6,000,000 stock of the Canadian Light & Power Company. On Dec. 19, 1910, E. A. Robert, president of the Montreal Street Railway, issued a statement in regard to the Montreal Tramways & Power Company, Ltd., in which he said:

"Several months ago the Imperial Trust Company was organized with a large capital paid up in cash to finance the acquisition of a majority of the shares of the Montreal Street Railway. It secured the co-operation of certain well-known English capitalists and it was the intention at the outset to obtain control also of a majority of the shares of the Canadian Light & Power Company.

"One of the objects of the Montreal Tramways & Power Company, Ltd., is to purchase the present holdings of the Imperial Trust Company and eventually acquire a majority of the shares of the Montreal Street Railway and the Canadian Light & Power Company and finance both these companies, chiefly with English capital.

"These two companies, the Montreal Street Railway and the Canadian Light & Power Company, will retain their separate and distinct identities, operate their own plants and work under their respective franchises, and be subject, as heretofore, to all legislative enactments and municipal regulation.

"It is the object of the capitalists who have organized the Montreal Tramways & Power Company, Ltd., to procure through the medium of a holding company these two companies so that they shall in future operate in entire harmony. The Montreal Street Railway will always have an independent supply of power, and the Canadian Light & Power Company will always have a customer for its power."

The directors of the Imperial Trust Company, to which Mr. Robert referred, are: E. A. Robert, president; J. W. McConnell, vice-president; H. R. Mallison, secretary; F. Howard Wilson, James G. Rose and H. A. Lovett.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Charles D. Beebe, vice-president of the Rochester, Syracuse & Eastern Railroad, president of the Syracuse, Lake

Shore & Northern Railroad and president of the Auburn & Syracuse Electric Railroad, is credited with the following statement, made in connection with the report circulated in Syracuse and Rochester that he and his associates had secured control of the Buffalo, Lockport & Rochester Railway: "My associates and I are coming into control of the Buffalo, Lockport & Rochester Railway under the terms of a reorganization, participated in by all security holders of said road, all of its creditors and also its stockholders. The reorganization plan, if carried through without foreclosure, will result in the bonded debt outstanding being reduced to the sum of $2,750,000, and the cancellation of all past-due coupons, including probably the one of Feb. 1, 1911; the cancellation of all equipment notes outstanding and the turning of the equipment over to the railway company free and clear; and also the cancellation of all floating debt. The road will also have the sum of $200,000 cash available in its treasury, subject to expenditure only for capital account. There will be no change in the organization, at least until after the new interests are in control of the property. The amount of bonds outstanding is $3,400,000. All bondholders surrender 25 per cent of par value. The $200,000 is provided by the sale of $200,000 surrendered bonds at par."

Elmira, Corning & Waverly Railroad, Waverly, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira, Corning & Waverly Railway to issue $689,000 of the total issue of $800,000 of first mortgage 5 per cent bonds, dated 1907, and due July 1, 1957. The Standard Trust Company, New York, N. Y., is trustee of the issue, and the bonds are to be delivered to the Southern Tier Development Company, at 97½, on account of the construction and equipment of the electric railway from Elmira to Corning, a distance of about 12 miles.

Interstate Railways, Philadelphia, Pa.—The directors of the Interstate Railways have declared operative the new preferred-stock financing plan. The plan was referred to in detail in the ELECTRIC RAILWAY JOURNAL of Nov. 26, 1910, page 1079.

Louisville (Ky.) Traction Company.—Frederick S. Wicks, Syracuse, N. Y., has been elected a director of the Louisville Traction Company, to succeed A. H. Davis, deceased.

Louisville (Ky.) Railway.—The Louisville Railway has announced that beginning in January, 1911, it will issue monthly reports of its earnings.

Northern Ohio Traction & Light Company, Akron, Ohio.—Claude Ashbrook, Cincinnati, Ohio, recently offered for subscription at 87½ and interest, yielding 6 per cent income, $200,000 of general mortgage 5 per cent gold bonds of the Canton-Akron Consolidated Railway, dated 1906 and due January, 1933, and guaranteed as to principal and interest by the Northern Ohio Traction & Light Company, which in 1906 purchased the entire capital stock of the Canton-Akron Consolidated Railway.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., 2½ per cent, preferred.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1½ per cent, preferred.

Chicago City & Connecting Railways, Chicago, Ill., preferred participation certificates, $2.25; common participation certificates, $1.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, 2½ per cent, preferred; ⅝ of 1 per cent, common.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Citizens' Electric Street Railroad, Newburyport, Mass., 2½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbus, Newark & Zanesville Electric Railway, Newark, Ohio, quarterly, 1½ per cent, preferred.

Danbury & Bethel Street Railway, Danbury, Conn., 2 per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Holyoke (Mass.) Street Railway, 4 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, H. I., 3 per cent, preferred; quarterly, 1 per cent, common.

Traffic and Transportation

The Daily Life of a Motorman

A two-column article appeared in the Richmond (Va.) *Evening Journal* of Dec. 20, 1910, on the "Life of a Motorman." It was written by a motorman of the Virginia Passenger & Power Company, and describes in detail his duties and the many things with which he has to contend.

It follows the inexperienced applicant for the position of motorman into the office of the average street railway. He receives an application blank on which he is required to give all essential facts about his previous record and himself. In addition he must furnish first-class recommendations from former employers and at least one or two responsible citizens to whom he is well known. Next, he is sent to the company surgeon, where he undergoes a thorough examination as to physical qualifications. If passed by the surgeon he receives a certificate, which he turns in at the office. He is then ready for instruction in the art of handling railway cars. The applicant is placed under the instruction of an experienced motorman, where he receives his training, which takes from 10 to 15 days, before he is given a regular run. Some extracts from the article recounting his experience after receiving his commission follow:

"It tries his nerve to run on a slick track. This is true of large cities, because of the fact that cars are run on close schedule and because of heavy street traffic.

"It takes cool-headedness and skilful handling of a car to negotiate slick track on a down-grade with safety.

"It tries his nerve and self-control when, just as he feels the wheels lock up and the car begin to slip, a lady drives right across the track in front of his car, and probably two or three little children are in the carriage with her.

"It gets right on his nerve when, while bowling along at a lively clip, say from 10 to 60 m.p.h., according to speed limit on the various lines, a little tot suddenly steps right out in the middle of the track.

"It tries his nerve when a driver who knows the car is approaching deliberately turns across in front of the car, forcing the motorman to reverse in order to avoid an accident.

"It tries his patience and self-control when some irate and overbearing gentleman comes out on the front and vents his grouch on the cussedness of things in general and the methods of the company in particular, oftentimes demanding that the motorman violate the rules of the company for his special benefit."

The article shows clearly some of the many practical difficulties with which the train crews and the company have to contend and should make the public more considerate in its treatment of both.

Holiday Traffic Record in New York Subway

The Public Service Commission of the First District of New York has made public a record of passengers carried on the subway and elevated lines of the Interborough Rapid Transit Company, New York, N. Y., which indicates that, with the exception of two days during the Hudson-Fulton Celebration in September, 1909, new high records were realized in the ten days ended Dec. 19, 1910. The statement made by the commission follows:

	Elevated.		Subway.	
	1910.	1909.	1910.	1909.
Saturday, Dec. 10	976,007	923,785	986,086	934,124
Sunday, Dec. 11	501,635	569,365	438,504	495,634
Monday, Dec. 12	1,015,687	848,126	1,009,771	848,812
Tuesday, Dec. 13	916,931	876,488	903,237	844,659
Wednesday, Dec. 14	909,825	869,413	906,261	863,939
Thursday, Dec. 15	913,605	865,809	909,232	870,240
Friday, Dec. 16	881,330	852,706	902,113	866,226
Saturday, Dec. 17	988,475	952,246	1,005,263	949,401
Sunday, Dec. 18	589,349	572,403	509,859	493,867
Monday, Dec. 19	1,066,677	987,380	1,027,785	982,199
Totals	8,759,521	8,317,721	8,598,111	8,149,101

Near-Side Stops in Reading.—The Mayor of Reading, Pa., has signed an ordinance passed by the City Council which requires that after Jan. 1, 1911, all street railways operating in Reading shall stop their cars on the near side of the street.

Holiday Memento.—C. C. Chapman, traffic manager of the Toledo & Western Railroad, Toledo, Ohio, presented the

compliments of the holiday season to a large number of patrons of the company by sending them Christmas cards and an aluminum ruler and letter opener, on which the name of the road had been engraved.

Car License and Pole Tax in Chester, Pa.—The Borough Council of Clifton Heights, which includes Chester, Pa., has passed a resolution which requires street railways operating within the limits of the borough to pay a pole tax in 1911 and increases the car license from $5 a year to $15 a year. The Philadelphia & Garretsford Street Railway and the Southern Pennsylvania Traction Company are affected.

Reasons for Not Entering Cars at Front End.—The United Railways & Electric Company, Baltimore, Md., has reprinted in pamphlet form for general distribution the interview given recently by William A. House, president of the company, to the Baltimore *Sun*, in which he explained the company's reason for opposing entrance to cars by the front door. This interview was re-published in full in the Electric Railway Journal of Dec. 17, 1910, page 1187.

Indiana Union Traction Company Appoints Road Instructor.—With a view of minimizing accidents as far as possible the Indiana Union Traction Company, Indianapolis, Ind., has appointed Clyde Howard, city clerk at Tipton, and at present employed as a train dispatcher, as a road instructor. Mr. Howard will instruct trainmen how to take switches, acquaint them with the location of meeting places and inform station agents and other road employees in regard to conducting their various departments.

Complaint Against Syracuse Rapid Transit Railway Dismissed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of trustees of Solvay, Onondaga County, against the Syracuse (N. Y.) Rapid Transit Railway, in relation to the extension of its double tracks from Bridge Street, in Solvay, to the westerly terminus of the Syracuse Rapid Transit Railway. At a hearing held in Syracuse, on Dec. 9, 1910, the company agreed to construct the extension of its line provided for in its franchise, and as demanded by complainants, within one and a half years. The right to reopen the complaint if this is not accomplished is reserved in the order.

South Shore Route Issues Vest Pocket Folder.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., is distributing a new folder of vest-pocket size, made up of a single sheet, 10¼ in. by 14¾ in., printed in red and blue, and with attractive cover designs which bear the new slogan of the road, "The Electric Way." A map of the district served, including the entrance into Chicago over the suburban lines of the Illinois Central Railroad, occupies three pages. Similarly six pages are taken to display two halftone views of cars, one showing two trains passing on the new double-track portion of the road, and featuring the South Bend and Chicago "special" trains, which carry passengers 92 miles in 2 hours and 55 minute. Complete time tables, weekday and Sunday service, including the connecting schedules of the Illinois Central Railroad, are shown in large type. The arrangement of the timetable in the vest-pocket folder is such that the same type "set-up" may be used for printing the standard-size folders of the road.

Anti-Accident Notice in Denver.—The Denver (Col.) Tramway has posted in its cars signs which read "There's a Reason for Everything Except a Woman Getting Off the Car Backward; That's Foolishness." Commenting on the use of the signs in Denver, the *Tramway Bulletin*, the official organ of the Denver City Tramway Mutual Aid Association, said in its December issue: "Perhaps no one thing in recent years has caused such widespread comment as the cards bearing the above inscription ever since they have been in the Denver street cars. They have been the subject of numerous letters to the newspapers, criticisms, commendations, and they have been the talk from day to day of passengers on cars, both coming to the city and going home, and they have formed an interesting topic of conversation and discussion among school teachers." The use of similar signs by the Kingston, Portsmouth & Cataraqui Electric Railway, Kingston, Ont., was noted in the Electric Railway Journal of Sept. 3, 1910, page 381.

Benefit Association in Allentown.—The officers of the Lehigh Valley Transit Company, Allentown, Pa., have organized an employees' benefit association, and commencing on Jan. 1, 1911, employees of the company will be urged to join the association, but membership will not be compulsory. There will be small monthly dues, depending on the amount required to meet the expenses, and the members of the association will receive $1 per day sick benefits and $150 death benefits. Instead of distributing turkeys to the employees at Christmas this year the company decided to pay in cash to the benefit association the dues of every member who desires to join before Jan. 1, 1911. In addition the company has decided voluntarily to inaugurate a pension system for the benefit of practically all of its employees independent of the benefit association. All employees who have been in the service of the company or its subsidiary affiliated companies continuously for 25 years will thereafter be entitled to a pension of $5 per week for life.

Complaint Against Utica & Mohawk Valley Railway Dismissed.—The Public Service Commission of the Second District of New York has dismissed the complaint made by patrons of the Utica & Mohawk Valley Railway living in the vicinity of stops 1, 2 and 3 from Utica, on the Utica and Frankfort branch. The complaint alleged that the rate to stops 1, 2 and 3 was unfair and discriminating, and asked that it be reduced from 10 cents to 5 cents. After hearing and investigation, the commission decided that the complainants have failed to furnish satisfactory proof that the present rate is unfair or discriminatory, under the present system in vogue in New York State upon interurban railways of establishing rates upon the zone basis instead of the mileage basis. The complainants reside in Herkimer County, outside of Utica, and base their case upon the fact that from the center of the city they are not allowed to ride as great a distance for 5 cents as passengers proceeding from the same point to Whitesboro and New Hartford, and they therefore urged that they should be placed upon the same mileage basis as the other two sections. The commission is of the opinion, however, that it would not be justified in establishing a rate upon the mileage basis in view of the present long-established practice of charging under the zone system on lines of this character. The zone in this case is at the city line, and it is reasonable and fair that an additional charge of 5 cents be made from that point, regardless of the fact that upon other lines passengers are carried by the company a somewhat longer distance for the same amount.

Suggestions to Public Service Railway.—The special committee appointed by Mayor Wittpenn, of Jersey City, to consider transit matters in that city has reported to the Mayor its suggestion for changes in the operating methods of the Public Service Railway which the committee believes would facilitate the movement of traffic in Jersey City. The changes which the committee suggest are largely of a nature that are of interest only locally. They relate to transfers, changes in route and the construction of new short lines to facilitate the movement of cars. In some instances the changes recommended are in direct accord with ideas which the company has been unable to carry out on account of opposition encountered from the local authorities. In regard to carrying freight the committee says: "One other suggestion for relieving street congestion is that the electric railway lines should act under the provisions of the statute of 1909, which allows street railways to carry freight. Freight sidings could be run into the manufacturing plants and other places of business and shipments could be made from them by electric cars at hours when the passenger traffic is light. This would relieve the streets of a great mass of traffic and would greatly increase the advantages of Jersey City as a site for factories." The suggestions of the commission had not been presented to the company up to Dec. 22, 1910, and in consequence no formal reply to them has been made by the company. In discussing the subject informally with a representative of the Jersey City *Journal*, however, a representative of the company pointed out wherein the company had tried to anticipate the recommendations of the committee. The company studied the subject of handling freight very carefully, and concluded that the conditions of short haul which govern the carting of freight in Jersey City prevent freight being handled successfully on the company's lines in Jersey City and vicinity.

Personal Mention

Mr. J. S. Oliver has been appointed general superintendent of the Goldsboro (N. C.) Traction Company to succeed Mr. E. B. Austin.

Mr. W. C. Sparks, who has been connected with the Indiana Union Traction Company, Anderson, Ind., for eight years, has resigned as superintendent of roadway of the company to become general manager of the Rockford & Interurban Railway, Rockford, Ill.

Mr. A. A. Kartholm has been appointed general passenger agent of the Fort Wayne & Wabash Valley Traction Co., Fort Wayne, Ind., effective on Jan. 1, 1911. For the last four years, Mr. Kartholm has been chief clerk to Mr. F. Hardy, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Co.

Mr. Edward W. Leaning has been appointed assistant chief of the division of statistics and accounts of the Public Service Commission of the Second District of New York. Mr. Leaning has been an employee of the Delaware & Hudson Company for 30 years, occupying various clerical positions from minor clerk to an executive position as chief clerk in the office of the auditor of disbursements of that company.

Mr. J. M. Burns has been appointed assistant superintendent of the Morris County Traction Company, Morristown, N. J. Mr. Burns was graduated from Cornell University in June, 1910, with the degree of electrical engineer. He entered the service of the Morris County Traction Company immediately after graduation, and previous to his appointment as assistant superintendent of the company he served as electrician and draftsman and had charge of all the track bonding and testing.

Mr. L. O. Lieber, whose resignation as electrical engineer of the Los Angeles & Redondo Railway, Los Angeles, Cal., was announced in the ELECTRIC RAILWAY JOURNAL of Dec. 17, 1910, will hereafter give his entire attention to the duties of his position as electrical engineer of the Los Angeles (Cal.) Railway, which has been succeeded by the Los Angeles Railway Corporation. Mr. Lieber served as electrical engineer of the Los Angeles Railway for several years before becoming connected with the Los Angeles & Redondo Railway.

Mr. W. H. Smaw, whose appointment as purchasing agent of the Georgia Railway & Electric Company, Atlanta, Ga., was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 17, 1910, was born in Atlanta on Aug. 11, 1873. Mr. Smaw was educated in the public schools of Atlanta and entered business in the mercantile line, serving one of the largest wholesale houses in the South successively as shipping clerk, assistant cashier and traffic manager. Mr. Smaw resigned this position in January, 1903, to become connected with the purchasing department of the Georgia Railway & Electric Company, and during the last two years he has acted intermittently as purchasing agent, owing to the ill health of Mr. G. B. Graves, the former purchasing agent.

Mr. C. C. McChord, whose nomination by President Taft as a member of the Interstate Commerce Commission has been confirmed by the Senate, was born on Dec. 3, 1859, at Springfield, Ky., and was educated at Center College, Danville, Ky. He practised law at Springfield, Ky., and was prosecuting attorney there from 1886 until 1892. He was appointed a member of the State Railroad Commission of Kentucky in May, 1892, and was elected chairman of the commission. In 1895 Mr. McChord resigned from the commission and was elected to the State Senate of Kentucky, where he served four years. While in the Legislature he secured the passage of an act which empowered the commission to make reasonable interstate freight and passenger rates. He again became chairman of the State Railroad Commission of Kentucky in 1899, and was re-elected chairman of the commission in 1903. Since he retired from the commission in 1907 Mr. McChord has been engaged in the practice of law.

Mr. Alan P. Norris, whose appointment as freight and passenger agent of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., to succeed Mr. C. F. Gladfelter, resigned, was announced in the ELECTRIC RAILWAY JOURNAL of Dec. 24, 1910, became connected with the company during the construction period, and has been connected with the company in the capacity of chief clerk to the general superintendent since shortly after the road was placed in operation. Mr. Norris will have charge of the freight and passenger traffic and will make his headquarters at the company's terminal station in Baltimore. Prior to his connection with the Washington, Baltimore & Annapolis Electric Railway, Mr. Norris was connected with the Merchants' & Miners' Transportation Company and with the Atlantic Coast Line Railway.

Prof. B. H. Meyer, whose nomination as a member of the Interstate Commerce Commission by President Taft has been confirmed by the Senate, was born at Mequon, Wis., on May 28, 1866. He was graduated from the Oshkosh Normal School and from the University of Wisconsin, and subsequently was graduated from the University of Berlin, where he took the courses in economics, history and sociology. From 1884 until 1886 he taught in district schools, and from 1887 until 1889 he was a principal in the schools at Fredonia, Wis. From 1889 until 1892 Prof. Meyer was principal of the high school at Port Washington, Wis. He then became connected with the University of Wisconsin, where he has served as extension lecturer, instructor in sociology, assistant professor of sociology and professor of the institutes of commerce. In 1904 and 1905 he was expert special agent for the Bureau of Census and the Interstate Commerce Commission in charge of the valuation of the railways in the United States. Prof. Meyer was also chairman of the Wisconsin Railroad Commission. He was a contributor to the *Railway Age*, and has written important monographs and articles on railway legislation and administration and other economic subjects. He is a member of many learned societies, among them the American Economical Association, American Academy of Political and Social Science and the University of Wisconsin Historical Society.

Mr. C. W. Ricker, who has been employed for the last 10 years as electrical engineer of the Cleveland Construction Company, Cleveland, Ohio, and the Warren Bicknell Company, Cleveland, Ohio, operating manager of electric railway and lighting properties, has resigned from these companies, effective on January 1, 1911, and has been appointed assistant general manager and chief engineer of the Havana (Cuba) Electric Railway, which operates all of the electric railways in Havana, and of which company Mr. Warren Bicknell, of the Warren Bicknell Company, is president. Mr. Ricker was graduated in 1891 from the Massachusetts Institute of Technology as an electrical engineer. After graduation he entered the employ of the American Telephone & Telegraph Company, in New York. In 1892 he took the students' course with the General Electric Company, at its Lynn Works, and the following year opened an office as a consulting engineer in Buffalo, where he remained six years. In 1899 Mr. Ricker accepted the position of electrical engineer of the United Electric Securities Company, Boston, Mass., and the following year became assistant to Mr. Theodore Stebbins, engineer of the local companies' department of the General Electric Company. While engaged on this work he was appointed engineer in charge of the Lima Electric Railway & Light Company, Lima, Ohio, and upon completion of the work with which he was intrusted there he entered the employ of the Cleveland Construction Company, Akron, Ohio. Mr. Ricker was also connected with the electric traction department of the New York Central & Hudson River Railroad, and held the position of electrical superintendent of power stations of the Interborough Rapid Transit Company.

OBITUARY

Charles E. Pollard, designing and selling engineer of the E. W. Bliss Company, Brooklyn, N. Y., is dead.

E. V. W. Rossiter, a vice-president of the New York Central & Hudson River Railroad, who died at his home in Flushing, N. Y., on Dec. 11, 1910, after an illness of several months, was a vice-president of the Oneida (N. Y.) Railway, Syracuse (N. Y.) Rapid Transit Company and the Utica & Mohawk Valley Railway, Utica, N. Y. Mr. Rossiter was born on July 13, 1844, at St. Louis, Mo., and had been connected with the lines forming part of the system of the New York Central & Hudson River Railroad for more than 50 years.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Hartford-Meriden Railway, Meriden, Conn.**—Application for a charter will be made by this company in Connecticut to build an electric railway to connect Hartford, Meriden, Berlin, Newlington and New Britain. Incorporators: C. D. Lawrence, John J. Malone, William Foley and Thomas Dryden.

***North Carolina-Virginia Railway, Ridgeway, N. C.**—Chartered in North Carolina to build a 6-mile railway from Ridgeway to the North Carolina line. Capital stock, maximum, $6,000, and the minimum, $2,000. Officers: E. C. Wing, New York, president; George Demarest, Brooklyn, secretary and treasurer. Directors: P. Minturn Smith, F. W. Davis, Bronson H. Smith, Brooklyn; S. Strayer, Passaic, N. J., and Malcolm K. Harris, Danville, Va.

***Hamilton, Caledonia & Port Dover Electric Railway, Hamilton, Ont.**—Incorporated in Ontario to build an electric railway to connect Hamilton, Caledonia and Port Dover. It is expected to begin work in the spring. George L. Staunton is interested.

Cleburne (Tex.) Street Railway.—Application for a charter has been made in Texas by this company to build an electric railway in Cleburne. Capital stock, $65,000. Incorporators: Daniel Hewitt, J. M. Moore, J. C. Blakeney, L. W. Chase, A. M. Morgan, W. M. Odell, C. M. Bentley and Lawrence Hewitt. [E. R. J., Aug. 13, '10.]

FRANCHISES

Phœnix, Ariz.—The Phœnix Street Railway has received a franchise from the Board of Supervisors to cross the country roads on the line from Phœnix to Glendale.

***San Francisco, Cal.**—Willis Polk, representing the Great Highway Development Company, has asked the Council for a franchise to build a 3-mile electric railway on the highway from Cliff House to Sloat Boulevard, in San Francisco.

Bridgeport, Conn.—The Bridgeport & Danbury Electric Railway will petition the General Assembly for an extension of time in which to construct and complete its proposed electric railway in Bridgeport. It will connect Bridgeport, Trumbull, Monroe, Newton, Bethel and Danbury. Morton F. Plant, New London, is interested. [E. R. J., July 9, '10.]

Fort Myers, Fla.—The Seminole Power & Ice Company has received a franchise from the County Commissioners to operate an electric railway in Fort Myers and vicinity. A. A. Gardner, Fort Myers, is interested. [E. R J., Nov. 24, '06.]

Highland, Ill.—The St. Louis & Eastern Traction Company, East St. Louis, has received a franchise from the City Council to build an electric railway through Highland. The railway will connect Granite City, Troy, Highland, Pierson, Pocahontas and Greenville. A. W. Crawford, Hillsboro, is interested. [E. R. J., Nov. 19, '10.]

***Bay City, Mich.**—C. D. Rose has asked the City Council for a franchise to build an electric railway over certain streets in Bay City.

Minneapolis, Minn.—The Twin City Rapid Transit Company will ask the City Council for a franchise to build another cross town line via Franklin Avenue, from Eighth Avenue, in Minneapolis, east to the city limits. W. J. Hield, Minneapolis, general manager.

Kansas City, Mo.—The Kansas City Railway & Light Company has received a franchise from the City Councils to build a new crosstown line in Kansas City.

Lakewood, N. J.—The Trenton, Lakewood & Atlantic Railway, Trenton, has asked the Township Committee for a franchise to build its railway on Ocean Avenue in Point Pleasant. The company plans to extend its line from Lakewood to Point Pleasant.

Stamford, N. Y.—The Niagara Falls, Dunnville & Welland Electric Railway, Welland, has asked the City Council for a franchise to build an electric railway through Stamford. This projected railway will connect Niagara Falls, Welland and Dunnville. F. E. Misener, Marshville, secretary. [E. R. J., Dec. 24, '10.]

Portland, Ore.—The Portland Subway Company, Salem, will ask the Council for a franchise to build its railway over certain streets in Portland. The company will also apply to the War Department for permission to put a tube under the Willamette River 40 ft. below low water. This is part of a plan to build a 4-track tunnel under the Willamette River and 150 miles of track on the east and west sides. L. Y. Keady is interested. [E. R. J., Dec. 17, '10.]

Portland, Ore.—The Oregon Electric Railway, Portland, has received a franchise from the City Council to extend its railway on Salmon Street, from Front Street to Tenth Street, and along Tenth Street to Flanders, in Portland.

***Lebanon, Pa.**—The Lebanon & Campbelltown Street Railway has asked the City Council for a franchise to build an electric railway through Lebanon. It has asked for a similar franchise in Campbelltown. S. M. Hershey is interested.

New Castle, Pa.—The New Castle & Beaver Falls Street Railway has received a six months' extension of time to its franchise from the Councils in which to begin work on its proposed 22-mile electric railway to connect New Castle and Beaver Falls. [E. R. J., June 11, '10.]

Stamford, Vt.—The Bennington & North Adams Street Railway, Hoosick Falls, has received a franchise to build an electric railway in Stamford. George E. Greene, superintendent.

Edgewood, W. Va.—The City & Elm Grove Railroad, Wheeling, has asked the City Council for a franchise to build an electric railway over certain streets in Edgewood, W. Va. J. W. Smith, general manager.

Whitewater, Wis.—The Badger Railway & Light Company, Milwaukee, has asked the Railroad Commission for a certificate of public convenience and necessity to build its proposed electric railway from Whitewater to Lake Geneva, via Elkhorn, a distance of 22 miles. Gustav Pickhardt, Milwaukee, secretary. [E. R. J., Dec. 10, '10.]

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—Furst, Wangler & Smith have been awarded the contract by this company to build 2½ miles of track to Shades Mountain.

Groton & Stonington Street Railroad, New London, Conn.—This company has filed with the Secretary of State a petition to the General Assembly asking for an amendment to its charter, so as to grant it the right to lay tracks over certain streets in Stonington. It also wishes to start in Broadway, in Mystic, extending into Old Mystic.

Norwich, Colchester & Hartford Traction Company, Norwich, Conn.—This company will petition the General Assembly of 1911 for an amendment to its charter, whereby another entrance to Norwich will be granted other than the one originally decided upon. H. M. Pollock, secretary. [E. R. J., Nov. 5, '10.]

St. Simons Railway Company, St. Simons Island, Ga.—This company advises that it will operate its proposed 4-mile railway on St. Simons Island with gasoline motor cars. [E. R. J., Dec. 17, '10.]

Richmond, Ind.—The Commercial Club of Richmond states that it has not yet decided when it will begin work on the proposed electric line to connect Cincinnati, Brookville, Liberty and Richmond, in which it is interested. Charles W. Jordan, Richmond. [E. R. J., Dec. 17, '10.]

Southern Michigan Railway, South Bend, Ind.—This company will build in the spring an extension of its railway from Niles, thus giving a street railway connection between South Bend and Buchanan.

Iowa City (Ia.) Electric Railway.—This company advises that it placed in operation Nov. 17 the first 1½ miles of its proposed 38-mile electric railway in Iowa City. It will begin in April, 1911, to build 2½ miles more. No contracts have yet been let for the new work. Capital stock authorized, $100,000. Issued, $28,500. It will purchase power from Cedar Rapids & Iowa City Railway Company and will operate 2 cars. Officers: J. O. Schultz, president; J. H. Rober, vice-president; D. A. Reese, secretary and treasurer;

J. O. Schultze, general manager, superintendent and purchasing agent, and B. J. Lambert, chief engineer, all of Iowa City. [E. R. J., July 9, '10.]

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has completed and placed in operation its extension from Valley Center to Sedgwick.

Murray (Ky.) Traction Company.—This company has begun preliminary surveys for its proposed 16-mile electric railway to extend from Murray to the Tennessee River. Nath. Ryan, Murray, president. [E. R. J., Jul. 16, '10.]

Aroostook Valley Railroad, Presque Isle, Maine.—This company is considering plans to build two extensions, one to begin at Washington station in Presque Isle and extend across Woodland to New Sweden; the other to go through Caribou to Limestone.

Frederick (Md.) Railroad.—This company is now electrifying the Thurmont division of its line. It will be completed in February, and service will be maintained between Montevue Hospital, Frederick, and Schleysville.

Boston & Eastern Electric Railroad, Boston, Mass.—This company has filed a petition with the House of Representatives asking that the next Legislature authorize the construction of the line, the petition requesting that the Legislature enact such a law as will insure the issuing of the certificate of exigency to the company by the Railroad Commissioners. John H. Bickford, 110 State Street, Boston, Mass., is chief engineer. [E. R. J., Aug. 20, '10.]

Berkshire Street Railway, Pittsfield, Mass.—This company has completed and placed in operation its Egremont extension, a distance of about four miles.

Moorhead & Fargo Street Railway, Moorhead, Minn.—It is stated that this company will extend its railway to Dilworth.

***Worthington, Minn.**—G. E. Doyle, East Chain, and H. W. Knight, Chicago, are interested in a plant to build an electric railway to connect Albert Lea and Worthington, via Elmore, Blue Earth, East Chain, Fairmont and along the southern edge of Minnesota and northern Iowa.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company is said to be considering plans for extending its North Gulfport Avenue and Twenty-fifth Avenue line to Bayou Banard.

Shore Line Electric Railway, New Rochelle, N. Y.—This company has completed and placed in operation its extension between Guilford and Stony Creek.

Interborough Rapid Transit Company, New York, N. Y.—This company has received from the Public Service Commission a certificate of public necessity and convenience authorizing the construction of third tracks to the Second, Third and Ninth Avenue elevated roads. Plans are also to be approved for the extension of the Ninth Avenue elevated road through Jerome Avenue to Woodlawn and of the Third Avenue line to Mount Vernon.

Alliance-Akron Railroad, Alliance, Ohio.—This company has awarded to the McGinty Company the contract for grading for its proposed 26-mile electric railway to connect Alliance and Akron, via Tallmadge, Brimfield and Rootstown. Charles Keith, president. [E. R. J., Oct. 1, '10.]

Kanauga Traction Company, Gallipolis, Ohio.—This company announces that it will extend its railway to Addison in the spring. J. S. Howard, secretary.

***Cornwall, Ont.**—Messrs. Moloney and P. F. Campbell are said to be considering plans for building a proposed electric railway between Hawkesbury and Cornwall.

Imperial Traction Company, Hamilton, Ont.—This company, which is applying for a federal charter, announces through its solicitors, Harding & Owens, Stratford, that it will begin construction in the spring on its proposed network of lines, covering western Ontario, to connect Hamilton, Guelph, Berlin, Stratford, St. Mary's and London through Ingersoll, Woodstock and Brantford. Branch lines are also proposed to Niagara Falls and to Sarnia. Headquarters, Hamilton. Capital stock, $6,000,000. Directors: L. B. Howland, Toronto; Roger Miller, Ingersoll; George M. Reid, London, and S. W. Hay, Listowel. [E. R. J., Dec. 24, '10.]

Lehigh Valley Transit Company, Allentown, Pa.—Plans have been completed by this company for a large expenditure for the betterment of traffic between Allentown and Philadelphia. The company has also arranged with the Quakertown Traction Company to build a new cutoff between Perkasie and Sellersville, shortening the distance about 1½ miles.

***Ogden (Utah) Rapid Transit Company.**—This company will extend its tracks from the Hermitage, in Ogden, to Huntsville. James A. West, Ogden, chief engineer.

SHOPS AND BUILDINGS

Southern Pacific Railroad, Los Angeles, Cal.—It is announced that this company will begin work at once on its new passenger station at Sixteenth Street, in Oakland. The structure is to be two stories high and so arranged as to accommodate elevated tracks for the proposed double-track electric railway to Berkeley. The cost is estimated to be about $300,000.

Lake Shore Electric Railway, Cleveland, Ohio.—Negotiations are under way and plans formulated for building a combination hotel and interurban depot by the Lake Shore Electric Railway at the southeast corner of Superior Avenue and the Public Square in Cleveland. The cost is estimated to be about $1,000,000.

Greenville Railway & Light Company, Greenville, Tex.—This company will build its car house on North Walnut Street, in Greenville. A. B. Coryell, Greenville, general manager.

Norfolk & Portsmouth Traction Company, Norfolk, Va.—This company plans to erect a car house on the site of its present Huntersville car house. The company has recently acquired the property adjoining the car house for this purpose. Construction will begin as soon as financial arrangements are completed.

POWER HOUSES AND SUBSTATIONS

Connecticut Company, New Haven, Conn.—This company has awarded to the Gillette Construction Company and Lord & Lake Company the contract for building a brick addition to its power house on Grand Avenue in New Haven to accommodate a 400-kw generator and other electrical equipment.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—This company will purchase, through the J. G. White Company, New York, N. Y., a large quantity of power house supplies, including turbines, motor generator sets and switchboards.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company plans to build a power house to supplant the storage battery station on Harrison Street and West Street, Belleville. The site will be near the present site of the car house, on the Rock Road. The cost is estimated to be about $20,000. C. M. Clark, 321 Chestnut Street, Philadelphia, Pa., president.

Keokuk Electric Railway & Power Company, Keokuk, Ia.—It is reported that this company is considering plans for making extensive changes to its power house in Keokuk. A. D. Ayres, Keokuk, manager.

Boston (Mass.) Elevated Railway.—This company has recently placed an order with the Westinghouse Machine Company, Pittsburgh, for seven Roney stokers to replace some old equipment at the Charlestown and Lincoln Wharf stations.

Niagara Gorge Railroad, Buffalo, N. Y.—This company has recently installed a small substation at Lewiston, containing a 300-kw General Electric rotary converter with two transformers.

Hamilton, Caledonia & Port Dover Electric Railway, Hamilton, Ont.—It is said that this company will build a power house at Caledonia. George L. Staunton, Hamilton, is interested.

Portland Railway, Light & Power Company, Portland, Ore.—This company has placed in operation its new east side power station, known as station L. The station has a capacity of 2720 hp. Next spring the station will be equipped with a 2000-kw d.c. generator.

Wilkes-Barre (Pa.) Railway.—This company is making improvements to its power house on South Main Street in Wilkes-Barre. A three-story addition will be built.

Manufactures & Supplies

ROLLING STOCK

Cleveland Erie Railway, Gerard, Pa., will purchase one 45-ft. or 48-ft. interurban car.

Morris County Traction Company, Morristown, N. J., will purchase 10 or 12 passenger cars and two snow plows.

Houston Electric Company, Houston, Texas, will order five double-truck, semi-convertible cars and 10 double-truck trail cars.

Chattanooga (Tenn.) Railway & Light Company has recently ordered 10 28-ft. 8-in. prepayment cars from the G. C. Kuhlman Car Company.

Guadalajara (Mexico) Tramways has ordered from the American Car Company 10 closed cars, 27 ft. 4 in. long, mounted on Brill No. 27-GE trucks.

Augusta-Aiken Railway & Electric Company, Augusta, Ga., will purchase through J. G. White & Co. 15 or 20 pairs of trucks and a large quantity of railway motor equipment.

Kankakee (Ill.) Electric Railway Company has ordered from the Westinghouse Electric & Manufacturing Company three double equipments of 92-A 35-hp motors in addition to the order recently announced in the Electric Railway Journal of Nov. 19, 1910.

San Antonio (Tex.) Traction Company, noted in the Electric Railway Journal of July 30, 1910, as having ordered four semi-convertible pay-as-you-enter cars from the American Car Company, has specified the following details for these cars:

Seating capacity 44	Destination signs.....Hunter
Length of body...28 ft. 10 in.	Gongs ..... Dedenda
Over vestibule..42 ft. 10 in.	Hand brakes.....Peacock
Width over sills.....8 ft.	Headlights ....Crouse-Hinds
Over posts at belt.....8 ft.	Motors 4-GE-54
Sill to trolley base..9 ft. 6 in.	Registers .....International
Height rail to sills....32½ in.	Safety guards.....Meyer
Body ..... Wood	Sanders .....Dumpit
Underframe...Wood and iron	Seats .....Winner
Curtain fixtures...Cur. S. Co.	Trucks.....Brill 27-G-1
Curtain material...Pantasote	

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., have moved their St. Louis office from the Security Building to 1,614 Wright Building.

Machado & Roller, New York, N. Y., have opened a Western sales office at 740 Monadnock Block, Chicago, Ill., in charge of Harry T. Shire, secretary of the company.

Atlantic Insulated Wire & Cable Company, Stamford, Conn., has appointed I. D. Gloss sales manager, to succeed the late Mr. Porter, with offices at 120 Liberty Street, New York.

Kennicott Company, Chicago Heights, Ill., has leased one-half of the fourteenth floor of the Corn Exchange Bank Building, Chicago, Ill., to be used exclusively by its sales office.

L. H. Baekeland, Yonkers, N. Y., has been awarded the John Scott Legacy Premium and Medal by the City of Philadelphia, on the recommendation of the Franklin Institute, for his invention of Bakelite, a compound with high insulating properties.

W. J. McBride, vice-president and general manager of the Haskell & Baker Car Company, Michigan City, Ind., has been elected president, succeeding the late J. H. Barker. Charles Porter, secretary of the company, has been elected treasurer, and Louis Boisot, secretary.

National Brake & Electric Company, Milwaukee, Wis., announces that Robert Long has been appointed manager of its New York office, succeeding S. F. Weston, resigned. Mr. Long has been associated with the company for several years and has just returned from South America, where he has had charge of the company's business there for the past few years.

W. A. Sharp, who has been actively connected with engineering interests in Chicago, Ill., for the past 20 years, has opened an office in the Boston Block, Minneapolis, Minn., where he will handle, in connection with other interests, the Northwestern business of the Murphy Iron Works, Detroit, Mich., having charge in that territory of the sale and installation of the Murphy automatic furnace.

Murphy Iron Works, Detroit, Mich., report that the year 1910 has shown the largest volume of business done by the company since its organization 33 years ago, and that the prospects for the coming season are excellent. Among recent orders for Murphy furnace equipment are one from the Boston Elevated Railway and one from the Cincinnati Traction Company.

Dodge, Day & Zimmermann, Philadelphia, Pa., engineers, have added to their organization Walter Loring Webb and James M. Kennedy. Both gentlemen are well known in the engineering world. Mr. Webb is the author of several engineering textbooks, including "The American Civil Engineer's Pocket Book," "Economics of Railroad Construction" and "Problems in the Use and Adjustment of Engineering Instruments."

Hill-Evans Rail Chair & Coupling Company, Belfast, Me., has been incorporated, with a capitalization of $50,000. The company proposes to manufacture railroad supplies and appurtenances, especially the Hill-Evans coupling and joint, patented May 17, 1910, and owned by Jesse C. Evans, Palmer G. Hill, Shelton M. White and William J. Alexander, of Lumberton, N. C. The directors are Austin W. Keating (president), Ralph O'Connell (treasurer) and Maurice W. Lord, all of Belfast.

ADVERTISING LITERATURE

J. Faessler Manufacturing Company, Moberly, Mo., has issued catalog No. 27, describing Faessler boilermakers' tools.

C. F. Pease Company, Chicago, Ill., has recently issued a 100-page illustrated catalog on blueprint machinery and drafting-room supplies.

Dossert & Company, New York, N. Y., have issued a 62-page catalog which illustrates and describes the different types of Dossert solderless connections.

Edison Storage Battery Company, Orange, N. J., has recently issued a complete catalog which describes and illustrates the Edison storage battery.

Ingersoll-Rand Company, New York, N. Y., has printed forms No. 3002 and 4109. Form No. 3002 illustrates and describes Class "A-1," straight-line, steam-driven, single-stage air compressors. No. 4109 describes the different features of the Temple-Ingersoll "electric-air" rock drills.

American Steel & Wire Company, Worcester, Mass., is distributing an illustrated pamphlet describing its "Non-Pay-Reel" wire-stringing device, which eliminates the use of cumbersome reels in stringing wires not larger than No. O B. & S. It consists of a payout reel and a grooved grinding pulley mounted on the end of a swinging arm. This arrangement makes the stringing of wires on poles a very simple process, as it prevents snarls. Should lack of space require it the wire may be drawn over a cross-arm on the pole when the coil is almost directly under the cross-arm. Other advantages of this method are presented in the pamphlet.

The J. G. Brill Company, Philadelphia, Pa., prints in the December issue of the Brill Magazine a biographical sketch of R. P. Stevens, president and general manager of the Lehigh Valley Transit Company. The sketch is accompanied with an excellent portrait of Mr. Stevens as a supplement. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Calcutta, India"; "More Pay-As-You-Enter Cars for Portland, Ore."; "Electrification of Steam Railway System in Northern Italy"; "Pay-As-You-Enter Cars for the Rockford & Interurban Railway"; "Semi-Convertible Cars for San Antonio," and "Equipment for the Missoula Street Railway." The December issue also contains the index for the year from January, 1910, to December, 1910. This index is arranged in the form of a table, in which the names of the companies whose rolling stock has been described are listed alphabetically with the page number under a division of the table which shows the type of rolling stock which is described. Thus it is easy to refer to all the articles which have appeared in the magazine on any particular type of car.

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